NORTHEAST
SITE SOLUTIONS
Turnkey Wireless Development

Northeast Site Solutions
Denise Sabo
4 Angela's Way,
Burlington CT 06013
860-209-4690
denise@northeastsitesolutions.com

December 21, 2018

Members of the Siting Council
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051

RE: Notice of Exempt Modification
142 Baldwin Drive, New Haven CT 06514
Latitude: 41.345440
Longitude: -72.970710
T-Mobile Site#: CT11086B_L700 4x2

Dear Ms. Bachman:

T-Mobile currently maintains nine (9) antennas at the 95-foot level of the existing 120-foot monopole tower at 142 Baldwin Drive, New Haven CT. The 179-foot tower and property are both owned by the State of Connecticut. T-Mobile now intends to replace six (6) of its existing antennas with three (3) new 1900/2100 MHz antenna and three (3) new 600/700 MHz antenna. The new antennas would be installed at the 95-foot level of the tower.

Planned Modifications:

Remove:

Remove and Replace:

(3) LNX6515 Antenna **(Remove)** - (3) APXVAARR24_43U-NA20 Antenna 600/700 MHz **(Replace)**
(3) AIR21B2P B4A **(Remove)** – AIR32 46 B66A **(Replace)**
(3)RRUS11 B12 **(Remove) -** (3) RRU 4449 B12/B71 **(Replace)**

Install New:

(1) Fiber Hybrid Line
(3) RRU 2217 B2

Existing to Remain:

(6) 1-5/8" Coax
(3) TMA
(2) Fiber Hybrid Line
(3)AIR32 B66

Ground:

Install New:

(1) Delta 25KW DC Generator – 220 gallon double walled self-contained tank with fuel sensor.
Requires two (2) 20 minute run cycles annually.

This facility was approved by the CT Siting Council Petition No.69–on June 25, 1981 CT DOT West Rock Tower. Please note the addresses do not match. We used the information from the previous filing. Please see attached.

.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies§ 16- SOj-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.SA. § 16-SOj-73, a copy of this letter is being sent to Mayor Toni Harp, Elected Official and Tom Talbot, Zoning Director for the Town of New Haven, as well as the property owner and the tower owner.

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

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

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

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

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

5. The proposed 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, T-Mobile respectfully submits that the proposed modifications to the above referenced telecommunications facility constitute an exempt modification under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,

Denise Sabo
Mobile: 860-209-4690
Fax: 413-521-0558
Office: 4 Angela's Way Burlington, CT 06013
Email: denise@northeastsitesolutions.com

Attachments
cc: Mayor Toni Harp –New Haven elected official
Tom Talbot –Planning and Zoning
State of CT - as property and tower owner

Exhibit A

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

ARTHUR B. POWERS
COMMISSIONER

May 29, 1981

Ms. Gloria Dibble Pond, Chairperson
State of Connecticut
Department of Business Regulation
Power Facility Evaluation Council
State Office Building, Room 24
165 Capitol Avenue
Hartford, Connecticut 06115

Dear Ms. Dibble Pond:

Enclosed is a Petition for Declaratory Ruling that no Certificate of Environmental Compatibility and Public Need is required for our proposal to install a 6' to 8' microwave parabolic antenna on our existing telecommunications tower located on West Rock Montain in New Haven, and two 6' to 8' microwave dish antennas on the existing telecommunications tower located on Buckley Hill Road in Colchester, which is owned by the Colchester Emergency Communications, Incorporated.

Fifteen copies of the Petition are included along with the $50 filing fee. Should you have any questions or wish additional information, please contact Mr. Thomas F. Kirker, Regional Transit Manager at 566-4904.

Very truly yours,

Arthur B. Powers
Commissioner

Encls. (16)

cc: Mr. John F. Sweeney, Connecticut Transit

Telephone 566-3477
24 Wolcott Hill Road • P.O. Drawer A • Wethersfield, Connecticut 06109
An Equal Opportunity Employer

STATE OF CONNECTICUT

POWER FACILITY EVALUATION COUNCIL

PETITION FOR DECLARATORY RULING

Ms. Gloria Dibble Pond, Chairperson
Power Facility Evaluation Council
State Office Building, Room 24
165 Capitol Avenue
Hartford, Connecticut 06115

Dear Ms. Dibble Pond:

Pursuant to Section 4-176 of the Connecticut General Statutes and Section 16-50j-39 of the Regulations of Connecticut State Agencies, the State Department of Transportation hereby petitions for a Declaratory Ruling that no Certificate of Environmental Compatibility and Public Need is required pursuant to Section 16-50k(a) of the Connecticut General Statutes for our installation of a 6' to 8' microwave parabolic antenna on our existing telecommunications tower located on West Rock Mountain in New Haven, and two 6' to 8' microwave parabolic antennas on the existing telecommunications tower located on Buckley Hill Road in Colchester, which is owned by the Colchester Emergency Communications, Incorporated. Communications and correspondence should be addressed to Mr. Thomas F. Kirker, Regional Transit Manager, Bureau of Public Transportation, at 24 Wolcott Hill Road, Wethersfield, Connecticut 06109, telephone number 566-4904.

I. <u>New Haven - West Rock Tower Antenna Addition</u> (See Attachment A)

It is submitted that no Certificate of Environmental Compatibility and Public Need is required for this project since; (1) the proposed microwave parabolic antenna will be attached to an existing telecommunications tower owned by the Department of Transportation which has been determined to be structurally capable to support the added antenna by its manufacturer, and (2) that the proposed antenna will not have any substantial adverse environmental effect pursuant to Section 16-50k(d). This antenna will be a necessary component of the microwave link route to our Connecticut Transit bus property in New Haven. The link will provide necessary transit communications, operating data and will also be capable of transmitting emergency alarms for the greater New Haven bus system. No alteration and/or clearing to the existing site will be required.

The antennas proposed will be 6' to 8' in diameter. The exact dimension will be determined when bids for the Connecticut Transit Radio System are received and an award made.

The following telecommunications tower inventory is provided as required.

a) Ground Elevation: 450' based on U.S.G.S. datum
b) Tower Height: 120'
c) Latitude: 41°-20'-43"
d) Longitude: 72°-58'-17"
e) U.S.G.S. Quadrangle Map: New Haven Quadrangle N4115
f) 8½" x 11" Map Copy of Tower Location(See Attachment B)
g) Tower Use: Telecommunications
h) Tower Type: Rhon Model SSV Heavy Duty Series with 11N through 6N Sections
i) Strength of Signal: See Item III

II. Colchester - Buckley Hill Tower Antenna Addition (See Attachment A)

It is submitted that no Certificate of Environmental Compatibility and Public Need is required for this project since; (1) the proposed microwave parabolic antennas will be attached to an existing telecommunications tower owned by the Colchester Emergency Communications, Inc.; address, State Police Barracks, Old Hartford Road, P.O. Box 317, Colchester, Connecticut 06415. This tower has been determined to be structurally capable to support the added antennas, and (2) that the proposed antennas will not have any substantial adverse environmental effect pursuant to Section 16-50k(d), (3) that it is in the mutual benefit of all parties concerned that shared use of existing telecommunications towers, where possible, be explored, and (4) that the Colchester Emergency Communications, Inc., through its Board of Directors, has authorized our mutual shared use of the Buckley Hill Tower.

This antennas will be a necessary component of the microwave link routes to our Connecticut Transit Hartford bus property. The link will provide necessary transit communications, operating data and will also be capable of transmitting emergency alarms for the greater Hartford bus system. No alteration and/or clearing to the existing site will be required. The antennas proposed will be 6' to 8' in diameter. The exact dimension will be determined when bids for the Connecticut Transit Radio system are received and an award made.

The following telecommunications tower inventory is provided as required.

a) Ground Elevation: 605'
b) Tower Height: 200'
c) Latitude: 41°-31'-54'
d) Longitude: 72°-21'-26'
e) U.S.G.S. Quadrangle Map: Colchester Quadrangle N4130
f) 8½" x 11" Map Coy of Tower Location: (See Attachment C)
g) Tower Use: Telecommunications
h) Tower Type: Rhon Model SSV Heavy Duty Series with 15N through 7N Sections
i) Strength of Signal: See Item III
j) Owner: Colchester Emergency Communications, Inc.
State Police Barracks
Old Hartford Road
P.O. Box 317
Colchester, Connecticut 06415
Norman Gustafson, President
Tele. No. 537-2512 or 537-5353

III. Signal Strength Data: West Rock and Buckley Hill Telecommunications Tower Antenna Additions.

The following microwave antenna data - strength of signal - are requirements of our radio system specifications and must be adhered to by prospective bidders in order to be qualified for award consideration:

The near field values of power density will be less than the U.S. Bureau of Radiological Health (BRH) density limit of one milliwatt per square centimeter. The power density to be expected at a maximum field point is 0.85 milliwatts per square centimeter obtained at a distance of 16.4 feet for a 6 foot parabolic dish antenna. All far field levels are below the U.S.B.R.H. limit for the antennas and transmitters proposed.

One milliwatt per square centimeter is obtained at a distance of 20'-0" from the horn opening.

One milliwatt per square centimeter is obtained at a distance of 4.5" from the feedhorn.

The actual power densities or distances to be expected, whichever the case may be, will be less than the above calculated values due to transmission line losses.

Considering that antennas will be mounted approximately at the top of the towers, it can be stated that the installation of the proposed microwave system will pose no potential radiation hazzard. The power density limit intended for use in these matters, as noted above, are far less than the OSHA power density limit of 10 milliwatts per square centimeter.

The proposed signal strength stated above indicates that at each location the power density levels will be below the OSHA power density limit requirements. The installation of these microwave antennas are needed to provide a vital method of radio communications between transit properties in Hartford and New Haven and their fleet of buses, respectively in order to lessen maintenance requirements and retrieve transit data. This communication system is also an essential public need in view of the relationship of the passengers (general public) carried to the systems intent and purpose (public conveyance), especially during emergency purposes. The proposed communications system will also be capable of reacting to other major emergency situations; ie., fixed nuclear facililty incidents or crisis relocation through the immediate deployment of buses to emergency evacuation areas.

Analysis has determined that microwave will provide the lowest cost alternate to meet the demands, as described herein, of the Connecticut Transit radio systems proposed for Hartford and New Haven. Its quickness to retrieve information and potential for minimal service problems versus lease lines is a major factor in our selection of system design.

As previously mentioned herein, no clearing or construction is required, and no scenic or historic values will be affected by our proposals. The Department of Transportation therefore submits that no substantial adverse environmental effect will result and that no certificate of environmental compatibility and public need is required in these matters.

IV. Conclusion

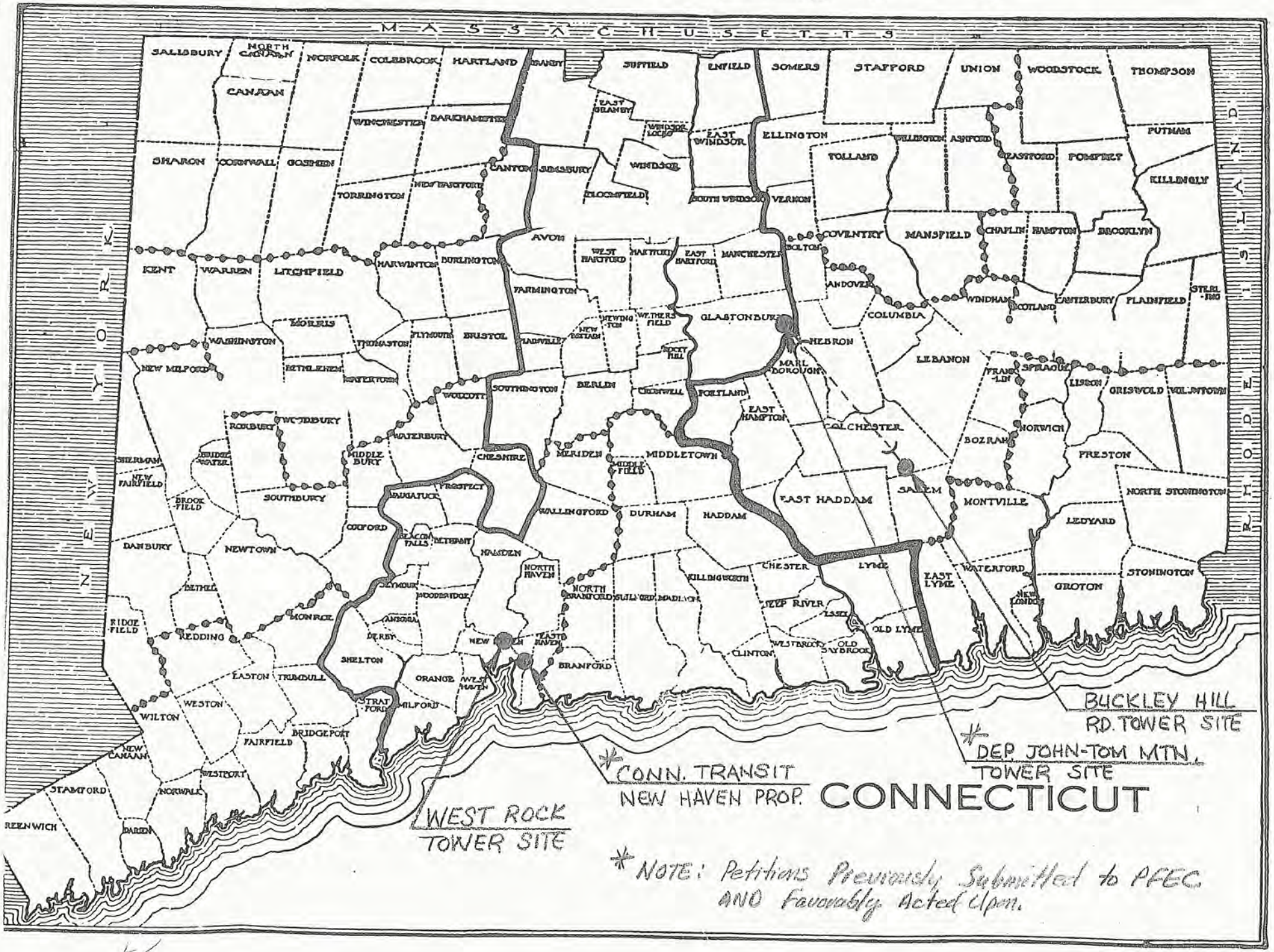
For the above reasons the Connecticut Department of Transportation respectfully requests a declaratory ruling to the effect that no certificate of environmental compatibililty and public need is required for the use of microwave antennas in the Copnnecticut Transit Hartford and New Haven radio systems, specifically at; (1) the New Haven, West Park Telecommunications Tower, and (2) the Colchester, Buckley Hill Telecommunications Tower. Such certificate is not necessary because there will be no substantial adverse environmental impact as a result of either antenna installation.

Respectfully submitted,

Thomas F. Kirker
Regional Transit Manager
Bureau of Public Transportation
Connecticut Department of Transportation

cc: Mr. John F. Sweeney, Connecticut Transit

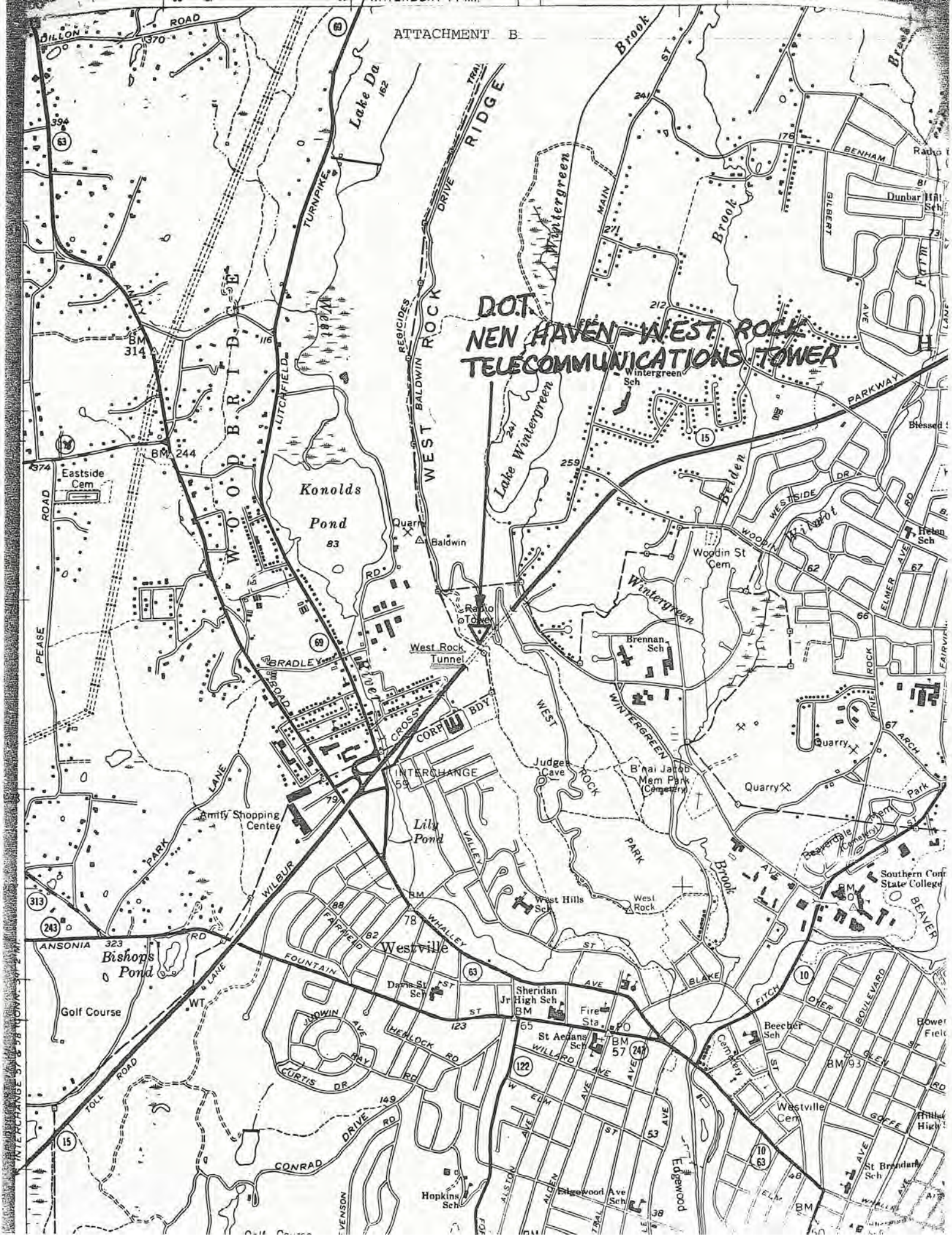
TELECOMMUNICATIONS TOWER AND MICROWAVE ROUTE MAP



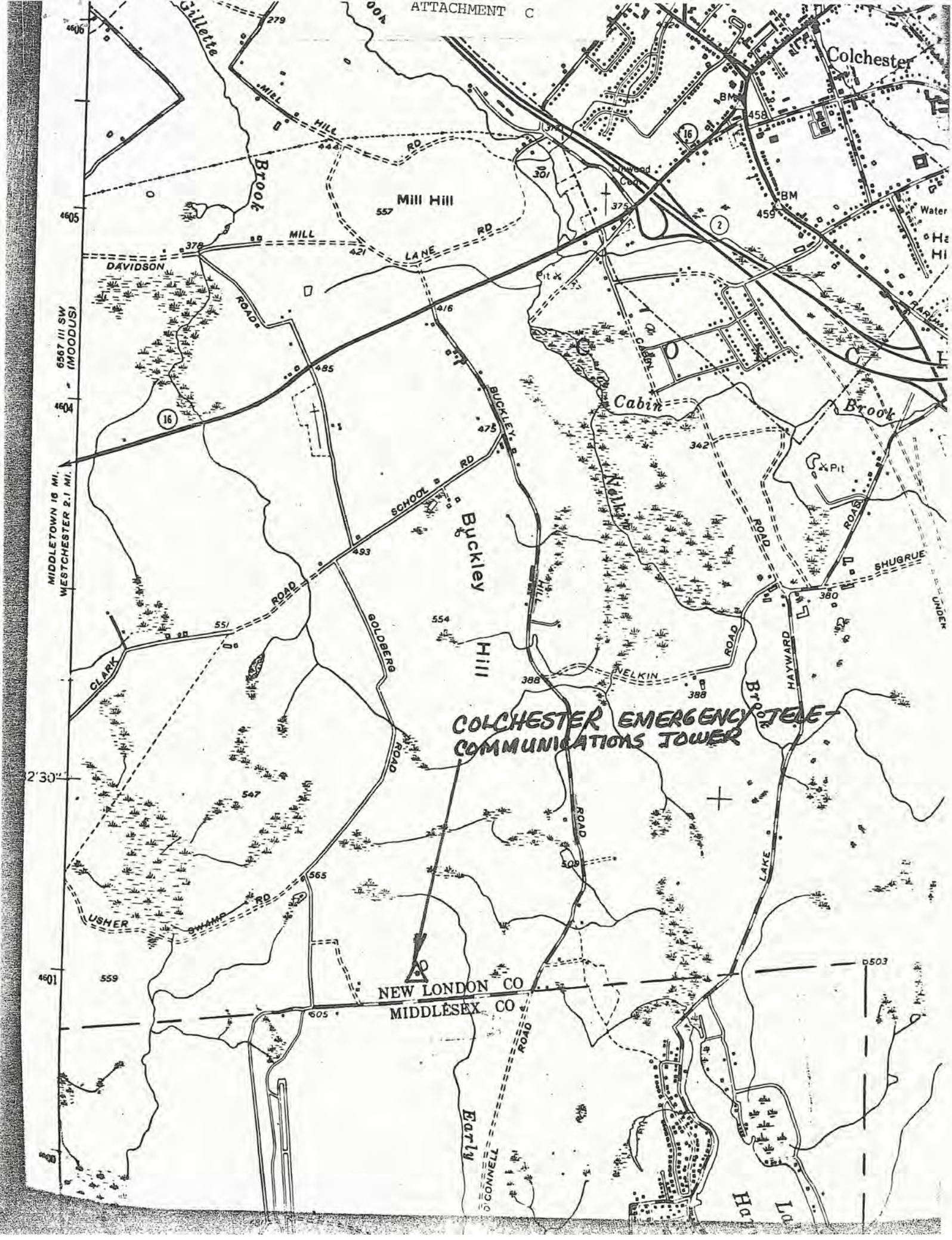
* NOTE: Petitions Previously Submitted to PFEC AND Favorably Acted Upon.

ATTACHMENT A

ATTACHMENT B



ATTACHMENT C



STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

STATE OFFICE BUILDING • HARTFORD, CONNECTICUT 06115

PHONE: 566-5612

July 7, 1981

The Honorable Arthur Powers
Commissioner
Department of Transportation
24 Wolcott Hill Road
Wethersfield, Connecticut 06109

RE: Petition No. 69 - Proposed Construction, West Rock Mountain, New Haven and Buckley Hill Road, Colchester, Connecticut.

Dear Commissioner Powers:

The Connecticut Siting Council at a meeting held on July 3, 1981, ruled that no certificate of environmental compatibility and public need is required pursuant to section 16-50k(a) of the General Statutes of Connecticut for the Department of Transportation for the proposed project which consists of installing a six foot to eight foot microwave parabolic antenna to an existing telecommunication tower located at West Rock, New Haven, and two six foot to eight foot microwave dish antennas on an existing telecommunication tower located on Buckley Hill Road, Colchester. The construction is to be exactly in accordance with your letter of May 29, 1981, any additional construction would not comply with the Council's ruling of July 3, 1981.

This decision applies only to this Petition No. 69 and is not applicable to any other tower facility modification or construction.

Yours very truly,

Gloria Dibble Pond
Chairperson

GDP:RVC:kls

cc: Mr. Thomas F. Kirker
Mr. John F. Sweeney

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

June 14, 1982

Ms. Gloria Dibble Pond
Chairperson
Connecticut Siting Council
1 Central Park Plaza
New Britain, CT 06051

Dear Ms. Dibble Pond:

Attached please find a check drawn on the account of Connecticut Transit for $50.00 to cover the fee assessed on Petition No. 69 - Proposed Construction, West Rock Mountain, New Haven and Buckley Hill Road, Colchester, Connecticut.

Very truly yours,

John J. Spaulding
Director of Operations
Bureau of Public Transportation

Attachment

cc: Mr. John F. Sweeney, Connecticut Transit

RECEIVED
JUN 21 1982
CONNECTICUT
SITING COUNCIL

566-4680
Phone

24 Wolcott Hill Road, P.O. Drawer A Wethersfield, Connecticut 06109-0801

An Equal Opportunity Employer

STATE OF CONNECTICUT

POWER FACILITY EVALUATION COUNCIL

Petition No. 69
Colchester and New Haven
June 25, 1981

Mr. Clark, Mr. Clapp, and Duncan Reid met Mr. Kirker, Regional Transit Manager for the Bureau of Public Transportation, for a field review of Petition No. 69.

This petition involves the addition of two microwave antennas to an existing telecommunication tower in Colchester and one microwave antenna to an existing telecommunication tower in New Haven.

Two towers exist at the Colchester site, a 200 foot tall self supporting structure, and a guyed tower approximately 100 feet tall. Both towers are owned by Colchester Emergency Communications, Inc., a private company not regulated under PUESA. The Department of Transportation plans to attach two 6 foot or 8 foot microwave dishes on the self-supporting tower which is structurally capable of supporting these two additions. The antennas will be mounted at approximately the 150 foot and 200 foot levels. There is a possibility that a short extention on the top of the tower may be required to obtain an unobstructed beam path. This will be clarified by the contractor after the bid for this work is awarded. Mr. Kirker is aware that another approval will be necessary if the tower must be extended. The proposed dishes will send and receive signals to existing facilities on John Tom Hill in Glastonbury and the State Police tower in Ledyard.

The Colchester tower is on the edge of an open field on Buckley Hill Road. It is a rural, sparcely populated area. There is one house directly across the street from the site.

The Department of Transportation owns and operates a 120 foot tall telecommunication tower on West Rock in New Haven. This self-supporting structure presently supports two microwave antennas, several stick antennas, and two unused reflector antennas. The Department of Transportation plans to remove the two unused reflector antennas, replace one stick antenna, add one 6 foot or 8 foot microwave dish to the tower, and construct a concrete equipment enclosure at the base of the tower. The existing equipment enclosure is not large enough to accommodate the new equipment. The new microwave dish will send signals to and receive signals from the Connecticut Transit property on James Street in New Haven.

The New Haven site is on state property within West Rock Park which is no longer open to the public. It is a wooded area near the top of West Rock Ridge. The ridge is a prominent feature in the New Haven area, and the tower

Phone 566-5612
State Office Building — Hartford, Connecticut 06115

is visible from many somewhat distant locations. There are two other towers near the Department of Transportation tower on the ridge top, one operated by the F.B.I., and one operated by the Message Center.

Duncan D. Reid
Environmentalist
June 26, 1981

DCR:kp

STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

136 Main Street, Suite 401
New Britain, Connecticut 06051
Phone: 827-7682

January 8, 1992

Mr. James F. Byrnes, Jr.
Deputy Commissioner
Department of Transportation
24 Wolcott Hill Road
P.O. Drawer A
Wethersfield, Connecticut 06109-0801

RE: State of Connecticut Department of Transportation notice of intent to modify an existing telecommunications tower and associated equipment located on West Rock Ridge in New Haven, Connecticut.

Dear Mr. Byrnes:

At a meeting on January 6, 1992, the Connecticut Siting Council (Council) acknowledged a notice of an exempt modification at an existing DOT telecommunications tower in New Haven, Connecticut, pursuant to Section 16-50j-73 of the Regulations of State Agencies (RSA).

The proposed modification is to be implemented as specified in your notice dated December 3, 1991. The modification is in compliance with the exception criteria in RSA section 16-50j-72 as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase radio frequency electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to Section 22a-162 of the Connecticut General Statutes.

The Council is pleased to note that the shared use of the existing tower meets the Council's long term goal and public interest to avoid construction of additional tower structures.

Please notify the Council when all work is complete.

Very truly yours,

Mortimer A. Gelston

Mortimer A. Gelston
Chairman

MAG/FC
5761E

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

24 WOLCOTT HILL ROAD, P.O. DRAWER A
WETHERSFIELD, CONNECTICUT 06109-0801

Phone:

December 3, 1991

Mr. Mortimer Gelston, Chairman
Connecticut Siting Council
136 Main Street, Suite 401
New Britain, CT 06051

Dear Mr. Gelston:

We are pleased to submit this Notice of Intent to Erect Exempt Telecommunications Associate Equipment regarding the installation of a microwave dish on an existing telecommunications tower on West Rock Ridge in New Haven, Connecticut.

Pursuant to Connecticut General Statute 16-50g, Section 16-50j-72(b), we are of the opinion that this Department is exempt from the need to obtain a Certificate of Environmental Compatibility and Public Need with regard to this request. Thus no fee is required.

I trust that we have addressed all requirements concerning the enclosed application. However, if you or your staff have any questions in this matter, please contact Mr. Thomas F. Kirker, Transit Manager, at 667-7324.

Very truly yours,

Edward Dwyer
for James F. Byrnes, Jr.
Deputy Commissioner
Bureau of Public Transportation

Enclosure

cc: Ralph Dandrea, Communication Consultant
Robert Lorah, General Manager, Connecticut Transit
Captain Ronald Mikulka, Department of Public Safety

STATE OF CONNECTICUT

SITING COUNCIL

NOTICE OF INTENT TO ERECT EXEMPT
TELECOMMUNICATIONS ASSOCIATED EQUIPMENT

Pursuant to Connecticut General Statue 16-50g et. seq. and Section 16-50j-73 of The Regulations of The Connecticut Siting Council, the State of Connecticut Department of Transportation hereby gives notice of its intent to place exempt telecommunications associated equipment at the West Rock Ridge site located in the city of New Haven, Connecticut.

The site is currently occupied by an existing, active, 120 foot, 3 legged self supporting telecommunications tower. The Division of State Police have applied and have been given approval by the Siting Council to replace the existing tower with a sturdier but similar 120 foot, 3 legged, self supporting tower within the same approximate area as depicted in Site Plan Drawing 027-200 attached in Attachment A. Your signed letter of October 10, 1989 signed by Gloria Dibble Pond, Chairperson, Connecticut Siting Council acknowledged the Division of State Police's notice of attempt to modify West Rock Ridge.

The State Department of Transportation proposes to add a solid 4 foot 18GHz dish at the 100 foot level on the telecommunication tower as shown in the site elevation drawing 027-510, legend # 17 which is included as Attachment B. This project is part of a

Department of Transportation effort to upgrade the New Haven Bus Radio System for improved reliability and communication.

The State Department of Transportation believes that this project is exempt from the need to obtain a Certificate of Environmental Compatibility and Public Need pursuant to Siting Council Reg. Sec. 16-50j-72(b) for the following reasons:

1.Existing tower site.

The proposed location will be occupied by a Siting Council approved one hundred and twenty foot, three legged, self supporting type telecommunication tower and equipment shelter installed by the Division of State Police.

2. Site Boundries.

As depicted in Attachment A, the property boundaries at the site will not be extended. No tree cutting or grading will be conducted at the site of this project.

3. Tower Height.

The 120 foot, three legged, self supporting type telecommunication tower will be retained and the height will not change. No alteration will be made to the tower other than the addition of the necessary brackets to hold the proposed microwave antenna dish.

4. Noise Level.

The proposed addition of the microwave antenna dish will not increase the noise level at the existing facility by six decibels or more.

5. Radiation Power Density.

The radio frequency sending or receiving capability of the facility will not increase the total radio frequency electromagnetic radiation power density measured at the tower site boundary to or above the standard considered by the State Department of Environmental Protection(DEP).

Although the State DEP is in the process of promulgating standards, it is authorized to adopt the standards recommended by the American National Standards Institute (ANSI). The current ANSI Standard applicable to the proposed Division of State Police facility and the total radio frequency electromagnetic radiation power density calculated for the proposed tower site boundary with the additional microwave antenna dish are set forth in attachment D.

CONCLUSION

For all the above stated reasons, The Department of Transportation requests the Siting Council to rule that this

notice is in compliance with the exception criteria for changes to an existing facility pursuant to Reg. Sec. 16-50j-72(b).

Dated at Wethersfield, CT, this 29th day of November, 1991.

by: Thomas F. Kirker

Thomas F. Kirker
Transit Manager
Connecticut Department of Transportation
24 Welcott Hill Rd.
P. O. Drawer A
Wethersfield, Connecticut 06109-0801
Tel. (203) 667-7324

ATTACHMENTS

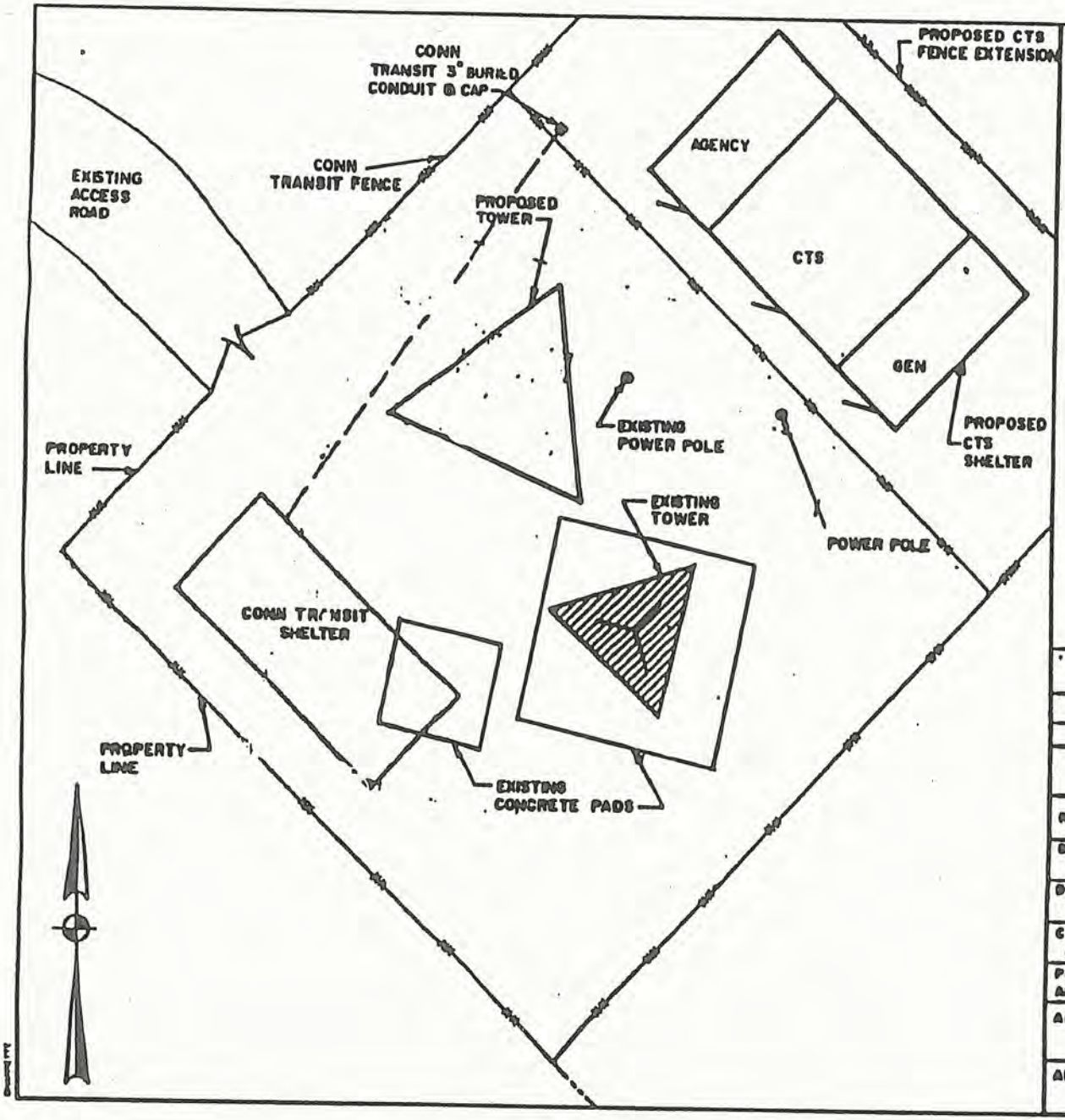
A. 027-200 REV.4: SITE PLAN - WEST ROCK RIDGE.

B. 027-510 REV.2: SITE ELEVATION - WEST ROCK RIDGE.

C. RADIO ANTENNA SYSTEMS DATA.

D. POWER DENSITY ANALYSIS(3 pages)

ATTACHMENT A



NOTES:

1. ARROW INDICATES TRUE NORTH
2. ALL DIMENSIONS IN FEET
3. UNDER A CURRENT CONTRACT WITH CONNECTICUT TRANSIT, THE FOLLOWING WILL BE DONE BY EARLY 1990.
   - REMOVE EXISTING FENCE
   - BUILD NEW SHELTER
   - REMOVE EXISTING DOT SHELTER
   - BUILD NEW FENCE TO LIMITS SHOWN.
   - MOVE EXISTING POWER POLE TO THE SOUTHEAST.
   - INSTALL NEW BURIED CONDUIT
4. WHEN A STRUCTURE IS TO BE DISMANTLED AND REMOVED, THE WORKS SHALL INCLUDE THE REMOVAL OF ANY AND ALL FOUNDATIONS, GUYS, GUY ANCHORS, GUARDRAIL POSTS, AND FUEL TANKS ASSOCIATED WITH THE STRUCTURE.

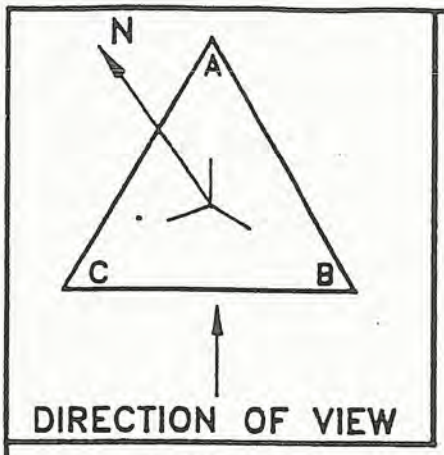
LEGEND

STRUCTURES TO BE DISMANTLED AND REMOVED FROM THE SITE.

REV.	DESCRIPTION	DATE	APP.
4	REVISED TO REFLECT CONN TRANSIT AGREEMENT - MARCH 1990		
3	RELOCATED PROPOSED TOWER. CHANGED PATH NO. 3		
2	ADDED BAR SCALE		
1	RELOCATED CTS SHELTER. ADDED PROPOSED TOWER, NEW DOT SHELTER, AND NEW FENCE.		

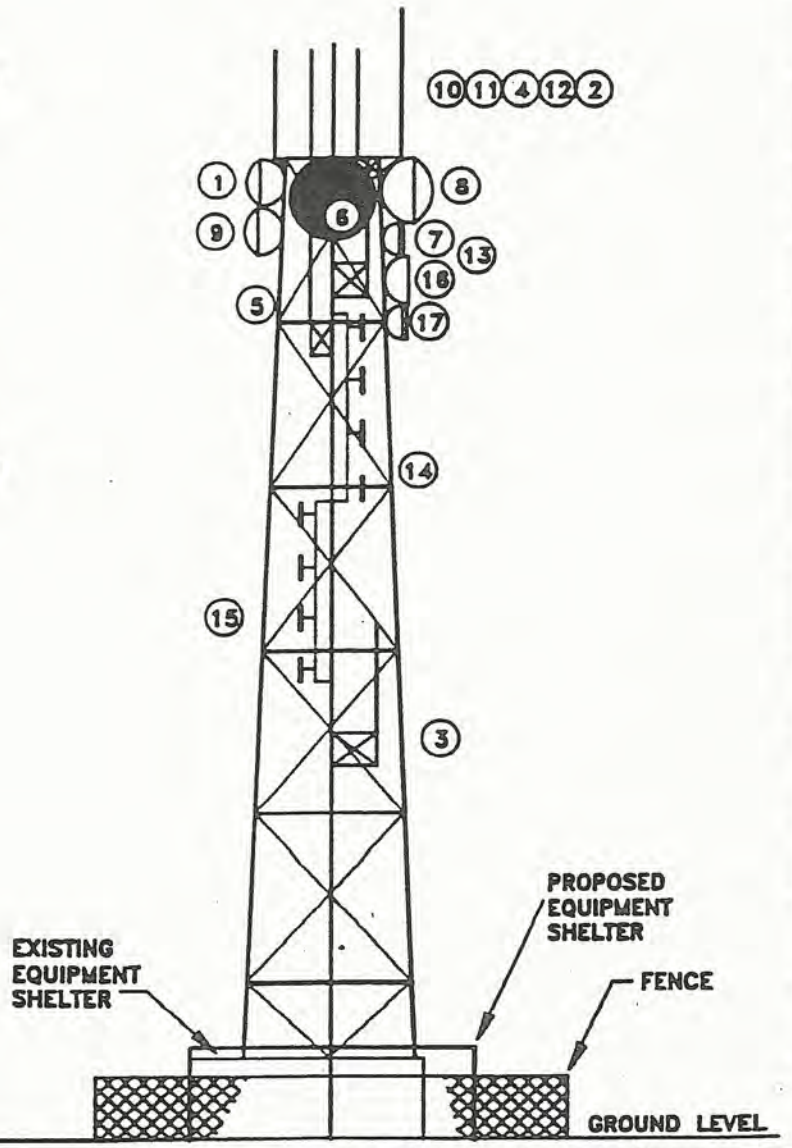
DRAWN WLF	DATE 9/20/89	T-CAS CORP.
DESIGNED DDS	DATE 9/20/89	SITE WEST ROCK RIDGE
CHECKED ENW	DATE 9/20/89	TITLE SITE PLAN
PROJECT APPROVED	DATE 10/4/89	
APPROVED FOR		SIZE B · PROJECT CTS · DRAWING NUMBER 027-200 · REV. 4
APPROVED FOR		SCALE 0 FEET 50 · SHEET 1 OF 1

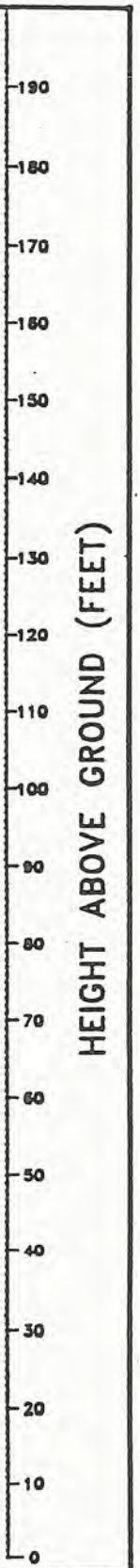
ATTACHMENT B



LEGEND

(1) (16) 6° DISH (DOT)
(2) 18° WHIP ON PIPE MOUNT (DOT)
(3) 13° WHIP (DOT)
(4) (5) 14° WHIP (CTT)
(6) 10° DISH W/RADOME (CSP)
(7) 4° DISH W/SHROUD (CSP)
(8) 8° DISH W/RADOME (CSP)
(9) 6° DISH W/RADOME (CSP)
(10) (11) (12) (13) 13° WHIP (CSP)
(14) (15) 22° 4-DIPOLE ARRAY (USS)
(17) 4° DISH W/SHROUD (CTT)





TITLE				SITE					
SITE ELEVATION				WEST ROCK RIDGE				T-CAS CORP	REV. 2
DESIGNED		DRAWN		CHECKED		REVISED		DRAWING NO.	
JCM	2/28/90	WLF	2/21/90	EHW	3/5/90	JCM	7/2/91	027-510	

ATTACHMENT B

T-CAS CORP
June 12, 1991

USER ABBREVIATIONS

USED ON SITE ELEVATIONS DRAWINGS AND ANTENNA LISTS

ATF = Bureau of Alcohol, Tobacco, and Firearms (p/o U.S. Treasury Department)
ATT = AT&T Communications, Inc.
CAP = Connecticut Wing Civil Air Patrol (Auxiliary of the U.S. Air Force)
CEC = Colchester Emergency Communications, Inc.
CMD = C-Med New Haven
CNG = Connecticut National Guard (p/o State Department of Public Safety)
CRC = Capitol Region Chiefs of Police Assn, Inc.
CSP = Connecticut State Police (p/o State Department of Public Safety)
CTT = Connecticut Transit (p/o Department of Transportation)
DEP = State Dept of Environmental Protection
DFD = Town of Danielson Fire Department
DHS = State Department of Health Services
DMV = State Department of Motor Vehicles
DOE = State Dept of Education
DOT = State Dept of Transportation
DPW = State Dept of Public Works
FBI = United States Federal Bureau of Investigation
FCP = Fairfield County Chiefs of Police, Assn., Inc.
GPD = Glastonbury Police Department
HAM = Connecticut Amateur Radio Emergency Services
HBC = Hutterian Brethren in Connecticut, Inc.
LCD = Litchfield County Dispatch, Inc.
MFD = Town of Middlefield Fire Dept
MFP = Town of Middlefield Police Dept
MMC = Metro Mobile CTS, Inc.
MPT = Municipal Police Training Council
NEC = Nuclear Emergency Communications System (Administered by DEP)
NEU = Northeast Utilities
NWS = National Weather Service (p/o U.S. Department of Commerce)
OEM = Office of Emergency Management (p/o State Department of Public Safety)
QVC = Quinebaug Valley Emergency Communications, Inc.
SHF = County Sheriff's Agency
SNT = SNET Cellular, Inc.
SSC = Town of Stafford Springs Constabulary
STS = Southbury Training School (p/o State Department of Mental Retardation)
STV = Storer Communications of Clinton, Inc.
TCM = Tolland County Mutual Aid Fire Service, Inc.
TOG = TOWN of Greenwich
TOH = Town of Haddam
USS = Secret Service (p/o U. S. Treasury Department)
VSC = Valley Shore Communications, Inc.
WTR = Water Resources (p/o DEP)

ATTACHMENT C

RADIO/ANTENNA SYSTEMS DATA

SITE NAME: WEST ROCK RIDGE PREPARED BY: T-CAS Corp
TOWER HEIGHT: 120 FEET ON DATE: 07-02-1991

OPERATING FREQUENCY (MHz)	TRANSMIT POWER (WATTS)	ANTENNA HEIGHT (FEET)	ANTENNA TYPE	ANTENNA VERTICAL SIZE (FT)	ANTENNA GAIN (dB)	ERP (W)
2180.800	3	117	SOLID DISH	6	29.9	1777
47.300	100	120	WHIP ON PIPE MOUNT	18	0.0	100
453.175	25	50	WHIP	13	7.5	141
453.725	75	120	WHIP	14	8.0	473
452.750	2 x 75	100	WHIP	14	8.0	946
1920.000	1	115	SOLID DISH W/RADOME	10	33.2	1275
18700.000	1	110	SOLID DISH W/SHROUD	4	45.0	19355
6700.000	1	116	SOLID DISH W/RADOME	8	42.1	9939
6700.000	1	111	SOLID DISH W/RADOME	6	39.6	5591
867.500	5 x 16	120	WHIP WITH REFLECTOR	13	11.0	1000
867.500	5 x 16	120	WHIP WITH REFLECTOR	13	11.0	1000
822.500	0	120	WHIP WITH REFLECTOR	13	11.0	0
822.500	0	107	WHIP WITH REFLECTOR	13	11.0	0
165.688	100	78	FOUR DIPOLE ARRAY	22	6.0	398
165.375	100	56	FOUR DIPOLE ARRAY	22	6.0	398
2191.200	3	105	SOLID DISH W/RADOME	6	29.9	1794
18700.000	1	100	SOLID DISH W/SHROUD	4	45.0	19355

TES: 1. TRANSMIT POWER ENTRIES SHOWN AS `5 x 25´ SHOULD BE INTERPRETED AS `5 TRANSMITTERS, EACH HAVING A POWER OF 25 WATTS´.
ENTRIES OF `0´ MEAN `RECEIVE ONLY´- i.e. NO TRANSMITTER.
ALL OTHER ENTRIES REFER TO ONE TRANSMITTER WITH THE POWER SHOWN.

2. ERP (EFFECTIVE RADIATED POWER) IS THE PRODUCT OF ALL TRANSMITTER POWERS AND THE NUMERICAL VALUE OF THE GAIN (ANTILOG OF dB) RELATIVE TO A DIPOLE ANTENNA.

ATTACHMENT D

POWER DENSITY ANALYSIS

AT THE TOWER BASE, FOR EACH RADIO/ANTENNA SYSTEM

SITE NAME: WEST ROCK RIDGE
TOWER HEIGHT: 120 FEET

PREPARED BY: T-CAS Corp
ON DATE: 07-02-1991

o	OPERATING FREQUENCY (MHz)	EIRP (WATTS)	DISTANCE TO BASE OF TOWER (FEET)	LIMIT OF SAFE EXPOSURE (MW/SQ-CM)	AT THE BASE OF THE TOWER: POWER DENSITY (MW/SQ-CM)	AT THE BASE OF THE TOWER: PERCENT OF SAFE LIMIT
1	2180.800	2915	117	5.000	0.0000244	0.0005
2	47.300	164	129	1.000	0.0003376	0.0338
3	453.175	231	57	1.511	0.0024743	0.1638
4	453.725	776	127	1.512	0.0016484	0.1090
5	452.750	1553	107	1.509	0.0046445	0.3078
6	1920.000	2092	115	5.000	0.0001279	0.0026
7	18700.000	31754	110	5.000	0.0013023	0.0260
8	6700.000	16305	116	5.000	0.0004425	0.0088
9	6700.000	9172	111	5.000	0.0004624	0.0092
0	867.500	1641	127	2.892	0.0035110	0.1214
1	867.500	1641	127	2.892	0.0035110	0.1214
2	822.500	0	127	2.742	0.0000000	0.0000
3	822.500	0	114	2.742	0.0000000	0.0000
4	165.688	653	89	1.000	0.0028238	0.2824
5	165.375	653	67	1.000	0.0049827	0.4983
6	2191.200	2943	105	5.000	0.0000304	0.0006
7	18700.000	31754	100	5.000	0.0014325	0.0287

TOTAL PERCENT OF SAFE LIMIT FOR ALL 17 RADIO SYSTEMS = 1.7142

TES:
1. THE `LIMITS OF SAFE EXPOSURE´ ARE CALCULATED IN ACCORDANCE WITH THE SAFETY LEVELS DEFINED IN ANSI STANDARD C95.1-1982, WHICH WAS ADOPTED BY THE CONNECTICUT LEGISLATURE INTO THE CONNECTICUT GENERAL STATUTES, SECTION 22a-162, IN 1984.
2. POWER DENSITIES ARE CALCULATED IN ACCORDANCE WITH THE METHODS DEFINED IN FCC DOCUMENT `OST BULLETIN NO. 65´, OCTOBER 1985.
3. EIRP (EFFECTIVE ISOTROPICALLY RADIATED POWER) REFERENCES THE RADIATED POWER TO A POINT SOURCE, WHICH YIELDS POWERS 1.6406 TIMES HIGHER THAN ERP (SEE TABLE IN SECTION 13-F).

ATTACHMENT D

POWER DENSITY ANALYSIS

POWER DENSITY (% OF SAFE LIMIT) vs DISTANCE FROM THE TOWER BASE

SITE NAME:	WEST ROCK RIDGE	PREPARED BY:	T-CAS Corp
TOWER HEIGHT:	120 FEET	ON DATE:	07-02-1991

DISTANCE (FEET)	POWER DENSITY (% OF SAFE LIMIT)
0	1.7142
100	0.8270
200	0.3551
300	0.2844
400	0.2390
500	0.1854
600	0.1523
700	0.1316
800	0.1141
900	0.0988
1000	0.0856
1100	0.0746
1200	0.0653
1300	0.0579
1400	0.0525
1500	0.0478
1600	0.0436
1700	0.0400
1800	0.0367
1900	0.0339
2000	0.0313
2100	0.0290
2200	0.0269
2300	0.0251
2400	0.0234
2500	0.0219

ATTACHMENT D

STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

136 Main Street, Suite 401
New Britain, Connecticut 06051
Phone: 827-7682

January 8, 1992

Mr. James F. Byrnes, Jr.
Deputy Commissioner
Department of Transportation
24 Wolcott Hill Road
P.O. Drawer A
Wethersfield, Connecticut 06109-0801

RE: State of Connecticut Department of Transportation notice of intent to modify an existing telecommunications tower and associated equipment located on West Rock Ridge in New Haven, Connecticut.

Dear Mr. Byrnes:

At a meeting on January 6, 1992, the Connecticut Siting Council (Council) acknowledged a notice of an exempt modification at an existing DOT telecommunications tower in New Haven, Connecticut, pursuant to Section 16-50j-73 of the Regulations of State Agencies (RSA).

The proposed modification is to be implemented as specified in your notice dated December 3, 1991. The modification is in compliance with the exception criteria in RSA section 16-50j-72 as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase radio frequency electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to Section 22a-162 of the Connecticut General Statutes.

The Council is pleased to note that the shared use of the existing tower meets the Council's long term goal and public interest to avoid construction of additional tower structures.

Please notify the Council when all work is complete.

Very truly yours,

Mortimer A. Gelston
Chairman

MAG/FC
5761E

Exhibit B

WINTERGREEN AV

Location	WINTERGREEN AV	**Mblu**	368/ 1166/ 00400/ /
Acct#	368 1166 00400	**Owner**	STATE OF CONNECTICUT
Assessment	$26,040	**Appraisal**	$37,200
PID	23555	**Building Count**	1

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2015	$0	$37,200	$37,200
Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2015	$0	$26,040	$26,040

Owner of Record

Owner	STATE OF CONNECTICUT	**Sale Price**	$0
Co-Owner	C/O DEPT OF TRANSPORTATION	**Certificate**	
Address	PO BOX 317546 NEWINGTON, CT 06131-7546	**Book & Page**	3357/ 61
		Sale Date	10/17/1985

Ownership History

Ownership History				
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Sale Date**
STATE OF CONNECTICUT	$0		3357/ 61	10/17/1985

Building Information

Building 1 : Section 1

Year Built:
Living Area: 0
Replacement Cost: $0
Building Percent Good:
Replacement Cost Less Depreciation: $0

Building Photo

Building Attributes	
Field	**Description**
Style	Vacant Land
Model	

Grade:	
Stories:	
Occupancy	
Exterior Wall 1	
Exterior Wall 2	
Roof Structure:	
Roof Cover	
Interior Wall 1	
Interior Wall 2	
Interior Flr 1	
Interior Flr 2	
Heat Fuel	
Heat Type:	
AC Type:	
Total Bedrooms:	
Total Bthrms:	
Total Half Baths:	
Total Xtra Fixtrs:	
Total Rooms:	
Bath Style:	
Kitchen Style:	
Interior Condition	
Fin Bsmnt Area	
Fin Bsmnt Qual	
NBHD Code	

Building Photo

(http://images.vgsi.com/photos/NewHavenCTPhotos//default.jpg

Building Layout

Building Layout

Building Sub-Areas (sq ft)	Legend
No Data for Building Sub-Areas	

Extra Features

Extra Features	Legend
No Data for Extra Features	

Land

Land Use

Use Code	901V
Description	STATE MDL-00
Zone	RM1
Neighborhood	2600
Alt Land Appr	No
Category	

Land Line Valuation

Size (Acres)	0.57
Frontage	0
Depth	0
Assessed Value	$26,040
Appraised Value	$37,200

Outbuildings

Outbuildings	Legend

No Data for Outbuildings

Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2014	$0	$37,200	$37,200
2013	$0	$37,200	$37,200
2012	$0	$37,200	$37,200

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2014	$0	$26,040	$26,040
2013	$0	$26,040	$26,040
2012	$0	$26,040	$26,040

Exhibit C

ANTENNA UPGRADES BY

T-Mobile

T-MOBILE NORTHEAST LLC

PROJECT: L700 4X2 AAS

SITE NUMBER: CT11086B

SITE NAME: NEW HAVEN/WC X59

SITE ADDRESS: 142 BALDWIN DRIVE

NEW HAVEN, CT 06515

(RF CONFIGURATION 67D92M)

PROJECT SCOPE:

UPGRADE OF EXISTING WIRELESS FACILITY AS FOLLOWS:
REPLACE (6) EXISTING ANTENNAS,
REPLACE (6) REMOTE RADIO UNITS (RRU),
ADD (1) 6X12 HYBRID CABLES.

PROJECT NOTES:

1. THIS IS AN UNMANNED TELECOMMUNICATION FACILITY AND NOT FOR HUMAN HABITATION:
   HANDICAPPED ACCESS IS NOT REQUIRED.
   POTABLE WATER OR SANITARY SERVICE IS NOT REQUIRED.
   NO OUTDOOR STORAGE OR ANY
   SOLID WASTE RECEPTACLES REQUIRED.
2. CONTRACTOR SHALL VERIFY ALL PLANS, EXISTING DIMENSIONS, AND CONDITIONS ON THE JOB SITE. CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ARCHITECT/ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK. FAILURE TO NOTIFY THE ARCHITECT/ENGINEER PLACES THE RESPONSIBILITY ON THE CONTRACTOR TO CORRECT THE DISCREPANCIES AT THE CONTRACTOR'S EXPENSE.
3. DEVELOPMENT AND USE OF THE SITE WILL CONFORM TO ALL APPLICABLE CODES, ORDINANCES AND SPECIFICATIONS.
4. REFER TO STRUCTURAL ANALYSIS REPORT ENTITLED "DETAILED STRUCTURAL ANALYSIS AND MODIFICATION OF AN EXISTING 120' SELF SUPPORT LATTICE AND FOUNDATION FOR PROPOSED ANTENNA ARRANGEMENT " SITE ID: CT11086B, DATED AUGUST 28, 2018, PREPARED BY AECOM.

APPLICABLE STATE ADOPTION CODES:

2016 CONNECTICUT STATE BUILDING CODE (CSBC).

ANSI/TIA-222-G-2005 STRUCTURAL STANDARD FOR ANTENNA SUPPORTING STRUCTURES AND ANTENNAS.

2014 NATIONAL ELECTRICAL CODE (NFPA 70) FOR POWER AND GROUNDING REQUIREMENTS.

APPROVALS:

FSA CM	DATE
RF ENGINEER	DATE
FOPS	DATE
T-MOBILE ENGINEERING AND DEVELOPMENT	DATE
	DATE
	DATE

SITE IMAGE:

VICINITY MAP:

PROJECT INFORMATION:

ADDRESS:	142 BALDWIN DRIVE NEW HAVEN, CT 06515
STRUCTURE TYPE:	LATTICE TOWER
COORDINATES:	41.345440 N -72.970710 W

PROJECT TEAM:

APPLICANT:	T-MOBILE NORTHEAST, LLC. 35 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002 860-692-7100
LANDLORD:	CT STATE POICE
PROJECT MANAGER:	NORTHEAST SITE SOLUTIONS 420 MAIN STREET, BLDG 4 STURBRIDGE, MA 01566 SHELDON FREINCLE SHELDON@NORTHEASTSITE SOLUTIONS.COM 201-776-8521
CONSULTANTS:	FORESITE LLC 462 WALNUT ST NEWTON, MA 02460 SAEED MOSSAVAT SMOSSAVAT@FORESITELLC.COM 617-212-3123

SHEET INDEX:

APPLICANT:

T-Mobile

T-MOBILE NORTHEAST LLC

35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
860-692-7100

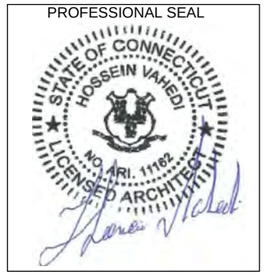
PROJECT MANAGER

NSS NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development
420 MAIN STREET, BLDG 4
STURBRIDGE, MA 01566
203-275-6669

CONSULTANT:

FORESITE LLC
Architects . Engineers . Surveyors
462 WALNUT STREET
NEWTON, MA 02460
617-212-3123

PROFESSIONAL SEAL



REV	DESCRIPTION	DATE
A	PRELIMINARY	08/31/18
0	SIGNED AND SEALED	09/04/18

SITE NUMBER: CT11086B
SITE NAME: NEW HAVEN/WC X59
SITE ADDRESS: 142 BALDWIN DRIVE
NEW HAVEN, CT 06515

SHEET TITLE:

T-1: TITLE SHEET

GENERAL NOTES:

1. THE CONTRACTOR SHALL GIVE ALL NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY, MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS, AND LOCAL AND STATE JURISDICTIONAL CODES BEARING ON THE PERFORMANCE OF THE WORK. THE WORK PERFORMED ON THE PROJECT AND THE MATERIALS INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES.

2. THE ARCHITECT/ENGINEER HAS MADE EVERY EFFORT TO SET FORTH IN THE CONSTRUCTION AND CONTRACT DOCUMENTS THE COMPLETE SCOPE OF WORK. THE CONTRACTOR BIDDING THE JOB IS NEVERTHELESS CAUTIONED THAT MINOR OMISSIONS OR ERRORS IN THE DRAWINGS AND OR SPECIFICATIONS SHALL NOT EXCUSE SAID CONTRACTOR FROM COMPLETING THE PROJECT AND IMPROVEMENTS IN ACCORDANCE WITH THE INTENT OF THESE DOCUMENTS.

3. THE CONTRACTOR OR BIDDER SHALL BEAR THE RESPONSIBILITY OF NOTIFYING (IN WRITING) THE CLIENT'S REPRESENTATIVE OF ANY CONFLICTS, ERRORS, OR OMISSIONS PRIOR TO THE SUBMISSION OF CONTRACTOR'S PROPOSAL OR PERFORMANCE OF WORK.

5. THE CONTRACTOR SHALL VISIT THE JOB SITE PRIOR TO THE SUBMISSION OF BIDS OR PERFORMING WORK TO FAMILIARIZE HIMSELF WITH THE FIELD CONDITIONS AND TO VERIFY THAT THE PROJECT CAN BE CONSTRUCTED IN ACCORDANCE WITH THE CONSTRUCTION DOCUMENTS.

6. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS ACCORDING TO THE MANUFACTURER'S / VENDOR'S SPECIFICATIONS UNLESS NOTED OTHERWISE OR WHERE LOCAL CODES OR ORDINANCES TAKE PRECEDENCE.

7. THE CONTRACTOR SHALL MAKE NECESSARY PROVISIONS TO PROTECT EXISTING IMPROVEMENTS DURING CONSTRUCTION.

8. THE CONTRACTOR SHALL COMPLY WITH ALL PERTINENT SECTIONS OF THE BASIC STATE BUILDING CODE, LATEST EDITION, AND ALL OSHA REQUIREMENTS AS THEY APPLY TO THIS PROJEC

9. THE CONTRACTOR SHALL NOTIFY THE CLIENT'S REPRESENTATIVE IN WRITING WHERE A CONFLICT OCCURS ON ANY OF THE CONTRACT DOCUMENTS. THE CONTRACTOR IS NOT TO ORDER MATERIAL OR CONSTRUCT ANY PORTION OF THE WORK THAT IS IN CONFLICT UNTIL CONFLICT IS RESOLVED BY THE CLIENT'S REPRESENTATIVE.

10. THE WORK SHALL CONFORM TO THE CODES AND STANDARDS OF THE FOLLOWING AGENCIES AS FURTHER CITED HEREIN:

A. ASTM: AMERICAN SOCIETY FOR TESTING AND MATERIALS, AS PUBLISHED IN "COMPILATION OF ASTM STANDARDS BUILDING CODES" OR LATEST EDITION.

B. AWS: AMERICAN WELDING SOCIETY INC. AS PUBLISHED IN "STANDARD D1.1–08, STRUCTURAL WELDING CODE" OR LATEST EDITION.

C. AISC: AMERICAN INSTITUTE FOR STEEL CONSTRUCTION AS PUBLISHED IN "CODE FOR STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES"; "SPECIFICATIONS FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS" (LATEST EDITION).

11. BOLTING:

A. BOLTS SHALL BE CONFORMING TO ASTM A325 HIGH STRENGTH, HOT DIP GALVANIZED WITH ASTM A153 HEAVY HEX TYPE NUTS.

B. BOLTS SHALL BE 3/4"ø MINIMUM (UNLESS OTHERWISE NOTED)

C. ALL CONNECTIONS SHALL BE 2 BOLTS MINIMUM.

12. FABRICATION:

A. FABRICATION OF STEEL SHALL CONFORM TO THE AISC AND AWS STANDARDS AND CODES (LATEST EDITION).

B. ALL STRUCTURAL STEEL SHALL BE HOT–DIP GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 (LATEST EDITION), UNLESS OTHERWISE NOTED.

13. ERECTION OF STEEL:

A. PROVIDE ALL ERECTION EQUIPMENT, BRACING, PLANKING, FIELD BOLTS, NUTS, WASHERS, DRIFT PINS, AND SIMILAR MATERIALS WHICH DO NOT FORM A PART OF THE COMPLETED CONSTRUCTION BUT ARE NECESSARY FOR ITS PROPER ERECTION.

B. ERECT AND ANCHOR ALL STRUCTURAL STEEL IN ACCORDANCE WITH AISC REFERENCE STANDARDS. ALL WORK SHALL BE ACCURATELY SET TO ESTABLISHED LINES AND ELEVATIONS AND RIGIDLY FASTENED IN PLACE WITH SUITABLE ATTACHMENTS TO THE CONSTRUCTION OF THE BUILDING.

C. TEMPORARY BRACING, GUYING AND SUPPORT SHALL BE PROVIDED TO KEEP THE STRUCTURE SAFE AND ALIGNED AT ALL TIMES DURING CONSTRUCTION, AND TO PREVENT DANGER TO PERSONS AND PROPERTY. CHECK ALL TEMPORARY LOADS AND STAY WITHIN SAFE CAPACITY OF ALL BUILDING COMPONENTS.

14. ANTENNA INSTALLATION:

A. INSTALL ANTENNAS AS INDICATED ON DRAWINGS AND CLIENT'S REPRESENTATIVE SPECIFICATIONS.

B. INSTALL GALVANIZED STEEL ANTENNA MOUNTS AS INDICATED ON DRAWINGS.

C. INSTALL COAXIAL / FIBER CABLES AND TERMINATIONS BETWEEN ANTENNAS AND EQUIPMENT PER MANUFACTURER'S RECOMMENDATIONS. WEATHERPROOF ALL CONNECTORS BETWEEN THE ANTENNA AND EQUIPMENT PER MANUFACTURER'S REQUIREMENTS.

15. ANTENNA AND COAXIAL / FIBER CABLE GROUNDING:

A. ALL EXTERIOR #6 GREEN GROUND WIRE "DAISY CHAIN" CONNECTIONS ARE TO BE WEATHER SEALED WITH ANDREWS CONNECTOR/SPLICE WEATHERPROOFING KIT TYPE #221213 OR EQUAL.

B. ALL COAXIAL / FIBER CABLE GROUNDING KITS ARE TO BE INSTALLED ON STRAIGHT RUNS OF COAXIAL / FIBER CABLE (NOT WITHIN BENDS).

16. RELATED WORK, FURNISH THE FOLLOWING WORK AS SPECIFIED UNDER CONSTRUCTION DOCUMENTS, BUT COORDINATE WITH OTHER TRADES PRIOR TO BID:

A. FLASHING OF OPENING INTO OUTSIDE WALLS

B. SEALING AND CAULKING ALL OPENINGS

C. PAINTING

D. CUTTING AND PATCHING

17. REQUIREMENTS OF REGULATORY AGENCIES:

A. FURNISH U.L. LISTED EQUIPMENT WHERE SUCH LABEL IS AVAILABLE. INSTALL IN CONFORMANCE WITH U.L. STANDARDS WHERE APPLICABLE.

B. INSTALL ANTENNA, ANTENNA CABLES, GROUNDING SYSTEM IN ACCORDANCE WITH DRAWINGS AND SPECIFICATION IN EFFECT AT PROJECT LOCATION AND RECOMMENDATIONS OF STATE AND LOCAL BUILDING CODES, AND SPECIAL CODES HAVING JURISDICTION OVER SPECIFIC PORTIONS OF WORK. THIS WORK INCLUDES BUT IS NOT LIMITED TO THE FOLLOWING:

C. TIA–EIA – 222 (LATEST EDITION). STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND ANTENNA SUPPORTING STRUCTURES.

D. FAA – FEDERAL AVIATION ADMINISTRATION ADVISORY CIRCULAR AC 70/7460–IH, OBSTRUCTION MARKING AND LIGHTING.

E. FCC – FEDERAL COMMUNICATIONS COMMISSION RULES AND REGULATIONS FORM 715, OBSTRUCTION MARKING AND LIGHTING SPECIFICATION FOR ANTENNA STRUCTURES AND FORM 715A, HIGH INTENSITY OBSTRUCTION LIGHTING SPECIFICATIONS FOR ANTENNA STRUCTURES.

F. AISC – AMERICAN INSTITUTE OF STEEL CONSTRUCTION SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 BOLTS (LATEST EDITION).

G. NEC – NATIONAL ELECTRICAL CODE – ON TOWER LIGHTING KITS.

H. UL – UNDERWRITER'S LABORATORIES APPROVED ELECTRICAL PRODUCTS.

I. IN ALL CASES, PART 77 OF THE FAA RULES AND PARTS 17 AND 22 OF THE FCC RULES ARE APPLICABLE AND IN THE EVENT OF CONFLICT, SUPERSEDE ANY OTHER STANDARDS OR SPECIFICATIONS.

J. 2009 LIFE SAFETY CODE NFPA – 101.

APPLICANT:
T-Mobile
T-MOBILE NORTHEAST LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
860-692-7100

PROJECT MANAGER
NSS NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development
420 MAIN STREET, BLDG 4
STURBRIDGE, MA 01566
203-275-6669

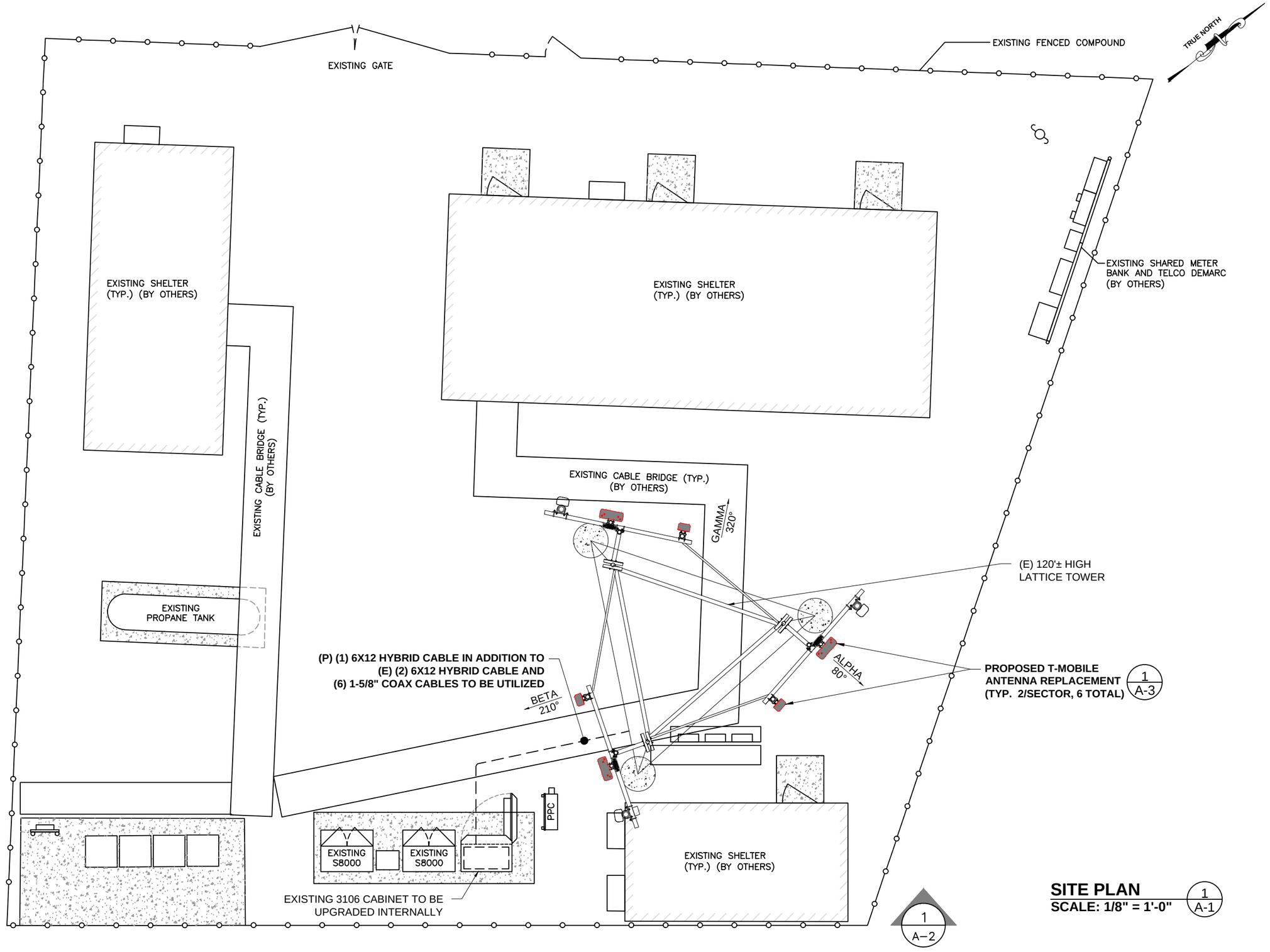
CONSULTANT:
FORESITE LLC
Architects . Engineers . Surveyors
462 WALNUT STREET
NEWTON, MA 02460
617-212-3123

PROFESSIONAL SEAL

REV	DESCRIPTION	DATE
A	PRELIMINARY	08/31/18
0	SIGNED AND SEALED	09/04/18

SITE NUMBER: CT11086B
SITE NAME: NEW HAVEN/WC X59
SITE ADDRESS: 142 BALDWIN DRIVE
NEW HAVEN, CT 06515

SHEET TITLE:
N-1: NOTES AND DISCLAIMERS



SITE PLAN
SCALE: 1/8" = 1'-0"

1
A-1

APPLICANT:
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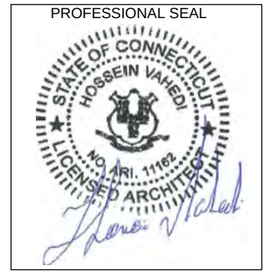
PROFESSIONAL SEAL



REV	DESCRIPTION	DATE
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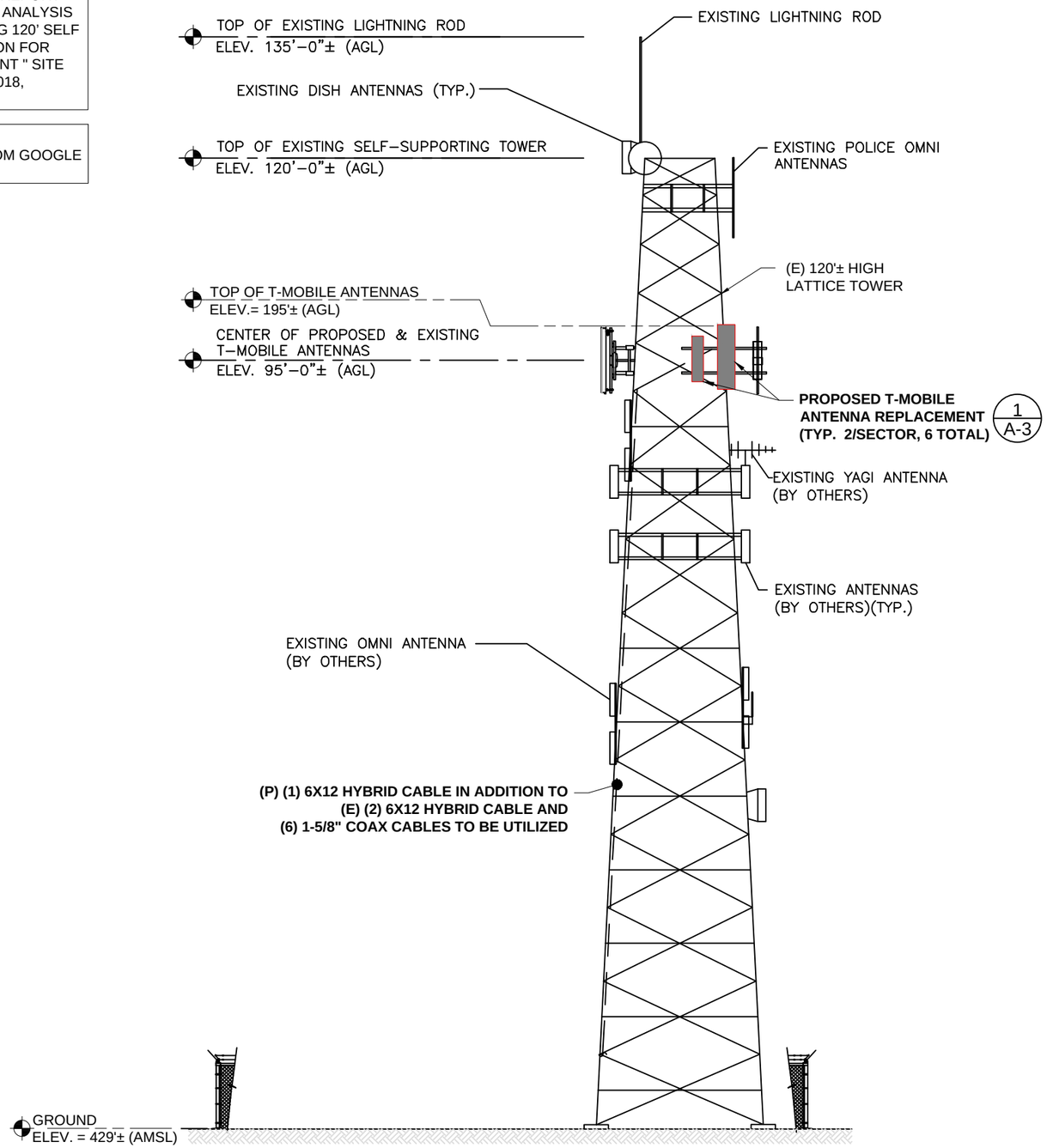
SITE NUMBER: CT11086B
SITE NAME: NEW HAVEN/WC X59
SITE ADDRESS: 142 BALDWIN DRIVE
NEW HAVEN, CT 06515

SHEET TITLE:
A-1: PLAN

STRUCTURAL NOTE:
REFER TO STRUCTURAL ANALYSIS REPORT ENTITLED "DETAILED STRUCTURAL ANALYSIS AND MODIFICATION OF AN EXISTING 120' SELF SUPPORT LATTICE AND FOUNDATION FOR PROPOSED ANTENNA ARRANGEMENT " SITE ID: CT11086B, DATED AUGUST 28, 2018, PREPARED BY AECOM.

ELEVATION NOTE:
AMSL ELEVATIONS ARE TAKEN FROM GOOGLE EARTH AND ARE APPROXIMATE.



ELEVATION
SCALE: 1/16" = 1'-0"

1
A-2

APPLICANT:
T-Mobile
T-MOBILE NORTHEAST LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
860-692-7100

PROJECT MANAGER
NSS NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development
420 MAIN STREET, BLDG 4
STURBRIDGE, MA 01566
203-275-6669

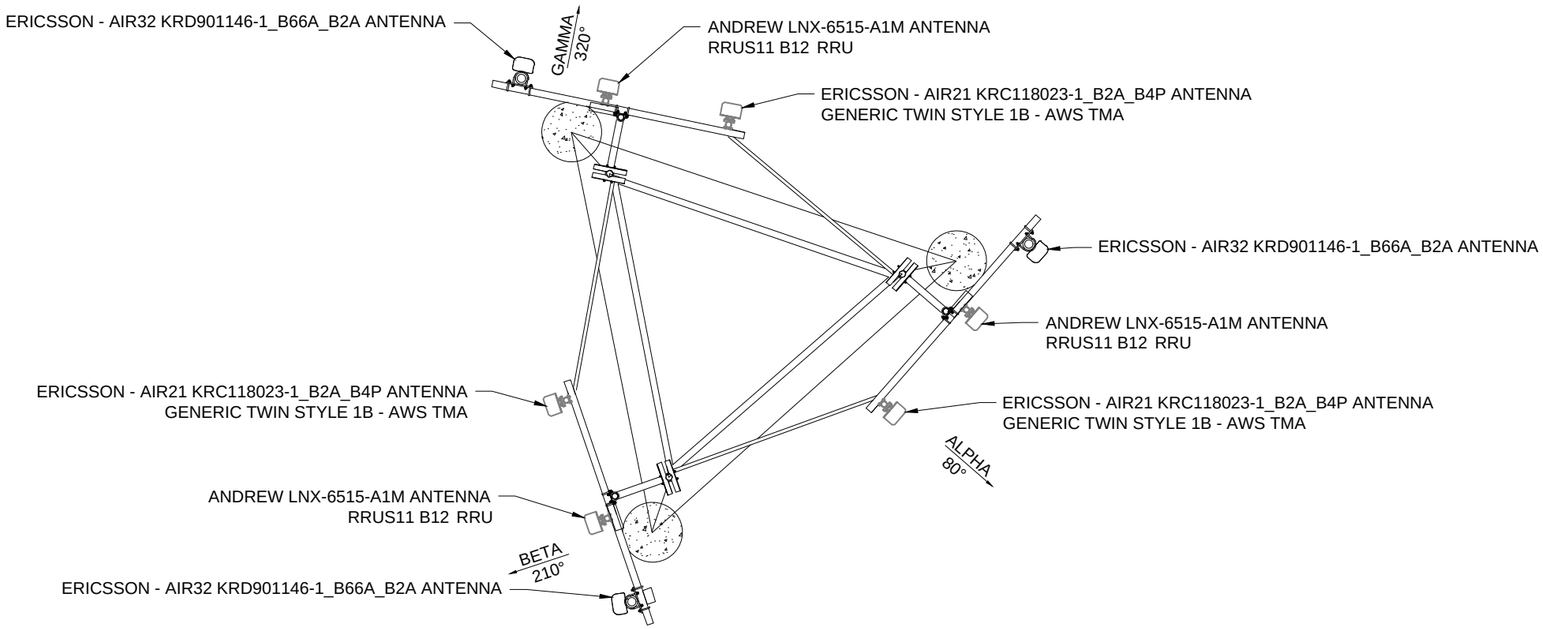
CONSULTANT:
FORESITE LLC
Architects . Engineers . Surveyors
462 WALNUT STREET
NEWTON, MA 02460
617-212-3123

PROFESSIONAL SEAL

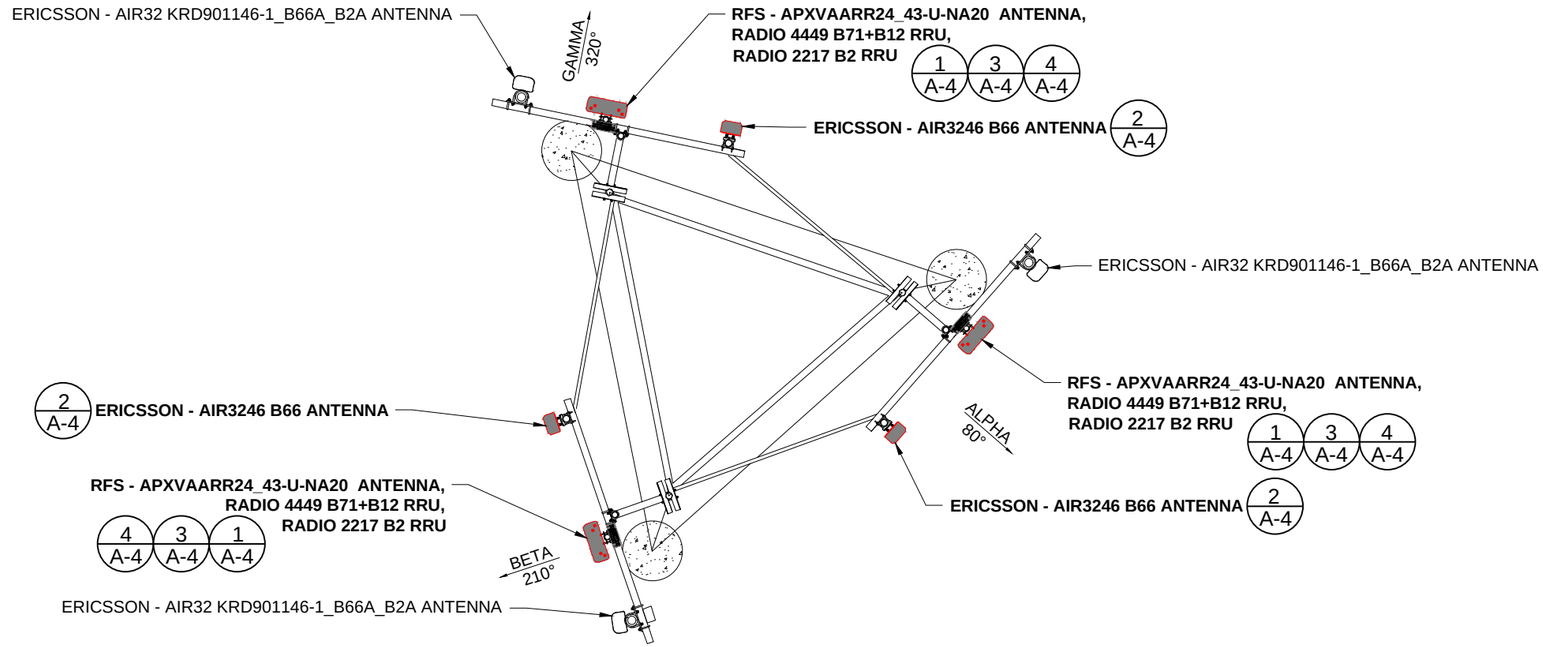
REV	DESCRIPTION	DATE
A	PRELIMINARY	08/31/18
0	SIGNED AND SEALED	09/04/18

SITE NUMBER: CT11086B
SITE NAME: NEW HAVEN/WC X59
SITE ADDRESS: 142 BALDWIN DRIVE
NEW HAVEN, CT 06515

SHEET TITLE:
A-2: ELEVATION



EXISTING ANTENNA PLAN



FINAL ANTENNA PLAN

ANTENNA PLAN

SCALE: NTS (1 / A-3)

APPLICANT:
T-Mobile
T-MOBILE NORTHEAST LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
860-692-7100

PROJECT MANAGER
NSS NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development
420 MAIN STREET, BLDG 4
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203-275-6669

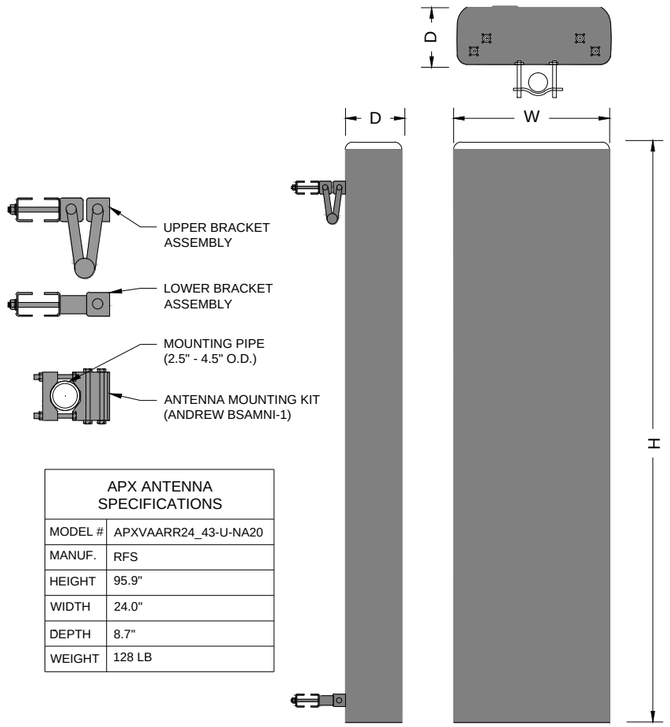
CONSULTANT:
FORESITE LLC
Architects . Engineers . Surveyors
462 WALNUT STREET
NEWTON, MA 02460
617-212-3123

PROFESSIONAL SEAL

REV	DESCRIPTION	DATE
A	PRELIMINARY	08/31/18
0	SIGNED AND SEALED	09/04/18

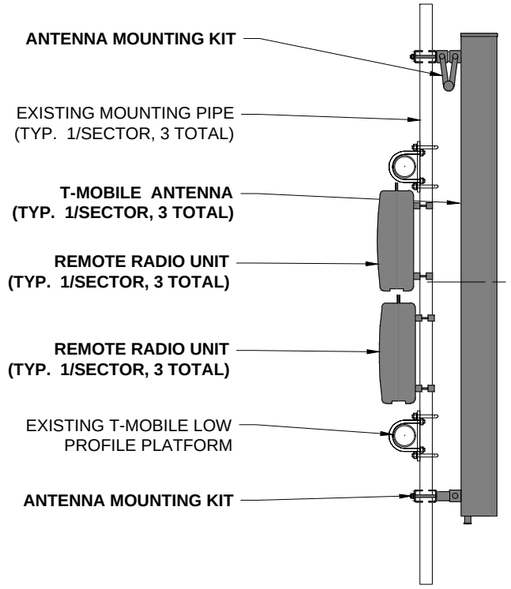
SITE NUMBER: CT11086B
SITE NAME: NEW HAVEN/WC X59
SITE ADDRESS: 142 BALDWIN DRIVE
NEW HAVEN, CT 06515

SHEET TITLE:
A-3: ANTENNA PLAN



APX ANTENNA SPECIFICATIONS	
MODEL #	APXVAARR24_43-U-NA20
MANUF.	RFS
HEIGHT	95.9"
WIDTH	24.0"
DEPTH	8.7"
WEIGHT	128 LB

RFS ANTENNA
N.T.S
1 / A-4



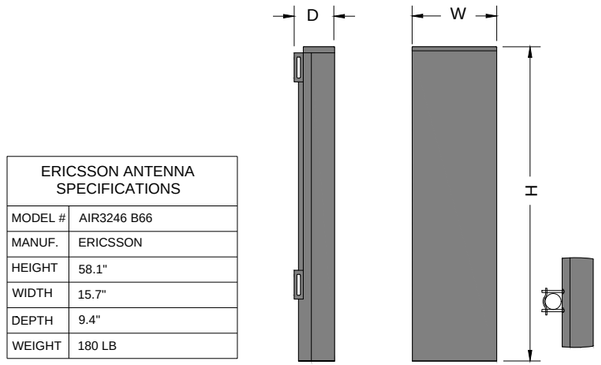
ANTENNA MOUNTING DETAIL
N.T.S
5 / A-4

STRUCTURAL NOTES:

PRIOR TO COMMENCING CONSTRUCTION, GC SHALL REFER TO TOWER STRUCTURAL ANALYSIS REPORT AND MOUNT ASSESSMENT TO DETERMINE IF THERE IS ANY SUPPLEMENTAL OF SPECIAL INSTALLATION REQUIRED FOR TOWER EQUIPMENT AND FOR CABLE BUNDLING, SHIELDING, MOUNTING, OR RELOCATION ARRANGEMENTS.

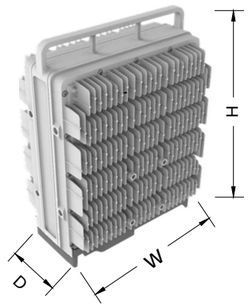
ANTENNA INSTALLATION SPECIAL WORK NOTE:

ANTENNA INSTALLATION WORKING POINT IS THE STRUCTURAL FACE FRAME VERTICAL CENTERLINE OF THE EXISTING ANTENNA SUPPORT ASSEMBLY. UNLESS NOTED OTHERWISE, VERTICALLY CENTERED PROPOSED PIPE MASTS AND ANTENNAS ON THIS WORKING POINT.

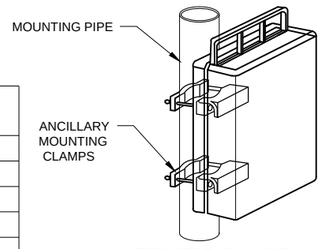


ERICSSON ANTENNA SPECIFICATIONS	
MODEL #	AIR3246 B66
MANUF.	ERICSSON
HEIGHT	58.1"
WIDTH	15.7"
DEPTH	9.4"
WEIGHT	180 LB

ERICSSON ANTENNA
N.T.S
2 / A-4

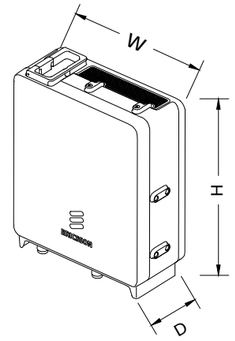


REMOTE RADIO UNIT SPECIFICATIONS	
MODEL #	RADIO 4449 B71+B12
MANUF.	ERICSSON
HEIGHT	14.9"
WIDTH	13.2"
DEPTH	10.4"
WEIGHT	74 LB



REMOTE RADIO UNIT MOUNTING DETAIL

REMOTE RADIO UNIT
N.T.S
3 / A-4



REMOTE RADIO UNIT SPECIFICATIONS	
MODEL #	RADIO 2217 B2
MANUF.	ERICSSON
HEIGHT	9.5"
WIDTH	11.5"
DEPTH	2.5"
WEIGHT	12.8 LB

REMOTE RADIO UNIT
N.T.S
4 / A-4

APPLICANT:
T-Mobile
T-MOBILE NORTHEAST LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
860-692-7100

PROJECT MANAGER
NSS NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development
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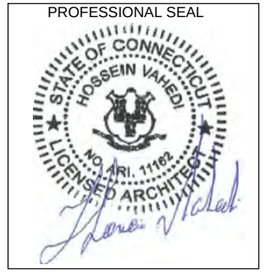
STURBRIDGE, MA 01566
203-275-6669

CONSULTANT:
FORESITE LLC
Architects . Engineers . Surveyors
462 WALNUT STREET
NEWTON, MA 02460
617-212-3123

PROFESSIONAL SEAL



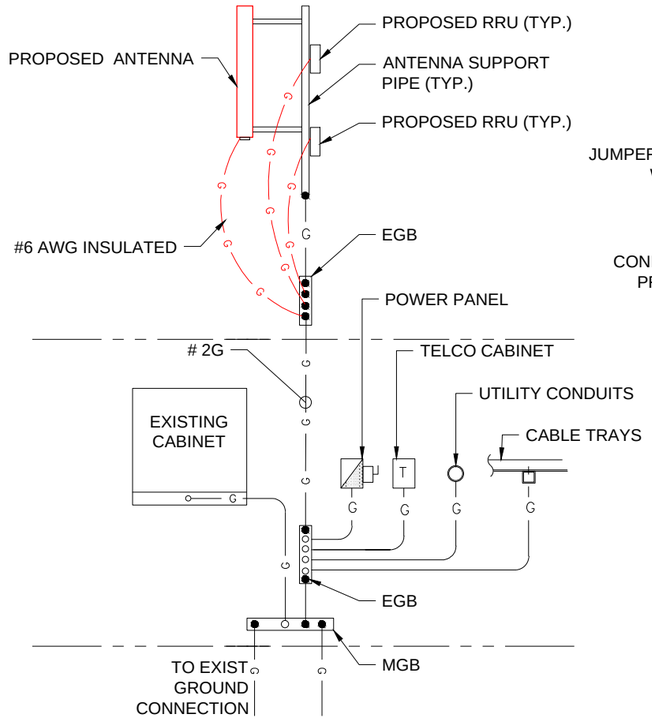
REV	DESCRIPTION	DATE
A	PRELIMINARY	08/31/18
0	SIGNED AND SEALED	09/04/18

SITE NUMBER: CT11086B
SITE NAME: NEW HAVEN/WC X59
SITE ADDRESS: 142 BALDWIN DRIVE
NEW HAVEN, CT 06515

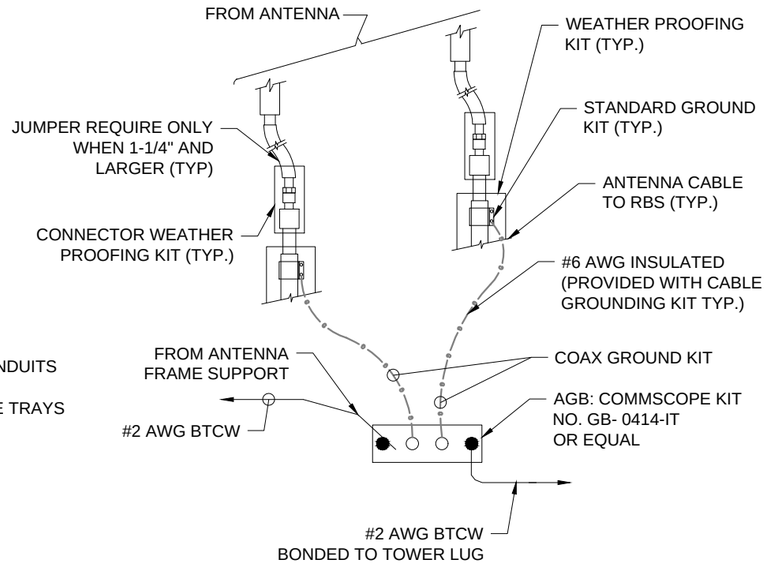
SHEET TITLE:
A-4: ANTENNA DETAILS

ELECTRICAL & GROUNDING NOTES

1. ALL ELECTRICAL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE (NEC) AS WELL AS APPLICABLE STATE AND LOCAL CODES.
2. ALL ELECTRICAL ITEMS SHALL BE U.L. APPROVED OR LISTED AND PRODUCED PER SPECIFICATION REQUIREMENTS.
3. THE ELECTRICAL WORK INCLUDES ALL LABOR AND MATERIAL DESCRIBED BY DRAWINGS AND SPECIFICATION INCLUDING INCIDENTAL WORK TO PROVIDE COMPLETE OPERATING AND APPROVED ELECTRICAL SYSTEM.
4. GENERAL CONTRACTOR SHALL PAY FEES FOR PERMITS, AND RESPONSIBLE FOR OBTAINING SAID PERMITS AND COORDINATION OF INSPECTIONS.
5. ELECTRICAL AND TELCO WIRING OUTSIDE A BUILDING AND EXPOSED TO WEATHER SHALL BE IN WATER TIGHT GALVANIZED RIGID STEEL CONDUITS OR SCHEDULE 80 PVC (AS PERMITTED BY CODE) ND WHERE REQUIRED IN LIQUID TIGHT FLEXIBLE METAL OR NONMETALLIC CONDUITS.
6. RIGID STEEL CONDUITS SHALL BE GROUNDED AT BOTH ENDS.
7. ELECTRICAL WIRING SHALL BE COPPER WITH TYPE XHHW, THWN, OR THIN INSULATION.
8. RUN ELECTRICAL CONDUIT OR CABLING BETWEEN ELECTRICAL ROOM AND PROPOSED CELL SITE ARE PEDESTAL AS INDICATED ON THIS DRAWING. PROVIDE FULL LENGTH PULL ROPE. COORDINATE INSTALLATION WITH UTILITY COMPANY.
9. RUN TELCO CONDUIT OR CABLE BETWEEN TELEPHONE UTILITY DEMARCATION POINT AND PROPOSED CELL SITE TELECOM CABINET AND RBS CABINET AS INDICATED ON DRAWING A -1. PROVIDE FULL LENGTH PULL ROPE INSTALLED TELCO CONDUIT. PROVIDE GREENLEE CONDUIT MEASURING TAPE AT EACH END.
10. ALL EQUIPMENT LOCATED OUTSIDE SHALL HAVE NAME 3R ENCLOSURE.
11. GROUNDING SHALL COMPLY WITH NEC ART. 250.
12. GROUNDING COAX CABLE SHIELDS MINIMUM AT BOTH ENDS USING MANUFACTURES COAX CABLE GROUNDING KITS SUPPLIED BY PROJECT OWNER.
13. USE #6 COPPER STRANDED WIRE WITH GREEN COLOR INSTALLATION FOR ABOVE GRADE GROUNDING (UNLESS OTHERWISE SPECIFIED) AND #2 SOLID TINNED BARE COPPER WIRE FOR BELOW GRADE GROUNDING AS INDICATED ON THE GROUND.
14. ALL GROUND CONNECTION TO BE BURNDY HYGROUND COMPRESSION TYPE CONNECTORS OR CADWELD EXOTHERMIC WELD. DO NOT ALLOW BARE COPPER WIRE TO BE IN CONTACT WITH GALVANIZED STEEL.
15. ROUTE GROUNDING CONDUCTORS ALONG THE SHORTEST AND STRAIGHTEST PATH POSSIBLE, EXCEPT AS OTHERWISE INDICATED. GROUNDING LEADS SHOULD NEVER BE BENT AS RIGHT ANGLE. ALWAYS MAKE AT LEAST 12" RADIUS BENDS. #6 WIRE CAN BE BENT AT 6" RADIUS WHEN NECESSARY BOND ANY METER OBJECTS WITHIN 7 FEET OF PROPOSED EQUIPMENT OR CABINET TO MASTER GROUND BAR.
16. CONNECTIONS TO MGB SHALL BE ARRANGED IN THREE MAIN GROUPS: SURGE PROCEDURES (COAXIAL CABLE GROUND KITS, TELCO AND POWER PANEL GROUND); (GROUNDING ELECTRODE RING OR BUILDING STEEL); NON-SURGING OBJECTS (EGB GROUND IN RBS UNIT).
17. CONNECTIONS TO GROUND BARS SHALL BE MADE WITH TWO HOLE COMPRESSION TYPE COPPER LUGS. APPLY OXIDE INHIBITING COMPOUND TO ALL LOCATIONS.
18. APPLY OXIDE INHIBITING COMPOUND TO ALL COMPRESSION TYPE GROUND CONNECTION.
19. BOND ANTENNA MOUNTING BRACKETS, COAXIAL CABLE GROUND KITS, AND ALNA TO EGB PLACED NEAR THE ANTENNA LOCATION.
20 BOND ANTENNA EGB'S AND MGB TO WATER MAIN.
21. TEST COMPLETED GROUND SYSTEM AND RECORD RESULTS FOR PROJECT CLOSE-OUT DOCUMENTATION.
22. BOND ANY METAL OBJECTS WITHIN 7 FEET OF PROPOSED EQUIPMENT OR CABINET TO MASTER GROUND BAR.
23. VERIFY PROPOSED SERVICE UPGRADE WITH LOCAL UTILITY COMPANY PRIOR TO CONSTRUCTION.

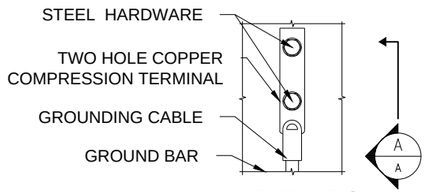


GROUNDING RISER DIAGRAM (1 / E-1)
SCALE: N.T.S

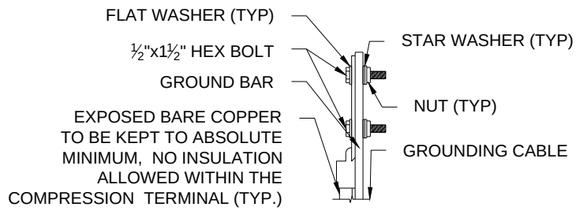


NOTES:
INSTALL CABLE GROUND KIT ABOVE HORIZONTAL BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO AGB/EGB

TOWER TOP CABLE GROUNDING DETAIL (2 / E-1)
SCALE: N.T.S



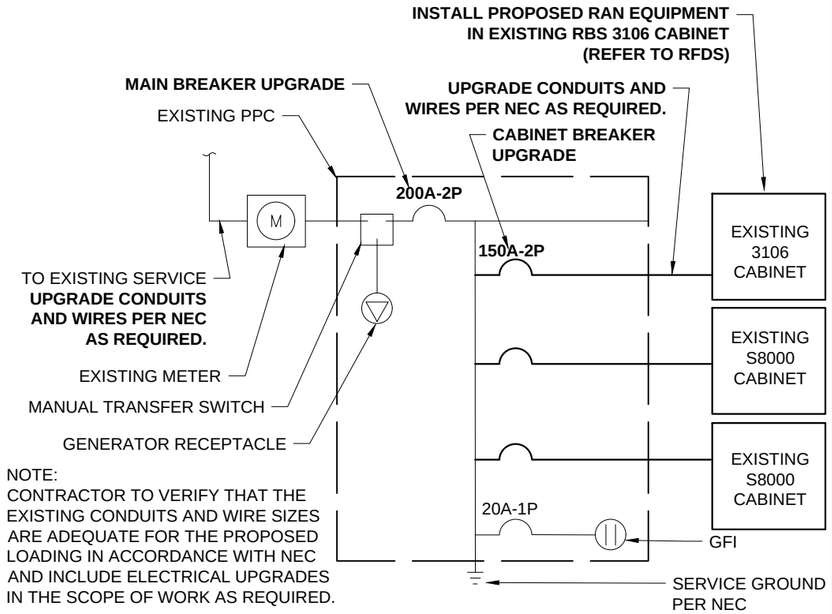
ELEVATION



SECTION A-A

NOTES:
1. "DOUBLING UP" OR "STACKING " OF CONNECTION IS NOT PERMITTED.
2. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.

TYPICAL GROUND BAR CONNECTIONS DETAIL (3 / E-1)
SCALE: N.T.S



NOTE:
CONTRACTOR TO VERIFY THAT THE EXISTING CONDUITS AND WIRE SIZES ARE ADEQUATE FOR THE PROPOSED LOADING IN ACCORDANCE WITH NEC AND INCLUDE ELECTRICAL UPGRADES IN THE SCOPE OF WORK AS REQUIRED.

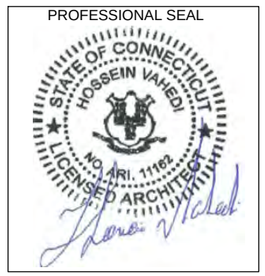
ONE LINE DIAGRAM (4 / E-1)
SCALE: N.T.S

APPLICANT:
T-MOBILE NORTHEAST LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
860-692-7100

PROJECT MANAGER
NSS NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development
420 MAIN STREET, BLDG 4
STURBRIDGE, MA 01566
203-275-6669

CONSULTANT:
FORESITE LLC
Architects . Engineers . Surveyors
462 WALNUT STREET
NEWTON, MA 02460
617-212-3123

PROFESSIONAL SEAL



REV	DESCRIPTION	DATE
A	PRELIMINARY	08/31/18
0	SIGNED AND SEALED	09/04/18

SITE NUMBER: CT11086B
SITE NAME: NEW HAVEN/WC X59
SITE ADDRESS:142 BALDWIN DRIVE
NEW HAVEN, CT 06515

SHEET TITLE:
E-1: GROUNDING AND ELECTRICAL DETAILS

Exhibit D

AECOM

Submitted to
AT&T / Smartlink
85 Rangeway Road
Building 3, Suite 102
N. Billerica, MA 01862

Sprint /
Airosmith Development, Inc.
32 Clinton Street
Saratoga Springs, NY 12866

T-Mobile / Northeast Site Solutions
420 Main Street
Sturbridge, MA 01566

Submitted by
AECOM
500 Enterprise Drive,
Suite 3B
Rocky Hill, CT 06067
August 14, 2018

DETAILED STRUCTURAL ANALYSIS AND MODIFICATION OF AN EXISTING 120' SELF SUPPORT LATTICE AND FOUNDATION FOR PROPOSED ANTENNA ARRANGEMENT

AT&T Site ID # : CTLO2013
Sprint Site I.D # : CT03XC003
T-Mobile Site I.D. #: CT11086A
Site Name : New Haven – State Police Tower #27
Site Address: 142 Baldwin Drive, New Haven, CT

60579836 / SMK-003
60579840 / ASM-010
60579905 / NSS-044

TABLE OF CONTENTS

1. EXECUTIVE SUMMARY

This report summarizes the structural analysis and modification of the existing 120' self-supporting lattice tower structure located at 142 Baldwin Drive, New Haven, Connecticut.

The structural analysis was conducted in accordance with the 2016 Connecticut State Building Code which includes the TIA-222-G[1] Standard, 2012 International Building Code, the 2016 Connecticut State Building Code Amendments, the AISC[2] Load Resistance Factor Design (LRFD), the ASCE 7[3] design Code, and the Connecticut State Police Requirements which include the TIA/EIA-222-F[4].

The antenna loading considered in the analysis consists of all the existing and proposed antennas, transmission lines and ancillary items as outlined in the Introduction Section of this Report.

The proposed T-Mobile, AT&T and Sprint antenna installations are listed below:

Proposed Appurtenances	Carrier	Antenna Center Elevation
Remove:		
(3) Ericsson AIR 21 B2A/B4P Panel Antennas **(3) Commscope LNX-6515DS-A1M Panel Antennas** **(3) Ericsson RRUS-11 RRH Units**	**T-Mobile (existing)**	**@ 95'**
(3) RFS APXVSPP18-C-A20 Panel Antennas	**Sprint (existing)**	**@ 71'**
Install:		
(3) RFS APXVAARR24_43—U-NA20 Panel Antennas **(3) Ericsson AIR 3246 B66 Panel Antennas** **(3) Ericsson 2217 B2 Radio Units (RRH)** **(3) Ericsson 4449 B71 + B12 Radio Units (RRH)** **(1) Ericsson 6x12 (6 AWG) Hybrid Cable**	**T-Mobile (Proposed)**	**@ 95'**
(2) Kathrein 800-10966 Panel Antennas (Alpha & Beta Sectors, 1 panel each sector) **(1) Kathrein 800-10965 Panel antenna (Gamma Sector)** **(3) RRUS-12 RRH Units** **(3) RRUS-B14 / Radio 4478 RRH Units** **(1) DC6-48-60-0-8F Surge Suppressor Units** **(2) 3/4" Diameter DC Cables**	**AT&T (Proposed)**	**@ 80'**
(3) Commscope NNVV-65B-R4 Panel Antennas **(3) Nokia Dual Band MIMO AAHC Panel Antennas** **(3) 800 MHz RRH Units**	**Sprint (Proposed)**	**@ 71'**

1. TIA = Telecommunications Industry Association Structural Standard for Antenna Supporting Structures and Antennas (Version G)

2. AISC = American Institute of Steel Construction (14th Edition)

3. ASCE 7 = American Society of Civil Engineers Standard 7 (2010 Edition)

4. TIA/EIA = Telecommunications Industry Association Structural Standard for Antenna Supporting Structures and Antennas (Version F)

1. EXECUTIVE SUMMARY - *continued*

The results of an initial structural analysis indicated that the existing tower and anchor bolts did not have enough capacity for the proposed loading conditions above. The tower structure and anchor bolts require modifications shown on SK-1 through SK-5. **Once the modifications indicated on sheets SK-1 through SK-5 are performed, the modified structure and anchor bolts are considered structurally adequate with the load specification specified above with the existing and proposed antenna loading herein.**

The results of the analysis indicate the modified tower's sway (deflection) is 0.2737 degrees and the modified tower's twist (rotation) is 0.1562 degrees. These figures combined are within the Connecticut State Police requirements of 0.75 degrees for combined twist (rotation) and sway (deflection) when applying the TIA/EIA-222-F design conditions.

This analysis is based on:

1) The tower structure's theoretical capacity, not including any assessment of the condition of the tower.
2) Tower geometry and structural member sizes utilized in the preparation of this report were obtained from manufacturer's original design documents prepared by Stainless, Inc. report number 358810, noted as revision B, dated March 3, 1995.
3) Tower Mapping and Existing Inventory via tower climb, performed by D&K Nationwide Communications, Inc. on March 30, 2016.
5) Antenna inventory provided by Connecticut State Police via e-mail on April 7, 2016.
6) Previous structural analysis and evaluation performed by AECOM on behalf of AT&T, project number 60565638 / SMK-001, signed and sealed in May 21, 2018.
7) Previous structural analysis and evaluation performed by AECOM on behalf of T-Mobile, project number 60577309 / NSS-043, signed and sealed on May 25, 2018.
8) Previous structural analysis and evaluation performed by AECOM on behalf of Sprint, project number 60565103 / ASM-005, signed and sealed on June 11, 2018.
9) Updated antenna Radio Frequency Data Sheet provided by Smartlink on behalf of AT&T, obtained via e-mail dated June 22, 2018.
10) Geotechnical Review of Existing State Police Communications Tower #27, prepared by Welti Geotechnical, P.C. dated August 13, 2018.
11) Antenna and mount configuration as specified within Section 2 and 6 of this report.
12) Coax cable orientation as specified in section 6 of this report.

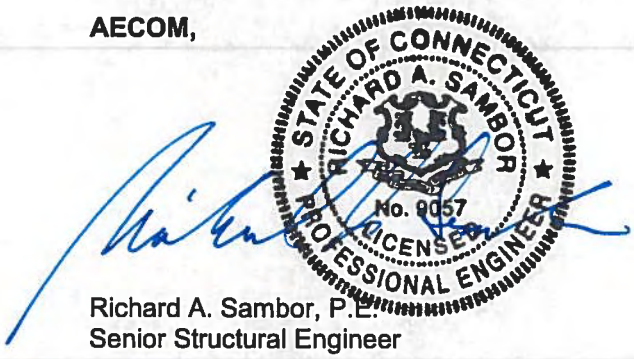
1. EXECUTIVE SUMMARY - *continued*

This report is only valid as per the assumptions and data utilized in this report for antenna inventory, mounts and associated cables. The user of this report shall field verify the antenna, cabling, and mount configuration used, as well as the physical condition of the tower members, connections and foundation. Notify the engineer in writing immediately if any of the information in this report is found to be other than specified.

If you should have any questions, please contact this office as (860) 990-6767.

Sincerely,

AECOM,



Richard A. Sambor, P.E.
Senior Structural Engineer

RAS/mcd

cc: IA, CF/Book - AECOM

2. INTRODUCTION

The subject tower is located at 142 Baldwin Drive, New Haven, Connecticut. The structure is an existing 120' self supporting steel tapered lattice tower, designed and manufactured by Stainless, Inc.

The structural analysis was conducted in accordance with the following:

- TIA-222-G Standard for Standard for a wind velocity of range of 95 mph to 115 mph (3-second gust) and 50 mph (3-second gust) concurrent with 0.75" ice thickness, considered to increase in thickness with height
- 2012 International Building Code with 2016 Connecticut State Building Code Amendments for a wind speed of 105 mph (3-second gust)
- 2010 AISC Load Resistance Factor Design (LRFD)
- 2010 ASCE 7 Minimum Design Loads for Buildings and Other Structures for the ice thickness referenced in the TIA-222-G Standard
- Connecticut State Police Requirements for a wind velocity of 90 mph (fastest mile) and 90 mph (fastest mile) concurrent with 0.5" ice. Twist (rotation) and sway (deflection) were determined in accordance with Connecticut State Police Requirements for a wind velocity of 90 mph (fastest mile) concurrent with 0.5" ice, analyzed under the TIA/EIA-222-F design Standard.

The inventory together with the proposed T-Mobile, AT&T and Sprint antenna arrangement is summarized in the table below:

Antenna Type	***Carrier***	***Mount***	***Antenna Centerline Elevation***	***Cable***
(1) 4' Lightning Rod	#27 Tower (existing)	18' Pipe Mast on Top of Tower	138'	---
(1) UHF3 Dipole Antenna	#26 CSP-15 (existing)	2' Flange Mount	120'	(1) LDF6-50A
(1) UHF-6 Whip Antenna	CSP-1 (existing)	*Share with below mount*	120'	(1) LDF5-50A
(1) OGT9-806 Whip Antenna	#25-B CSP-7 (existing)	*Share with below Mount*	120'	(1) LDF7-50A
(1) SC479-HF1LDF Whip Antenna	#24-C CSP-21 (existing)	*Share with below Mount*	120'	(1) AVA7-50A
(1) OGT9-806 Whip Antenna	#24-D CSP-8 (existing)	*Share with below Mount*	120'	(1) LDF7-50A
(1) (Inverted) SC479-HF1LDF Whip Antenna	#25-A CSP-17 (existing)	(2) 5' Sidearm Mounts w/ 8' Pipe	114'	(1) AVA7-50A
(1) Junction Box	#24-A (existing)	(2) 4' Sidearm mounts w/ 8' Pipe	113.5'	(2) 3/8"
(1) (Inverted) Whip Antenna	#24-B (existing)	*Share with above Mount*	113.5'	(1) 1/2"
(1) (Inverted) Dipole Antenna	#24-E (existing)	*Share with above Mount*	113.5	(1) 1-1/4" Cable
(1) (Inverted) SC479-HF1LDF Whip Antenna	#23-A CSP-22 (existing)	*Share with above mount*	112.75'	(1) AVA7-50A

Antenna Type	*Carrier*	*Mount*	*Antenna Centerline Elevation*	*Cable*
(1) (Inverted) SC479-HF1LDF Whip Antenna	#23-B CSP-23 (existing)	*Share with above mount*	112.75’	(1) AVA7-50A
(1) Sinclair Whip Antenna	#22 (existing)	(1) 4’x8’ Gate-boom 3’ Standoff w/ 2-1/2” Pipe	112’	(3) 1 5/8”
(1) Junction Box	#23-C (existing)	(1) Unistrut mount attached to Waveguide ladder	112’	(1) 1/2"
(1) PA6-65 Dish Antenna	#21 CSP-5 (existing)	2-1/2” Pipe Mounted to leg	110’	(1) WEP65
(1) (Inverted) SC479-HF1LDF Whip Antenna	CSP-9 (existing)	*See above mount @ 113’*	110’	(1) LDF7-50A
(1) SC479-HF1LDF Whip Antenna	CSP-18 (existing)	*See above mount @ 113’*	110’	(1) AVA7-50A
(1) (Inverted) SC479-HF1LDF Whip Antenna	CSP-19 (existing)	*See above mount @ 113’*	110’	(1) AVA7-50A
(1) 432E-83I-01T TTA Unit	CSP-20 (existing)	*See above mount @ 113’*	110’	(1) LDF4-50A
(1) WPA-70040-4CF-EDIN Panel Antenna	CSP-28 (existing)	Leg Mounted	110’	(1) AVA7-50A
(1) PA6-65 Dish Antenna	#20 CSP-3 (existing)	2-1/2” Pipe Mounted to leg	109’	(1) WEP65
(1) PA6-65 Dish Antenna	#19 CSP-6 (existing)	2-1/2” Pipe Mounted to leg	107’	(1) WEP65
(1) SE419-SWBPALDF Panel Antenna	CSP-29 (existing)	Leg Mounted	105’	(1) AVA7-50A
(1) 432E-83I-01T TTA Unit	CSP-30 (existing)	Face Mounted	105’	(1) LDF4-50A
(1) 422-86A-99116 TTA Unit	CSP-31 (existing)	Face Mounted	105’	(1) LDF3-50A
(1) 422-86A-99116 TTA Unit	CSP-32 (existing)	Face Mounted	105’	(1) LDF3-50A
(1) AP13-850 Panel Antenna	#18A CSP-12 (existing)	2-1/2” Pipe Mounted to Face	101’	(1) LDF7-50A
(1) SE419-SWBPALDF Panel Antenna	#18B CSP-13 (existing)	2-1/2” Pipe Mounted to Face	101’	(1) LDF7-50A
(3) APXVAARR24_43—U-NA20 Panels (3) Ericsson AIR 3246 B66 Panels (3) Ericsson 2217 B2 RRH’s (3) Ericsson 4449 B71 + B12 RRH’s	**T-Mobile (Proposed)**	Shared with Below Mount	**95’**	**(1) 1-1/4” F.O. Cable (6x12 6AWG)**
(3) AIR32 B66 Panel Antennas (3) TMA Units	T-Mobile (existing)	(3) EUSF10-U T-Arm Mounts attached to Leg	95’	(6) 1-5/8” (2) 1-1/4” Fiber Optic Cables
(1) (Inverted) OGT9-806 Whip Antenna	#16A CSP-10 (existing)	(2) 5’ Standoff Mounts w/ 4-1/2” Pipe Mount	92’	(1) LDF7-50A
(1) PD-458 Whip Antenna	#16B CSP-2 (existing)	*Share with above mount*	92’	(1) LDF5-50A

Antenna Type	*Carrier*	*Mount*	*Antenna Centerline Elevation*	*Cable*
(1) Dipole Antenna	#15 (existing)	3' Sidearm w/ 2" Pipe Mount	86'	(1) 7/8"
(1) 3' Yagi Antenna	#12 (existing)	*Share with above mount*	81'	(1) 1/2"
(1) DB-230 Yagi Antenna	#13 CSP-11 (existing)	*Share with above mount*	81'	(1) LDF5-50A
(2) Kathrein 800-10966 Panel Antennas (1 A; 1 B Sectors) (1) Kathrein 800-10965 Panel antenna (Gamma Sector) (3) RRUS-12 RRH Units (3) RRUS-B14 / Radio 4478 RRH Units (1) DC6-48-60-0-8F Surge Suppressor Units	**AT&T (Proposed)**	*See below Mount*	**80'**	**(2) 3/4" DC Cables**
(2) CCI TPA-65R-LCUUUU-H8 Panel Antennas (Alpha & Beta Sectors, 1 panel each sector) (2) CCI HPA-65R-BUU-H8 Panels (Alpha & Beta Sectors,1 per sector) (2) Andrew SBNH-1D6565C Panels (Alpha & Beta Sectors, 1 per sector) (1) CCI HPA-65R-BUU-H6 (Gamma) Panel (1) Quintel QS66512-3 Panel Antenna (Gamma Sector) (3) RRUS-11 RRH Units (6) RRUS-32 RRH Units (2) DC6-48-60-18-8F Surge Suppressor Units (2) DTMABP7819VG12A TMA Units	AT&T (existing)	(3) Antenna Face Mounts	80'	(4) 1-1/4" (2) 1/2" Fiber Optic Cables (4) 3/4" DC Cables
(1) 22' Dipole Antenna	#14 (existing)	4' Sidearm	77'	(1) 1/2"
(3) NNVV-65B-R4 Panel Antennas (3) Nokia MIMO Panel Antennas (3) TD-RRH8x20-25 RRH Units	**Sprint (Proposed)**	*Shared with below Mount*	**71'**	*Shared with below Cables*
(3) ALU RRH 800 MHz 2x50W (3) 1900 RRH Units	Sprint (existing)	Pipe Mounts on Existing Frame	71'	(4) 1-1/4" Hybriflex Cables
(1) 6' Dual Yagi Antenna	#9 (existing)	2' Sidearm	65'	(1) 1/2"
(1) GPS Antenna	#8 (existing)	3' Sidearm	63'	(1) 7/8"
(1) DB-264 20' Dipole Antenna	#7 CSP-4 (existing)	2' Sidearm	55'	(1) LDF5-50A
(1) DB-803 Whip Antenna	#6 CSP-16 (existing)	2' Sidearm	53'	(1) LDF4-50A

Antenna Type	*Carrier*	*Mount*	*Antenna Centerline Elevation*	*Cable*
(1) 10’ Dipole Antenna	#4A (existing)	3’ Sidearm	48’	(1) 1/2"
(1) 3’ Yagi Antenna	#4B (existing)	*Shared with above mount*	48’	(1) 1/2"
(1) 5’ Whip Antenna	#3 (existing)	Leg Mounted	47’	(1) 1/2"
(1) 3’ Whip Antenna	#2 (existing)	Leg Mounted	43’	(1) 7/8”
(1) 4’ Dish with Shroud Cover	#1A (existing)	4’ Sidearm	41’	(2) 1/2"
(1) 1’x1’ Panel Antenna	#1B (existing)	*Shared with above mount*	41’	(1) 3/8”
(1) 6’ Whip Antenna	#5 CSP-14 (existing)	1’ Sidearm Mount	39’	(1) LDF4-50A

Notes: Refer to TNX Tower feed-line plan within Section 6 of this report for coax locations. Antenna elevations and ID numbering obtained from Tower Mapping and Existing Inventory via tower climb, performed by D&K Nationwide Communications, Inc. on March 30, 2016.

“A#” refers to the antenna number used in the structural analysis program to identify tower appurtenances.

This structural analysis and evaluation of the communications tower was performed by AECOM for T-Mobile, AT&T and Sprint. The purpose of this analysis was to investigate the structural integrity of the modified tower and foundation for existing and proposed antenna loads in compliance with the 2016 Connecticut State Building Code. This analysis was conducted to evaluate stress on the tower and the effect forces to the foundation of the tower resulting from existing and proposed antenna arrangements.

3. ANALYSIS METHODOLOGY AND LOADING CONDITIONS

The structural analysis was done in accordance with, the TIA-222-G–Structural Standard for Antenna Towers and Antenna Supporting Structures and Antennas, the 2012 International Building Code with 2016 Connecticut State Building Code Amendments and the American Institute of Steel Construction (AISC) Manual of Steel Construction – Load Resistance Factor Design (LRFD)

The structural analysis was conducted using TNX Tower version 7.0.8.5 and used the following conditions for this tower review (following the TIA/EIA-222-G Standard):

- Structure Class 3 – (Essential Communications)
  - NOTE: ASCE 7 and CT State Building Code Applied Risk Category 4 for design wind loads (see below)
- Topographic Category 4 – (Tower location on top of ridge – rolling wind conditions considered)
  - Crest Height used for analysis: (approximate elevations listed below)
    - Tower Base Elevation = 450 feet
    - High point (2 mile Radius) = 550 feet (Ref. NW Regicides Trail)
    - Low Point (2 mile Radius) = 50 feet (Ref. Benchmark @ Southern Connecticut State University)
    - "H" = (Avg of High/Low) – Base Elevation = 150 feet
- Exposure Class C – (Open Terrain with scattered obstructions)
- Load Conditions:
  - Two load conditions were evaluated as shown which were compared to design stresses according to AISC and TIA-222-G Standard.

Basic Wind Speed:

- TIA-222-G:
  - New Haven County (Wind Speed Range): V = 95 mph - 115 mph (3-second gust) [Annex of TIA/EIA-222-G 2006]
- IBC 2012 w/ 2016 CT State Building Code Amendment:
  - (2012) IBC Section 1609.1.1 – Determination of Wind Loads – Exception 5 "Designs using TIA-222" applies for determination of Design Wind Load obtained as "V.ult" are to be converted to "V.asd" when applying the TIA-222-G design Standard (under Section 1609.3) for Basic Wind Speed.
  - (2016) CT State Building Code Amendment to the IBC Section 1609.3 wind loads are obtained from Appendix N of the State Building Code.
    - **V.asd = 105 mph** (3-Second Gust) Wind Design Parameter for the City of New Haven, Connecticut for Risk Category four (IV) for essential communications (Connecticut State Police).

Load Condition 1 = 105 mph (3-second gust) Wind Load (without ice) + Tower Dead Load
Load Condition 2 = 50 mph (3-second gust) Wind Load (with ice) + Ice Load + Tower Dead Load

Ice thickness used for this analysis is **0.75 inch** (assumed to start at the base of the tower) and is considered to increase in thickness with height. The initial ice thickness for design is referenced in the Annex of TIA-222-G and follows the same design criteria as the ASCE 7 Standard.

The load conditions below implement the design requirements of the Connecticut State Police for the tower structures deflection limits with the allowable deflection limit of the combination of the tower's sway (deflection) and twist (rotation) under the TIA-222-F design Standard. This design limit required the design combined value of sway (deflection) and twist (rotation) to be under 0.75 degrees following the TIA-222-F design Standard.

3. ANALYSIS METHODOLOGY AND LOADING CONDITIONS (cont.)

Load Condition 3 = 90 mph (fastest mile) Wind Load (with ice) + Ice Load + Tower Dead Load

Seismic event consideration factors/values for design:

- S.s = 0.186 (2016 CT State Building Code – Location Specific Value)
- S.1 = 0.062 (2016 CT State Building Code – Location Specific Value)
- Site Classification = "C" – from Geotechnical Report description of "Fractured Rock"
- Seismic Design Category = "C" – (2012 International Building Code)
- F.a = 1.2 (Obtained from TIA-222-G Table 2-12 Considering above conditions)
- F.v = 1.7 (Obtained from TIA-222-G Table 2-13 Considering above conditions)

Strength Limit State Load Combinations (TIA-222-G Section 2.3.2):

The structural analysis herein has considered the following load combinations within the analysis:

1. ***1.2 Dead Load Tower structure + 1.0 Dead Load Guy Assemblies + 1.6 Wind load without ice***
2. 1.2 Dead Load Tower structure + 1.0 Dead Load Guy Assemblies + 1.0 Dead weight of ice due to factored ice thickness + 1.0 Concurrent wind load with factored ice thickness + 1.0 Load effects due to temperature
3. 1.2 Dead Load Tower structure + 1.0 Dead Load Guy Assemblies + 1.0 Earthquake Load

NOTE 1: The above **bolded** load combination is considered to create the governing design loads per the results of the analysis.

NOTE 2: The above "Dead Load Guy Assemblies" are not considered as part of the analysis and are considered as a value of zero.

NOTE 3: The "Load effects due to temperature" do not apply for structures that are self-sustaining (from the TIA-222-G Standard)

4. FINDINGS AND EVALUATION

The combined axial and bending stresses on the tower structure were evaluated to compare with the strength design in accordance with AISC (LRFD). The results of an initial analysis indicated that the existing tower did not have enough capacity to support the proposed loading conditions. The tower structure and anchor bolts require modifications shown on SK-1 through SK-5. Once the modifications indicated on sheets SK-1 through SK-5 are performed, the modified structure and existing foundation are considered structurally adequate with the wind load classification specified with the existing and proposed antenna loading noted herein.

The modified tower's sway (deflection) is 0.2737 degrees and the modified tower's twist (rotation) is 0.1562 degrees. These figures combined are within the Connecticut State Police required maximum 0.75 degrees for combined twist and sway when applying the TIA/EIA-222-F design conditions.

Controlling Tower Component Stress vs. Capacity Summary:

Component / (Section No.)	Critical Component Size	Controlling Elevation	Stress (% capacity)	Pass/Fail
Leg (T8)	Pipe 5"x0.400" (t) / Compression	25' – 50'	**94.8**	Pass
Diagonal (T9)	(2)L3-1/2x3-1/2x3/8 / Compression	0' – 25'	**90.7**	Pass
Horizontal (T7)	L3-1/2x3-1/2x1/4 / Compression	50' – 75'	**96.9**	Pass
Top Grit (T9)	L4x4x5/16 / Compression	0' – 25'	**97.7**	Pass
Redundant Horizontal Bracing (T9)	L2-1/2x2-1/2x1/4 / Compression	0' – 25'	**34.9**	Pass
Redundant Diagonal Bracing (T9)	L2-1/2x2-1/2x1/4 / Compression	0' – 25'	**61.6**	Pass
Inner Bracing (T9)	L2-1/2x2-1/2x3/16 / Compression	0' – 25'	**13.5**	Pass
Tower Connection Bolt	(2) 5/8" Diameter A325X Bolts / Shear Capacity	25'	**97.7**	Pass

Foundation Summary:

Component	Required	Computed	% Capacity	Pass/Fail
(Modified) Anchor Rod - Capacity (TIA-222-G – 4.9.9)	Ratio < 1.0	0.970	**97.0**	Pass
Foundation – Spread Foot (6'x6') Uplift Capacity	625.89 Kip (Factored Resistance)	393 Kip	**62.9**	Pass
Foundation – Rock Anchorage – Bonded Embedment Length	20 Feet (installed)	16.59 Ft	**78.7**	Pass
Foundation – Bearing on Rock Capacity	13.4400 ksf (Factored Resistance)	12.676 ksf	**73.5**	Pass

4. FINDINGS AND EVALUATION (cont.)

Maximum Deformations – Proposed Condition

ANSI/TIA-222-G Section 2.8.2 - Limit State Deformations

1. A rotation of 4 degrees about the vertical axis (twist) or any horizontal axis (sway) of the structure
2. A horizontal displacement (in feet) of 3% of the height of the structure.

Load Case Description	Current		Allowable	
	Sway (degree)	Displacement (Feet)	Sway (degree)	Displacement (Feet)
Service Wind Load	0.1334	0.7365	4.0	3.6

Tower Twist & Sway at Top (Connecticut State Police Requirements - TIA-222-F):

Description	Current	Total	Allowable
Tower Twist (degrees)	0.1562	0.4299	0.750
Tower Sway (degrees)	0.2737		

5. CONCLUSIONS AND RECOMMENDATIONS

The results of an initial structural analysis indicated that the existing tower and anchor bolts did not have enough capacity for the proposed loading conditions above. The tower structure and anchor bolts require modifications shown on SK-1 through SK-5. **Once the modifications indicated on sheets SK-1 through SK-5 are performed, the modified structure and anchor bolts are considered structurally adequate with the load specification specified above with the existing and proposed antenna loading herein.**

The results of the analysis indicate the modified tower's sway (deflection) is 0.2737 degrees and the modified tower's twist (rotation) is 0.1562 degrees. These figures combined are within the Connecticut State Police requirements of 0.75 degrees for combined twist (rotation) and sway (deflection) when applying the TIA/EIA-222-F design conditions.

Limitations/Assumptions:

This report is based on the following:

1. Tower inventory as listed in this report.

2. Tower is properly installed and maintained.

3. All members are as specified in the original design documents and are in good condition.

4. All required members are in place.

5. All bolts are in place and are properly tightened.

6. Tower is in plumb condition.

7. All member protective coatings are in good condition.

8. All tower members were properly designed, detailed, fabricated, and installed and have been properly maintained since erection.

9. Foundations are in good condition without defect and were properly constructed to support original design loads as specified in the original design documents.

AECOM is not responsible for any modifications completed prior to or hereafter in which AECOM is not or was not directly involved. Modifications include but are not limited to:

A. Adding antennas
B. Removing/replacing antennas
C. Adding coaxial cables

AECOM hereby states that this document represents the entire report and that it assumes no liability for any factual changes that may occur after the date of this report. All representations, recommendations, and conclusions are based upon information contained and set forth herein. If you are aware of any information which conflicts with that which is contained herein, or you are aware of any defects arising from original design, material, fabrication, or erection deficiencies, you should disregard this report and immediately contact AECOM. AECOM disclaims all liability for any representation, recommendation, or conclusion not expressly stated herein.

Ongoing and Periodic Inspection and Maintenance:

After the Contractor has successfully completed the installation and the work has been accepted, the owner will be responsible for the ongoing and periodic inspection and maintenance of the tower.

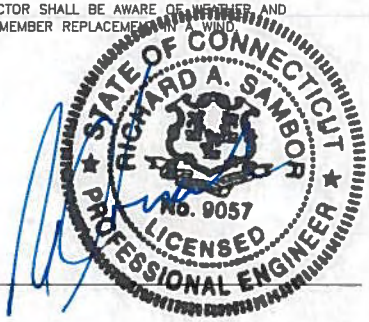
The tower owner shall refer to TIA-222-G Section 14.2 for recommendations for maintenance and inspection. The frequency of the inspection and maintenance intervals is to be determined by the owner based upon actual site and environmental conditions. It is recommended that a complete and through inspection of the entire tower structural system be performed at least yearly and more frequently as conditions warrant. It is also recommended that the structure be inspected after severe wind and/or ice storms or other extreme loading conditions.

6. DRAWINGS AND DATA

REINFORCEMENT DRAWINGS SK-1 THROUGH SK-5

GENERAL CONSTRUCTION NOTES

1. ALL WORK SHALL COMPLY WITH THE CURRENT CONNECTICUT STATE BUILDING AND LIFE SAFETY CODES, SUPPLEMENTS AND AMENDMENTS.
2. CONTRACTOR IS TO REVIEW ALL DRAWINGS AND NOTES IN THE CONTRACT DOCUMENT SET. CONTRACTOR SHALL COORDINATE ALL WORK SHOWN IN THE SET OF DRAWINGS. THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF DRAWINGS TO ALL SUB-CONTRACTORS AND ALL RELATED PARTIES. THE SUB-CONTRACTORS SHALL EXAMINE ALL THE DRAWINGS AND SPECIFICATIONS FOR THE INFORMATION THAT AFFECTS THEIR WORK.
3. CONTRACTOR SHALL PROVIDE A COMPLETE BUILD-OUT WITH ALL FINISHES, STRUCTURAL, MECHANICAL, AND ELECTRICAL COMPONENTS AND PROVIDE ALL ITEMS AS SHOWN OR INDICATED ON DRAWINGS OR WRITTEN IN SPECIFICATIONS.
4. CONTRACTOR SHALL FURNISH ALL MATERIAL, LABOR AND EQUIPMENT TO COMPLETE THE WORK AND FURNISH A COMPLETED JOB ALL IN ACCORDANCE WITH LOCAL AND STATE GOVERNING AUTHORITIES AND OTHER AUTHORITIES HAVING LAWFUL JURISDICTION OVER THE WORK.
5. CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS AND ALL INSPECTIONS REQUIRED AND SHALL ALSO PAY FEES REQUIRED FOR THE GENERAL CONSTRUCTION AND ELECTRICAL SUB-CONTRACTORS SHALL PAY FOR THEIR PERMITS.
6. CONTRACTOR SHALL MAINTAIN A CURRENT SET OF DRAWINGS ON SITE AT ALL TIMES AND ENSURE THE DISTRIBUTION OF NEW DRAWINGS TO SUB-CONTRACTORS AND OTHER RELEVANT PARTIES AS SOON AS THEY ARE MADE AVAILABLE. ALL OLD DRAWINGS SHALL BE MARKED VOID AND REMOVED FROM THE CONTRACT AREA. CONTRACTOR SHALL FURNISH "AS-BUILT" SET OF DRAWINGS TO OWNER UPON COMPLETION OF PROJECT.
7. INSTALLATION OF THIS WIRELESS COMMUNICATIONS EQUIPMENT SITE REQUIRES WORK IN THE IMMEDIATE VICINITY OF EXISTING OPERATING TELECOMMUNICATION SYSTEMS. THE CONTRACTOR SHALL PROVIDE AND COORDINATE THE METHODS OF PROTECTION WITH THE VARIOUS TELECOMMUNICATION CARRIERS AND THE TOWER OWNER. THERE SHALL BE NO INTERRUPTION OF OPERATION WITHOUT TIMELY COORDINATION WITH AND APPROVAL BY THE VARIOUS COMMUNICATIONS OPERATORS INCLUDING THE CONNECTICUT STATE POLICE.
8. NO MOVEMENT, ALTERATION, OR DISCONNECTION OF CONNECTICUT STATE POLICE ANTENNAS MAY OCCUR WITHOUT THE NOTIFICATION AND APPROVAL OF THE CONNECTICUT STATE POLICE. CONTACT THE NETWORK CONTROL CENTER AT 860-865-8008.
9. TOWER REINFORCING WORK AFFECTING CRITICAL CONNECTICUT STATE POLICE ANTENNAS MAY BE REQUIRED TO BE CONDUCTED AT TIMES AS DETERMINED BY THE REQUIREMENTS OF THE CONNECTICUT STATE POLICE.
10. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUB-CONTRACTORS FOR ANY CONDITION PER MFR'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR ARCHITECT.
11. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ON-SITE SAFETY FROM THE TIME THE JOB IS AWARDED UNTIL ALL WORK IS COMPLETE AND ACCEPTED BY THE OWNER.
12. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ARCHITECT FOR REVIEW. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTAL TO THE ARCHITECT FOR REVIEW.
13. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA. SUBMIT ANY DISCREPANCIES FROM THE DRAWINGS TO THE ARCHITECT.
14. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURE AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY.
15. CONTRACTOR SHALL COMPLY WITH OWNER ENVIRONMENTAL ENGINEER ON ALL METHODS AND PROVISIONS FOR ALL EXCAVATION ACTIVITIES INCLUDING SOIL/ROCK DISPOSAL. ALL BACKFILL MATERIALS TO BE PROVIDED BY THE CONTRACTOR.
16. CONTRACTOR TO CONTACT "CALL BEFORE YOU DIG" AT 1-800-922-4455 TO VERIFY AND IDENTIFY THE EXACT LOCATIONS OF ALL UNDERGROUND UTILITIES AND OBSTRUCTIONS IDENTIFIED PRIOR TO COMMENCING WORK IN THE CONTRACT AREA.
17. DIMENSIONS OF EXISTING TOWER ARE BASED ON MANUFACTURER'S DRAWINGS PREPARED BY STAINLESS, INC., DATED MARCH 3, 1995, AND ARE NOT GUARANTEED. CONTRACTOR SHALL TAKE FIELD DIMENSIONS AS NECESSARY TO ASSURE PROPER FIT OF ALL FINISHED WORK AND SHALL ASSUME FULL RESPONSIBILITY FOR THEIR ACCURACY. WHEN SHOP DRAWINGS BASED ON FIELD MEASUREMENT ARE SUBMITTED FOR REVIEW, DIMENSIONS ARE PROVIDED FOR THE ENGINEER'S REFERENCE ONLY.
18. TOWER INVENTORY IS BASED ON INFORMATION OBTAINED FROM D&K NATIONWIDE COMMUNICATIONS, INC., MARCH 30, 2016 AND BY CONNECTICUT STATE POLICE DATED APRIL 7, 2016.
19. CONTRACTOR TO VERIFY REQUIRED CLEARANCES INCLUDING BUT NOT LIMITED TO EXISTING BUILDINGS, EQUIPMENT PADS AND SHELTERS PRIOR TO COMMENCING WORK.
20. THE CONTRACTOR IS RESPONSIBLE FOR THE STABILITY OF THE STRUCTURE DURING CONSTRUCTION. NO MEMBER OF THE TOWER SHALL BE LEFT DISCONNECTED FOR THE NEXT WORKING DAY. THE CONTRACTOR SHALL BE AWARE OF WEATHER AND WIND CONDITIONS AND NOT PERFORM MEMBER REPLACEMENT IN A WIND.



STRUCTURAL NOTES

STRUCTURAL STEEL MATERIAL:

STRUCTURAL STEEL LEG:
- LEG PIPES 0.400 THICK AND THICKER ..... A572-60 (60 KSI)
- LEG PIPES 3/8" THICK AND THINNER ..... A572-50 (50 KSI)

EXISTING BEAMS, CHANNELS, PLATES, ANGLES A36
REPLACEMENT ANGLES ..... A529 Gr 50 (50 KSI)
WELDED "T" BEAM ..... A992 (50 KSI)

STRUCTURAL STEEL SHALL CONFORM TO ALL THE REQUIREMENTS OF THE ASTM SPECIFICATION, AS REFERENCED IN THE CODE.

UNLESS OTHERWISE NOTED, ALL STEEL WILL BE GALVANIZED IN ACCORDANCE WITH ASTM 123 AFTER FABRICATION. TOUCH UP ALL DAMAGED GALVANIZED STEEL WITH APPROVED COLD ZINC, "GALVANOX", "DRY GALV", "ZINC-IT", OR APPROVED EQUIVALENT, IN ACCORDANCE WITH MANUFACTURERS GUIDELINES. TOUCH-UP DAMAGED NON GALVANIZED STEEL WITH SAME PAINT APPLIED IN SHOP OR FIELD.

SHOP AND ERECTION DRAWINGS SHALL BE SUBMITTED FOR ALL STRUCTURAL STEEL WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. SUBMIT 2 SETS OF PRINTS FOR THE ENGINEER REVIEW.

MILL BEARING ENDS OF COLUMNS, STIFFENERS, AND OTHER BEARING SURFACES TO TRANSFER LOAD OVER ENTIRE CROSS SECTION.

THE OMISSION OF ANY MATERIAL THAT WAS SHOWN ON THE CONTRACT DRAWINGS SHALL NOT RELIEVE THE CONTRACTOR OF PROVIDING THE SAME.

CONNECTIONS / FIELD ASSEMBLY:

BOLTED CONNECTIONS: UNLESS OTHERWISE NOTED, ALL JOINTS ARE SLIP CRITICAL TYPE, REQUIRING 5/8", 3/4", 7/8", 1" DIA. A325-X & A490-X BOLTS, A563 NUTS AND F436 WASHERS, ALL GALVANIZED. BEVELED WASHERS SHALL BE USED ON BEAM FLANGES HAVING A SLOPE GREATER THAN 1:20.

STRUCTURE IS DESIGNED TO BE LEVEL AND PLUMB, SELF-SUPPORTING AND STABLE AFTER WORK IS COMPLETED.

COMMENCEMENT OF WORK WITHOUT NOTIFYING THE ENGINEER OF ANY DISCREPANCIES WILL BE CONSIDERED ACCEPTANCE OF PRECEDING WORK.

ALL WELDING SHALL BE DONE BY A CERTIFIED WELDER IN ACCORDANCE WITH AWS STANDARDS, USING E70XX ELECTRODES UNLESS OTHERWISE NOTED. WHERE WELD SIZES ARE NOT SHOWN PROVIDE THE MINIMUM SIZES PER "PREQUALIFIED WELDED JOINTS" TABLES IN AISC "MANUAL OF STEEL CONTRUCTION", 14TH EDITION.

INSPECTIONS:

SPECIAL INSPECTIONS ARE REQUIRED PER THE CODE FOR STRUCTURAL STEEL WORK.

PLEASE CONTACT AECOM @ 860-990-6767 FOR CONSTRUCTION PHASE SERVICES AND/OR SPECIAL INSPECTIONS.

AT&T, SPRINT, AND T-MOBILE WILL SUPPLY THE SERVICES OF THE REQUIRED SPECIAL INSPECTOR AND TESTING AGENTS AS REQUIRED. CONTRACTOR SHALL COORDINATE INSPECTIONS OF FABRICATOR'S AND ERECTOR'S WORK AND MATERIALS TO MEET THE REQUIREMENTS OF THE STATEMENT OF SPECIAL INSPECTIONS FOR THIS PROJECT.

COPIES OF TESTING AND INSPECTION REPORTS WILL BE PROVIDED TO AT&T, SPRINT, T-MOBILE, STATE BUILDING OFFICIAL, ENGINEER OF RECORD AND CONTRACTOR.

PROJECT NO.	
Designed by:	MCD
Drawn by:	GAT
Checked by:	KAB
Approved by:	RAS

AECOM
500 ENTERPRISE DRIVE
ROCKY HILL, CONNECTICUT
(860)-529-8882

T-Mobile · Sprint · at&t

SITE ADDRESS: 142 BALDWIN AVENUE
NEW HAVEN, CONNECTICUT 06516

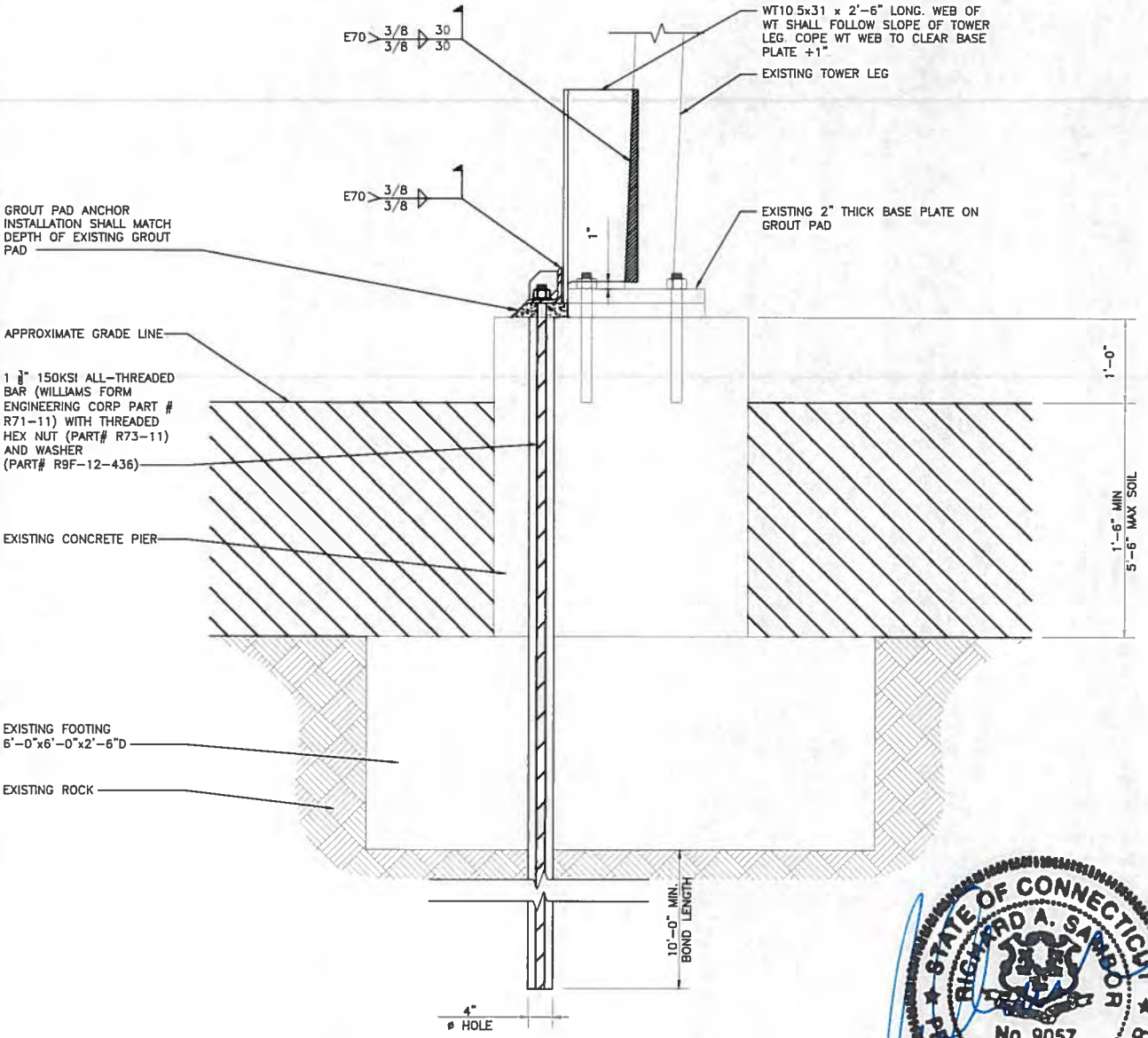
REV.	DATE:	DESCRIPTION

Scale: AS NOTED | Date: 08/14/18
Job No. | File No.

Dwg. No. SK-1

Dwg. 1 of 5

NOTES:
1. ELEVATION OF EXISTING SOIL AND ROCK DETERMINED FROM GEOTECHNICAL REPORT DATED AUGUST 13, 2018.
2. PRODUCTS LISTED BY WILLIAMS FORM ENGINEERING CORP ARE MINIMUM DESIGN REQUIREMENTS. CONTRACTOR MAY SUBSTITUTE MATERIALS THAT MEET OR EXCEED THESE LISTED PRODUCTS.
3. CONTRACTOR SHALL AVOID EXISTING PIER REINFORCING WHEN DRILLING 4" DIAMETER ROCK ANCHOR HOLE.
4. ROCK ANCHOR BAR IS NOT INTENDED TO BE PRE-STRESSED FOR THIS INSTALLATION. MINIMUM GROUT BOND LENGTH FOR ANCHOR SHALL BE NO LESS THAN 10 FEET INTO ROCK.
5. GROUT SHALL FILL DRILLED HOLE AND MUST SET PRIOR TO FURTHER ANCHORAGE INSTALLATION. GROUT MATERIAL CONSIDERED FOR DESIGN IS US SPEC RA GROUT SUPPLIED BY WILLIAMS FORM ENGINEERING CORP
6. GROUT PAD EXTENSION SHALL CREATE LEVEL SURFACE AREA FOR ANCHOR TO BE INSTALLED.



1 / SK-2 ANCHOR ELEVATION @ LEGS A, B & C

SCALE: 1/2"=1'-0" (EXISTING ROCK ANCHORS NOT SHOWN FOR CLARITY)

STATE OF CONNECTICUT
RICHARD A. SAMBOR
No. 9057
LICENSED
PROFESSIONAL ENGINEER

PROJECT NO.	
Designed by:	MCD
Drawn by:	GAT
Checked by:	KAB
Approved by:	RAS

AECOM
500 ENTERPRISE DRIVE
ROCKY HILL, CONNECTICUT
(860)-529-8882

T-Mobile · Sprint · at&t

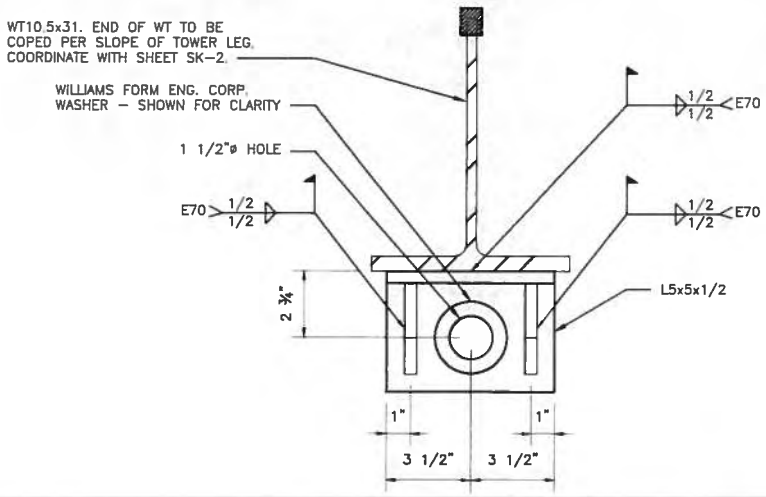
SITE ADDRESS: 142 BALDWIN AVENUE
NEW HAVEN, CONNECTICUT 06516

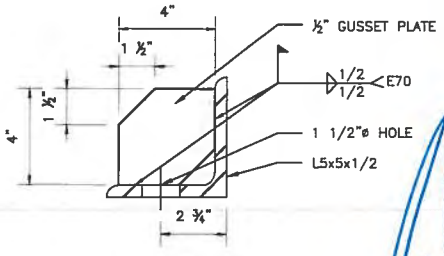
REV.	DATE:	DESCRIPTION

Scale: AS NOTED | Date: 08/14/18
Job No. | File No.

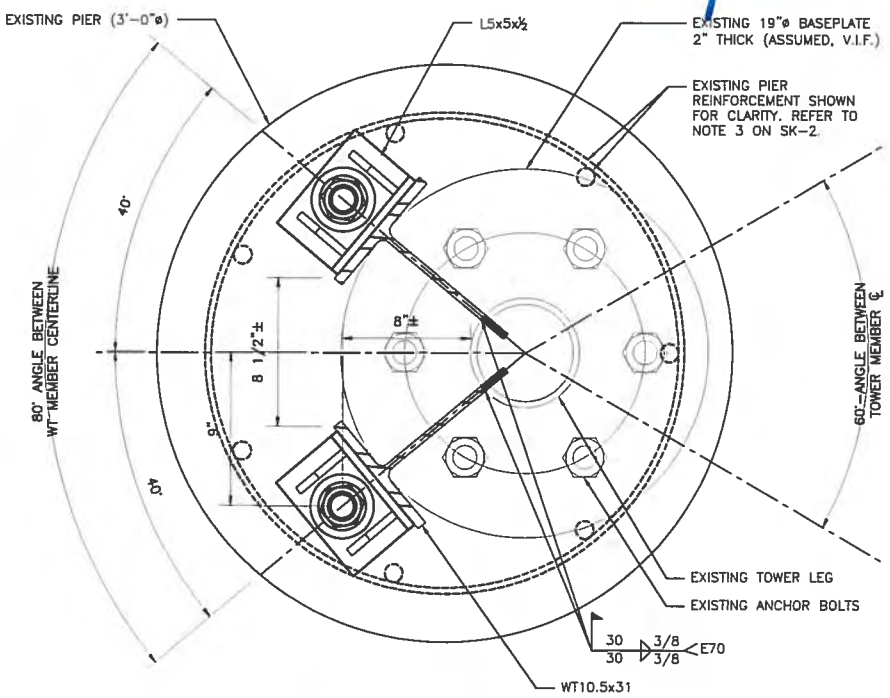
Dwg. No. SK-2

Dwg. 2 of 5





2 / SK-3 **ANCHOR DETAIL**
SCALE: 1-1/2"=1'-0"



1 / SK-3 **ANCHOR LAYOUT @ LEGS A, B &C**
SCALE: 1"=1'-0" (FOOTING NOT SHOWN FOR CLARITY)

STATE OF CONNECTICUT
RICHARD A. SYMBOR
No. 9057
LICENSED
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PROJECT NO.
Designed by: MCD
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Checked by: KAB
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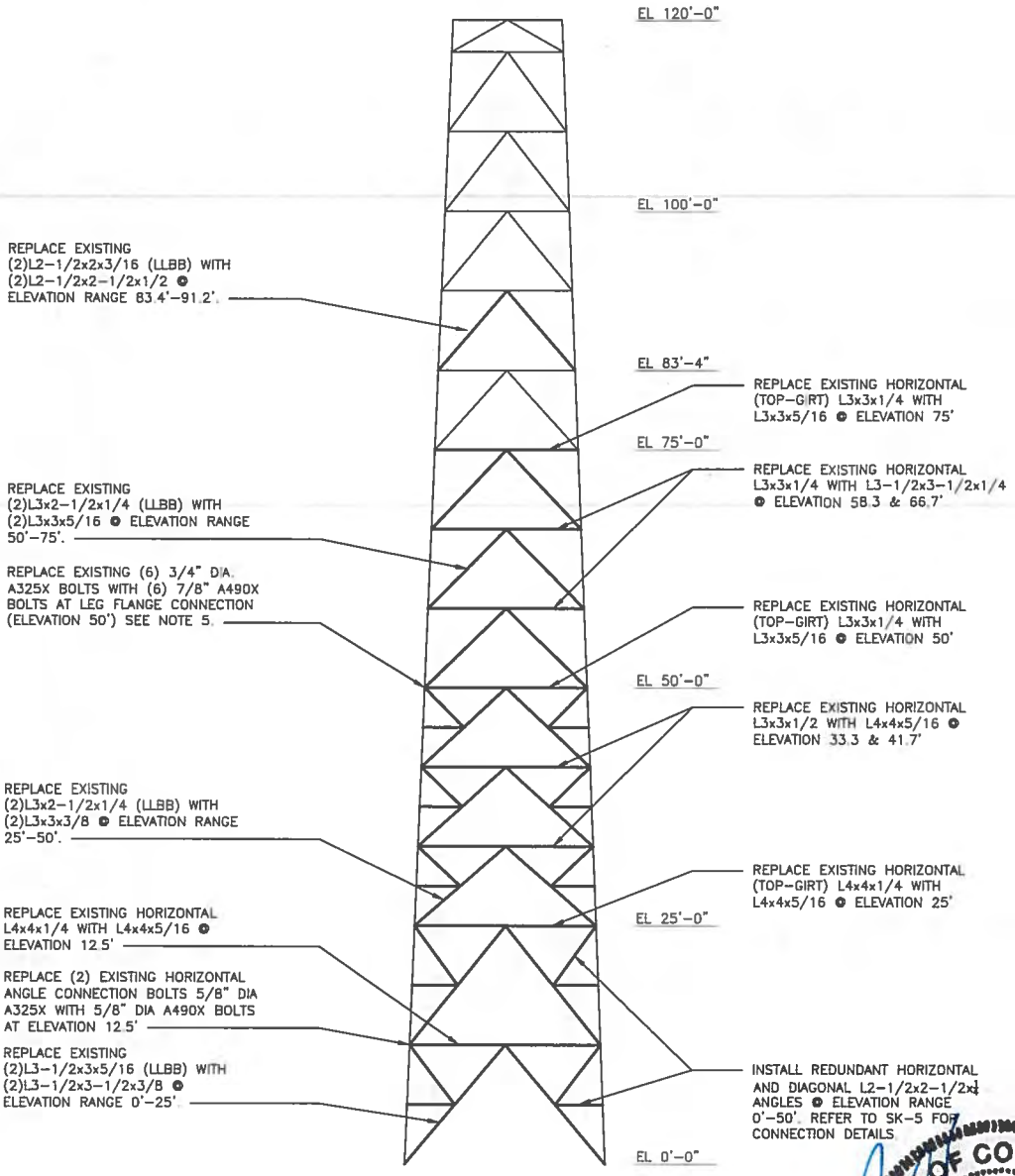
NEW HAVEN, CONNECTICUT 06516

REV.	DATE:	DESCRIPTION

Scale: AS NOTED | Date: 08/14/18
Job No. | File No. | Dwg. 3 of 5

Dwg. No. SK-3

NOTES:
1. REFER TO STRUCTURAL NOTES ON SK-1 FOR STEEL GRADE REQUIREMENTS FOR REPLACEMENT MEMBERS.
2. CONTRACTOR SHALL FIELD VERIFY EXISTING TOWER INFORMATION AND ANGLE MEMBER ORIENTATION PRIOR TO ORDERING MATERIALS.
3. REINFORCEMENT OF TOWER IS REQUIRED FOR ALL 3 SIDES OF EXISTING TOWER STRUCTURE.
4. CONNECTION BOLTS FOR REPLACEMENT MEMBERS SHALL BE REPLACED IN KIND. EXISTING BOLTS SHALL NOT BE RE-USED FOR CONNECTING REPLACEMENT MEMBERS.
5. CONTRACTOR SHALL VERIFY THE APPLICABILITY OF INSTALLING A 7/8" DIA BOLT AT THE INDICATED TOWER LEG FLANGE CONNECTION. CONTRACTOR SHALL OBTAIN PRIOR APPROVAL FROM THE CONNECTICUT STATE POLICE IF THE EXISTING FLANGE BOLT HOLES NEED TO BE INCREASED VIA DRILLING OR OTHER METHODS OF CONSTRUCTION.



1 / SK-2 **TOWER ELEVATION**
SCALE: 1" = 30'-0"

NOTES:
REFER TO SK-1 STRUCTURAL NOTES FOR MORE INFORMATION

STATE OF CONNECTICUT
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REV.	DATE:	DESCRIPTION

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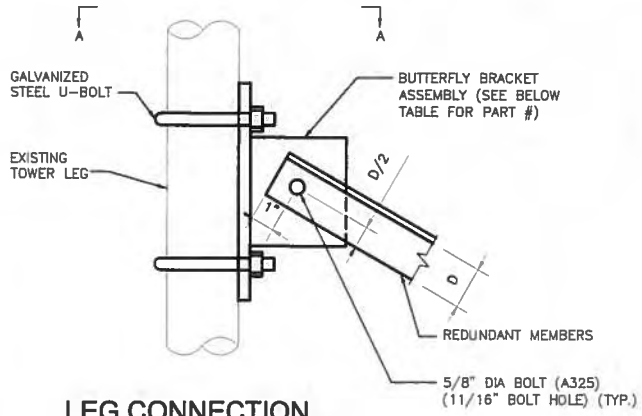
Job No. | File No.

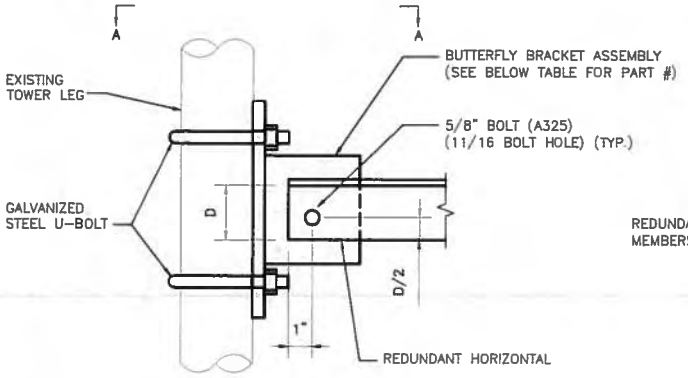
Dwg. No. SK-4
Dwg. 4 of 5



3 SK-5 LEG CONNECTION REDUNDANT DIAGONAL

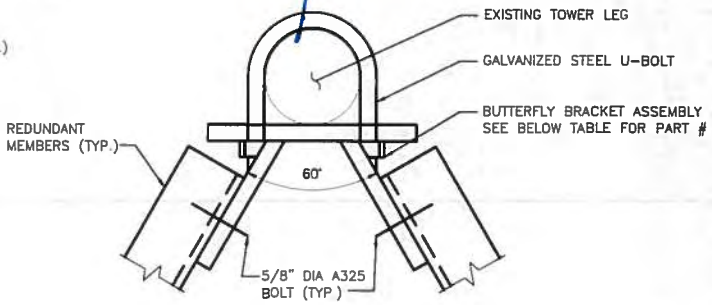
SCALE: 1-1/2"=1'-0"

NOTES:
1. REFER TO SK-1 FOR STRUCTURAL NOTES. COORDINATE SHEET WITH SK-4 FOR SECONDARY HORIZONTAL/DIAGONAL CONNECTION MEMBERS.
2. CONTRACTOR SHALL FIELD VERIFY DIMENSIONS SHOWN PRIOR TO ORDERING MATERIALS.
3. DIMENSIONS NOTED AS 'D' (DEPTH) VARY. REFER TO SK-4 FOR MEMBER SIZE REQUIREMENTS.



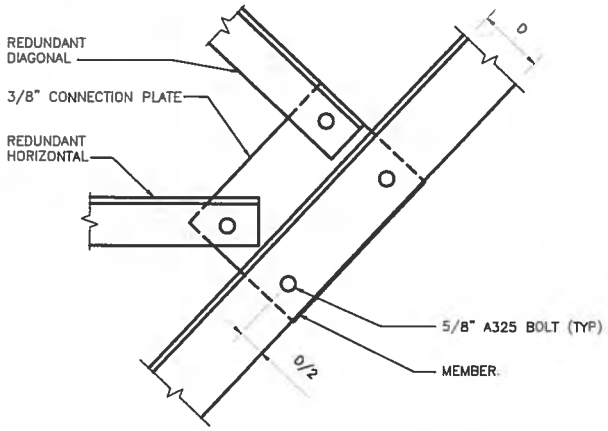
2 SK-5 LEG CONNECTION REDUNDANT HORIZONTAL

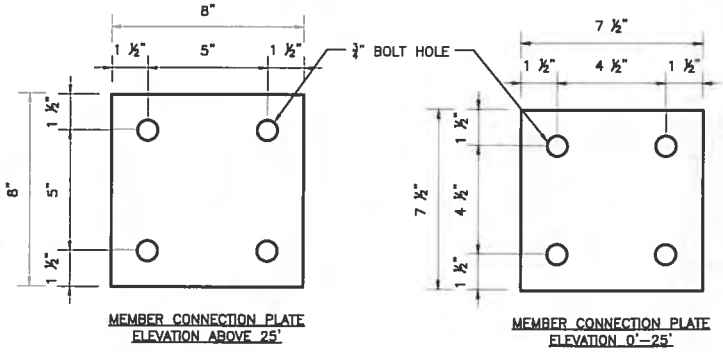
SCALE: 1-1/2"=1'-0"



5 SK-5 SECTION A

SCALE: N.T.S.





1 SK-5 REDUNDANT MEMBER CONNECTION

SCALE: 1-1/2"=1'-0"

4 SK-5 CONNECTION PLATES

SCALE: 1-1/2"=1'-0"

ELEVATION	LEG BUTTERFLY BRACKET #
0'-25'	RSH-0568-86
25'-50'	RSH-0545-68

NOTE: LEG BUTTERFLY BRACKET ASSEMBLY INFORMATION BASED PRIMUS ELECTRONICS CORPORATION. CONTRACTOR SHALL USE PRODUCTS SIMILAR TO OR EXCEEDING IN QUALITY FOR CONSTRUCTION.

NOTE:
1. DETAILS 2 & 3 ABOVE ILLUSTRATE CONNECTIONS OF DIAGONAL AND HORIZONTAL MEMBERS TO TOWER LEGS. BUTTERFLY BRACKET ASSEMBLIES USED FOR CONNECTION TO EXISTING LEGS SHALL BE INSTALLED AS CLOSE TO EXISTING ADJOINING MEMBER AS POSSIBLE.

STATE OF CONNECTICUT RICHARD A. SAMBOR No. 9057 LICENSED PROFESSIONAL ENGINEER

PROJECT NO.
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Dwg. No. SK-5
Dwg. 5 of 5

SEISMIC BASE SHEAR ANALYSIS

Seismic (Vs) Base Shear Implementing TIA–222-G, IBC 2012 & Connecticut State Building Code of 2016

Calculation of Seismic Base Shear Implementing TIA-222-G, IBC 2012 & & CT State Building Code 2016.

Location: New Haven, CT -Site Class "C"

$S_{DS} = \frac{2}{3} F_A S_S$, where $S_S = 0.186$ and $F_A = 1.2$ $S_{DS} = \frac{2}{3} F_A S_S = \frac{2}{3} * 1.2 * 0.186 = 0.1488$

$S_{D1} = \frac{2}{3} F_V S_1$, where $S_1 = 0.062$ and $F_V = 1.7$ $S_{D1} = \frac{2}{3} F_V S_1 = \frac{2}{3} * 1.7 * 0.062 = 0.0703$

TIA-222-G SECTION 2.7 EARTHQUAKE LOADS (PROCEDURES):

1. Importance Factor "I" (tables 2-3 TIA-222-G) = 1.5 (Structure Class 3)

ANSI/TIA-222-G 2.7.7.1 (TOTAL BASE SEISMIC SHEAR (Vs)

W=DL TOWER	=	20.090	Kips
W=Antennas/Mounts	=	11.358	Kips
W=Cables	=	4.464	Kips
		35.9120	Kips = WT Total = "W"

$$V_S = \frac{S_{DS} * W * I}{R} = \frac{0.149 * 35.9120 kips * 1.5}{3.0} = 2.675444\ kips,$$ where R = 3.0 for Lattice Tower

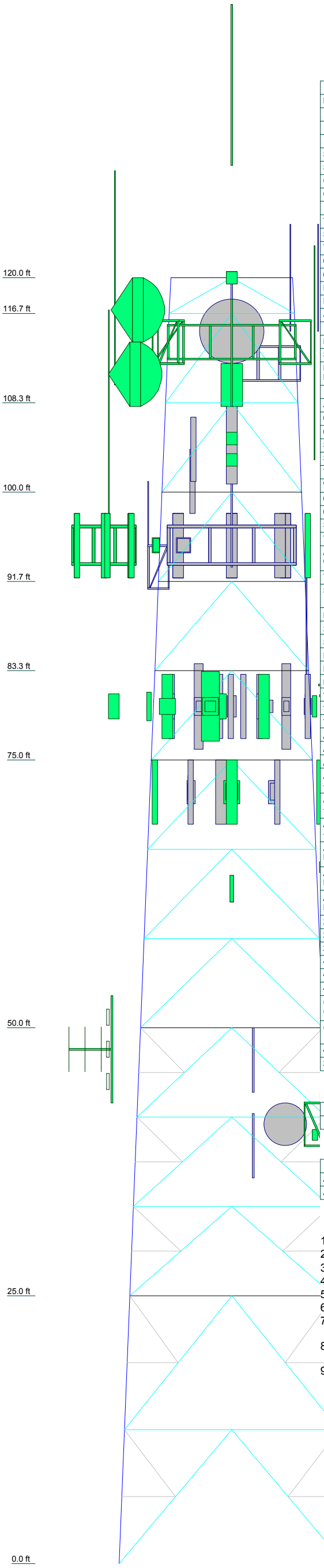
$$V_{S.min} = \frac{0.5 * S_{D1} * W * I}{R} = \frac{0.5 * 0.0703\ *\ 35.9120 kips\ *\ 1.5}{3.0} = 0.6312\quad kips$$

*By visual inspection, the above "Base Shear" value when considering the following Load Combination is less that the base shear of wind on structure.

$1.2 * DL + 1.0\ E\ < 1.2\ DL + 1.6\ W,$ (122 Kips), therefore seismic effect on structure Does NOT control Design.

TNX TOWER INPUT/OUTPUT SUMMARY

Section	T1	T2	T3	T4	T5	T6	T7	T8	T9
Legs	P.5x.250				A500-50		P5x.375	P.5x.400	P6.875x.400
Leg Grade									A572-60
Diagonals	2L2 1/2x2x3/16					2L2 1/2x2x3/8	2L3x3x5/16	2L3x3x3/8	2L3 1/2x3 1/2x3/8
Diagonal Grade	A36					A36		A529-50	
Top Girts	N.A.	A			L3x3x1/4		L3x3x5/16	L3 1/2x3 1/2x5/16	L4x4x5/16
Horizontals	L2 1/2x2 1/2x3/16				N.A.		L3 1/2x3 1/2x1/4	L4x4x5/16	L4x4x3/8
Red. Horizontals	N.A.				N.A.				L2 1/2x2 1/2x1/4
Red. Diagonals					N.A.				L2 1/2x2 1/2x1/4
Inner Bracing	N.A.				L2 1/2x2 1/2x3/16				L2 1/2x2 1/2x3/16
Face Width (ft)	11.4146	11.6814	12.3483	13.0153	13.6822	14.3492	15.0162	17.017	19.0179
# Panels @ (ft)	B						11 @ 8.33333		2 @ 12.5
Weight (K)	0.5	0.8	0.8	0.9	1.1	1.3	5.1	6.9	7.2



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod 5/8x4' (#27)	138	3' Yagi (#13 - CSP-11)	82
16'x2.5" Pipe Mount (#27 Mount)	138	3' Yagi (#12)	81
16'x3" Omni (inverted) (#23-A - CSP-22)	120 - 106	RRUS-32 (ATT)	80
16'x3" Omni (inverted) (#23-B - CSP-23)	120 - 106	SBNH-1D6565C (ATT)	80
SC479-HF1LDF (inverted) (#24-B)	120 - 106	DC6-48-60-18-8F (Squid) Suppressor (ATT)	80
SC479-HF1LDF (#24-C - CSP#21)	120	TPA-65R-LCUUUU-H8 Panel w/ RET (ATT)	80
OGT9-840 (#24-D - CSP#8)	120	RRUS-11 (ATT)	80
OGT9-840 (#25-B - CSP#7)	120	RRUS-32 (ATT)	80
10'x2" Dipole Antenna (#26 - CSP-15)	120	HPA-65R-BUU-H8 Panel (ATT)	80
TMA 432-83H-01T (CSP-24)	120	RRUS-32 (ATT)	80
SC479-HF1LDF (inverted) (CSP - 9 (P))	120 - 106	SBNH-1D6565C (ATT)	80
TMA 432-83H-01T (CSP-24)	120	(2) DTMABP7819VG12A TMA (ATT)	80
6' DISH (SOLID) (#19 - CSP-3)	117	QS66512-2 Panel Antenna (ATT)	80
6' DISH (SOLID) (#21 - CSP-5)	115	RRUS-11 (ATT)	80
Rohn 6' Side-Arm(1) (#24 Antennas Mount)	114	(2) RRUS-32 (ATT)	80
Rohn 6' Side-Arm(1) (#24 Antennas Mount)	114	HPA-65R-BUU-H8 Panel (ATT)	80
Junction Box (#24-A)	114	800-10966 Kathrien Panel w/ Pipe Mt. (ATT - Proposed)	80
10'x2" Dipole Antenna (inverted) (#24-E)	114 - 104	RRUS-12 (ATT - Proposed)	80
Rohn 6' Side-Arm(1) (#25 Antennas Mount)	114	4478 Radio Unit (4x40W) (ATT - Proposed)	80
SC479-HF1LDF (inverted) (#25-A - CSP-17)	114 - 100	800-10966 Kathrien Panel w/ Pipe Mt. (ATT - Proposed)	80
Pirod 4' Side Mount Standoff (1) (#22, 23-A, 23-B Mount)	113	RRUS-12 (ATT - Proposed)	80
16'x3" Omni (#22)	113	4478 Radio Unit (4x40W) (ATT - Proposed)	80
Junction Box (#23-C)	112	800-10965 Kathrien Panel w/ Pipe Mount (ATT - Proposed)	80
6' DISH (SOLID) (#20 - CSP-6)	111	RRUS-12 (ATT - Proposed)	80
6'8"x4" Pipe Mount (#21 - Dish Mount)	110	4478 Radio Unit (4x40W) (ATT - Proposed)	80
SC479-HF1LDF (CSP-18 (New Install))	110	DC6-48-60-0-8F (Squid) Unit (ATT - Proposed)	80
SC479-HF1LDF (inverted) (CSP-19 (New Install))	110 - 96	RRUS-11 (ATT)	80
TMA 432-83H-01T (CSP-20)	110	RRUS-32 (ATT)	80
WPA-70040-4CF-EDIN Panel (CSP-28)	110	DC6-48-60-18-8F (Squid) Suppressor (ATT)	80
6'8"x4" Pipe Mount (#19 - Dish Mount)	107	Face Mount ((#11) ATT)	80
6'8"x4" Pipe Mount (#20 - Dish Mount)	107	Face Mount ((#11) ATT)	80
SE419-SWBPALDF Panel Antenna (CSP-29)	105	Face Mount ((#11) ATT)	80
TMA 432-83H-01T (CSP-30)	105	HPA-65R-BUU-H8 Panel (ATT)	80
AP13-850/065D w/Mount Pipe (#18-B - CSP-12(E))	104	TPA-65R-LCUUUU-H8 Panel w/ RET (ATT)	80
TMA 432-83H-01T (CSP-32)	103	20' 4-Bay Dipole (#14)	77
SE419-SWBPALDF Panel Antenna (#18-A - CSP 13(P))	101	3'4"x4" Pipe Mount (horizontal) ((Bottom mount) #15)	76
PD458-406 (# 16-B - CSP-2)	100 - 92	Face Mount (Sprint)	72
3'4"x4" Pipe Mount (horizontal) ((Top Mount) #15)	96	Face Mount (Sprint)	72
SC479-HF1LDF (inverted) (# 16-A - CSP-10)	95 - 81	Face Mount (Sprint)	72
EUSF10-U ((#17) T-Mobile)	95	ALU 4x45W (1900 MHz) (Sprint)	72
EUSF10-U ((#17) T-Mobile)	95	ALU 4x45W (1900 MHz) (Sprint)	72
EUSF10-U ((#17) T-Mobile)	95	ALU 4x45W (1900 MHz) (Sprint)	72
TMA2093F00V1-1 Twin TMA ((#17) T-Mobile)	95	ALU TD-RRH-8x20-25 (Sprint)	72
TMA2093F00V1-1 Twin TMA ((#17) T-Mobile)	95	ALU TD-RRH-8x20-25 (Sprint)	72
TMA2093F00V1-1 Twin TMA ((#17) T-Mobile)	95	ALU TD-RRH-8x20-25 (Sprint)	72
AIR32 B66Aa/B2a Antenna Panel ((#17) T-Mobile)	95	ALU 800MHz 2x50W (Sprint)	72
AIR32 B66Aa/B2a Antenna Panel ((#17) T-Mobile)	95	ALU 800MHz 2x50W (Sprint)	72
AIR32 B66Aa/B2a Antenna Panel ((#17) T-Mobile)	95	ALU 800MHz 2x50W (Sprint)	72
APXVAARR24_43-U-NA20 Panel (RFS) (T-Mobile - Proposed)	95	NNVV-65B-R4 Panel Antenna (Sprint)	72
APXVAARR24_43-U-NA20 Panel (RFS) (T-Mobile - Proposed)	95	NNVV-65B-R4 Panel Antenna (Sprint)	72
APXVAARR24_43-U-NA20 Panel (RFS) (T-Mobile - Proposed)	95	NNVV-65B-R4 Panel Antenna (Sprint)	72
AIR 3246 B66 Panel Antenna (T-Mobile - Proposed)	95	AAHC Panel Antenna (Sprint)	72
AIR 3246 B66 Panel Antenna (T-Mobile - Proposed)	95	AAHC Panel Antenna (Sprint)	72
AIR 3246 B66 Panel Antenna (T-Mobile - Proposed)	95	AAHC Panel Antenna (Sprint)	72
2217 B2 Radio Unit (T-Mobile - Proposed)	95	4'6"x3" Pipe Mount (horizontal) ((Bottom mount) #14)	67
2217 B2 Radio Unit (T-Mobile - Proposed)	95	6' Yagi w/ Mount (#9)	65
2217 B2 Radio Unit (T-Mobile - Proposed)	95	GPS (#8)	63
4449 B71 + B12 Radio Unit (T-Mobile - Proposed)	95	2'6"x4" Pipe Mount (For #8)	63
4449 B71 + B12 Radio Unit (T-Mobile - Proposed)	95	20' 4-Bay Dipole w/ 2' Sidearm Mount (#7 - CSP-4)	55
4449 B71 + B12 Radio Unit (T-Mobile - Proposed)	95	1.0" Dia 4' Omni w/Pipe Mount (#6 - CSP#16)	53
(2) (Horizontal) 8'x2 1/2" Pipe Mount (Invert #16-A) (# 16-AB)	92	3' Yagi (#4-B)	48
(2) (Horizontal) 8'x2 1/2" Pipe Mount (Upright # 16-B) (# 16-AB)	92	Pirod 4' Side Mount Standoff (1) (#4-AB)	48
4'6"x3" Pipe Mount (horizontal) ((Top Mount) #14)	87	10'x6" Dipole Antenna (#4-A)	48
20' 4-Bay Dipole (#15)	86	5'x1.5in dia Whip Antenna /w mount (#3)	47
		3' Whip (3in diameter) /w mount (#2)	43
		4 FT DISH (#1-A)	41
		Pirod 6' Side Mount Standoff (1) (#1-A Dish Mount)	41
		1'x1' Panel Antenna (#1-B (mount Share #1-A))	40
		6'x1" Whip Antenna w/ Mount (#5 - CSP#14)	39

SYMBOL LIST

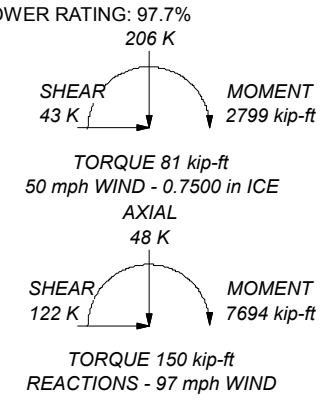
MARK	SIZE	MARK	SIZE
A	L2 1/2x2 1/2x3/16	B	1 @ 3.33333

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A500-50	50 ksi	62 ksi	A529-50	50 ksi	65 ksi
A36	36 ksi	58 ksi	A572-60	60 ksi	75 ksi

TOWER DESIGN NOTES

1. Tower designed for Exposure C to the TIA-222-G Standard.
2. Tower designed for a 97 mph basic wind in accordance with the TIA-222-G Standard.
3. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 60 mph wind.
5. Tower Structure Class III.
6. Topographic Category 4 with Crest Height of 150.00 ft
7. Antenna/Mount/Cable's marked (# ##) refer to site tower climb identification numbers. Tower climb by D and K Nationwide Communications, Inc. (March 30, 2016).
8. Antenna/Mount/Cable's marked (CSP-#) refer to Connecticut State Police inventory obtained via e-mail dated April 8, 2016.
9. TOWER RATING: 97.7%



AECOM
500 Enterprise Drive, Suite 3B
Rocky Hill, CT
Phone: 860-529-8882
FAX: 860-529-3991

Job:	**120' Self-Supporting Lattice Tower**		
Project:	**Connecticut State Police Tower - West Rock - MODification**		
Client:	SMK-003 / ASM-010 / NSS-044 / (AT&T) / (Sprint) / (T-Mobile)	Drawn by: MCD	App'd:
Code:	TIA-222-G	Date: 08/14/18	Scale: NTS
Path:	P:\Projects\Telcom\StructuralsByLocation\Connecticut\NewHaven\CSP#27\06_SMK-003_ASM-010_NSS-044\TIA-G\MOD_CSP#27 Tower.eri		Dwg No. E-1

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	2L2 1/2x2 1/2x1/4	C	1 @ 3.33333
B	L2 1/2x2 1/2x3/16		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A500-50	50 ksi	62 ksi	A529-50	50 ksi	65 ksi
A36	36 ksi	58 ksi	A572-60	60 ksi	75 ksi

TOWER DESIGN NOTES

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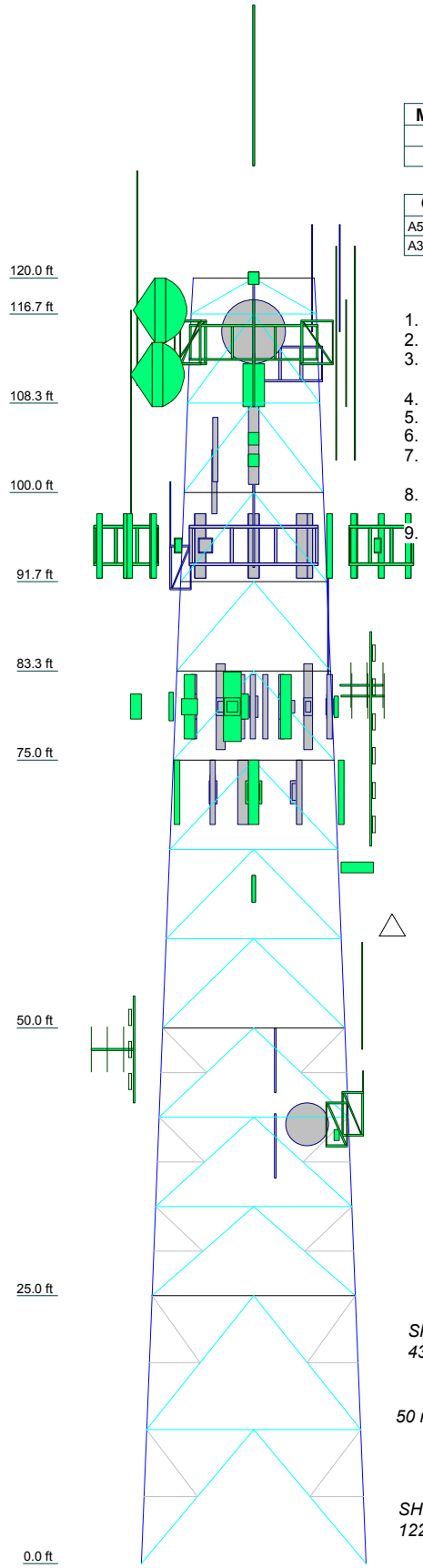
8. Antenna/Mount/Cable's marked (CSP-#) refer to Connecticut State Police inventory obtained via e-mail dated April 8, 2016.
9. TOWER RATING: 97.7%

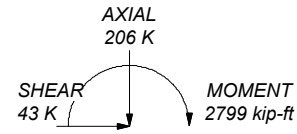


Section	T9	T8	T7	T6	T5	T4	T3	T2	T1
Legs	P6.875x.400	P.5x.400	P5x.375			P.5x.250			
Leg Grade	A572-60		A500-50						
Diagonals	2L3 1/2x3 1/2x3/8	2L3x3x3/8	2L3x3x5/16	2L2 1/2x2x3/8	A	2L2 1/2x2x3/16			
Diagonal Grade		A529-50		A36	A529-50		A36		
Top Girts	L4x4x5/16	L3 1/2x3 1/2x5/16	L3x3x5/16		L3x3x1/4		N.A.		B
Horizontals	L4x4x3/8	L4x4x5/16	L3 1/2x3 1/2x1/4		N.A.		L2 1/2x2 1/2x3/16		N.A.
Red. Horizontals	L2 1/2x2 1/2x1/4		N.A.						
Red. Diagonals	L2 1/2x2 1/2x1/4		N.A.						
Inner Bracing	L2 1/2x2 1/2x3/16		L2 1/2x2x3/16			N.A.			
Face Width (ft) 21.0188	19.0179	17.017	15.0162	14.3492	13.6822	13.0153	12.3483	11.6814	4.4146
# Panels @ (ft)	2 @ 12.5		11 @ 8.33333						C
Weight (K) 24.6	7.2	6.9	5.1	1.3	1.1	0.9	0.8	0.8	0.5

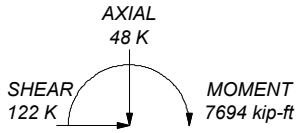
ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 439 K
SHEAR: 66 K

UPLIFT: -393 K
SHEAR: 61 K



TORQUE 81 kip-ft
50 mph WIND - 0.7500 in ICE



TORQUE 150 kip-ft
REACTIONS - 97 mph WIND

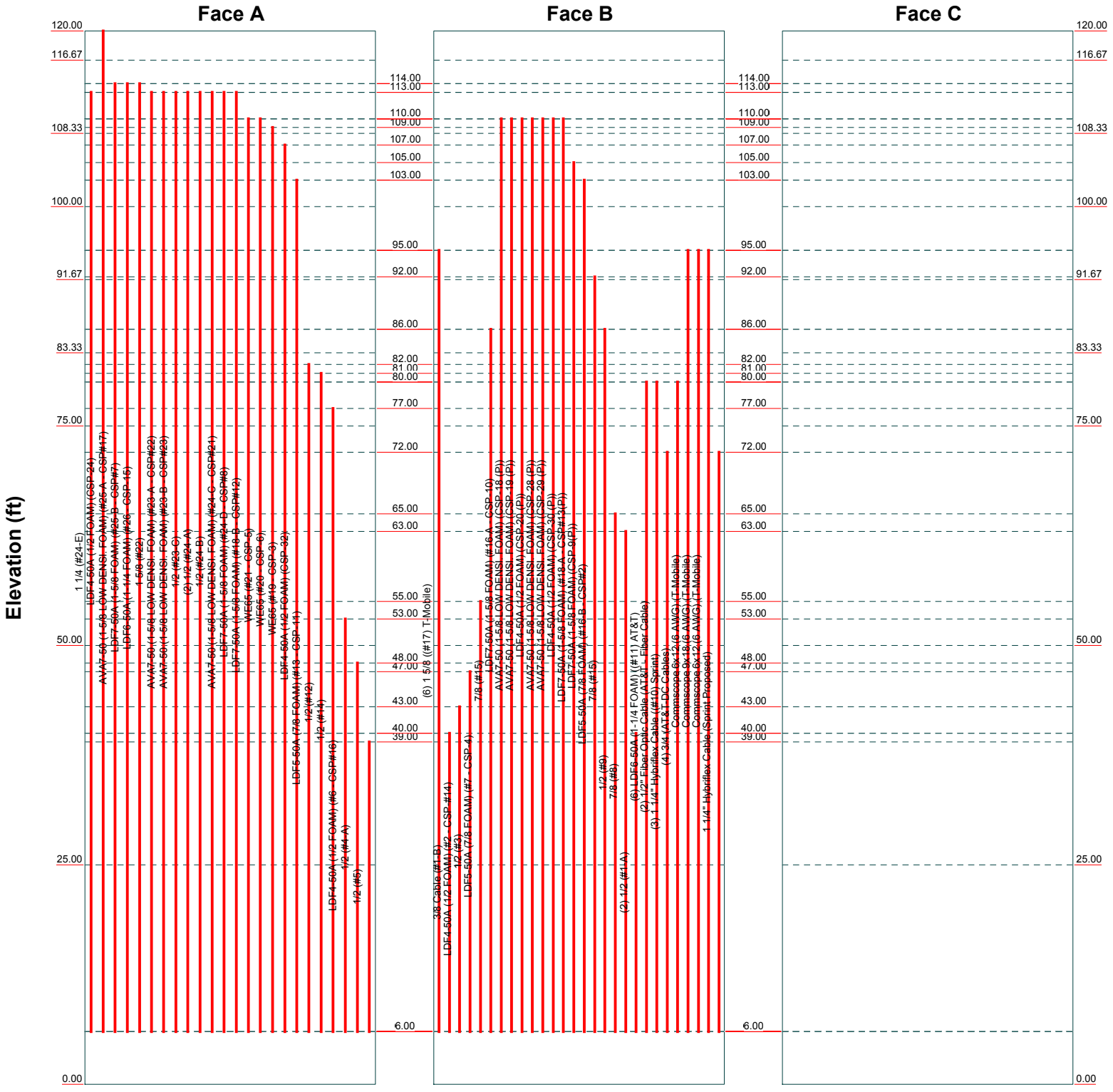
AECOM
500 Enterprise Drive, Suite 3B
Rocky Hill, CT
Phone: 860-529-8882
FAX: 860-529-3991

Job: ***120' Self-Supporting Lattice Tower***			
Project: ***Connecticut State Police Tower - West Rock - MODification***			
Client: SMK-003 / ASM-010 / NSS-044 / (AT&T) / (Sprint) / (T-Mobile)	Drawn by: MCD	App'd:	
Code: TIA-222-G	Date: 08/14/18	Scale: NTS	
Path: P:\Projects\Telcom\StructuralsByLocation\Connecticut\NewHaven\CSP#27\06_SMK-003_ASM-010_NSS-044\TIA-G\MOD_CSP#27 Tower.eri		Dwg No. E-1	

TNX TOWER FEEDLINE DISTRIBUTION CHART

Feed Line Distribution Chart
0' - 120'

Round | Flat | App In Face | App Out Face | Truss Leg



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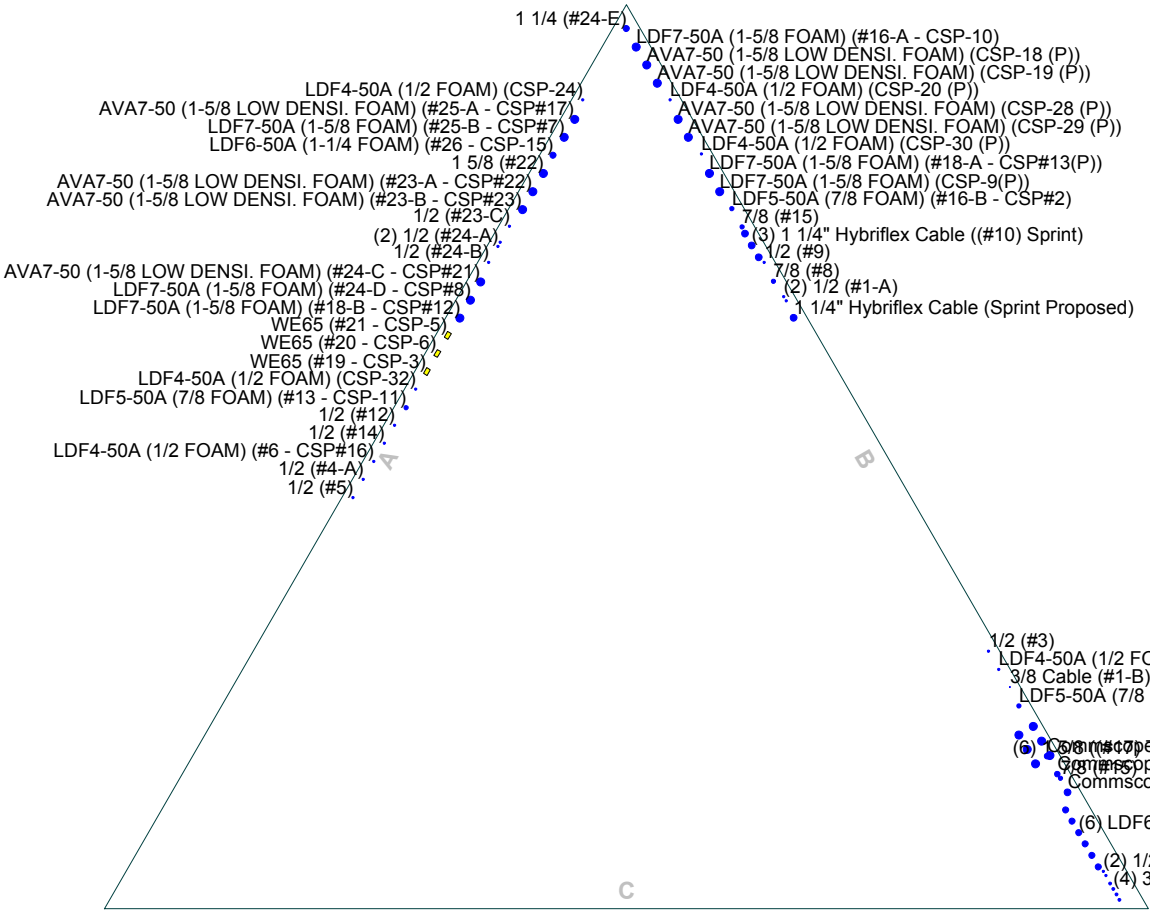
App'd:	
Code:	TIA-222-G
Date:	08/14/18
Scale:	NTS
Path:	P:\Projects\Telcom\StructuralsByLocation\Connecticut\NewHaven\CSP#27\06_SMK-003_ASM-010_NSS-044\TIA-G\MOD_CSP#27 Tower.eri
Dwg No.	E-7

TNX TOWER FEEDLINE PLAN

Feed Line Plan

Round Flat App In Face App Out Face



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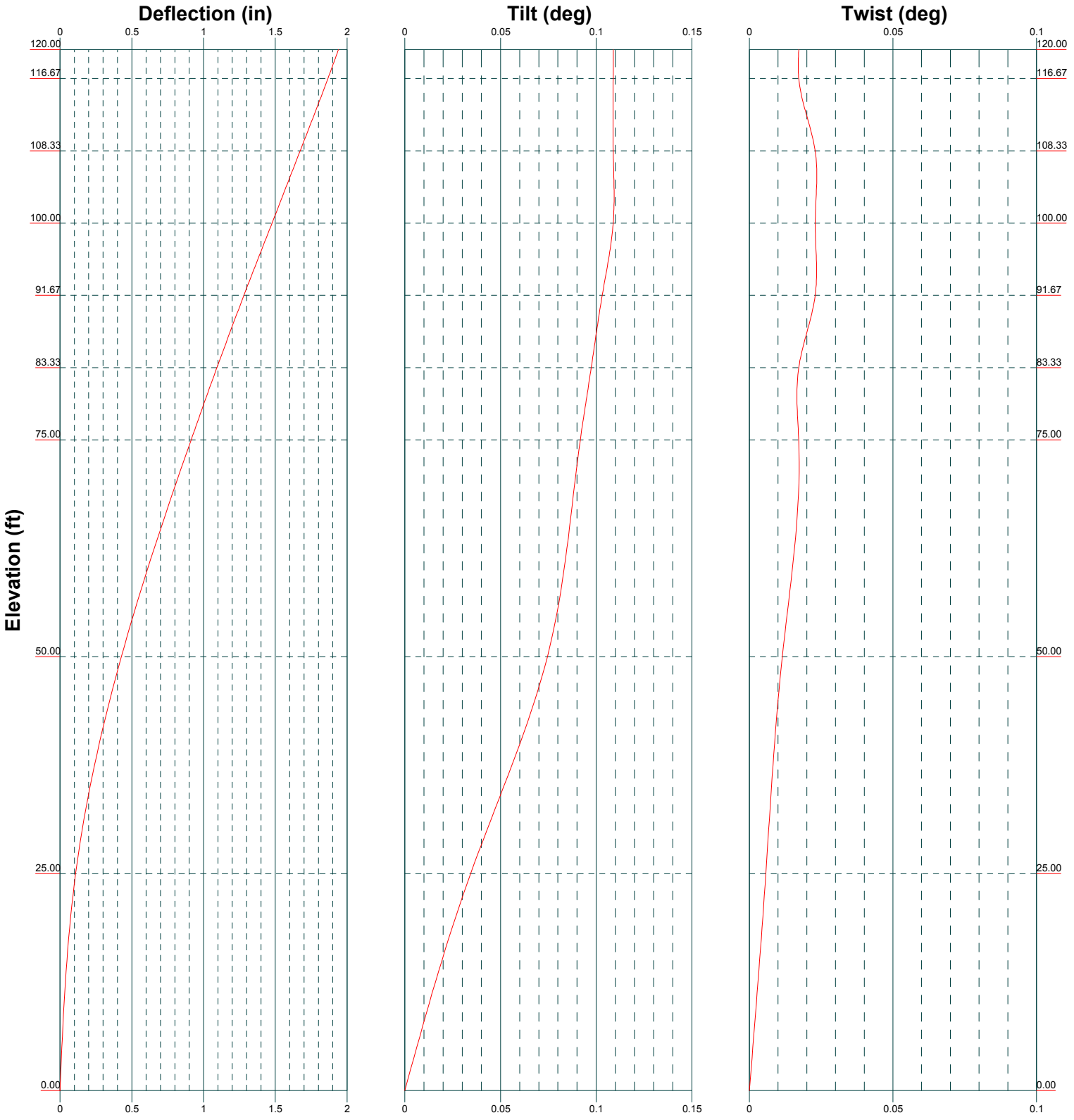
Code:	TIA-222-G	Date: 08/14/18	Scale: NTS
Path:	P:\Projects\Telcom\StructuralsByLocation\Connecticut\NewHavenCSP#27\06_SMK-003_ASM-010_NSS-044\TIA-G\MOD_CSP#27 Tower.eri		Dwg No. E-7

TNX DEFLECTION, TILT AND TWIST

TIA-222-G - Service - 60 mph

Maximum Values



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Project: ***Connecticut State Police Tower - West Rock - MODification***			
Client: SMK-003 / ASM-010 / NSS-044 / (AT&T) / (Sprint) / (T-Mobile)	Drawn by: MCD	App'd:	
Code: TIA-222-G	Date: 08/14/18	Scale: NTS	
Path: P:\Projects\Telcom\StructuralsByLocation\Connecticut\NewHavenCSP#27\06_SMK-003_ASM-010_NSS-044\TIA-G\MOD_CSP#27 Tower.eri		Dwg No. E-5	

TNX TOWER DETAILED OUTPUT

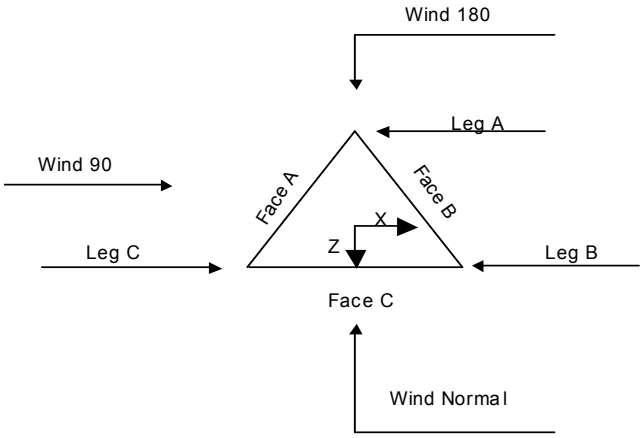
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 120.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 11.41 ft at the top and 21.02 ft at the base.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

Basic wind speed of 97 mph.
Structure Class III.
Exposure Category C.
Topographic Category 4.
Crest Height 150.00 ft.
Nominal ice thickness of 0.7500 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 50 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
Antenna/Mount/Cable's marked (# ##) refer to site tower climb identification numbers. Tower climb by D and K Nationwide Communications, Inc. (March 30, 2016)..
Antenna/Mount/Cable's marked (CSP-#) refer to Connecticut State Police inventory obtained via e-mail dated April 8, 2016..
Pressures are calculated at each section.
Stress ratio used in tower member design is 1.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation ft	Assembly Database	Description	Section Width ft	Number of Sections	Section Length ft
T1	120.00-116.67			11.41	1	3.33
T2	116.67-108.33			11.68	1	8.33
T3	108.33-100.00			12.35	1	8.33
T4	100.00-91.67			13.02	1	8.33
T5	91.67-83.33			13.68	1	8.33
T6	83.33-75.00			14.35	1	8.33
T7	75.00-50.00			15.02	1	25.00
T8	50.00-25.00			17.02	1	25.00
T9	25.00-0.00			19.02	1	25.00

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T1	120.00-116.67	3.33	K Brace Down	No	Yes	0.0000	0.0000
T2	116.67-108.33	8.33	K Brace Down	No	Yes	0.0000	0.0000
T3	108.33-100.00	8.33	K Brace Down	No	Yes	0.0000	0.0000
T4	100.00-91.67	8.33	K Brace Down	No	Yes	0.0000	0.0000
T5	91.67-83.33	8.33	K Brace Down	No	Yes	0.0000	0.0000
T6	83.33-75.00	8.33	K Brace Down	No	Yes	0.0000	0.0000

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T7	75.00-50.00	8.33	K Brace Down	No	Yes	0.0000	0.0000
T8	50.00-25.00	8.33	K1 Down	No	Yes	0.0000	0.0000
T9	25.00-0.00	12.50	K1 Down	No	Yes	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 120.00-116.67	Pipe	P.5x.250	A500-50 (50 ksi)	Double Angle	2L2 1/2x2x3/16	A36 (36 ksi)
T2 116.67-108.33	Pipe	P.5x.250	A500-50 (50 ksi)	Double Angle	2L2 1/2x2x3/16	A36 (36 ksi)
T3 108.33-100.00	Pipe	P.5x.250	A500-50 (50 ksi)	Double Angle	2L2 1/2x2x3/16	A36 (36 ksi)
T4 100.00-91.67	Pipe	P.5x.250	A500-50 (50 ksi)	Double Angle	2L2 1/2x2x3/16	A36 (36 ksi)
T5 91.67-83.33	Pipe	P.5x.250	A500-50 (50 ksi)	Double Equal Angle	2L2 1/2x2 1/2x1/4	A529-50 (50 ksi)
T6 83.33-75.00	Pipe	P.5x.250	A500-50 (50 ksi)	Double Angle	2L2 1/2x2x3/8	A36 (36 ksi)
T7 75.00-50.00	Pipe	P5x.375	A500-50 (50 ksi)	Double Equal Angle	2L3x3x5/16	A529-50 (50 ksi)
T8 50.00-25.00	Pipe	P.5x.400	A572-60 (60 ksi)	Double Equal Angle	2L3x3x3/8	A529-50 (50 ksi)
T9 25.00-0.00	Pipe	P6.875x.400	A572-60 (60 ksi)	Double Equal Angle	2L3 1/2x3 1/2x3/8	A529-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 120.00-116.67	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T4 100.00-91.67	Single Angle	L3x3x1/4	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T5 91.67-83.33	Single Angle	L3x3x1/4	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T6 83.33-75.00	Single Angle	L3x3x1/4	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T7 75.00-50.00	Single Angle	L3x3x5/16	A529-50 (50 ksi)	Solid Round		A36 (36 ksi)
T8 50.00-25.00	Equal Angle	L3 1/2x3 1/2x5/16	A529-50 (50 ksi)	Solid Round		A36 (36 ksi)
T9 25.00-0.00	Equal Angle	L4x4x5/16	A529-50 (50 ksi)	Solid Round		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T1 120.00-116.67	None	Flat Bar		A36 (36 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T2 116.67-108.33	None	Flat Bar		A36 (36 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T3 108.33-100.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T4 100.00-91.67	None	Flat Bar		A36 (36 ksi)	Single Angle	L3x3x1/4	A36 (36 ksi)
T5 91.67-83.33	None	Flat Bar		A36 (36 ksi)	Single Angle	L3x3x1/4	A36 (36 ksi)
T6 83.33-75.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L3x3x1/4	A36 (36 ksi)
T7 75.00-50.00	None	Flat Bar		A36 (36 ksi)	Equal Angle	L3 1/2x3 1/2x1/4	A529-50 (50 ksi)
T8 50.00-25.00	None	Flat Bar		A36 (36 ksi)	Equal Angle	L4x4x5/16	A529-50 (50 ksi)
T9 25.00-0.00	None	Flat Bar		A36 (36 ksi)	Equal Angle	L4x4x3/8	A529-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Secondary Horizontal Type	Secondary Horizontal Size	Secondary Horizontal Grade	Inner Bracing Type	Inner Bracing Size	Inner Bracing Grade
T4 100.00-91.67	Solid Round		A572-50 (50 ksi)	Single Angle	L2 1/2x2x3/16	A36 (36 ksi)
T5 91.67-83.33	Solid Round		A572-50 (50 ksi)	Single Angle	L2 1/2x2x3/16	A36 (36 ksi)
T6 83.33-75.00	Solid Round		A572-50 (50 ksi)	Single Angle	L2 1/2x2x3/16	A36 (36 ksi)
T7 75.00-50.00	Solid Round		A572-50 (50 ksi)	Single Angle	L2 1/2x2x3/16	A36 (36 ksi)
T8 50.00-25.00	Solid Round		A572-50 (50 ksi)	Single Angle	L2 1/2x2x3/16	A36 (36 ksi)
T9 25.00-0.00	Solid Round		A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Redundant Bracing Grade		Redundant Type	Redundant Size	K Factor
T8	A36	Horizontal (1)	Equal Angle	L2 1/2x2 1/2x1/4	1
50.00-25.00	(36 ksi)	Diagonal (1)	Equal Angle	L2 1/2x2 1/2x1/4	1
T9 25.00-0.00	A36	Horizontal (1)	Equal Angle	L2 1/2x2 1/2x1/4	1
	(36 ksi)	Diagonal (1)	Equal Angle	L2 1/2x2 1/2x1/4	1

Tower Section Geometry *(cont'd)*

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
T1 120.00-116.67	0.00	0.0000	A36 (36 ksi)	1	1	1	0.0000	36.0000	36.0000
T2 116.67-108.33	0.00	0.0000	A36 (36 ksi)	1	1	1	0.0000	36.0000	36.0000
T3 108.33-100.00	0.00	0.0000	A36 (36 ksi)	1	1	1	0.0000	36.0000	36.0000
T4 100.00-91.67	0.00	0.0000	A36 (36 ksi)	1	1	1	0.0000	36.0000	36.0000
T5 91.67-83.33	0.00	0.0000	A36 (36 ksi)	1	1	1	0.0000	36.0000	36.0000
T6 83.33-75.00	0.00	0.0000	A36 (36 ksi)	1	1	1	0.0000	36.0000	36.0000
T7 75.00-50.00	0.00	0.0000	A36 (36 ksi)	1	1	1	0.0000	36.0000	36.0000
T8 50.00-25.00	0.00	0.0000	A36 (36 ksi)	1	1	1	0.0000	36.0000	36.0000
T9 25.00-0.00	0.00	0.0000	A36 (36 ksi)	1	1	1	0.0000	36.0000	36.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1 120.00-116.67	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T2 116.67-108.33	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T3 108.33-100.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T4 100.00-91.67	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T5 91.67-83.33	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T6 83.33-75.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T7 75.00-50.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T8 50.00-25.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T9 25.00-0.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1

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

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 120.00-116.67	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T2 116.67-108.33	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T3 108.33-100.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T4 100.00-91.67	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T5 91.67-83.33	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T6 83.33-75.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T7 75.00-50.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T8 50.00-25.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T9 25.00-0.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 120.00-116.67	Flange	0.0000 A325X	0	0.7500 A325X	1	0.6250 A325X	2	0.0000 A325X	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T2 116.67-108.33	Flange	0.0000 A325X	0	0.7500 A325X	1	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T3 108.33-100.00	Flange	0.0000 A325X	0	0.7500 A325X	1	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T4 100.00-91.67	Flange	0.7500 A325X	6	0.7500 A325X	1	0.6250 A325X	2	0.0000 A325X	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T5 91.67-83.33	Flange	0.7500 A325X	0	0.7500 A325X	1	0.6250 A325X	2	0.0000 A325X	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T6 83.33-75.00	Flange	0.7500 A325X	0	0.7500 A325X	1	0.6250 A325X	2	0.6250 A325X	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T7 75.00-50.00	Flange	0.7500 A325X	6	0.7500 A325X	1	0.6250 A325X	2	0.6250 A325X	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T8 50.00-25.00	Flange	0.8750 A490X	6	0.7500 A325X	1	0.6250 A325X	2	0.6250 A325X	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T9 25.00-0.00	Flange	1.0000 A325X	8	1.0000 A325X	1	0.6250 A325X	2	0.6250 A325X	0	0.6250 A325N	0	0.6250 A490X	2	0.6250 A325N	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
1 5/8 ((#17) T-Mobile)	B	No	Ar (CaAa)	95.00 - 6.00	-5.0000	0.31	6	3	1.9800	1.9800		1.04
3/8 Cable (#1-B)	B	No	Ar (CaAa)	40.00 - 6.00	-2.0000	0.25	1	1	0.3750	0.3750		0.20
LDF4-50A (1/2 FOAM) (#2 - CSP-#14)	B	No	Ar (CaAa)	43.00 - 6.00	-2.0000	0.23	1	1	0.6300	0.6300		0.15
1/2 (#3)	B	No	Ar (CaAa)	47.00 - 6.00	-2.0000	0.21	1	1	0.5800	0.5800		0.25
LDF5-50A (7/8 FOAM) (#7 - CSP-4)	B	No	Ar (CaAa)	55.00 - 6.00	-2.0000	0.27	1	1	1.0900	1.0900		0.33
7/8 (#15)	B	No	Ar (CaAa)	86.00 - 6.00	-2.0000	0.35	1	1	1.1100	1.1100		0.54
1 1/4 (#24-E)	A	No	Ar (CaAa)	113.00 - 6.00	-2.0000	0.48	1	1	1.5500	1.5500		0.66
LDF4-50A (1/2 FOAM) (CSP-24)	A	No	Ar (CaAa)	120.00 - 6.00	-2.0000	0.4	1	1	0.6300	0.6300		0.15
AVA7-50 (1-5/8 LOW DENSI. FOAM) (#25-A - CSP#17)	A	No	Ar (CaAa)	114.00 - 6.00	-2.0000	0.38	1	1	1.9800	1.9800		0.72
LDF7-50A (1-5/8 FOAM) (#25-B - CSP#7)	A	No	Ar (CaAa)	114.00 - 6.00	-2.0000	0.36	1	1	1.9800	1.9800		0.82
LDF6-50A (1-1/4 FOAM) (#26 - CSP-15)	A	No	Ar (CaAa)	114.00 - 6.00	-2.0000	0.34	1	1	1.5500	1.5500		0.66
1 5/8 (#22)	A	No	Ar (CaAa)	113.00 - 6.00	-2.0000	0.32	1	1	1.9800	1.9800		1.04
AVA7-50 (1-5/8 LOW DENSI. FOAM) (#23-A - CSP#22)	A	No	Ar (CaAa)	113.00 - 6.00	-2.0000	0.3	1	1	1.9800	1.9800		0.72
AVA7-50 (1-5/8 LOW DENSI. FOAM) (#23-B - CSP#23)	A	No	Ar (CaAa)	113.00 - 6.00	-2.0000	0.28	1	1	1.9800	1.9800		0.72
1/2 (#23-C)	A	No	Ar (CaAa)	113.00 - 6.00	-2.0000	0.26	1	1	0.5800	0.5800		0.25
1/2 (#24-A)	A	No	Ar (CaAa)	113.00 - 6.00	-2.0000	0.24	2	2	0.5800	0.5800		0.25
1/2 (#24-B)	A	No	Ar (CaAa)	113.00 - 6.00	-2.0000	0.22	1	1	0.5800	0.5800		0.25
AVA7-50 (1-5/8 LOW DENSI. FOAM) (#24-C - CSP#21)	A	No	Ar (CaAa)	113.00 - 6.00	-2.0000	0.2	1	1	1.9800	1.9800		0.72

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
LDF7-50A (1-5/8 FOAM) (#24-D - CSP#8)	A	No	Ar (CaAa)	113.00 - 6.00	-2.0000	0.18	1	1	1.9800	1.9800		0.82
LDF7-50A (1-5/8 FOAM) (#18-B - CSP#12)	A	No	Ar (CaAa)	110.00 - 6.00	-2.0000	0.16	1	1	1.9800	1.9800		0.82
WE65 (#21 - CSP-5)	A	No	Af (CaAa)	110.00 - 6.00	-2.0000	0.14	1	1	1.5836	1.5836		0.53
WE65 (#20 - CSP-6)	A	No	Af (CaAa)	109.00 - 6.00	-2.0000	0.12	1	1	1.5836	1.5836		0.53
WE65 (#19 - CSP-3)	A	No	Af (CaAa)	107.00 - 6.00	-2.0000	0.1	1	1	1.5836	1.5836		0.53
LDF4-50A (1/2 FOAM) (CSP-32)	A	No	Ar (CaAa)	103.00 - 6.00	-2.0000	0.08	1	1	0.6300	0.6300		0.15
LDF5-50A (7/8 FOAM) (#13 - CSP-11)	A	No	Ar (CaAa)	82.00 - 6.00	-2.0000	0.06	1	1	1.0900	1.0900		0.33
1/2 (#12)	A	No	Ar (CaAa)	81.00 - 6.00	-2.0000	0.04	1	1	0.5800	0.5800		0.25
1/2 (#14)	A	No	Ar (CaAa)	77.00 - 6.00	-2.0000	0.02	1	1	0.5800	0.5800		0.25
LDF4-50A (1/2 FOAM) (#6 - CSP#16)	A	No	Ar (CaAa)	53.00 - 6.00	-2.0000	0	1	1	0.6300	0.6300		0.15
1/2 (#4-A)	A	No	Ar (CaAa)	48.00 - 6.00	-2.0000	-0.02	1	1	0.5800	0.5800		0.25
1/2 (#5)	A	No	Ar (CaAa)	39.00 - 6.00	-2.0000	-0.04	1	1	0.5800	0.5800		0.25
LDF7-50A (1-5/8 FOAM) (#16-A - CSP-10)	B	No	Ar (CaAa)	110.00 - 6.00	-2.0000	-0.46	1	1	1.9800	1.9800		0.82
AVA7-50 (1-5/8 LOW DENSI. FOAM) (CSP-18 (P))	B	No	Ar (CaAa)	110.00 - 6.00	-2.0000	-0.44	1	1	1.9800	1.9800		0.72
AVA7-50 (1-5/8 LOW DENSI. FOAM) (CSP-19 (P))	B	No	Ar (CaAa)	110.00 - 6.00	-2.0000	-0.42	1	1	1.9800	1.9800		0.72
LDF4-50A (1/2 FOAM) (CSP-20 (P))	B	No	Ar (CaAa)	110.00 - 6.00	-2.0000	-0.4	1	1	0.6300	0.6300		0.15
AVA7-50 (1-5/8 LOW DENSI. FOAM) (CSP-28 (P))	B	No	Ar (CaAa)	110.00 - 6.00	-2.0000	-0.38	1	1	1.9800	1.9800		0.72
AVA7-50 (1-5/8 LOW DENSI. FOAM) (CSP-29 (P))	B	No	Ar (CaAa)	110.00 - 6.00	-2.0000	-0.36	1	1	1.9800	1.9800		0.72
LDF4-50A (1/2 FOAM)	B	No	Ar (CaAa)	110.00 - 6.00	-2.0000	-0.34	1	1	0.6300	0.6300		0.15

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
(CSP-30 (P)) LDF7-50A (1-5/8 FOAM)	B	No	Ar (CaAa)	105.00 - 6.00	-2.0000	-0.32	1	1	1.9800	1.9800		0.82
(#18-A - CSP#13(P)) LDF7-50A (1-5/8 FOAM)	B	No	Ar (CaAa)	103.00 - 6.00	-2.0000	-0.3	1	1	1.9800	1.9800		0.82
(CSP-9(P)) LDF5-50A (7/8 FOAM)	B	No	Ar (CaAa)	92.00 - 6.00	-2.0000	-0.28	1	1	1.0900	1.0900		0.33
(#16-B - CSP#2) 7/8	B	No	Ar (CaAa)	86.00 - 6.00	-2.0000	-0.26	1	1	1.1100	1.1100		0.54
(#15) 1/2	B	No	Ar (CaAa)	65.00 - 6.00	-2.0000	-0.22	1	1	0.5800	0.5800		0.25
(#9) 7/8	B	No	Ar (CaAa)	63.00 - 6.00	-2.0000	-0.2	1	1	1.1100	1.1100		0.54
(#8) 1/2	B	No	Ar (CaAa)	40.00 - 6.00	-2.0000	-0.18	2	2	0.5800	0.5800		0.25
(#1-A) LDF6-50A (1-1/4 FOAM)	B	No	Ar (CaAa)	80.00 - 6.00	-4.5000	0.41	6	6	1.5500	1.5500		0.66
((#11) AT&T) 1/2" Fiber Optic Cable (AT&T - Fiber Cable)	B	No	Ar (CaAa)	80.00 - 6.00	-4.5000	0.45	2	2	0.5800	0.5800		0.25
1 1/4" Hybriflex Cable ((#10) Sprint)	B	No	Ar (CaAa)	72.00 - 6.00	-2.0000	-0.24	3	3	1.6250	1.6250		1.60
3/4 (AT&T-DC Cables)	B	No	Ar (CaAa)	80.00 - 6.00	-4.5000	0.47	4	4	0.7500	0.7500		0.54
Commscope 6x12 (6 AWG) (T-Mobile)	B	No	Ar (CaAa)	95.00 - 6.00	-2.0000	0.345	1	1	1.4300	1.4300		1.63
Commscope 9x18 (6 AWG) (T-Mobile)	B	No	Ar (CaAa)	95.00 - 6.00	-2.0000	0.365	1	1	1.5900	1.5900		2.59
Commscope 6x12 (6 AWG) (T-Mobile)	B	No	Ar (CaAa)	95.00 - 6.00	-2.0000	0.325	1	1	1.4300	1.4300		1.63
1 1/4" Hybriflex Cable (Sprint Proposed)	B	No	Ar (CaAa)	72.00 - 6.00	-2.0000	-0.16	1	1	1.6250	1.6250		1.60

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

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
T1	120.00-116.67	A	0.000	0.000	0.210	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
T2	116.67-108.33	A	0.000	0.000	11.019	0.000	0.04
		B	0.000	0.000	1.860	0.000	0.01
		C	0.000	0.000	0.000	0.000	0.00
T3	108.33-100.00	A	0.000	0.000	24.677	0.000	0.09
		B	0.000	0.000	10.884	0.000	0.04
		C	0.000	0.000	0.000	0.000	0.00
T4	100.00-91.67	A	0.000	0.000	25.365	0.000	0.09
		B	0.000	0.000	18.080	0.000	0.09
		C	0.000	0.000	0.000	0.000	0.00
T5	91.67-83.33	A	0.000	0.000	25.365	0.000	0.09
		B	0.000	0.000	27.709	0.000	0.15
		C	0.000	0.000	0.000	0.000	0.00
T6	83.33-75.00	A	0.000	0.000	26.592	0.000	0.09
		B	0.000	0.000	35.697	0.000	0.19
		C	0.000	0.000	0.000	0.000	0.00
T7	75.00-50.00	A	0.000	0.000	81.909	0.000	0.29
		B	0.000	0.000	137.708	0.000	0.80
		C	0.000	0.000	0.000	0.000	0.00
T8	50.00-25.00	A	0.000	0.000	85.441	0.000	0.30
		B	0.000	0.000	148.462	0.000	0.85
		C	0.000	0.000	0.000	0.000	0.00
T9	25.00-0.00	A	0.000	0.000	65.508	0.000	0.23
		B	0.000	0.000	114.466	0.000	0.65
		C	0.000	0.000	0.000	0.000	0.00

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	120.00-116.67	A	2.449	0.000	0.000	1.843	0.000	0.03
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
T2	116.67-108.33	A	2.455	0.000	0.000	48.248	0.000	0.90
		B		0.000	0.000	7.589	0.000	0.15
		C		0.000	0.000	0.000	0.000	0.00
T3	108.33-100.00	A	2.465	0.000	0.000	99.265	0.000	1.86
		B		0.000	0.000	43.581	0.000	0.86
		C		0.000	0.000	0.000	0.000	0.00
T4	100.00-91.67	A	2.474	0.000	0.000	103.539	0.000	1.94
		B		0.000	0.000	64.018	0.000	1.32
		C		0.000	0.000	0.000	0.000	0.00
T5	91.67-83.33	A	2.484	0.000	0.000	103.845	0.000	1.96
		B		0.000	0.000	93.486	0.000	1.98
		C		0.000	0.000	0.000	0.000	0.00
T6	83.33-75.00	A	2.494	0.000	0.000	112.856	0.000	2.12
		B		0.000	0.000	127.803	0.000	2.55
		C		0.000	0.000	0.000	0.000	0.00
T7	75.00-50.00	A	2.511	0.000	0.000	359.051	0.000	6.77
		B		0.000	0.000	514.176	0.000	9.98
		C		0.000	0.000	0.000	0.000	0.00
T8	50.00-25.00	A	2.516	0.000	0.000	392.866	0.000	7.37
		B		0.000	0.000	594.764	0.000	11.33
		C		0.000	0.000	0.000	0.000	0.00
T9	25.00-0.00	A	2.401	0.000	0.000	293.263	0.000	5.29

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	454.656	0.000	8.31
		C		0.000	0.000	0.000	0.000	0.00

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	120.00-116.67	-0.0376	-0.5107	-0.1519	-2.0620
T2	116.67-108.33	-2.2305	-13.1796	-3.6731	-22.3636
T3	108.33-100.00	-4.3428	-25.7198	-6.6826	-37.5175
T4	100.00-91.67	-0.3030	-23.8707	-4.0005	-36.4919
T5	91.67-83.33	5.2055	-21.2043	0.5143	-34.2535
T6	83.33-75.00	9.6302	-18.2291	3.5146	-30.8136
T7	75.00-50.00	12.5901	-18.1358	5.7488	-30.8121
T8	50.00-25.00	12.5044	-17.6954	7.0077	-30.4967
T9	25.00-0.00	12.1647	-17.1729	7.4973	-30.2122

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	8	LDF4-50A (1/2 FOAM)	116.67 - 120.00	0.6000	0.5082
T2	7	1 1/4	108.33 - 113.00	0.6000	0.6000
T2	8	LDF4-50A (1/2 FOAM)	108.33 - 116.67	0.6000	0.6000
T2	9	AVA7-50 (1-5/8 LOW DENSI. FOAM)	108.33 - 114.00	0.6000	0.6000
T2	10	LDF7-50A (1-5/8 FOAM)	108.33 - 114.00	0.6000	0.6000
T2	11	LDF6-50A (1-1/4 FOAM)	108.33 - 114.00	0.6000	0.6000
T2	12	1 5/8	108.33 - 113.00	0.6000	0.6000
T2	13	AVA7-50 (1-5/8 LOW DENSI. FOAM)	108.33 - 113.00	0.6000	0.6000
T2	14	AVA7-50 (1-5/8 LOW DENSI. FOAM)	108.33 - 113.00	0.6000	0.6000
T2	15	1/2	108.33 - 113.00	0.6000	0.6000
T2	16	1/2	108.33 - 113.00	0.6000	0.6000
T2	17	1/2	108.33 - 113.00	0.6000	0.6000
T2	18	AVA7-50 (1-5/8 LOW DENSI. FOAM)	108.33 - 113.00	0.6000	0.6000
T2	19	LDF7-50A (1-5/8 FOAM)	108.33 - 113.00	0.6000	0.6000
T2	20	LDF7-50A (1-5/8 FOAM)	108.33 -	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T2	21	WE65	110.00 108.33 - 110.00	0.6000	0.6000
T2	22	WE65	108.33 - 109.00	0.6000	0.6000
T2	31	LDF7-50A (1-5/8 FOAM)	108.33 - 110.00	0.6000	0.6000
T2	32	AVA7-50 (1-5/8 LOW DENSI. FOAM)	108.33 - 110.00	0.6000	0.6000
T2	33	AVA7-50 (1-5/8 LOW DENSI. FOAM)	108.33 - 110.00	0.6000	0.6000
T2	34	LDF4-50A (1/2 FOAM)	108.33 - 110.00	0.6000	0.6000
T2	35	AVA7-50 (1-5/8 LOW DENSI. FOAM)	108.33 - 110.00	0.6000	0.6000
T2	36	AVA7-50 (1-5/8 LOW DENSI. FOAM)	108.33 - 110.00	0.6000	0.6000
T2	37	LDF4-50A (1/2 FOAM)	108.33 - 110.00	0.6000	0.6000
T3	7	1 1/4	100.00 - 108.33	0.6000	0.6000
T3	8	LDF4-50A (1/2 FOAM)	100.00 - 108.33	0.6000	0.6000
T3	9	AVA7-50 (1-5/8 LOW DENSI. FOAM)	100.00 - 108.33	0.6000	0.6000
T3	10	LDF7-50A (1-5/8 FOAM)	100.00 - 108.33	0.6000	0.6000
T3	11	LDF6-50A (1-1/4 FOAM)	100.00 - 108.33	0.6000	0.6000
T3	12	1 5/8	100.00 - 108.33	0.6000	0.6000
T3	13	AVA7-50 (1-5/8 LOW DENSI. FOAM)	100.00 - 108.33	0.6000	0.6000
T3	14	AVA7-50 (1-5/8 LOW DENSI. FOAM)	100.00 - 108.33	0.6000	0.6000
T3	15	1/2	100.00 - 108.33	0.6000	0.6000
T3	16	1/2	100.00 - 108.33	0.6000	0.6000
T3	17	1/2	100.00 - 108.33	0.6000	0.6000
T3	18	AVA7-50 (1-5/8 LOW DENSI. FOAM)	100.00 - 108.33	0.6000	0.6000
T3	19	LDF7-50A (1-5/8 FOAM)	100.00 - 108.33	0.6000	0.6000
T3	20	LDF7-50A (1-5/8 FOAM)	100.00 - 108.33	0.6000	0.6000
T3	21	WE65	100.00 - 108.33	0.6000	0.6000
T3	22	WE65	100.00 - 108.33	0.6000	0.6000
T3	23	WE65	100.00 - 107.00	0.6000	0.6000
T3	24	LDF4-50A (1/2 FOAM)	100.00 - 103.00	0.6000	0.6000
T3	31	LDF7-50A (1-5/8 FOAM)	100.00 - 108.33	0.6000	0.6000
T3	32	AVA7-50 (1-5/8 LOW DENSI. FOAM)	100.00 - 108.33	0.6000	0.6000
T3	33	AVA7-50 (1-5/8 LOW DENSI. FOAM)	100.00 - 108.33	0.6000	0.6000
T3	34	LDF4-50A (1/2 FOAM)	100.00 -	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
			108.33		
T3	35	AVA7-50 (1-5/8 LOW DENSI. FOAM)	100.00 - 108.33	0.6000	0.6000
T3	36	AVA7-50 (1-5/8 LOW DENSI. FOAM)	100.00 - 108.33	0.6000	0.6000
T3	37	LDF4-50A (1/2 FOAM)	100.00 - 108.33	0.6000	0.6000
T3	38	LDF7-50A (1-5/8 FOAM)	100.00 - 105.00	0.6000	0.6000
T3	39	LDF7-50A (1-5/8 FOAM)	100.00 - 103.00	0.6000	0.6000
T4	1	1 5/8	91.67 - 95.00	0.6000	0.6000
T4	7	1 1/4	91.67 - 100.00	0.6000	0.6000
T4	8	LDF4-50A (1/2 FOAM)	91.67 - 100.00	0.6000	0.6000
T4	9	AVA7-50 (1-5/8 LOW DENSI. FOAM)	91.67 - 100.00	0.6000	0.6000
T4	10	LDF7-50A (1-5/8 FOAM)	91.67 - 100.00	0.6000	0.6000
T4	11	LDF6-50A (1-1/4 FOAM)	91.67 - 100.00	0.6000	0.6000
T4	12	1 5/8	91.67 - 100.00	0.6000	0.6000
T4	13	AVA7-50 (1-5/8 LOW DENSI. FOAM)	91.67 - 100.00	0.6000	0.6000
T4	14	AVA7-50 (1-5/8 LOW DENSI. FOAM)	91.67 - 100.00	0.6000	0.6000
T4	15	1/2	91.67 - 100.00	0.6000	0.6000
T4	16	1/2	91.67 - 100.00	0.6000	0.6000
T4	17	1/2	91.67 - 100.00	0.6000	0.6000
T4	18	AVA7-50 (1-5/8 LOW DENSI. FOAM)	91.67 - 100.00	0.6000	0.6000
T4	19	LDF7-50A (1-5/8 FOAM)	91.67 - 100.00	0.6000	0.6000
T4	20	LDF7-50A (1-5/8 FOAM)	91.67 - 100.00	0.6000	0.6000
T4	21	WE65	91.67 - 100.00	0.6000	0.6000
T4	22	WE65	91.67 - 100.00	0.6000	0.6000
T4	23	WE65	91.67 - 100.00	0.6000	0.6000
T4	24	LDF4-50A (1/2 FOAM)	91.67 - 100.00	0.6000	0.6000
T4	31	LDF7-50A (1-5/8 FOAM)	91.67 - 100.00	0.6000	0.6000
T4	32	AVA7-50 (1-5/8 LOW DENSI. FOAM)	91.67 - 100.00	0.6000	0.6000
T4	33	AVA7-50 (1-5/8 LOW DENSI. FOAM)	91.67 - 100.00	0.6000	0.6000
T4	34	LDF4-50A (1/2 FOAM)	91.67 - 100.00	0.6000	0.6000
T4	35	AVA7-50 (1-5/8 LOW DENSI. FOAM)	91.67 - 100.00	0.6000	0.6000
T4	36	AVA7-50 (1-5/8 LOW DENSI. FOAM)	91.67 - 100.00	0.6000	0.6000
T4	37	LDF4-50A (1/2 FOAM)	91.67 - 100.00	0.6000	0.6000
T4	38	LDF7-50A (1-5/8 FOAM)	91.67 - 100.00	0.6000	0.6000
T4	39	LDF7-50A (1-5/8 FOAM)	91.67 - 100.00	0.6000	0.6000
T4	40	LDF5-50A (7/8 FOAM)	91.67 - 92.00	0.6000	0.6000
T4	50	Commscope 6x12 (6 AWG)	91.67 - 95.00	0.6000	0.6000
T4	51	Commscope 9x18 (6 AWG)	91.67 - 95.00	0.6000	0.6000
T4	52	Commscope 6x12 (6 AWG)	91.67 - 95.00	0.6000	0.6000
T5	1	1 5/8	83.33 - 91.67	0.6000	0.6000
T5	6	7/8	83.33 - 86.00	0.6000	0.6000
T5	7	1 1/4	83.33 - 91.67	0.6000	0.6000
T5	8	LDF4-50A (1/2 FOAM)	83.33 - 91.67	0.6000	0.6000
T5	9	AVA7-50 (1-5/8 LOW DENSI. FOAM)	83.33 - 91.67	0.6000	0.6000
T5	10	LDF7-50A (1-5/8 FOAM)	83.33 - 91.67	0.6000	0.6000
T5	11	LDF6-50A (1-1/4 FOAM)	83.33 - 91.67	0.6000	0.6000
T5	12	1 5/8	83.33 - 91.67	0.6000	0.6000
T5	13	AVA7-50 (1-5/8 LOW DENSI. FOAM)	83.33 - 91.67	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T5	14	AVA7-50 (1-5/8 LOW DENSI. FOAM)	83.33 - 91.67	0.6000	0.6000
T5	15	1/2	83.33 - 91.67	0.6000	0.6000
T5	16	1/2	83.33 - 91.67	0.6000	0.6000
T5	17	1/2	83.33 - 91.67	0.6000	0.6000
T5	18	AVA7-50 (1-5/8 LOW DENSI. FOAM)	83.33 - 91.67	0.6000	0.6000
T5	19	LDF7-50A (1-5/8 FOAM)	83.33 - 91.67	0.6000	0.6000
T5	20	LDF7-50A (1-5/8 FOAM)	83.33 - 91.67	0.6000	0.6000
T5	21	WE65	83.33 - 91.67	0.6000	0.6000
T5	22	WE65	83.33 - 91.67	0.6000	0.6000
T5	23	WE65	83.33 - 91.67	0.6000	0.6000
T5	24	LDF4-50A (1/2 FOAM)	83.33 - 91.67	0.6000	0.6000
T5	31	LDF7-50A (1-5/8 FOAM)	83.33 - 91.67	0.6000	0.6000
T5	32	AVA7-50 (1-5/8 LOW DENSI. FOAM)	83.33 - 91.67	0.6000	0.6000
T5	33	AVA7-50 (1-5/8 LOW DENSI. FOAM)	83.33 - 91.67	0.6000	0.6000
T5	34	LDF4-50A (1/2 FOAM)	83.33 - 91.67	0.6000	0.6000
T5	35	AVA7-50 (1-5/8 LOW DENSI. FOAM)	83.33 - 91.67	0.6000	0.6000
T5	36	AVA7-50 (1-5/8 LOW DENSI. FOAM)	83.33 - 91.67	0.6000	0.6000
T5	37	LDF4-50A (1/2 FOAM)	83.33 - 91.67	0.6000	0.6000
T5	38	LDF7-50A (1-5/8 FOAM)	83.33 - 91.67	0.6000	0.6000
T5	39	LDF7-50A (1-5/8 FOAM)	83.33 - 91.67	0.6000	0.6000
T5	40	LDF5-50A (7/8 FOAM)	83.33 - 91.67	0.6000	0.6000
T5	41	7/8	83.33 - 86.00	0.6000	0.6000
T5	50	Commscope 6x12 (6 AWG)	83.33 - 91.67	0.6000	0.6000
T5	51	Commscope 9x18 (6 AWG)	83.33 - 91.67	0.6000	0.6000
T5	52	Commscope 6x12 (6 AWG)	83.33 - 91.67	0.6000	0.6000
T6	1	1 5/8	75.00 - 83.33	0.6000	0.6000
T6	6	7/8	75.00 - 83.33	0.6000	0.6000
T6	7	1 1/4	75.00 - 83.33	0.6000	0.6000
T6	8	LDF4-50A (1/2 FOAM)	75.00 - 83.33	0.6000	0.6000
T6	9	AVA7-50 (1-5/8 LOW DENSI. FOAM)	75.00 - 83.33	0.6000	0.6000
T6	10	LDF7-50A (1-5/8 FOAM)	75.00 - 83.33	0.6000	0.6000
T6	11	LDF6-50A (1-1/4 FOAM)	75.00 - 83.33	0.6000	0.6000
T6	12	1 5/8	75.00 - 83.33	0.6000	0.6000
T6	13	AVA7-50 (1-5/8 LOW DENSI. FOAM)	75.00 - 83.33	0.6000	0.6000
T6	14	AVA7-50 (1-5/8 LOW DENSI. FOAM)	75.00 - 83.33	0.6000	0.6000
T6	15	1/2	75.00 - 83.33	0.6000	0.6000
T6	16	1/2	75.00 - 83.33	0.6000	0.6000
T6	17	1/2	75.00 - 83.33	0.6000	0.6000
T6	18	AVA7-50 (1-5/8 LOW DENSI. FOAM)	75.00 - 83.33	0.6000	0.6000
T6	19	LDF7-50A (1-5/8 FOAM)	75.00 - 83.33	0.6000	0.6000
T6	20	LDF7-50A (1-5/8 FOAM)	75.00 - 83.33	0.6000	0.6000
T6	21	WE65	75.00 - 83.33	0.6000	0.6000
T6	22	WE65	75.00 - 83.33	0.6000	0.6000
T6	23	WE65	75.00 - 83.33	0.6000	0.6000
T6	24	LDF4-50A (1/2 FOAM)	75.00 - 83.33	0.6000	0.6000
T6	25	LDF5-50A (7/8 FOAM)	75.00 - 82.00	0.6000	0.6000
T6	26	1/2	75.00 - 81.00	0.6000	0.6000
T6	27	1/2	75.00 - 77.00	0.6000	0.6000
T6	31	LDF7-50A (1-5/8 FOAM)	75.00 - 83.33	0.6000	0.6000
T6	32	AVA7-50 (1-5/8 LOW DENSI. FOAM)	75.00 - 83.33	0.6000	0.6000
T6	33	AVA7-50 (1-5/8 LOW	75.00 - 83.33	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
		DENSI. FOAM)			
T6	34	LDF4-50A (1/2 FOAM)	75.00 - 83.33	0.6000	0.6000
T6	35	AVA7-50 (1-5/8 LOW DENSI. FOAM)	75.00 - 83.33	0.6000	0.6000
T6	36	AVA7-50 (1-5/8 LOW DENSI. FOAM)	75.00 - 83.33	0.6000	0.6000
T6	37	LDF4-50A (1/2 FOAM)	75.00 - 83.33	0.6000	0.6000
T6	38	LDF7-50A (1-5/8 FOAM)	75.00 - 83.33	0.6000	0.6000
T6	39	LDF7-50A (1-5/8 FOAM)	75.00 - 83.33	0.6000	0.6000
T6	40	LDF5-50A (7/8 FOAM)	75.00 - 83.33	0.6000	0.6000
T6	41	7/8	75.00 - 83.33	0.6000	0.6000
T6	45	LDF6-50A (1-1/4 FOAM)	75.00 - 80.00	0.6000	0.6000
T6	47	1/2" Fiber Optic Cable	75.00 - 80.00	0.6000	0.6000
T6	49	3/4	75.00 - 80.00	0.6000	0.6000
T6	50	Commscope 6x12 (6 AWG)	75.00 - 83.33	0.6000	0.6000
T6	51	Commscope 9x18 (6 AWG)	75.00 - 83.33	0.6000	0.6000
T6	52	Commscope 6x12 (6 AWG)	75.00 - 83.33	0.6000	0.6000
T7	1	1 5/8	50.00 - 75.00	0.6000	0.6000
T7	5	LDF5-50A (7/8 FOAM)	50.00 - 55.00	0.6000	0.6000
T7	6	7/8	50.00 - 75.00	0.6000	0.6000
T7	7	1 1/4	50.00 - 75.00	0.6000	0.6000
T7	8	LDF4-50A (1/2 FOAM)	50.00 - 75.00	0.6000	0.6000
T7	9	AVA7-50 (1-5/8 LOW DENSI. FOAM)	50.00 - 75.00	0.6000	0.6000
T7	10	LDF7-50A (1-5/8 FOAM)	50.00 - 75.00	0.6000	0.6000
T7	11	LDF6-50A (1-1/4 FOAM)	50.00 - 75.00	0.6000	0.6000
T7	12	1 5/8	50.00 - 75.00	0.6000	0.6000
T7	13	AVA7-50 (1-5/8 LOW DENSI. FOAM)	50.00 - 75.00	0.6000	0.6000
T7	14	AVA7-50 (1-5/8 LOW DENSI. FOAM)	50.00 - 75.00	0.6000	0.6000
T7	15	1/2	50.00 - 75.00	0.6000	0.6000
T7	16	1/2	50.00 - 75.00	0.6000	0.6000
T7	17	1/2	50.00 - 75.00	0.6000	0.6000
T7	18	AVA7-50 (1-5/8 LOW DENSI. FOAM)	50.00 - 75.00	0.6000	0.6000
T7	19	LDF7-50A (1-5/8 FOAM)	50.00 - 75.00	0.6000	0.6000
T7	20	LDF7-50A (1-5/8 FOAM)	50.00 - 75.00	0.6000	0.6000
T7	21	WE65	50.00 - 75.00	0.6000	0.6000
T7	22	WE65	50.00 - 75.00	0.6000	0.6000
T7	23	WE65	50.00 - 75.00	0.6000	0.6000
T7	24	LDF4-50A (1/2 FOAM)	50.00 - 75.00	0.6000	0.6000
T7	25	LDF5-50A (7/8 FOAM)	50.00 - 75.00	0.6000	0.6000
T7	26	1/2	50.00 - 75.00	0.6000	0.6000
T7	27	1/2	50.00 - 75.00	0.6000	0.6000
T7	28	LDF4-50A (1/2 FOAM)	50.00 - 53.00	0.6000	0.6000
T7	31	LDF7-50A (1-5/8 FOAM)	50.00 - 75.00	0.6000	0.6000
T7	32	AVA7-50 (1-5/8 LOW DENSI. FOAM)	50.00 - 75.00	0.6000	0.6000
T7	33	AVA7-50 (1-5/8 LOW DENSI. FOAM)	50.00 - 75.00	0.6000	0.6000
T7	34	LDF4-50A (1/2 FOAM)	50.00 - 75.00	0.6000	0.6000
T7	35	AVA7-50 (1-5/8 LOW DENSI. FOAM)	50.00 - 75.00	0.6000	0.6000
T7	36	AVA7-50 (1-5/8 LOW DENSI. FOAM)	50.00 - 75.00	0.6000	0.6000
T7	37	LDF4-50A (1/2 FOAM)	50.00 - 75.00	0.6000	0.6000
T7	38	LDF7-50A (1-5/8 FOAM)	50.00 - 75.00	0.6000	0.6000
T7	39	LDF7-50A (1-5/8 FOAM)	50.00 - 75.00	0.6000	0.6000
T7	40	LDF5-50A (7/8 FOAM)	50.00 - 75.00	0.6000	0.6000
T7	41	7/8	50.00 - 75.00	0.6000	0.6000
T7	42	1/2	50.00 - 65.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T7	43	7/8	50.00 - 63.00	0.6000	0.6000
T7	45	LDF6-50A (1-1/4 FOAM)	50.00 - 75.00	0.6000	0.6000
T7	47	1/2" Fiber Optic Cable	50.00 - 75.00	0.6000	0.6000
T7	48	1 1/4" Hybriflex Cable	50.00 - 72.00	0.6000	0.6000
T7	49	3/4	50.00 - 75.00	0.6000	0.6000
T7	50	Commscope 6x12 (6 AWG)	50.00 - 75.00	0.6000	0.6000
T7	51	Commscope 9x18 (6 AWG)	50.00 - 75.00	0.6000	0.6000
T7	52	Commscope 6x12 (6 AWG)	50.00 - 75.00	0.6000	0.6000
T7	53	1 1/4" Hybriflex Cable	50.00 - 72.00	0.6000	0.6000
T8	1	1 5/8	25.00 - 50.00	0.6000	0.6000
T8	2	3/8 Cable	25.00 - 40.00	0.6000	0.6000
T8	3	LDF4-50A (1/2 FOAM)	25.00 - 43.00	0.6000	0.6000
T8	4	1/2	25.00 - 47.00	0.6000	0.6000
T8	5	LDF5-50A (7/8 FOAM)	25.00 - 50.00	0.6000	0.6000
T8	6	7/8	25.00 - 50.00	0.6000	0.6000
T8	7	1 1/4	25.00 - 50.00	0.6000	0.6000
T8	8	LDF4-50A (1/2 FOAM)	25.00 - 50.00	0.6000	0.6000
T8	9	AVA7-50 (1-5/8 LOW DENSI. FOAM)	25.00 - 50.00	0.6000	0.6000
T8	10	LDF7-50A (1-5/8 FOAM)	25.00 - 50.00	0.6000	0.6000
T8	11	LDF6-50A (1-1/4 FOAM)	25.00 - 50.00	0.6000	0.6000
T8	12	1 5/8	25.00 - 50.00	0.6000	0.6000
T8	13	AVA7-50 (1-5/8 LOW DENSI. FOAM)	25.00 - 50.00	0.6000	0.6000
T8	14	AVA7-50 (1-5/8 LOW DENSI. FOAM)	25.00 - 50.00	0.6000	0.6000
T8	15	1/2	25.00 - 50.00	0.6000	0.6000
T8	16	1/2	25.00 - 50.00	0.6000	0.6000
T8	17	1/2	25.00 - 50.00	0.6000	0.6000
T8	18	AVA7-50 (1-5/8 LOW DENSI. FOAM)	25.00 - 50.00	0.6000	0.6000
T8	19	LDF7-50A (1-5/8 FOAM)	25.00 - 50.00	0.6000	0.6000
T8	20	LDF7-50A (1-5/8 FOAM)	25.00 - 50.00	0.6000	0.6000
T8	21	WE65	25.00 - 50.00	0.6000	0.6000
T8	22	WE65	25.00 - 50.00	0.6000	0.6000
T8	23	WE65	25.00 - 50.00	0.6000	0.6000
T8	24	LDF4-50A (1/2 FOAM)	25.00 - 50.00	0.6000	0.6000
T8	25	LDF5-50A (7/8 FOAM)	25.00 - 50.00	0.6000	0.6000
T8	26	1/2	25.00 - 50.00	0.6000	0.6000
T8	27	1/2	25.00 - 50.00	0.6000	0.6000
T8	28	LDF4-50A (1/2 FOAM)	25.00 - 50.00	0.6000	0.6000
T8	29	1/2	25.00 - 48.00	0.6000	0.6000
T8	30	1/2	25.00 - 39.00	0.6000	0.6000
T8	31	LDF7-50A (1-5/8 FOAM)	25.00 - 50.00	0.6000	0.6000
T8	32	AVA7-50 (1-5/8 LOW DENSI. FOAM)	25.00 - 50.00	0.6000	0.6000
T8	33	AVA7-50 (1-5/8 LOW DENSI. FOAM)	25.00 - 50.00	0.6000	0.6000
T8	34	LDF4-50A (1/2 FOAM)	25.00 - 50.00	0.6000	0.6000
T8	35	AVA7-50 (1-5/8 LOW DENSI. FOAM)	25.00 - 50.00	0.6000	0.6000
T8	36	AVA7-50 (1-5/8 LOW DENSI. FOAM)	25.00 - 50.00	0.6000	0.6000
T8	37	LDF4-50A (1/2 FOAM)	25.00 - 50.00	0.6000	0.6000
T8	38	LDF7-50A (1-5/8 FOAM)	25.00 - 50.00	0.6000	0.6000
T8	39	LDF7-50A (1-5/8 FOAM)	25.00 - 50.00	0.6000	0.6000
T8	40	LDF5-50A (7/8 FOAM)	25.00 - 50.00	0.6000	0.6000
T8	41	7/8	25.00 - 50.00	0.6000	0.6000
T8	42	1/2	25.00 - 50.00	0.6000	0.6000
T8	43	7/8	25.00 - 50.00	0.6000	0.6000
T8	44	1/2	25.00 - 40.00	0.6000	0.6000
T8	45	LDF6-50A (1-1/4 FOAM)	25.00 - 50.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T8	47	1/2" Fiber Optic Cable	25.00 - 50.00	0.6000	0.6000
T8	48	1 1/4" Hybriflex Cable	25.00 - 50.00	0.6000	0.6000
T8	49	3/4	25.00 - 50.00	0.6000	0.6000
T8	50	Commscope 6x12 (6 AWG)	25.00 - 50.00	0.6000	0.6000
T8	51	Commscope 9x18 (6 AWG)	25.00 - 50.00	0.6000	0.6000
T8	52	Commscope 6x12 (6 AWG)	25.00 - 50.00	0.6000	0.6000
T8	53	1 1/4" Hybriflex Cable	25.00 - 50.00	0.6000	0.6000
T9	1	1 5/8	6.00 - 25.00	0.6000	0.6000
T9	2	3/8 Cable	6.00 - 25.00	0.6000	0.6000
T9	3	LDF4-50A (1/2 FOAM)	6.00 - 25.00	0.6000	0.6000
T9	4	1/2	6.00 - 25.00	0.6000	0.6000
T9	5	LDF5-50A (7/8 FOAM)	6.00 - 25.00	0.6000	0.6000
T9	6	7/8	6.00 - 25.00	0.6000	0.6000
T9	7	1 1/4	6.00 - 25.00	0.6000	0.6000
T9	8	LDF4-50A (1/2 FOAM)	6.00 - 25.00	0.6000	0.6000
T9	9	AVA7-50 (1-5/8 LOW DENSI. FOAM)	6.00 - 25.00	0.6000	0.6000
T9	10	LDF7-50A (1-5/8 FOAM)	6.00 - 25.00	0.6000	0.6000
T9	11	LDF6-50A (1-1/4 FOAM)	6.00 - 25.00	0.6000	0.6000
T9	12	1 5/8	6.00 - 25.00	0.6000	0.6000
T9	13	AVA7-50 (1-5/8 LOW DENSI. FOAM)	6.00 - 25.00	0.6000	0.6000
T9	14	AVA7-50 (1-5/8 LOW DENSI. FOAM)	6.00 - 25.00	0.6000	0.6000
T9	15	1/2	6.00 - 25.00	0.6000	0.6000
T9	16	1/2	6.00 - 25.00	0.6000	0.6000
T9	17	1/2	6.00 - 25.00	0.6000	0.6000
T9	18	AVA7-50 (1-5/8 LOW DENSI. FOAM)	6.00 - 25.00	0.6000	0.6000
T9	19	LDF7-50A (1-5/8 FOAM)	6.00 - 25.00	0.6000	0.6000
T9	20	LDF7-50A (1-5/8 FOAM)	6.00 - 25.00	0.6000	0.6000
T9	21	WE65	6.00 - 25.00	0.6000	0.6000
T9	22	WE65	6.00 - 25.00	0.6000	0.6000
T9	23	WE65	6.00 - 25.00	0.6000	0.6000
T9	24	LDF4-50A (1/2 FOAM)	6.00 - 25.00	0.6000	0.6000
T9	25	LDF5-50A (7/8 FOAM)	6.00 - 25.00	0.6000	0.6000
T9	26	1/2	6.00 - 25.00	0.6000	0.6000
T9	27	1/2	6.00 - 25.00	0.6000	0.6000
T9	28	LDF4-50A (1/2 FOAM)	6.00 - 25.00	0.6000	0.6000
T9	29	1/2	6.00 - 25.00	0.6000	0.6000
T9	30	1/2	6.00 - 25.00	0.6000	0.6000
T9	31	LDF7-50A (1-5/8 FOAM)	6.00 - 25.00	0.6000	0.6000
T9	32	AVA7-50 (1-5/8 LOW DENSI. FOAM)	6.00 - 25.00	0.6000	0.6000
T9	33	AVA7-50 (1-5/8 LOW DENSI. FOAM)	6.00 - 25.00	0.6000	0.6000
T9	34	LDF4-50A (1/2 FOAM)	6.00 - 25.00	0.6000	0.6000
T9	35	AVA7-50 (1-5/8 LOW DENSI. FOAM)	6.00 - 25.00	0.6000	0.6000
T9	36	AVA7-50 (1-5/8 LOW DENSI. FOAM)	6.00 - 25.00	0.6000	0.6000
T9	37	LDF4-50A (1/2 FOAM)	6.00 - 25.00	0.6000	0.6000
T9	38	LDF7-50A (1-5/8 FOAM)	6.00 - 25.00	0.6000	0.6000
T9	39	LDF7-50A (1-5/8 FOAM)	6.00 - 25.00	0.6000	0.6000
T9	40	LDF5-50A (7/8 FOAM)	6.00 - 25.00	0.6000	0.6000
T9	41	7/8	6.00 - 25.00	0.6000	0.6000
T9	42	1/2	6.00 - 25.00	0.6000	0.6000
T9	43	7/8	6.00 - 25.00	0.6000	0.6000
T9	44	1/2	6.00 - 25.00	0.6000	0.6000
T9	45	LDF6-50A (1-1/4 FOAM)	6.00 - 25.00	0.6000	0.6000
T9	47	1/2" Fiber Optic Cable	6.00 - 25.00	0.6000	0.6000
T9	48	1 1/4" Hybriflex Cable	6.00 - 25.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T9	49	3/4	6.00 - 25.00	0.6000	0.6000
T9	50	Commscope 6x12 (6 AWG)	6.00 - 25.00	0.6000	0.6000
T9	51	Commscope 9x18 (6 AWG)	6.00 - 25.00	0.6000	0.6000
T9	52	Commscope 6x12 (6 AWG)	6.00 - 25.00	0.6000	0.6000
T9	53	1 1/4" Hybriflex Cable	6.00 - 25.00	0.6000	0.6000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Pirod 6' Side Mount Standoff	B	From Leg	1.00	0.0000	41.00	No Ice	4.97	4.97	0.07
(1)			4.00			1/2" Ice	6.12	6.12	0.13
(#1-A Dish Mount)			0.00			1" Ice	7.27	7.27	0.19
1'x1' Panel Antenna	B	From Leg	1.00	0.0000	40.00	No Ice	1.20	0.13	0.01
(#1-B (mount Share #1-A))			4.00			1/2" Ice	1.34	0.21	0.02
			0.00			1" Ice	1.48	0.29	0.02
3' Whip (3in diameter) /w	B	From Leg	0.50	0.0000	43.00	No Ice	1.18	1.18	0.02
mount			0.00			1/2" Ice	1.64	1.64	0.03
(#2)			0.00			1" Ice	2.04	2.04	0.05
5'x1.5in dia Whip Antenna /w	A	From Leg	0.50	0.0000	47.00	No Ice	1.81	1.81	0.03
mount			0.00			1/2" Ice	2.64	2.64	0.05
(#3)			0.00			1" Ice	3.30	3.30	0.07
10'x6" Dipole Antenna	C	From Leg	3.00	0.0000	48.00	No Ice	9.17	1.67	0.05
(#4-A)			0.00			1/2" Ice	9.89	2.79	0.08
			0.00			1" Ice	10.62	3.93	0.12
3' Yagi	C	From Leg	3.00	0.0000	48.00	No Ice	2.08	2.08	0.03
(#4-B)			0.00			1/2" Ice	3.79	3.79	0.05
			0.00			1" Ice	5.52	5.52	0.09
Pirod 4' Side Mount Standoff	C	None		0.0000	48.00	No Ice	2.72	2.72	0.05
(1)						1/2" Ice	4.91	4.91	0.09
(#4-A&B)						1" Ice	7.10	7.10	0.13
6'x1" Whip Antenna w/	A	From Leg	1.00	0.0000	39.00	No Ice	2.02	2.02	0.05
Mount			0.00			1/2" Ice	3.14	3.14	0.07
(#5 - CSP#14)			0.00			1" Ice	4.13	4.13	0.10
1.0" Dia 4' Omni w/Pipe	B	From Leg	2.00	0.0000	53.00	No Ice	0.94	0.94	0.02
Mount			0.00			1/2" Ice	1.39	1.39	0.03
(#6 - CSP#16)			0.00			1" Ice	1.80	1.80	0.05
20' 4-Bay Dipole w/ 2'	A	From Leg	2.00	0.0000	55.00	No Ice	4.00	4.00	0.06
Sidearm Mount			0.00			1/2" Ice	6.00	6.00	0.10
(#7 - CSP-4)			0.00			1" Ice	8.00	8.00	0.14
GPS	B	From Leg	3.00	0.0000	63.00	No Ice	1.00	1.00	0.01
(#8)			0.00			1/2" Ice	1.50	1.50	0.01
			0.00			1" Ice	2.00	2.00	0.02
2'6"x4" Pipe Mount	B	None		0.0000	63.00	No Ice	0.58	0.58	0.03
(For #8)						1/2" Ice	0.91	0.91	0.04
						1" Ice	1.09	1.09	0.05
6' Yagi w/ Mount	B	From Leg	2.00	0.0000	65.00	No Ice	7.59	0.71	0.05
(#9)			0.00			1/2" Ice	8.18	0.98	0.09
			0.00			1" Ice	8.79	1.26	0.14
3' Yagi	B	From Leg	1.00	40.0000	81.00	No Ice	2.08	2.08	0.03

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
(#12)			0.00			1/2" Ice	3.79	3.79	0.05
			0.00			1" Ice	5.52	5.52	0.09
3' Yagi	B	From Leg	1.00	-40.0000	82.00	No Ice	2.08	2.08	0.03
(#13 - CSP-11)			0.00			1/2" Ice	3.79	3.79	0.05
			0.00			1" Ice	5.52	5.52	0.09
20' 4-Bay Dipole	B	From Leg	4.00	0.0000	77.00	No Ice	4.00	4.00	0.06
(#14)			0.00			1/2" Ice	6.00	6.00	0.10
			0.00			1" Ice	8.00	8.00	0.14
4'6"x3" Pipe Mount	B	None		0.0000	67.00	No Ice	1.30	1.30	0.03
(horizontal)						1/2" Ice	1.57	1.57	0.08
((Bottom mount) #14)						1" Ice	1.86	1.86	0.14
4'6"x3" Pipe Mount	B	None		0.0000	87.00	No Ice	1.30	1.30	0.03
(horizontal)						1/2" Ice	1.57	1.57	0.08
((Top Mount) #14)						1" Ice	1.86	1.86	0.14
20' 4-Bay Dipole	A	From Leg	4.00	0.0000	86.00	No Ice	4.00	4.00	0.06
(#15)			0.00			1/2" Ice	6.00	6.00	0.10
			0.00			1" Ice	8.00	8.00	0.14
3'4"x4" Pipe Mount	A	None		0.0000	76.00	No Ice	1.05	1.05	0.04
(horizontal)						1/2" Ice	1.27	1.27	0.09
((Bottom mount) #15)						1" Ice	1.52	1.52	0.13
3'4"x4" Pipe Mount	A	None		0.0000	96.00	No Ice	1.05	1.05	0.04
(horizontal)						1/2" Ice	1.27	1.27	0.09
((Top Mount) #15)						1" Ice	1.52	1.52	0.13
SC479-HF1LDF (inverted)	B	From Face	4.00	0.0000	81.00 - 95.00	No Ice	1.74	1.74	0.04
(# 16-A - CSP-10)			0.00			1/2" Ice	2.60	2.60	0.05
			0.00			1" Ice	3.31	3.31	0.08
PD458-406	A	From Face	4.00	0.0000	100.00 - 92.00	No Ice	4.59	4.59	0.02
(# 16-B - CSP-2)			0.00			1/2" Ice	6.89	6.89	0.04
			0.00			1" Ice	9.19	9.19	0.05
(2) (Horizontal) 8'x2 1/2"	A	None		0.0000	92.00	No Ice	2.30	2.30	0.04
Pipe Mount (Upright # 16-B)						1/2" Ice	3.13	3.13	0.15
(# 16-A&B)						1" Ice	3.62	3.62	0.27
(2) (Horizontal) 8'x2 1/2"	A	None		0.0000	92.00	No Ice	2.30	2.30	0.04
Pipe Mount (Invert #16-A)						1/2" Ice	3.13	3.13	0.15
(# 16-A&B)						1" Ice	3.62	3.62	0.27
SE419-SWBPALDF Panel	A	From Face	0.50	0.0000	101.00	No Ice	11.64	7.88	0.05
Antenna			0.00			1/2" Ice	12.29	8.51	0.11
(#18-A - CSP 13(P))			0.00			1" Ice	12.95	9.14	0.19
AP13-850/065D w/Mount	A	From Face	0.50	0.0000	104.00	No Ice	5.31	3.92	0.04
Pipe			0.00			1/2" Ice	5.93	4.96	0.08
(#18-B - CSP-12(E))			0.00			1" Ice	6.44	5.72	0.14
6'8"x4" Pipe Mount	C	None		0.0000	107.00	No Ice	1.68	1.68	0.07
(#19 - Dish Mount)						1/2" Ice	3.01	3.01	0.09
						1" Ice	3.42	3.42	0.12
6'8"x4" Pipe Mount	C	None		0.0000	107.00	No Ice	1.68	1.68	0.07
(#20 - Dish Mount)						1/2" Ice	3.01	3.01	0.09
						1" Ice	3.42	3.42	0.12
6'8"x4" Pipe Mount	A	None		0.0000	110.00	No Ice	1.69	1.69	0.07
(#21 - Dish Mount)						1/2" Ice	3.01	3.01	0.09
						1" Ice	3.42	3.42	0.12
Pirod 4' Side Mount Standoff	B	None		0.0000	113.00	No Ice	2.72	2.72	0.05
(1)						1/2" Ice	4.91	4.91	0.09
(#22, 23-A, 23-B Mount)						1" Ice	7.10	7.10	0.13
16'x3" Omni	B	From Leg	4.00	0.0000	113.00	No Ice	5.06	5.06	0.03
(#22)			0.00			1/2" Ice	6.54	6.54	0.07
			0.00			1" Ice	8.04	8.04	0.11
16'x3" Omni (inverted)	B	From Leg	4.00	0.0000	106.00 - 120.00	No Ice	5.06	5.06	0.03

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
(#23-A - CSP-22)			0.00			1/2" Ice	6.54	6.54	0.07
			0.00			1" Ice	8.04	8.04	0.11
16'x3" Omni (inverted)	B	From Leg	2.00	0.0000	106.00 - 120.00	No Ice	5.06	5.06	0.03
(#23-B - CSP-23)			0.00			1/2" Ice	6.54	6.54	0.07
			0.00			1" Ice	8.04	8.04	0.11
Junction Box	B	From Face	0.50	0.0000	112.00	No Ice	3.15	1.05	0.02
(#23-C)			0.00			1/2" Ice	3.39	1.21	0.04
			0.00			1" Ice	3.63	1.37	0.06
Rohn 6' Side-Arm(1)	B	From Leg	0.00	20.0000	114.00	No Ice	10.60	10.60	0.14
(#24 Antennas Mount)			0.00			1/2" Ice	15.40	15.40	0.21
			0.00			1" Ice	20.20	20.20	0.28
Rohn 6' Side-Arm(1)	C	From Leg	0.00	-20.0000	114.00	No Ice	10.60	10.60	0.14
(#24 Antennas Mount)			0.00			1/2" Ice	15.40	15.40	0.21
			0.00			1" Ice	20.20	20.20	0.28
Junction Box	C	From Face	3.00	0.0000	114.00	No Ice	3.15	1.05	0.02
(#24-A)			0.00			1/2" Ice	3.39	1.21	0.04
			0.00			1" Ice	3.63	1.37	0.06
SC479-HF1LDF (inverted)	C	From Face	6.00	0.0000	106.00 - 120.00	No Ice	5.06	5.06	0.03
(#24-B)			0.00			1/2" Ice	6.54	6.54	0.07
			0.00			1" Ice	8.04	8.04	0.11
SC479-HF1LDF	B	From Face	6.00	0.0000	120.00	No Ice	3.82	3.82	0.03
(#24-C - CSP#21)			0.00			1/2" Ice	6.54	6.54	0.07
			0.00			1" Ice	8.04	8.04	0.11
OGT9-840	B	From Face	3.00	0.0000	120.00	No Ice	2.27	2.27	0.02
(#24-D - CSP#8)			0.00			1/2" Ice	3.44	3.44	0.04
			0.00			1" Ice	4.61	4.61	0.06
10'x2" Dipole Antenna	C	From Face	3.00	0.0000	104.00 - 114.00	No Ice	9.17	1.67	0.05
(inverted)			0.00			1/2" Ice	9.89	2.79	0.08
(#24-E)			0.00			1" Ice	10.62	3.93	0.12
Rohn 6' Side-Arm(1)	C	From Leg	0.00	60.0000	114.00	No Ice	10.60	10.60	0.14
(#25 Antennas Mount)			0.00			1/2" Ice	15.40	15.40	0.21
			0.00			1" Ice	20.20	20.20	0.28
SC479-HF1LDF (inverted)	C	From Leg	6.00	60.0000	100.00 - 114.00	No Ice	5.06	5.06	0.03
(#25-A - CSP-17)			0.00			1/2" Ice	6.54	6.54	0.07
			0.00			1" Ice	8.04	8.04	0.11
OGT9-840	C	From Leg	6.00	60.0000	120.00	No Ice	2.27	2.27	0.02
(#25-B - CSP#7)			0.00			1/2" Ice	3.44	3.44	0.04
			0.00			1" Ice	4.61	4.61	0.06
10'x2" Dipole Antenna	A	From Leg	0.50	0.0000	120.00	No Ice	9.17	1.67	0.05
(#26 - CSP-15)			0.00			1/2" Ice	9.89	2.79	0.08
			0.00			1" Ice	10.62	3.93	0.12
Lightning Rod 5/8x4'	C	None		0.0000	138.00	No Ice	0.25	0.25	0.03
(#27)						1/2" Ice	0.66	0.66	0.03
						1" Ice	0.97	0.97	0.04
16'x2.5" Pipe Mount	C	None		0.0000	138.00	No Ice	4.00	4.00	0.09
(#27 Mount)						1/2" Ice	4.80	4.80	0.09
						1" Ice	5.60	5.60	0.10
TMA 432-83H-01T	C	None		0.0000	103.00	No Ice	1.40	0.82	0.03
(CSP-32)						1/2" Ice	1.55	0.94	0.04
						1" Ice	1.70	1.06	0.05
TMA 432-83H-01T	B	None		0.0000	120.00	No Ice	1.40	0.82	0.03
(CSP-24)						1/2" Ice	1.55	0.94	0.04
						1" Ice	1.70	1.06	0.05
SC479-HF1LDF (inverted)	B	From Leg	3.00	0.0000	106.00 - 120.00	No Ice	5.06	5.06	0.03
(CSP - 9 (P))			0.00			1/2" Ice	6.54	6.54	0.07
			0.00			1" Ice	8.04	8.04	0.11
SC479-HF1LDF	A	From Leg	3.00	0.0000	110.00	No Ice	3.79	3.79	0.03

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
(CSP-18 (New Install))			0.00			1/2" Ice	6.54	6.54	0.07
			0.00			1" Ice	8.04	8.04	0.11
SC479-HF1LDF (inverted)	A	From Leg	3.00	0.0000	96.00 - 110.00	No Ice	5.06	5.06	0.03
(CSP-19 (New Install))			0.00			1/2" Ice	6.54	6.54	0.07
			0.00			1" Ice	8.04	8.04	0.11
TMA 432-83H-01T	A	None		0.0000	110.00	No Ice	1.40	0.82	0.03
(CSP-20)						1/2" Ice	1.55	0.94	0.04
						1" Ice	1.70	1.06	0.05
SE419-SWBPALDF Panel	A	From Leg	0.50	0.0000	105.00	No Ice	11.64	7.88	0.05
Antenna			0.00			1/2" Ice	12.29	8.51	0.11
(CSP-29)			0.00			1" Ice	12.95	9.14	0.19
TMA 432-83H-01T	A	None		0.0000	105.00	No Ice	1.40	0.82	0.03
(CSP-30)						1/2" Ice	1.55	0.94	0.04
						1" Ice	1.70	1.06	0.05
WPA-70040-4CF-EDIN	A	None		0.0000	110.00	No Ice	9.46	3.53	0.02
Panel						1/2" Ice	9.86	3.84	0.08
(CSP-28)						1" Ice	10.27	4.15	0.14
TMA 432-83H-01T	A	None		0.0000	120.00	No Ice	1.40	0.82	0.03
(CSP-24)						1/2" Ice	1.55	0.94	0.04
						1" Ice	1.70	1.06	0.05
** Remove AIROSMITH ASM-005									
** AT&T Existing Inventory									
Face Mount	A	From Face	0.00	0.0000	80.00	No Ice	7.86	7.86	0.24
((#11) ATT)			0.00			1/2" Ice	10.66	10.66	0.34
			0.00			1" Ice	12.46	13.46	0.43
Face Mount	B	From Face	0.00	0.0000	80.00	No Ice	7.86	7.86	0.24
((#11) ATT)			0.00			1/2" Ice	10.66	10.66	0.34
			0.00			1" Ice	12.46	13.46	0.43
Face Mount	C	From Face	0.00	0.0000	80.00	No Ice	7.86	7.86	0.24
((#11) ATT)			0.00			1/2" Ice	10.66	10.66	0.34
			0.00			1" Ice	12.46	13.46	0.43
TPA-65R-LCUUUU-H8	A	From Face	0.50	0.0000	80.00	No Ice	12.86	10.38	0.10
Panel w/ RET			6.00			1/2" Ice	13.46	11.79	0.20
(ATT)			0.00			1" Ice	14.08	13.05	0.31
RRUS-11	A	From Face	0.50	0.0000	80.00	No Ice	2.57	1.07	0.05
(ATT)			6.00			1/2" Ice	2.76	1.21	0.07
			0.00			1" Ice	2.97	1.36	0.09
RRUS-32	A	From Face	0.50	0.0000	80.00	No Ice	2.74	1.67	0.06
(ATT)			6.00			1/2" Ice	2.96	1.86	0.08
			0.00			1" Ice	3.19	2.05	0.11
DC6-48-60-18-8F (Squid)	A	From Leg	0.50	0.0000	80.00	No Ice	0.79	0.79	0.02
Suppressor			0.00			1/2" Ice	1.27	1.27	0.04
(ATT)			0.00			1" Ice	1.45	1.45	0.05
HPA-65R-BUU-H8 Panel	A	From Face	0.50	0.0000	80.00	No Ice	12.76	7.48	0.07
(ATT)			-3.00			1/2" Ice	13.34	8.06	0.14
			0.00			1" Ice	13.93	8.64	0.22
RRUS-32	A	From Face	0.50	0.0000	80.00	No Ice	2.74	1.67	0.06
(ATT)			-3.00			1/2" Ice	2.96	1.86	0.08
			0.00			1" Ice	3.19	2.05	0.11
SBNH-1D6565C	A	From Face	0.50	0.0000	80.00	No Ice	11.48	9.64	0.08
(ATT)			8.00			1/2" Ice	12.11	11.07	0.17
			0.00			1" Ice	12.75	12.39	0.27
DC6-48-60-18-8F (Squid)	B	From Leg	0.50	0.0000	80.00	No Ice	0.79	0.79	0.02
Suppressor			0.00			1/2" Ice	1.27	1.27	0.04
(ATT)			0.00			1" Ice	1.45	1.45	0.05
TPA-65R-LCUUUU-H8	B	From Face	0.50	0.0000	80.00	No Ice	12.86	10.38	0.10

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
Panel w/ RET			6.00			1/2" Ice	13.46	11.79	0.20
(ATT)			0.00			1" Ice	14.08	13.05	0.31
RRUS-11	B	From Face	0.50	0.0000	80.00	No Ice	2.57	1.07	0.05
(ATT)			6.00			1/2" Ice	2.76	1.21	0.07
			0.00			1" Ice	2.97	1.36	0.09
RRUS-32	B	From Face	0.50	0.0000	80.00	No Ice	2.74	1.67	0.06
(ATT)			6.00			1/2" Ice	2.96	1.86	0.08
			0.00			1" Ice	3.19	2.05	0.11
HPA-65R-BUU-H8 Panel	B	From Face	0.50	0.0000	80.00	No Ice	12.76	7.48	0.07
(ATT)			-3.00			1/2" Ice	13.34	8.06	0.14
			0.00			1" Ice	13.93	8.64	0.22
RRUS-32	B	From Face	0.50	0.0000	80.00	No Ice	2.74	1.67	0.06
(ATT)			-3.00			1/2" Ice	2.96	1.86	0.08
			0.00			1" Ice	3.19	2.05	0.11
SBNH-1D6565C	B	From Face	0.50	0.0000	80.00	No Ice	11.48	9.64	0.08
(ATT)			-6.00			1/2" Ice	12.11	11.07	0.17
			0.00			1" Ice	12.75	12.39	0.27
(2) DTMABP7819VG12A	B	From Face	0.50	0.0000	80.00	No Ice	1.36	0.51	0.02
TMA			-6.00			1/2" Ice	1.51	0.61	0.03
(ATT)			0.00			1" Ice	1.66	0.72	0.04
QS66512-2 Panel Antenna	C	From Face	0.50	0.0000	80.00	No Ice	8.13	8.22	0.13
(ATT)			6.00			1/2" Ice	8.59	9.19	0.21
			0.00			1" Ice	9.05	10.02	0.29
RRUS-11	C	From Face	0.50	0.0000	80.00	No Ice	2.57	1.07	0.05
(ATT)			6.00			1/2" Ice	2.76	1.21	0.07
			0.00			1" Ice	2.97	1.36	0.09
(2) RRUS-32	C	From Face	0.50	0.0000	80.00	No Ice	2.74	1.67	0.06
(ATT)			6.00			1/2" Ice	2.96	1.86	0.08
			0.00			1" Ice	3.19	2.05	0.11
HPA-65R-BUU-H8 Panel	C	From Face	0.50	0.0000	80.00	No Ice	12.76	7.48	0.07
(ATT)			-3.00			1/2" Ice	13.34	8.06	0.14
			0.00			1" Ice	13.93	8.64	0.22
** AT&T Existing Inventory									
** AT&T Proposed Inventory									
800-10966 Kathrien Panel w/	A	From Face	0.50	0.0000	80.00	No Ice	17.36	9.40	0.14
Pipe Mt.			2.00			1/2" Ice	17.99	10.82	0.26
(ATT - Proposed)			0.00			1" Ice	18.63	12.09	0.38
RRUS-12	A	From Face	0.50	0.0000	80.00	No Ice	3.15	1.29	0.06
(ATT - Proposed)			2.00			1/2" Ice	3.36	1.44	0.08
			0.00			1" Ice	3.59	1.60	0.11
4478 Radio Unit (4x40W)	A	From Face	0.50	0.0000	80.00	No Ice	1.08	1.08	0.06
(ATT - Proposed)			2.00			1/2" Ice	1.21	1.21	0.07
			0.00			1" Ice	1.35	1.35	0.09
800-10966 Kathrien Panel w/	B	From Face	0.50	0.0000	80.00	No Ice	17.36	9.40	0.14
Pipe Mt.			2.00			1/2" Ice	17.99	10.82	0.26
(ATT - Proposed)			0.00			1" Ice	18.63	12.09	0.38
RRUS-12	B	From Face	0.50	0.0000	80.00	No Ice	3.15	1.29	0.06
(ATT - Proposed)			2.00			1/2" Ice	3.36	1.44	0.08
			0.00			1" Ice	3.59	1.60	0.11
4478 Radio Unit (4x40W)	B	From Face	0.50	0.0000	80.00	No Ice	1.08	1.08	0.06
(ATT - Proposed)			2.00			1/2" Ice	1.21	1.21	0.07
			0.00			1" Ice	1.35	1.35	0.09
800-10965 Kathrien Panel w/	C	From Face	0.50	0.0000	80.00	No Ice	13.84	7.42	0.13
Pipe Mount			2.00			1/2" Ice	14.38	8.56	0.23
(ATT - Proposed)			0.00			1" Ice	14.93	9.46	0.33
RRUS-12	C	From Face	0.50	0.0000	80.00	No Ice	3.15	1.29	0.06
(ATT - Proposed)			2.00			1/2" Ice	3.36	1.44	0.08

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
			0.00			1" Ice	3.59	1.60	0.11
4478 Radio Unit (4x40W)	C	From Face	0.50	0.0000	80.00	No Ice	1.08	1.08	0.06
(ATT - Proposed)			2.00			1/2" Ice	1.21	1.21	0.07
			0.00			1" Ice	1.35	1.35	0.09
DC6-48-60-0-8F (Squid) Unit	C	From Leg	0.50	0.0000	80.00	No Ice	1.09	1.09	0.03
(ATT - Proposed)			0.00			1/2" Ice	1.70	1.70	0.05
			0.00			1" Ice	1.91	1.91	0.07
** AT&T Proposed Inventory									
* T-Mobile Existing Inventory									
EUSF10-U	A	From Leg	0.50	0.0000	95.00	No Ice	8.91	3.67	0.41
((#17) T-Mobile)			0.00			1/2" Ice	12.66	5.24	0.51
			0.00			1" Ice	16.41	6.81	0.61
EUSF10-U	C	From Leg	0.50	0.0000	95.00	No Ice	8.91	3.67	0.41
((#17) T-Mobile)			0.00			1/2" Ice	12.66	5.24	0.51
			0.00			1" Ice	16.41	6.81	0.61
EUSF10-U	B	From Leg	0.50	0.0000	95.00	No Ice	8.91	3.67	0.41
((#17) T-Mobile)			0.00			1/2" Ice	12.66	5.24	0.51
			0.00			1" Ice	16.41	6.81	0.61
TMA2093F00V1-1 Twin TMA	A	From Leg	3.00	0.0000	95.00	No Ice	0.37	0.96	0.03
			4.50			1/2" Ice	0.46	1.09	0.03
((#17) T-Mobile)			0.00			1" Ice	0.55	1.22	0.04
TMA2093F00V1-1 Twin TMA	B	From Leg	3.00	0.0000	95.00	No Ice	0.37	0.96	0.03
			4.50			1/2" Ice	0.46	1.09	0.03
((#17) T-Mobile)			0.00			1" Ice	0.55	1.22	0.04
TMA2093F00V1-1 Twin TMA	C	From Leg	3.00	0.0000	95.00	No Ice	0.37	0.96	0.03
			4.50			1/2" Ice	0.46	1.09	0.03
((#17) T-Mobile)			0.00			1" Ice	0.55	1.22	0.04
AIR32 B66Aa/B2a Antenna Panel	A	From Leg	3.00	0.0000	95.00	No Ice	5.72	5.16	0.15
			0.00			1/2" Ice	6.22	5.96	0.21
((#17) T-Mobile)			0.00			1" Ice	6.68	6.64	0.27
AIR32 B66Aa/B2a Antenna Panel	B	From Leg	3.00	0.0000	95.00	No Ice	5.72	5.16	0.15
			0.00			1/2" Ice	6.22	5.96	0.21
((#17) T-Mobile)			0.00			1" Ice	6.68	6.64	0.27
AIR32 B66Aa/B2a Antenna Panel	C	From Leg	3.00	0.0000	95.00	No Ice	5.72	5.16	0.15
			0.00			1/2" Ice	6.22	5.96	0.21
((#17) T-Mobile)			0.00			1" Ice	6.68	6.64	0.27
* T-Mobile Existing Inventory									
* T-Mobile Proposed Inventory									
APXVAARR24_43-U-NA20 Panel (RFS)	A	From Leg	3.00	0.0000	95.00	No Ice	20.24	10.79	0.21
			4.50			1/2" Ice	20.89	12.21	0.34
(T-Mobile - Proposed)			0.00			1" Ice	21.55	13.49	0.48
APXVAARR24_43-U-NA20 Panel (RFS)	B	From Leg	3.00	0.0000	95.00	No Ice	20.24	10.79	0.21
			4.50			1/2" Ice	20.89	12.21	0.34
(T-Mobile - Proposed)			0.00			1" Ice	21.55	13.49	0.48
APXVAARR24_43-U-NA20 Panel (RFS)	C	From Leg	3.00	0.0000	95.00	No Ice	20.24	10.79	0.21
			4.50			1/2" Ice	20.89	12.21	0.34
(T-Mobile - Proposed)			0.00			1" Ice	21.55	13.49	0.48
AIR 3246 B66 Panel Antenna	A	From Leg	3.00	0.0000	95.00	No Ice	7.99	6.34	0.21
(T-Mobile - Proposed)			4.50			1/2" Ice	8.39	7.01	0.28
			0.00			1" Ice	8.81	7.70	0.36
AIR 3246 B66 Panel Antenna	B	From Leg	3.00	0.0000	95.00	No Ice	7.99	6.34	0.21
(T-Mobile - Proposed)			4.50			1/2" Ice	8.39	7.01	0.28
			0.00			1" Ice	8.81	7.70	0.36
AIR 3246 B66 Panel Antenna	C	From Leg	3.00	0.0000	95.00	No Ice	7.99	6.34	0.21

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
(T-Mobile - Proposed)			4.50			1/2" Ice	8.39	7.01	0.28
			0.00			1" Ice	8.81	7.70	0.36
2217 B2 Radio Unit	A	From Leg	3.00	0.0000	95.00	No Ice	2.27	2.27	0.05
(T-Mobile - Proposed)			-4.50			1/2" Ice	2.45	2.45	0.07
			0.00			1" Ice	2.65	2.65	0.10
2217 B2 Radio Unit	B	From Leg	3.00	0.0000	95.00	No Ice	2.27	2.27	0.05
(T-Mobile - Proposed)			-4.50			1/2" Ice	2.45	2.45	0.07
			0.00			1" Ice	2.65	2.65	0.10
2217 B2 Radio Unit	C	From Leg	3.00	0.0000	95.00	No Ice	2.27	2.27	0.05
(T-Mobile - Proposed)			-4.50			1/2" Ice	2.45	2.45	0.07
			0.00			1" Ice	2.65	2.65	0.10
4449 B71 + B12 Radio Unit	A	From Leg	3.00	0.0000	95.00	No Ice	1.66	1.16	0.08
(T-Mobile - Proposed)			-4.50			1/2" Ice	1.82	1.29	0.10
			0.00			1" Ice	1.98	1.44	0.11
4449 B71 + B12 Radio Unit	B	From Leg	3.00	0.0000	95.00	No Ice	1.66	1.16	0.08
(T-Mobile - Proposed)			-4.50			1/2" Ice	1.82	1.29	0.10
			0.00			1" Ice	1.98	1.44	0.11
4449 B71 + B12 Radio Unit	C	From Leg	3.00	0.0000	95.00	No Ice	1.66	1.16	0.08
(T-Mobile - Proposed)			-4.50			1/2" Ice	1.82	1.29	0.10
			0.00			1" Ice	1.98	1.44	0.11
* T-Mobile Propsoed Inventory * Sprint Inventory Exist/Proposed									
Face Mount	A	From Face	0.00	0.0000	72.00	No Ice	9.73	9.73	0.31
(Sprint)			0.00			1/2" Ice	13.12	13.12	0.42
			0.00			1" Ice	16.51	16.51	0.54
Face Mount	B	From Face	0.00	0.0000	72.00	No Ice	9.73	9.73	0.31
(Sprint)			0.00			1/2" Ice	13.12	13.12	0.42
			0.00			1" Ice	16.51	16.51	0.54
Face Mount	C	From Face	0.00	0.0000	72.00	No Ice	9.73	9.73	0.31
(Sprint)			0.00			1/2" Ice	13.12	13.12	0.42
			0.00			1" Ice	16.51	16.51	0.54
ALU 4x45W (1900 MHz)	A	From Face	0.00	0.0000	72.00	No Ice	2.54	1.61	0.06
(Sprint)			0.00			1/2" Ice	2.75	1.79	0.08
			0.50			1" Ice	2.97	1.98	0.10
ALU 4x45W (1900 MHz)	B	From Face	0.00	0.0000	72.00	No Ice	2.54	1.61	0.06
(Sprint)			0.00			1/2" Ice	2.75	1.79	0.08
			0.00			1" Ice	2.97	1.98	0.10
ALU 4x45W (1900 MHz)	C	From Face	0.00	0.0000	72.00	No Ice	2.54	1.61	0.06
(Sprint)			0.00			1/2" Ice	2.75	1.79	0.08
			0.00			1" Ice	2.97	1.98	0.10
ALU TD-RRH-8x20-25	A	From Face	0.00	0.0000	72.00	No Ice	4.03	1.53	0.08
(Sprint)			0.00			1/2" Ice	4.28	1.70	0.10
			0.00			1" Ice	4.54	1.89	0.13
ALU TD-RRH-8x20-25	B	From Face	0.00	0.0000	72.00	No Ice	4.03	1.53	0.08
(Sprint)			0.00			1/2" Ice	4.28	1.70	0.10
			0.00			1" Ice	4.54	1.89	0.13
ALU TD-RRH-8x20-25	C	From Face	0.00	0.0000	72.00	No Ice	4.03	1.53	0.08
(Sprint)			0.00			1/2" Ice	4.28	1.70	0.10
			0.00			1" Ice	4.54	1.89	0.13
ALU 800MHz 2x50W	A	From Face	0.00	0.0000	72.00	No Ice	2.06	1.93	0.06
(Sprint)			0.00			1/2" Ice	2.24	2.11	0.09
			0.00			1" Ice	2.43	2.29	0.11
ALU 800MHz 2x50W	B	From Face	0.00	0.0000	72.00	No Ice	2.06	1.93	0.06
(Sprint)			0.00			1/2" Ice	2.24	2.11	0.09
			0.00			1" Ice	2.43	2.29	0.11

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
ALU 800MHz 2x50W (Sprint)	C	From Face	0.00 0.00 0.00	0.0000	72.00	No Ice 1/2" Ice 1" Ice	2.06 2.24 2.43	1.93 2.11 2.29	0.06 0.09 0.11
NNVV-65B-R4 Panel Antenna (Sprint)	A	From Leg	0.00 -1.00 0.00	0.0000	72.00	No Ice 1/2" Ice 1" Ice	12.27 12.77 13.27	5.75 6.21 6.67	0.09 0.16 0.24
NNVV-65B-R4 Panel Antenna (Sprint)	B	From Leg	0.00 -1.00 0.00	0.0000	72.00	No Ice 1/2" Ice 1" Ice	12.27 12.77 13.27	5.75 6.21 6.67	0.09 0.16 0.24
NNVV-65B-R4 Panel Antenna (Sprint)	C	From Leg	0.00 -1.00 0.00	0.0000	72.00	No Ice 1/2" Ice 1" Ice	12.27 12.77 13.27	5.75 6.21 6.67	0.09 0.16 0.24
AAHC Panel Antenna (Sprint)	A	From Face	0.00 0.00 0.00	0.0000	72.00	No Ice 1/2" Ice 1" Ice	4.20 4.46 4.72	2.07 2.26 2.46	0.10 0.14 0.17
AAHC Panel Antenna (Sprint)	B	From Face	0.50 0.00 0.00	0.0000	72.00	No Ice 1/2" Ice 1" Ice	4.20 4.46 4.72	2.07 2.26 2.46	0.10 0.14 0.17
AAHC Panel Antenna (Sprint)	C	From Face	0.50 0.00 0.00	0.0000	72.00	No Ice 1/2" Ice 1" Ice	4.20 4.46 4.72	2.07 2.26 2.46	0.10 0.14 0.17
* Sprint Inventory Exist/Proposed									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
4 FT DISH (#1-A)	A	Paraboloid w/Shroud (HP)	From Leg	1.50 5.00 0.00	Worst		41.00	4.00	No Ice 1/2" Ice 1" Ice	12.57 13.10 13.62	0.14 0.28 0.42
6' DISH (SOLID) (#19 - CSP-3)	C	Paraboloid w/Radome	From Leg	0.50 0.00 0.00	Worst		117.00	6.00	No Ice 1/2" Ice 1" Ice	28.27 29.05 29.83	0.09 0.24 0.39
6' DISH (SOLID) (#21 - CSP-5)	A	Paraboloid w/Radome	From Leg	0.50 0.00 0.00	Worst		115.00	6.00	No Ice 1/2" Ice 1" Ice	28.27 29.05 29.83	0.09 0.24 0.39
6' DISH (SOLID) (#20 - CSP-6)	C	Paraboloid w/Radome	From Leg	0.50 0.00 0.00	Worst		111.00	6.00	No Ice 1/2" Ice 1" Ice	28.27 29.05 29.83	0.09 0.24 0.39

222-G Verification Constants

Constant	Value
Wind Importance Factor Without Ice	1.15

Constant	*Value*
Wind Importance Factor With Ice Factor	1
Ice Importance Factor	1.25
K_d	0.85
Z_g	900
α	9.5
K_{zmin}	0.85
K_e	1
K_t	0.72
f	1.5

222-G Section Verification ArRr By Element

Section Elevation *ft*	*Elem. Num.*	*Size*	*C*	*C w/Ice*	*Face*	*e*	*e w/Ice*	A_r ft^2	A_r *w/Ice* ft^2	A_rR_r ft^2	A_rR_r *w/Ice* ft^2
T1 120.00-116.67	1	P.5x.250	60.575	57.643	C	0.195	0.492	1.390	2.753	0.635	1.873
	1	P.5x.250	60.575	57.643	A	0.195	0.492	1.390	2.753	0.635	1.873
	2	P.5x.250	60.575	57.643	C	0.195	0.492	1.390	2.753	0.635	1.873
	2	P.5x.250	60.575	57.643	B	0.195	0.492	1.390	2.753	0.635	1.873
	3	P.5x.250	60.575	57.643	B	0.195	0.492	1.390	2.753	0.635	1.873
	3	P.5x.250	60.575	57.643	A	0.195	0.492	1.390	2.753	0.635	1.873
					A		Sum:	2.781	5.505	1.270	3.747
					B			2.781	5.505	1.270	3.747
					C			2.781	5.505	1.270	3.747
T2 116.67-108.33	13	P.5x.250	60.908	58.031	C	0.13	0.309	3.476	6.890	1.474	4.147
	13	P.5x.250	60.908	58.031	A	0.13	0.309	3.476	6.890	1.474	4.147
	14	P.5x.250	60.908	58.031	C	0.13	0.309	3.476	6.890	1.474	4.147
	14	P.5x.250	60.908	58.031	B	0.13	0.309	3.476	6.890	1.474	4.147
	15	P.5x.250	60.908	58.031	B	0.13	0.309	3.476	6.890	1.474	4.147
	15	P.5x.250	60.908	58.031	A	0.13	0.309	3.476	6.890	1.474	4.147
					A		Sum:	6.952	13.780	2.948	8.294
					B			6.952	13.780	2.948	8.294
					C			6.952	13.780	2.948	8.294
T3 108.33-100.00	25	P.5x.250	61.411	58.619	C	0.126	0.301	3.476	6.903	1.458	4.136
	25	P.5x.250	61.411	58.619	A	0.126	0.301	3.476	6.903	1.458	4.136
	26	P.5x.250	61.411	58.619	C	0.126	0.301	3.476	6.903	1.458	4.136
	26	P.5x.250	61.411	58.619	B	0.126	0.301	3.476	6.903	1.458	4.136
	27	P.5x.250	61.411	58.619	B	0.126	0.301	3.476	6.903	1.458	4.136
	27	P.5x.250	61.411	58.619	A	0.126	0.301	3.476	6.903	1.458	4.136
					A		Sum:	6.952	13.805	2.916	8.272
					B			6.952	13.805	2.916	8.272
					C			6.952	13.805	2.916	8.272
T4 100.00-91.67	37	P.5x.250	61.946	59.244	C	0.126	0.298	3.476	6.916	1.450	4.137
	37	P.5x.250	61.946	59.244	A	0.126	0.298	3.476	6.916	1.450	4.137
	38	P.5x.250	61.946	59.244	C	0.126	0.298	3.476	6.916	1.450	4.137
	38	P.5x.250	61.946	59.244	B	0.126	0.298	3.476	6.916	1.450	4.137
	39	P.5x.250	61.946	59.244	B	0.126	0.298	3.476	6.916	1.450	4.137
	39	P.5x.250	61.946	59.244	A	0.126	0.298	3.476	6.916	1.450	4.137
					A		Sum:	6.952	13.832	2.900	8.274
					B			6.952	13.832	2.900	8.274
					C			6.952	13.832	2.900	8.274
T5 91.67-83.33	52	P.5x.250	62.51	59.9	C	0.122	0.291	3.476	6.930	1.434	4.130
	52	P.5x.250	62.51	59.9	A	0.122	0.291	3.476	6.930	1.434	4.130
	53	P.5x.250	62.51	59.9	C	0.122	0.291	3.476	6.930	1.434	4.130
	53	P.5x.250	62.51	59.9	B	0.122	0.291	3.476	6.930	1.434	4.130
	54	P.5x.250	62.51	59.9	B	0.122	0.291	3.476	6.930	1.434	4.130

Section Elevation ft	Elem. Num.	Size	C	C w/Ice	Face	e	e w/Ice	A_r ft^2	A_r w/Ice ft^2	A_rR_r ft^2	A_rR_r w/Ice ft^2
	54	P.5x.250	62.51	59.9	A	0.122	0.291	3.476	6.930	1.434	4.130
					A		Sum:	6.952	13.859	2.869	8.261
					B			6.952	13.859	2.869	8.261
					C			6.952	13.859	2.869	8.261
T6 83.33-75.00	67	P.5x.250	63.095	60.58	C	0.119	0.284	3.476	6.943	1.419	4.126
	67	P.5x.250	63.095	60.58	A	0.119	0.284	3.476	6.943	1.419	4.126
	68	P.5x.250	63.095	60.58	C	0.119	0.284	3.476	6.943	1.419	4.126
	68	P.5x.250	63.095	60.58	B	0.119	0.284	3.476	6.943	1.419	4.126
	69	P.5x.250	63.095	60.58	B	0.119	0.284	3.476	6.943	1.419	4.126
	69	P.5x.250	63.095	60.58	A	0.119	0.284	3.476	6.943	1.419	4.126
					A		Sum:	6.952	13.886	2.838	8.251
					B			6.952	13.886	2.838	8.251
					C			6.952	13.886	2.838	8.251
T7 75.00-50.00	82	P5x.375	71.529	65.42	C	0.129	0.288	11.602	22.075	4.735	13.138
	82	P5x.375	71.529	65.42	A	0.129	0.288	11.602	22.075	4.735	13.138
	83	P5x.375	71.529	65.42	C	0.129	0.288	11.602	22.075	4.735	13.138
	83	P5x.375	71.529	65.42	B	0.129	0.288	11.602	22.075	4.735	13.138
	84	P5x.375	71.529	65.42	B	0.129	0.288	11.602	22.075	4.735	13.138
	84	P5x.375	71.529	65.42	A	0.129	0.288	11.602	22.075	4.735	13.138
					A		Sum:	23.204	44.151	9.469	26.277
					B			23.204	44.151	9.469	26.277
					C			23.204	44.151	9.469	26.277
T8 50.00-25.00	121	P.5x.400	65.738	63.404	C	0.147	0.352	10.428	20.924	4.352	12.906
	121	P.5x.400	65.738	63.404	A	0.147	0.352	10.428	20.924	4.352	12.906
	122	P.5x.400	65.738	63.404	C	0.147	0.352	10.428	20.924	4.352	12.906
	122	P.5x.400	65.738	63.404	B	0.147	0.352	10.428	20.924	4.352	12.906
	123	P.5x.400	65.738	63.404	B	0.147	0.352	10.428	20.924	4.352	12.906
	123	P.5x.400	65.738	63.404	A	0.147	0.352	10.428	20.924	4.352	12.906
					A		Sum:	20.856	41.848	8.705	25.813
					B			20.856	41.848	8.705	25.813
					C			20.856	41.848	8.705	25.813
T9 25.00-0.00	196	P6.875x.400	89.856	73.358	C	0.135	0.284	14.338	24.353	5.899	14.471
	196	P6.875x.400	89.856	73.358	A	0.135	0.284	14.338	24.353	5.899	14.471
	197	P6.875x.400	89.856	73.358	C	0.135	0.284	14.338	24.353	5.899	14.471
	197	P6.875x.400	89.856	73.358	B	0.135	0.284	14.338	24.353	5.899	14.471
	198	P6.875x.400	89.856	73.358	B	0.135	0.284	14.338	24.353	5.899	14.471
	198	P6.875x.400	89.856	73.358	A	0.135	0.284	14.338	24.353	5.899	14.471
					A		Sum:	28.676	48.705	11.797	28.941
					B			28.676	48.705	11.797	28.941
					C			28.676	48.705	11.797	28.941

222-G Section Verification Tables - No Ice

Section Elevation ft	z_{wind} ft	z_{ice} ft	K_z	K_h	K_{zt}	t_z in	q_z psf	Face	e	A_rR_r ft^2
T1 120.00-116.67	118.33		1.311	3.265	1.49		46	A	0.195	1.270
								B	0.195	1.270
								C	0.195	1.270
T2 116.67-108.33	112.50		1.297	3.08	1.522		46	A	0.13	2.948
								B	0.13	2.948
								C	0.13	2.948

Section Elevation ft	z_{wind} ft	z_{ice} ft	K_z	K_h	K_{zt}	t_z in	q_z psf	Face	e	A_rR_r ft²
T3 108.33-100.00	104.17		1.277	2.834	1.573		47	A	0.126	2.916
								B	0.126	2.916
								C	0.126	2.916
T4 100.00-91.67	95.83		1.254	2.607	1.629		48	A	0.126	2.900
								B	0.126	2.900
								C	0.126	2.900
T5 91.67-83.33	87.50		1.231	2.399	1.69		49	A	0.122	2.869
								B	0.122	2.869
								C	0.122	2.869
T6 83.33-75.00	79.17		1.205	2.207	1.759		50	A	0.119	2.838
								B	0.119	2.838
								C	0.119	2.838
T7 75.00-50.00	62.50		1.146	1.868	1.919		52	A	0.129	9.469
								B	0.129	9.469
								C	0.129	9.469
T8 50.00-25.00	37.50		1.029	1.455	2.235		54	A	0.147	8.705
								B	0.147	8.705
								C	0.147	8.705
T9 25.00-0.00	12.50		0.85	1.133	2.675		54	A	0.135	11.797
								B	0.135	11.797
								C	0.135	11.797

222-G Section Verification Tables - Ice

Section Elevation ft	z_{wind} ft	z_{ice} ft	K_z	K_h	K_{zt}	t_z in	q_z psf	Face	e	A_rR_r ft²
T1 120.00-116.67	118.33	118.33	1.311	3.265	1.49	2.4493	11	A	0.492	10.406
								B	0.492	10.406
								C	0.492	10.406
T2 116.67-108.33	112.50	112.50	1.297	3.08	1.522	2.4554	11	A	0.309	16.007
								B	0.309	16.007
								C	0.309	16.007
T3 108.33-100.00	104.17	104.17	1.277	2.834	1.573	2.4646	11	A	0.301	16.247
								B	0.301	16.247
								C	0.301	16.247
T4 100.00-91.67	95.83	95.83	1.254	2.607	1.629	2.4742	11	A	0.298	16.539
								B	0.298	16.539
								C	0.298	16.539
T5 91.67-83.33	87.50	87.50	1.231	2.399	1.69	2.4840	11	A	0.291	16.805
								B	0.291	16.805
								C	0.291	16.805
T6 83.33-75.00	79.17	79.17	1.205	2.207	1.759	2.4937	12	A	0.284	17.080
								B	0.284	17.080
								C	0.284	17.080
T7 75.00-50.00	62.50	62.50	1.146	1.868	1.919	2.5109	12	A	0.288	54.616
								B	0.288	54.616
								C	0.288	54.616
T8 50.00-25.00	37.50	37.50	1.029	1.455	2.235	2.5163	13	A	0.352	73.321
								B	0.352	73.321
								C	0.352	73.321
T9 25.00-0.00	12.50	12.50	0.85	1.133	2.675	2.4009	12	A	0.284	64.315
								B	0.284	64.315
								C	0.284	64.315

222-G Section Verification Tables - Service

Section Elevation ft	z_{wind} ft	z_{ice} ft	K_z	K_h	K_{zt}	t_z in	q_z psf	Face	e	A_rR_r ft²
T1 120.00-116.67	118.33		1.311	3.265	1.49		15	A	0.195	1.270
								B	0.195	1.270
								C	0.195	1.270
T2 116.67-108.33	112.50		1.297	3.08	1.522		15	A	0.13	2.948
								B	0.13	2.948
								C	0.13	2.948
T3 108.33-100.00	104.17		1.277	2.834	1.573		16	A	0.126	2.916
								B	0.126	2.916
								C	0.126	2.916
T4 100.00-91.67	95.83		1.254	2.607	1.629		16	A	0.126	2.900
								B	0.126	2.900
								C	0.126	2.900
T5 91.67-83.33	87.50		1.231	2.399	1.69		16	A	0.122	2.869
								B	0.122	2.869
								C	0.122	2.869
T6 83.33-75.00	79.17		1.205	2.207	1.759		17	A	0.119	2.838
								B	0.119	2.838
								C	0.119	2.838
T7 75.00-50.00	62.50		1.146	1.868	1.919		17	A	0.129	9.469
								B	0.129	9.469
								C	0.129	9.469
T8 50.00-25.00	37.50		1.029	1.455	2.235		18	A	0.147	8.705
								B	0.147	8.705
								C	0.147	8.705
T9 25.00-0.00	12.50		0.85	1.133	2.675		18	A	0.135	11.797
								B	0.135	11.797
								C	0.135	11.797

Tower Pressures - No Ice

$G_H = 0.850$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1	118.33	1.311	46	39.883	A	4.994	2.781	2.781	35.77	0.210	0.000
120.00-116.67					B	4.994	2.781		35.77	0.000	0.000
					C	4.994	2.781		35.77	0.000	0.000
T2	112.50	1.297	46	103.599	A	6.523	6.952	6.952	51.59	11.019	0.000
116.67-108.33					B	6.523	6.952		51.59	1.860	0.000
					C	6.523	6.952		51.59	0.000	0.000
T3	104.17	1.277	47	109.157	A	6.751	6.952	6.952	50.73	24.677	0.000
108.33-100.00					B	6.751	6.952		50.73	10.884	0.000
					C	6.751	6.952		50.73	0.000	0.000
T4	95.83	1.254	48	114.715	A	7.506	6.952	6.952	48.08	25.365	0.000
100.00-91.67					B	7.506	6.952		48.08	18.080	0.000
					C	7.506	6.952		48.08	0.000	0.000
T5 91.67-83.33	87.50	1.231	49	120.273	A	7.766	6.952	6.952	47.23	25.365	0.000
					B	7.766	6.952		47.23	27.709	0.000
					C	7.766	6.952		47.23	0.000	0.000
T6 83.33-75.00	79.17	1.205	50	125.831	A	8.028	6.952	6.952	46.41	26.592	0.000

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
					B	8.028	6.952		46.41	35.697	0.000
					C	8.028	6.952		46.41	0.000	0.000
T7 75.00-50.00	62.50	1.146	52	412.014	A	29.741	23.204	23.204	43.83	81.909	0.000
					B	29.741	23.204		43.83	137.708	0.000
					C	29.741	23.204		43.83	0.000	0.000
T8 50.00-25.00	37.50	1.029	54	460.861	A	47.069	20.856	20.856	30.70	85.441	0.000
					B	47.069	20.856		30.70	148.462	0.000
					C	47.069	20.856		30.70	0.000	0.000
T9 25.00-0.00	12.50	0.85	54	514.792	A	40.991	28.676	28.676	41.16	65.508	0.000
					B	40.991	28.676		41.16	114.466	0.000
					C	40.991	28.676		41.16	0.000	0.000

Tower Pressure - With Ice

$G_H = 0.850$

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1	118.33	1.311	11	2.4493	41.245	A	4.994	15.290	5.505	27.14	1.843	0.000
120.00-116.67						B	4.994	15.290		27.14	0.000	0.000
						C	4.994	15.290		27.14	0.000	0.000
T2	112.50	1.297	11	2.4554	107.012	A	6.523	26.593	13.780	41.61	48.248	0.000
116.67-108.33						B	6.523	26.593		41.61	7.589	0.000
						C	6.523	26.593		41.61	0.000	0.000
T3	104.17	1.277	11	2.4646	112.583	A	6.751	27.116	13.805	40.76	99.265	0.000
108.33-100.00						B	6.751	27.116		40.76	43.581	0.000
						C	6.751	27.116		40.76	0.000	0.000
T4 100.00-91.67	95.83	1.254	11	2.4742	118.154	A	7.506	27.650	13.832	39.34	103.539	0.000
						B	7.506	27.650		39.34	64.018	0.000
						C	7.506	27.650		39.34	0.000	0.000
T5 91.67-83.33	87.50	1.231	11	2.4840	123.725	A	7.766	28.193	13.859	38.54	103.845	0.000
						B	7.766	28.193		38.54	93.486	0.000
						C	7.766	28.193		38.54	0.000	0.000
T6 83.33-75.00	79.17	1.205	12	2.4937	129.297	A	8.028	28.743	13.886	37.76	112.856	0.000
						B	8.028	28.743		37.76	127.803	0.000
						C	8.028	28.743		37.76	0.000	0.000
T7 75.00-50.00	62.50	1.146	12	2.5109	422.484	A	29.741	91.767	44.151	36.34	359.051	0.000
						B	29.741	91.767		36.34	514.176	0.000
						C	29.741	91.767		36.34	0.000	0.000
T8 50.00-25.00	37.50	1.029	13	2.5163	471.355	A	47.069	118.868	41.848	25.22	392.866	0.000
						B	47.069	118.868		25.22	594.764	0.000
						C	47.069	118.868		25.22	0.000	0.000
T9 25.00-0.00	12.50	0.85	12	2.4009	524.804	A	40.991	108.237	48.705	32.64	293.263	0.000
						B	40.991	108.237		32.64	454.656	0.000
						C	40.991	108.237		32.64	0.000	0.000

Tower Pressure - Service

$G_H = 0.850$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1	118.33	1.311	15	39.883	A	4.994	2.781	2.781	35.77	0.210	0.000
120.00-116.67					B	4.994	2.781		35.77	0.000	0.000
					C	4.994	2.781		35.77	0.000	0.000
T2	112.50	1.297	15	103.599	A	6.523	6.952	6.952	51.59	11.019	0.000
116.67-108.33					B	6.523	6.952		51.59	1.860	0.000
					C	6.523	6.952		51.59	0.000	0.000
T3	104.17	1.277	16	109.157	A	6.751	6.952	6.952	50.73	24.677	0.000
108.33-100.00					B	6.751	6.952		50.73	10.884	0.000
					C	6.751	6.952		50.73	0.000	0.000
T4	95.83	1.254	16	114.715	A	7.506	6.952	6.952	48.08	25.365	0.000
100.00-91.67					B	7.506	6.952		48.08	18.080	0.000
					C	7.506	6.952		48.08	0.000	0.000
T5 91.67-83.33	87.50	1.231	16	120.273	A	7.766	6.952	6.952	47.23	25.365	0.000
					B	7.766	6.952		47.23	27.709	0.000
					C	7.766	6.952		47.23	0.000	0.000
T6 83.33-75.00	79.17	1.205	17	125.831	A	8.028	6.952	6.952	46.41	26.592	0.000
					B	8.028	6.952		46.41	35.697	0.000
					C	8.028	6.952		46.41	0.000	0.000
T7 75.00-50.00	62.50	1.146	17	412.014	A	29.741	23.204	23.204	43.83	81.909	0.000
					B	29.741	23.204		43.83	137.708	0.000
					C	29.741	23.204		43.83	0.000	0.000
T8 50.00-25.00	37.50	1.029	18	460.861	A	47.069	20.856	20.856	30.70	85.441	0.000
					B	47.069	20.856		30.70	148.462	0.000
					C	47.069	20.856		30.70	0.000	0.000
T9 25.00-0.00	12.50	0.85	18	514.792	A	40.991	28.676	28.676	41.16	65.508	0.000
					B	40.991	28.676		41.16	114.466	0.000
					C	40.991	28.676		41.16	0.000	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.00	0.45	A	0.195	2.613	46	1	1	6.264	0.64	193.44	C
120.00-116.67			B	0.195	2.613		1	1	6.264			
			C	0.195	2.613		1	1	6.264			
T2	0.05	0.77	A	0.13	2.846	46	1	1	9.471	1.37	164.49	C
116.67-108.33			B	0.13	2.846		1	1	9.471			
			C	0.13	2.846		1	1	9.471			
T3	0.13	0.78	A	0.126	2.864	47	1	1	9.668	1.97	236.35	C
108.33-100.00			B	0.126	2.864		1	1	9.668			
			C	0.126	2.864		1	1	9.668			
T4	0.18	0.92	A	0.126	2.862	48	1	1	10.406	2.28	273.96	C
100.00-91.67			B	0.126	2.862		1	1	10.406			
			C	0.126	2.862		1	1	10.406			
T5	0.24	1.11	A	0.122	2.876	49	1	1	10.635	2.60	311.85	C
91.67-83.33			B	0.122	2.876		1	1	10.635			
			C	0.122	2.876		1	1	10.635			
T6	0.29	1.30	A	0.119	2.889	50	1	1	10.866	2.92	349.96	C
83.33-75.00			B	0.119	2.889		1	1	10.866			
			C	0.119	2.889		1	1	10.866			
T7	1.08	5.12	A	0.129	2.852	52	1	1	39.210	10.73	429.08	C
75.00-50.00			B	0.129	2.852		1	1	39.210			
			C	0.129	2.852		1	1	39.210			
T8	1.15	6.90	A	0.147	2.781	54	1	1	55.773	13.60	544.12	C
50.00-25.00			B	0.147	2.781		1	1	55.773			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
			C	0.147	2.781		1	1	55.773			
T9 25.00-0.00	0.88	7.21	A	0.135	2.826	54	1	1	52.788	11.70	468.03	C
			B	0.135	2.826		1	1	52.788			
			C	0.135	2.826		1	1	52.788			
Sum Weight:	3.99	24.56						OTM	2439.53 kip-ft	47.81		

Tower Forces - No Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.00	0.45	A	0.195	2.613	46	0.825	1	5.390	0.56	166.66	C
120.00-116.67			B	0.195	2.613		0.825	1	5.390			
			C	0.195	2.613		0.825	1	5.390			
T2	0.05	0.77	A	0.13	2.846	46	0.825	1	8.329	1.24	149.08	C
116.67-108.33			B	0.13	2.846		0.825	1	8.329			
			C	0.13	2.846		0.825	1	8.329			
T3	0.13	0.78	A	0.126	2.864	47	0.825	1	8.486	1.83	220.04	C
108.33-100.00			B	0.126	2.864		0.825	1	8.486			
			C	0.126	2.864		0.825	1	8.486			
T4	0.18	0.92	A	0.126	2.862	48	0.825	1	9.092	2.13	255.52	C
100.00-91.67			B	0.126	2.862		0.825	1	9.092			
			C	0.126	2.862		0.825	1	9.092			
T5	0.24	1.11	A	0.122	2.876	49	0.825	1	9.275	2.44	292.33	C
91.67-83.33			B	0.122	2.876		0.825	1	9.275			
			C	0.122	2.876		0.825	1	9.275			
T6	0.29	1.30	A	0.119	2.889	50	0.825	1	9.461	2.74	329.30	C
83.33-75.00			B	0.119	2.889		0.825	1	9.461			
			C	0.119	2.889		0.825	1	9.461			
T7	1.08	5.12	A	0.129	2.852	52	0.825	1	34.006	10.07	402.93	C
75.00-50.00			B	0.129	2.852		0.825	1	34.006			
			C	0.129	2.852		0.825	1	34.006			
T8	1.15	6.90	A	0.147	2.781	54	0.825	1	47.536	12.55	501.93	C
50.00-25.00			B	0.147	2.781		0.825	1	47.536			
			C	0.147	2.781		0.825	1	47.536			
T9 25.00-0.00	0.88	7.21	A	0.135	2.826	54	0.825	1	45.615	10.78	431.13	C
			B	0.135	2.826		0.825	1	45.615			
			C	0.135	2.826		0.825	1	45.615			
Sum Weight:	3.99	24.56						OTM	2265.84 kip-ft	44.34		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.00	0.45	A	0.195	2.613	46	0.8	1	5.265	0.54	162.83	C
120.00-116.67			B	0.195	2.613		0.8	1	5.265			
			C	0.195	2.613		0.8	1	5.265			
T2	0.05	0.77	A	0.13	2.846	46	0.8	1	8.166	1.22	146.88	C
116.67-108.33			B	0.13	2.846		0.8	1	8.166			
			C	0.13	2.846		0.8	1	8.166			
T3	0.13	0.78	A	0.126	2.864	47	0.8	1	8.317	1.81	217.71	C
108.33-100.00			B	0.126	2.864		0.8	1	8.317			
			C	0.126	2.864		0.8	1	8.317			
T4	0.18	0.92	A	0.126	2.862	48	0.8	1	8.904	2.11	252.88	C
100.00-91.67			B	0.126	2.862		0.8	1	8.904			
			C	0.126	2.862		0.8	1	8.904			
T5	0.24	1.11	A	0.122	2.876	49	0.8	1	9.081	2.41	289.54	C
91.67-83.33			B	0.122	2.876		0.8	1	9.081			
			C	0.122	2.876		0.8	1	9.081			
T6	0.29	1.30	A	0.119	2.889	50	0.8	1	9.260	2.72	326.35	C
83.33-75.00			B	0.119	2.889		0.8	1	9.260			
			C	0.119	2.889		0.8	1	9.260			
T7	1.08	5.12	A	0.129	2.852	52	0.8	1	33.262	9.98	399.20	C
75.00-50.00			B	0.129	2.852		0.8	1	33.262			
			C	0.129	2.852		0.8	1	33.262			
T8	1.15	6.90	A	0.147	2.781	54	0.8	1	46.360	12.40	495.90	C
50.00-25.00			B	0.147	2.781		0.8	1	46.360			
			C	0.147	2.781		0.8	1	46.360			
T9 25.00-0.00	0.88	7.21	A	0.135	2.826	54	0.8	1	44.590	10.65	425.86	C
			B	0.135	2.826		0.8	1	44.590			
			C	0.135	2.826		0.8	1	44.590			
Sum Weight:	3.99	24.56						OTM	2241.02 kip-ft	43.84		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.00	0.45	A	0.195	2.613	46	0.85	1	5.515	0.57	170.48	C
120.00-116.67			B	0.195	2.613		0.85	1	5.515			
			C	0.195	2.613		0.85	1	5.515			
T2	0.05	0.77	A	0.13	2.846	46	0.85	1	8.492	1.26	151.28	C
116.67-108.33			B	0.13	2.846		0.85	1	8.492			
			C	0.13	2.846		0.85	1	8.492			
T3	0.13	0.78	A	0.126	2.864	47	0.85	1	8.655	1.85	222.37	C
108.33-100.00			B	0.126	2.864		0.85	1	8.655			
			C	0.126	2.864		0.85	1	8.655			
T4	0.18	0.92	A	0.126	2.862	48	0.85	1	9.280	2.15	258.15	C
100.00-91.67			B	0.126	2.862		0.85	1	9.280			
			C	0.126	2.862		0.85	1	9.280			
T5	0.24	1.11	A	0.122	2.876	49	0.85	1	9.470	2.46	295.12	C
91.67-83.33			B	0.122	2.876		0.85	1	9.470			
			C	0.122	2.876		0.85	1	9.470			
T6	0.29	1.30	A	0.119	2.889	50	0.85	1	9.661	2.77	332.25	C
83.33-75.00			B	0.119	2.889		0.85	1	9.661			
			C	0.119	2.889		0.85	1	9.661			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T7	1.08	5.12	A	0.129	2.852	52	0.85	1	34.749	10.17	406.67	C
75.00-50.00			B	0.129	2.852		0.85	1	34.749			
			C	0.129	2.852		0.85	1	34.749			
T8	1.15	6.90	A	0.147	2.781	54	0.85	1	48.713	12.70	507.95	C
50.00-25.00			B	0.147	2.781		0.85	1	48.713			
			C	0.147	2.781		0.85	1	48.713			
T9 25.00-0.00	0.88	7.21	A	0.135	2.826	54	0.85	1	46.640	10.91	436.40	C
			B	0.135	2.826		0.85	1	46.640			
			C	0.135	2.826		0.85	1	46.640			
Sum Weight:	3.99	24.56						OTM	2290.65 kip-ft	44.84		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.03	2.19	A	0.492	1.911	11	1	1	15.399	0.27	82.27	C
120.00-116.67			B	0.492	1.911		1	1	15.399			
			C	0.492	1.911		1	1	15.399			
T2	1.05	3.35	A	0.309	2.271	11	1	1	22.530	0.77	92.78	C
116.67-108.33			B	0.309	2.271		1	1	22.530			
			C	0.309	2.271		1	1	22.530			
T3	2.72	3.44	A	0.301	2.294	11	1	1	22.998	1.29	154.24	C
108.33-100.00			B	0.301	2.294		1	1	22.998			
			C	0.301	2.294		1	1	22.998			
T4	3.27	4.07	A	0.298	2.303	11	1	1	24.045	1.47	176.71	C
100.00-91.67			B	0.298	2.303		1	1	24.045			
			C	0.298	2.303		1	1	24.045			
T5	3.94	4.37	A	0.291	2.321	11	1	1	24.571	1.69	202.48	C
91.67-83.33			B	0.291	2.321		1	1	24.571			
			C	0.291	2.321		1	1	24.571			
T6	4.68	4.66	A	0.284	2.338	12	1	1	25.107	1.99	238.83	C
83.33-75.00			B	0.284	2.338		1	1	25.107			
			C	0.284	2.338		1	1	25.107			
T7	16.75	16.84	A	0.288	2.329	12	1	1	84.357	7.33	293.19	C
75.00-50.00			B	0.288	2.329		1	1	84.357			
			C	0.288	2.329		1	1	84.357			
T8	18.70	23.24	A	0.352	2.167	13	1	1	120.390	9.08	363.14	C
50.00-25.00			B	0.352	2.167		1	1	120.390			
			C	0.352	2.167		1	1	120.390			
T9 25.00-0.00	13.60	21.03	A	0.284	2.338	12	1	1	105.306	7.31	292.24	C
			B	0.284	2.338		1	1	105.306			
			C	0.284	2.338		1	1	105.306			
Sum Weight:	64.74	83.20						OTM	1589.53 kip-ft	31.20		

Tower Forces - With Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.03	2.19	A	0.492	1.911	11	0.825	1	14.526	0.26	77.75	C
120.00-116.67			B	0.492	1.911		0.825	1	14.526			
			C	0.492	1.911		0.825	1	14.526			
T2	1.05	3.35	A	0.309	2.271	11	0.825	1	21.389	0.75	89.94	C
116.67-108.33			B	0.309	2.271		0.825	1	21.389			
			C	0.309	2.271		0.825	1	21.389			
T3	2.72	3.44	A	0.301	2.294	11	0.825	1	21.817	1.26	151.22	C
108.33-100.00			B	0.301	2.294		0.825	1	21.817			
			C	0.301	2.294		0.825	1	21.817			
T4	3.27	4.07	A	0.298	2.303	11	0.825	1	22.731	1.44	173.28	C
100.00-91.67			B	0.298	2.303		0.825	1	22.731			
			C	0.298	2.303		0.825	1	22.731			
T5	3.94	4.37	A	0.291	2.321	11	0.825	1	23.212	1.66	198.84	C
91.67-83.33			B	0.291	2.321		0.825	1	23.212			
			C	0.291	2.321		0.825	1	23.212			
T6	4.68	4.66	A	0.284	2.338	12	0.825	1	23.702	1.96	234.97	C
83.33-75.00			B	0.284	2.338		0.825	1	23.702			
			C	0.284	2.338		0.825	1	23.702			
T7	16.75	16.84	A	0.288	2.329	12	0.825	1	79.152	7.21	288.26	C
75.00-50.00			B	0.288	2.329		0.825	1	79.152			
			C	0.288	2.329		0.825	1	79.152			
T8	18.70	23.24	A	0.352	2.167	13	0.825	1	112.153	8.89	355.54	C
50.00-25.00			B	0.352	2.167		0.825	1	112.153			
			C	0.352	2.167		0.825	1	112.153			
T9 25.00-0.00	13.60	21.03	A	0.284	2.338	12	0.825	1	98.133	7.13	285.18	C
			B	0.284	2.338		0.825	1	98.133			
			C	0.284	2.338		0.825	1	98.133			
Sum Weight:	64.74	83.20						OTM	1557.48 kip-ft	30.55		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.03	2.19	A	0.492	1.911	11	0.8	1	14.401	0.26	77.10	C
120.00-116.67			B	0.492	1.911		0.8	1	14.401			
			C	0.492	1.911		0.8	1	14.401			
T2	1.05	3.35	A	0.309	2.271	11	0.8	1	21.226	0.75	89.53	C
116.67-108.33			B	0.309	2.271		0.8	1	21.226			
			C	0.309	2.271		0.8	1	21.226			
T3	2.72	3.44	A	0.301	2.294	11	0.8	1	21.648	1.26	150.79	C
108.33-100.00			B	0.301	2.294		0.8	1	21.648			
			C	0.301	2.294		0.8	1	21.648			
T4	3.27	4.07	A	0.298	2.303	11	0.8	1	22.544	1.44	172.79	C
100.00-91.67			B	0.298	2.303		0.8	1	22.544			
			C	0.298	2.303		0.8	1	22.544			
T5	3.94	4.37	A	0.291	2.321	11	0.8	1	23.017	1.65	198.32	C
91.67-83.33			B	0.291	2.321		0.8	1	23.017			
			C	0.291	2.321		0.8	1	23.017			
T6	4.68	4.66	A	0.284	2.338	12	0.8	1	23.502	1.95	234.42	C
83.33-75.00			B	0.284	2.338		0.8	1	23.502			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
			C	0.284	2.338		0.8	1	23.502			
T7	16.75	16.84	A	0.288	2.329	12	0.8	1	78.409	7.19	287.55	C
75.00-50.00			B	0.288	2.329		0.8	1	78.409			
			C	0.288	2.329		0.8	1	78.409			
T8	18.70	23.24	A	0.352	2.167	13	0.8	1	110.976	8.86	354.46	C
50.00-25.00			B	0.352	2.167		0.8	1	110.976			
			C	0.352	2.167		0.8	1	110.976			
T9 25.00-0.00	13.60	21.03	A	0.284	2.338	12	0.8	1	97.108	7.10	284.17	C
			B	0.284	2.338		0.8	1	97.108			
			C	0.284	2.338		0.8	1	97.108			
Sum Weight:	64.74	83.20						OTM	1552.91 kip-ft	30.46		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.03	2.19	A	0.492	1.911	11	0.85	1	14.650	0.26	78.40	C
120.00-116.67			B	0.492	1.911		0.85	1	14.650			
			C	0.492	1.911		0.85	1	14.650			
T2	1.05	3.35	A	0.309	2.271	11	0.85	1	21.552	0.75	90.35	C
116.67-108.33			B	0.309	2.271		0.85	1	21.552			
			C	0.309	2.271		0.85	1	21.552			
T3	2.72	3.44	A	0.301	2.294	11	0.85	1	21.986	1.26	151.65	C
108.33-100.00			B	0.301	2.294		0.85	1	21.986			
			C	0.301	2.294		0.85	1	21.986			
T4	3.27	4.07	A	0.298	2.303	11	0.85	1	22.919	1.45	173.77	C
100.00-91.67			B	0.298	2.303		0.85	1	22.919			
			C	0.298	2.303		0.85	1	22.919			
T5	3.94	4.37	A	0.291	2.321	11	0.85	1	23.406	1.66	199.36	C
91.67-83.33			B	0.291	2.321		0.85	1	23.406			
			C	0.291	2.321		0.85	1	23.406			
T6	4.68	4.66	A	0.284	2.338	12	0.85	1	23.903	1.96	235.52	C
83.33-75.00			B	0.284	2.338		0.85	1	23.903			
			C	0.284	2.338		0.85	1	23.903			
T7	16.75	16.84	A	0.288	2.329	12	0.85	1	79.896	7.22	288.96	C
75.00-50.00			B	0.288	2.329		0.85	1	79.896			
			C	0.288	2.329		0.85	1	79.896			
T8	18.70	23.24	A	0.352	2.167	13	0.85	1	113.330	8.92	356.63	C
50.00-25.00			B	0.352	2.167		0.85	1	113.330			
			C	0.352	2.167		0.85	1	113.330			
T9 25.00-0.00	13.60	21.03	A	0.284	2.338	12	0.85	1	99.158	7.15	286.19	C
			B	0.284	2.338		0.85	1	99.158			
			C	0.284	2.338		0.85	1	99.158			
Sum Weight:	64.74	83.20						OTM	1562.06 kip-ft	30.64		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.00	0.45	A	0.195	2.613	15	1	1	6.264	0.21	64.36	C
120.00-116.67			B	0.195	2.613		1	1	6.264			
			C	0.195	2.613		1	1	6.264			
T2	0.05	0.77	A	0.13	2.846	15	1	1	9.471	0.46	54.73	C
116.67-108.33			B	0.13	2.846		1	1	9.471			
			C	0.13	2.846		1	1	9.471			
T3	0.13	0.78	A	0.126	2.864	16	1	1	9.668	0.66	78.63	C
108.33-100.00			B	0.126	2.864		1	1	9.668			
			C	0.126	2.864		1	1	9.668			
T4	0.18	0.92	A	0.126	2.862	16	1	1	10.406	0.76	91.15	C
100.00-91.67			B	0.126	2.862		1	1	10.406			
			C	0.126	2.862		1	1	10.406			
T5	0.24	1.11	A	0.122	2.876	16	1	1	10.635	0.86	103.75	C
91.67-83.33			B	0.122	2.876		1	1	10.635			
			C	0.122	2.876		1	1	10.635			
T6	0.29	1.30	A	0.119	2.889	17	1	1	10.866	0.97	116.43	C
83.33-75.00			B	0.119	2.889		1	1	10.866			
			C	0.119	2.889		1	1	10.866			
T7	1.08	5.12	A	0.129	2.852	17	1	1	39.210	3.57	142.76	C
75.00-50.00			B	0.129	2.852		1	1	39.210			
			C	0.129	2.852		1	1	39.210			
T8	1.15	6.90	A	0.147	2.781	18	1	1	55.773	4.53	181.03	C
50.00-25.00			B	0.147	2.781		1	1	55.773			
			C	0.147	2.781		1	1	55.773			
T9 25.00-0.00	0.88	7.21	A	0.135	2.826	18	1	1	52.788	3.89	155.72	C
			B	0.135	2.826		1	1	52.788			
			C	0.135	2.826		1	1	52.788			
Sum Weight:	3.99	24.56						OTM	811.65 kip-ft	15.91		

Tower Forces - Service - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.00	0.45	A	0.195	2.613	15	0.825	1	5.390	0.18	55.45	C
120.00-116.67			B	0.195	2.613		0.825	1	5.390			
			C	0.195	2.613		0.825	1	5.390			
T2	0.05	0.77	A	0.13	2.846	15	0.825	1	8.329	0.41	49.60	C
116.67-108.33			B	0.13	2.846		0.825	1	8.329			
			C	0.13	2.846		0.825	1	8.329			
T3	0.13	0.78	A	0.126	2.864	16	0.825	1	8.486	0.61	73.21	C
108.33-100.00			B	0.126	2.864		0.825	1	8.486			
			C	0.126	2.864		0.825	1	8.486			
T4	0.18	0.92	A	0.126	2.862	16	0.825	1	9.092	0.71	85.01	C
100.00-91.67			B	0.126	2.862		0.825	1	9.092			
			C	0.126	2.862		0.825	1	9.092			
T5	0.24	1.11	A	0.122	2.876	16	0.825	1	9.275	0.81	97.26	C
91.67-83.33			B	0.122	2.876		0.825	1	9.275			
			C	0.122	2.876		0.825	1	9.275			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T6	0.29	1.30	A	0.119	2.889	17	0.825	1	9.461	0.91	109.56	C
83.33-75.00			B	0.119	2.889		0.825	1	9.461			
			C	0.119	2.889		0.825	1	9.461			
T7	1.08	5.12	A	0.129	2.852	17	0.825	1	34.006	3.35	134.06	C
75.00-50.00			B	0.129	2.852		0.825	1	34.006			
			C	0.129	2.852		0.825	1	34.006			
T8	1.15	6.90	A	0.147	2.781	18	0.825	1	47.536	4.17	166.99	C
50.00-25.00			B	0.147	2.781		0.825	1	47.536			
			C	0.147	2.781		0.825	1	47.536			
T9 25.00-0.00	0.88	7.21	A	0.135	2.826	18	0.825	1	45.615	3.59	143.44	C
			B	0.135	2.826		0.825	1	45.615			
			C	0.135	2.826		0.825	1	45.615			
Sum Weight:	3.99	24.56						OTM	753.86 kip-ft	14.75		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.00	0.45	A	0.195	2.613	15	0.8	1	5.265	0.18	54.17	C
120.00-116.67			B	0.195	2.613		0.8	1	5.265			
			C	0.195	2.613		0.8	1	5.265			
T2	0.05	0.77	A	0.13	2.846	15	0.8	1	8.166	0.41	48.87	C
116.67-108.33			B	0.13	2.846		0.8	1	8.166			
			C	0.13	2.846		0.8	1	8.166			
T3	0.13	0.78	A	0.126	2.864	16	0.8	1	8.317	0.60	72.43	C
108.33-100.00			B	0.126	2.864		0.8	1	8.317			
			C	0.126	2.864		0.8	1	8.317			
T4	0.18	0.92	A	0.126	2.862	16	0.8	1	8.904	0.70	84.14	C
100.00-91.67			B	0.126	2.862		0.8	1	8.904			
			C	0.126	2.862		0.8	1	8.904			
T5	0.24	1.11	A	0.122	2.876	16	0.8	1	9.081	0.80	96.33	C
91.67-83.33			B	0.122	2.876		0.8	1	9.081			
			C	0.122	2.876		0.8	1	9.081			
T6	0.29	1.30	A	0.119	2.889	17	0.8	1	9.260	0.90	108.58	C
83.33-75.00			B	0.119	2.889		0.8	1	9.260			
			C	0.119	2.889		0.8	1	9.260			
T7	1.08	5.12	A	0.129	2.852	17	0.8	1	33.262	3.32	132.82	C
75.00-50.00			B	0.129	2.852		0.8	1	33.262			
			C	0.129	2.852		0.8	1	33.262			
T8	1.15	6.90	A	0.147	2.781	18	0.8	1	46.360	4.12	164.99	C
50.00-25.00			B	0.147	2.781		0.8	1	46.360			
			C	0.147	2.781		0.8	1	46.360			
T9 25.00-0.00	0.88	7.21	A	0.135	2.826	18	0.8	1	44.590	3.54	141.69	C
			B	0.135	2.826		0.8	1	44.590			
			C	0.135	2.826		0.8	1	44.590			
Sum Weight:	3.99	24.56						OTM	745.60 kip-ft	14.59		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.00	0.45	A	0.195	2.613	15	0.85	1	5.515	0.19	56.72	C
120.00-116.67			B	0.195	2.613		0.85	1	5.515			
			C	0.195	2.613		0.85	1	5.515			
T2	0.05	0.77	A	0.13	2.846	15	0.85	1	8.492	0.42	50.33	C
116.67-108.33			B	0.13	2.846		0.85	1	8.492			
			C	0.13	2.846		0.85	1	8.492			
T3	0.13	0.78	A	0.126	2.864	16	0.85	1	8.655	0.62	73.98	C
108.33-100.00			B	0.126	2.864		0.85	1	8.655			
			C	0.126	2.864		0.85	1	8.655			
T4	0.18	0.92	A	0.126	2.862	16	0.85	1	9.280	0.72	85.89	C
100.00-91.67			B	0.126	2.862		0.85	1	9.280			
			C	0.126	2.862		0.85	1	9.280			
T5	0.24	1.11	A	0.122	2.876	16	0.85	1	9.470	0.82	98.19	C
91.67-83.33			B	0.122	2.876		0.85	1	9.470			
			C	0.122	2.876		0.85	1	9.470			
T6	0.29	1.30	A	0.119	2.889	17	0.85	1	9.661	0.92	110.54	C
83.33-75.00			B	0.119	2.889		0.85	1	9.661			
			C	0.119	2.889		0.85	1	9.661			
T7	1.08	5.12	A	0.129	2.852	17	0.85	1	34.749	3.38	135.30	C
75.00-50.00			B	0.129	2.852		0.85	1	34.749			
			C	0.129	2.852		0.85	1	34.749			
T8	1.15	6.90	A	0.147	2.781	18	0.85	1	48.713	4.22	169.00	C
50.00-25.00			B	0.147	2.781		0.85	1	48.713			
			C	0.147	2.781		0.85	1	48.713			
T9 25.00-0.00	0.88	7.21	A	0.135	2.826	18	0.85	1	46.640	3.63	145.19	C
			B	0.135	2.826		0.85	1	46.640			
			C	0.135	2.826		0.85	1	46.640			
Sum Weight:	3.99	24.56						OTM	762.11 kip-ft	14.92		

Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Leg Weight	6.83					
Bracing Weight	17.73					
Total Member Self-Weight	24.56			-11.52	-11.72	
Total Weight	39.89			-11.52	-11.72	
Wind 0 deg - No Ice		-0.03	-76.01	-4985.65	-6.81	37.18
Wind 30 deg - No Ice		36.47	-63.24	-4187.85	-2402.26	-11.02
Wind 45 deg - No Ice		51.24	-51.27	-3402.47	-3377.44	-33.33
Wind 60 deg - No Ice		62.34	-36.00	-2395.08	-4114.18	-52.95
Wind 90 deg - No Ice		72.99	0.03	-6.61	-4801.30	-82.20
Wind 120 deg - No Ice		65.80	38.03	2479.80	-4291.01	-93.61
Wind 135 deg - No Ice		53.31	53.35	3488.14	-3486.15	-86.57
Wind 150 deg - No Ice		36.52	63.26	4169.72	-2410.76	-71.19
Wind 180 deg - No Ice		0.03	72.04	4764.10	-16.63	-33.92
Wind 210 deg - No Ice		-36.47	63.24	4164.81	2378.82	11.02

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Wind 225 deg - No Ice		-51.24	51.27	3379.43	3354.01	33.33
Wind 240 deg - No Ice		-65.77	37.98	2471.29	4262.66	56.43
Wind 270 deg - No Ice		-72.99	-0.03	-16.43	4777.86	82.20
Wind 300 deg - No Ice		-62.36	-36.04	-2403.58	4095.66	86.88
Wind 315 deg - No Ice		-53.31	-53.35	-3511.18	3462.72	86.57
Wind 330 deg - No Ice		-36.52	-63.26	-4192.76	2387.32	71.19
Member Ice	58.64					
Total Weight Ice	198.10			-247.56	-101.30	
Wind 0 deg - Ice		-0.01	-43.35	-2924.02	-100.10	13.63
Wind 30 deg - Ice		21.37	-37.06	-2541.05	-1420.41	-28.98
Wind 45 deg - Ice		30.17	-30.19	-2116.59	-1964.18	-47.78
Wind 60 deg - Ice		36.87	-21.30	-1566.44	-2379.33	-63.22
Wind 90 deg - Ice		42.77	0.01	-246.36	-2741.60	-81.17
Wind 120 deg - Ice		37.53	21.69	1091.71	-2412.25	-78.31
Wind 135 deg - Ice		30.57	30.59	1641.95	-1984.66	-67.78
Wind 150 deg - Ice		21.40	37.07	2047.13	-1422.49	-52.19
Wind 180 deg - Ice		0.01	42.62	2392.28	-102.50	-13.33
Wind 210 deg - Ice		-21.37	37.06	2045.93	1217.81	28.98
Wind 225 deg - Ice		-30.17	30.19	1621.47	1761.59	47.78
Wind 240 deg - Ice		-37.51	21.66	1089.63	2208.45	64.68
Wind 270 deg - Ice		-42.77	-0.01	-248.76	2539.00	81.17
Wind 300 deg - Ice		-36.89	-21.32	-1568.52	2177.94	76.55
Wind 315 deg - Ice		-30.57	-30.59	-2137.07	1782.06	67.78
Wind 330 deg - Ice		-21.40	-37.07	-2542.25	1219.89	52.19
Total Weight	39.89			-11.52	-11.72	
Wind 0 deg - Service		-0.01	-25.29	-1656.73	1.04	12.37
Wind 30 deg - Service		12.13	-21.04	-1391.30	-795.94	-3.67
Wind 45 deg - Service		17.05	-17.06	-1130.00	-1120.39	-11.09
Wind 60 deg - Service		20.74	-11.98	-794.83	-1365.51	-17.62
Wind 90 deg - Service		24.28	0.01	-0.17	-1594.12	-27.35
Wind 120 deg - Service		21.89	12.65	827.07	-1424.34	-31.14
Wind 135 deg - Service		17.74	17.75	1162.55	-1156.56	-28.80
Wind 150 deg - Service		12.15	21.05	1389.32	-798.77	-23.68
Wind 180 deg - Service		0.01	23.97	1587.07	-2.23	-11.29
Wind 210 deg - Service		-12.13	21.04	1387.69	794.75	3.67
Wind 225 deg - Service		-17.05	17.06	1126.38	1119.20	11.09
Wind 240 deg - Service		-21.88	12.64	824.24	1421.52	18.77
Wind 270 deg - Service		-24.28	-0.01	-3.44	1592.93	27.35
Wind 300 deg - Service		-20.75	-11.99	-797.66	1365.95	28.90
Wind 315 deg - Service		-17.74	-17.75	-1166.16	1155.37	28.80
Wind 330 deg - Service		-12.15	-21.05	-1392.93	797.58	23.68

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 45 deg - No Ice
7	0.9 Dead+1.6 Wind 45 deg - No Ice
8	1.2 Dead+1.6 Wind 60 deg - No Ice
9	0.9 Dead+1.6 Wind 60 deg - No Ice
10	1.2 Dead+1.6 Wind 90 deg - No Ice

Comb. No.	Description
11	0.9 Dead+1.6 Wind 90 deg - No Ice
12	1.2 Dead+1.6 Wind 120 deg - No Ice
13	0.9 Dead+1.6 Wind 120 deg - No Ice
14	1.2 Dead+1.6 Wind 135 deg - No Ice
15	0.9 Dead+1.6 Wind 135 deg - No Ice
16	1.2 Dead+1.6 Wind 150 deg - No Ice
17	0.9 Dead+1.6 Wind 150 deg - No Ice
18	1.2 Dead+1.6 Wind 180 deg - No Ice
19	0.9 Dead+1.6 Wind 180 deg - No Ice
20	1.2 Dead+1.6 Wind 210 deg - No Ice
21	0.9 Dead+1.6 Wind 210 deg - No Ice
22	1.2 Dead+1.6 Wind 225 deg - No Ice
23	0.9 Dead+1.6 Wind 225 deg - No Ice
24	1.2 Dead+1.6 Wind 240 deg - No Ice
25	0.9 Dead+1.6 Wind 240 deg - No Ice
26	1.2 Dead+1.6 Wind 270 deg - No Ice
27	0.9 Dead+1.6 Wind 270 deg - No Ice
28	1.2 Dead+1.6 Wind 300 deg - No Ice
29	0.9 Dead+1.6 Wind 300 deg - No Ice
30	1.2 Dead+1.6 Wind 315 deg - No Ice
31	0.9 Dead+1.6 Wind 315 deg - No Ice
32	1.2 Dead+1.6 Wind 330 deg - No Ice
33	0.9 Dead+1.6 Wind 330 deg - No Ice
34	1.2 Dead+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 45 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
39	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
40	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
41	1.2 Dead+1.0 Wind 135 deg+1.0 Ice+1.0 Temp
42	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
43	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
44	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
45	1.2 Dead+1.0 Wind 225 deg+1.0 Ice+1.0 Temp
46	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
47	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
48	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
49	1.2 Dead+1.0 Wind 315 deg+1.0 Ice+1.0 Temp
50	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
51	Dead+Wind 0 deg - Service
52	Dead+Wind 30 deg - Service
53	Dead+Wind 45 deg - Service
54	Dead+Wind 60 deg - Service
55	Dead+Wind 90 deg - Service
56	Dead+Wind 120 deg - Service
57	Dead+Wind 135 deg - Service
58	Dead+Wind 150 deg - Service
59	Dead+Wind 180 deg - Service
60	Dead+Wind 210 deg - Service
61	Dead+Wind 225 deg - Service
62	Dead+Wind 240 deg - Service
63	Dead+Wind 270 deg - Service
64	Dead+Wind 300 deg - Service
65	Dead+Wind 315 deg - Service
66	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
T1	120 - 116.667	Leg	Max Tension	9	0.42	0.00	0.00
			Max. Compression	46	-1.33	0.51	0.10
			Max. Mx	18	0.29	-2.05	-0.21
			Max. My	16	-0.26	0.00	-2.16
			Max. Vy	3	-1.18	2.05	0.21
			Max. Vx	16	1.69	0.00	-2.16
		Diagonal	Max Tension	29	0.18	0.00	0.00
			Max. Compression	41	-0.50	0.00	0.00
			Max. Mx	34	-0.31	0.14	0.00
			Max. My	34	-0.31	0.00	-0.00
			Max. Vy	34	-0.08	0.00	0.00
			Max. Vx	34	-0.00	0.00	0.00
		Top Girt	Max Tension	31	0.25	0.00	0.00
			Max. Compression	14	-0.25	0.02	0.00
			Max. Mx	43	0.03	0.09	0.02
			Max. My	35	0.06	0.08	0.02
			Max. Vy	43	-0.08	0.09	0.02
			Max. Vx	35	0.01	0.00	0.00
T2	116.667 - 108.333	Leg	Max Tension	19	0.19	-2.05	-0.21
			Max. Compression	46	-4.55	0.33	-0.05
			Max. Mx	18	0.10	-2.05	-0.21
			Max. My	32	-0.34	-0.06	-2.23
			Max. Vy	3	1.65	2.05	0.21
			Max. Vx	16	-1.69	0.00	-2.16
		Diagonal	Max Tension	5	5.37	0.00	0.00
			Max. Compression	4	-5.49	0.00	0.00
			Max. Mx	34	-0.15	0.23	0.00
			Max. My	34	-0.16	0.00	-0.01
			Max. Vy	34	0.09	0.00	0.00
			Max. Vx	34	0.00	0.00	0.00
		Horizontal	Max Tension	18	3.91	0.00	0.00
			Max. Compression	3	-3.92	0.01	0.00
			Max. Mx	43	-0.20	0.09	0.03
			Max. My	35	0.64	0.09	0.03
			Max. Vy	43	-0.08	0.09	0.03
			Max. Vx	35	0.01	0.00	0.00
T3	108.333 - 100	Leg	Max Tension	19	6.89	-1.39	-0.30
			Max. Compression	35	-9.82	0.28	0.04
			Max. Mx	18	6.31	-1.99	-0.06
			Max. My	26	-1.30	-0.02	-2.36
			Max. Vy	13	-0.70	1.94	0.37
			Max. Vx	26	0.98	-0.02	-2.36
		Diagonal	Max Tension	5	9.11	0.00	0.00
			Max. Compression	4	-9.22	0.00	0.00
			Max. Mx	34	-0.18	0.25	0.00
			Max. My	34	-0.17	0.00	-0.01
			Max. Vy	34	-0.09	0.00	0.00
			Max. Vx	34	0.00	0.00	0.00
		Horizontal	Max Tension	18	5.92	0.00	0.00
			Max. Compression	3	-6.04	0.02	0.00
			Max. Mx	48	-0.17	0.11	0.03
			Max. My	38	-0.29	0.11	0.03
			Max. Vy	48	0.08	0.11	0.03
			Max. Vx	35	-0.01	0.00	0.00
T4	100 - 91.6667	Leg	Max Tension	19	17.83	-1.98	-0.06
			Max. Compression	2	-22.93	1.57	0.04
			Max. Mx	8	16.22	3.95	0.42
			Max. My	10	-1.62	-0.07	-3.98
			Max. Vy	8	1.93	-1.61	0.17
			Max. Vx	10	-2.04	-0.04	1.74

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
		Diagonal	Max Tension	5	13.20	0.00	0.00
			Max. Compression	4	-13.37	0.00	0.00
			Max. Mx	34	-0.39	0.27	0.00
			Max. My	34	-0.34	0.00	0.01
			Max. Vy	34	-0.10	0.00	0.00
			Max. Vx	34	-0.00	0.00	0.00
		Top Girt	Max Tension	20	8.42	0.00	0.00
			Max. Compression	3	-8.41	0.03	0.01
			Max. Mx	48	-0.51	0.16	0.00
			Max. My	2	0.66	0.02	-0.03
			Max. Vy	48	-0.11	0.16	0.00
			Max. Vx	2	0.00	0.02	-0.03
		Inner Bracing	Max Tension	3	0.14	0.00	0.00
			Max. Compression	2	-0.15	0.00	0.00
			Max. Mx	34	-0.01	-0.11	0.00
			Max. Vy	34	0.07	0.00	0.00
T5	91.6667 - 83.3333	Leg	Max Tension	19	32.34	-1.62	-0.04
			Max. Compression	2	-39.90	2.30	-0.19
			Max. Mx	25	-37.22	2.39	-0.40
			Max. My	26	-3.90	-0.04	-3.01
			Max. Vy	24	-0.35	2.39	-0.40
			Max. Vx	10	-0.62	-0.02	3.01
		Diagonal	Max Tension	21	16.84	0.00	0.00
			Max. Compression	20	-17.06	0.00	0.00
			Max. Mx	34	-0.46	0.32	0.00
			Max. My	34	-0.32	0.00	-0.01
			Max. Vy	34	-0.12	0.00	0.00
			Max. Vx	34	0.00	0.00	0.00
		Top Girt	Max Tension	20	11.04	0.00	0.00
			Max. Compression	5	-11.00	0.03	-0.00
			Max. Mx	48	-0.70	0.18	0.01
			Max. My	2	2.60	0.01	-0.03
			Max. Vy	48	0.12	0.18	0.01
			Max. Vx	2	-0.01	0.01	-0.03
		Inner Bracing	Max Tension	5	0.19	0.00	0.00
			Max. Compression	4	-0.19	0.00	0.00
			Max. Mx	34	-0.01	-0.12	0.00
			Max. Vy	34	0.07	0.00	0.00
T6	83.3333 - 75	Leg	Max Tension	19	51.89	-2.32	0.18
			Max. Compression	2	-62.66	4.40	-0.25
			Max. Mx	8	47.91	5.41	0.28
			Max. My	26	-5.82	-0.09	6.17
			Max. Vy	8	-2.44	-2.39	0.39
			Max. Vx	26	-2.89	-0.04	-3.01
		Diagonal	Max Tension	21	21.41	0.00	0.00
			Max. Compression	20	-21.69	0.00	0.00
			Max. Mx	34	-0.54	0.37	0.00
			Max. My	34	-0.38	0.00	0.01
			Max. Vy	34	0.13	0.00	0.00
			Max. Vx	34	-0.00	0.00	0.00
		Top Girt	Max Tension	6	14.64	0.03	-0.01
			Max. Compression	23	-14.56	0.00	0.00
			Max. Mx	38	-1.25	0.20	0.01
			Max. My	2	2.80	0.01	-0.04
			Max. Vy	38	-0.12	0.20	0.01
			Max. Vx	2	0.01	0.01	-0.04
		Inner Bracing	Max Tension	23	0.25	0.00	0.00
			Max. Compression	22	-0.26	0.00	0.00
			Max. Mx	34	-0.01	-0.13	0.00
			Max. Vy	34	-0.07	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T7	75 - 50	Leg	Max Tension	19	140.58	-0.84	0.21
			Max. Compression	2	-160.76	-0.42	-0.08
			Max. Mx	8	72.33	-4.58	0.28
			Max. My	10	-6.13	-0.05	4.99
			Max. Vy	8	-1.92	-4.58	0.28
			Max. Vx	26	-2.07	-0.09	-4.99
		Diagonal	Max Tension	17	30.35	0.00	0.00
			Max. Compression	16	-30.71	0.00	0.00
			Max. Mx	34	-0.71	0.51	0.00
			Max. My	34	-0.60	0.00	-0.02
			Max. Vy	34	-0.17	0.00	0.00
			Max. Vx	34	0.01	0.00	0.00
		Horizontal	Max Tension	32	21.87	0.00	0.00
			Max. Compression	17	-21.67	0.05	-0.00
			Max. Mx	38	1.15	0.30	0.02
			Max. My	12	3.14	0.00	-0.07
			Max. Vy	38	0.16	0.30	0.02
			Max. Vx	12	0.01	0.00	-0.07
		Top Girt	Max Tension	6	19.31	0.05	-0.01
			Max. Compression	23	-19.24	0.00	0.00
			Max. Mx	38	-1.63	0.23	0.01
			Max. My	2	2.82	0.02	-0.05
			Max. Vy	38	-0.14	0.23	0.01
			Max. Vx	2	0.01	0.02	-0.05
		Inner Bracing	Max Tension	23	0.33	0.00	0.00
			Max. Compression	22	-0.34	0.00	0.00
			Max. Mx	34	-0.01	-0.17	0.00
			Max. Vy	34	0.09	0.00	0.00
T8	50 - 25	Leg	Max Tension	19	242.26	2.93	0.12
			Max. Compression	2	-272.39	5.00	0.08
			Max. Mx	2	-272.34	-5.03	-0.20
			Max. My	10	-12.23	-0.41	3.79
			Max. Vy	2	2.50	5.00	0.08
			Max. Vx	10	1.84	-0.27	2.50
		Diagonal	Max Tension	17	37.32	-0.17	0.01
			Max. Compression	32	-38.04	0.00	0.00
			Max. Mx	30	19.28	-0.34	0.01
			Max. My	35	-0.92	-0.15	0.03
			Max. Vy	37	0.13	-0.18	-0.03
			Max. Vx	48	0.01	0.00	0.00
		Horizontal	Max Tension	16	27.81	0.12	-0.00
			Max. Compression	17	-27.63	0.09	-0.00
			Max. Mx	38	-1.83	0.49	0.02
			Max. My	24	-0.36	-0.05	-0.10
			Max. Vy	38	0.21	0.49	0.02
			Max. Vx	24	-0.01	-0.05	-0.10
		Top Girt	Max Tension	16	23.33	0.09	-0.00
			Max. Compression	17	-23.26	0.06	-0.00
			Max. Mx	38	-1.71	0.36	0.01
			Max. My	24	-0.64	-0.01	-0.07
			Max. Vy	38	-0.18	0.36	0.01
			Max. Vx	24	0.01	-0.01	-0.07
		Redund Horz 1 Bracing	Max Tension	2	4.72	0.00	0.00
			Max. Compression	2	-4.72	0.00	0.00
			Max. Mx	34	0.87	-0.06	0.00
			Max. My	34	0.75	0.00	0.00
			Max. Vy	34	0.05	0.00	0.00
			Max. Vx	34	-0.00	0.00	0.00
		Redund Diag 1 Bracing	Max Tension	2	3.24	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	2	-3.24	0.00	0.00
			Max. Mx	34	0.75	-0.08	0.00
			Max. My	34	0.50	0.00	-0.00
			Max. Vy	34	0.05	0.00	0.00
			Max. Vx	34	-0.00	0.00	0.00
		Inner Bracing	Max Tension	33	0.40	0.00	0.00
			Max. Compression	32	-0.41	0.00	0.00
			Max. Mx	34	-0.02	-0.22	0.00
			Max. Vy	34	0.10	0.00	0.00
T9	25 - 0	Leg	Max Tension	19	333.99	6.62	0.29
			Max. Compression	2	-374.04	0.00	0.00
			Max. Mx	2	-373.97	9.64	0.14
			Max. My	10	-13.59	-0.61	5.75
			Max. Vy	2	-2.98	9.64	0.14
			Max. Vx	10	-1.62	-0.61	5.75
		Diagonal	Max Tension	17	49.76	-0.43	0.01
			Max. Compression	16	-50.57	0.00	0.00
			Max. Mx	30	26.80	-0.66	0.02
			Max. My	43	-1.60	-0.02	-0.05
			Max. Vy	37	0.17	-0.33	-0.05
			Max. Vx	46	0.01	0.00	0.00
		Horizontal	Max Tension	30	31.51	0.00	0.00
			Max. Compression	15	-31.47	0.19	0.02
			Max. Mx	38	-2.76	0.54	0.02
			Max. My	24	-0.08	-0.08	-0.10
			Max. Vy	38	-0.23	0.54	0.02
			Max. Vx	24	0.01	-0.08	-0.10
		Top Girt	Max Tension	16	29.67	0.13	-0.00
			Max. Compression	17	-29.49	0.09	-0.00
			Max. Mx	38	-2.02	0.52	0.02
			Max. My	24	-0.93	-0.07	-0.10
			Max. Vy	38	-0.21	0.52	0.02
			Max. Vx	24	0.01	-0.07	-0.10
		Redund Horz 1 Bracing	Max Tension	2	6.49	0.00	0.00
			Max. Compression	2	-6.49	0.00	0.00
			Max. Mx	34	1.07	-0.07	0.00
			Max. My	34	0.91	0.00	0.00
			Max. Vy	34	0.06	0.00	0.00
			Max. Vx	34	-0.00	0.00	0.00
		Redund Diag 1 Bracing	Max Tension	2	5.26	0.00	0.00
			Max. Compression	2	-5.26	0.00	0.00
			Max. Mx	34	1.13	-0.10	0.00
			Max. My	34	0.78	0.00	-0.00
			Max. Vy	34	0.05	0.00	0.00
			Max. Vx	34	-0.00	0.00	0.00
		Inner Bracing	Max Tension	17	0.51	0.00	0.00
			Max. Compression	16	-0.52	0.00	0.00
			Max. Mx	34	-0.02	-0.26	0.00
			Max. Vy	34	0.11	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	24	434.12	55.77	-35.05
	Max. H_x	24	434.12	55.77	-35.05
	Max. H_z	7	-380.12	-48.29	34.17
	Min. Vert	9	-391.56	-51.32	32.30
	Min. H_x	9	-391.56	-51.32	32.30
	Min. H_z	22	406.21	49.98	-35.16
Leg B	Max. Vert	12	436.21	-55.01	-36.51
	Max. H_x	29	-391.30	50.61	33.61
	Max. H_z	31	-379.95	47.16	36.21
	Min. Vert	29	-391.30	50.61	33.61
	Min. H_x	12	436.21	-55.01	-36.51
	Min. H_z	14	408.38	-48.87	-37.23
Leg A	Max. Vert	2	438.65	1.65	65.93
	Max. H_x	26	17.15	19.22	1.17
	Max. H_z	2	438.65	1.65	65.93
	Min. Vert	19	-392.92	-1.49	-60.66
	Min. H_x	11	12.11	-19.20	0.83
	Min. H_z	19	-392.92	-1.49	-60.66

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	39.89	-0.00	0.00	-11.52	-11.72	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	47.87	-0.04	-121.62	-7694.26	-6.21	59.49
0.9 Dead+1.6 Wind 0 deg - No Ice	35.90	-0.04	-121.62	-7690.81	-2.69	59.49
1.2 Dead+1.6 Wind 30 deg - No Ice	47.87	58.35	-101.18	-6466.55	-3706.47	-17.63
0.9 Dead+1.6 Wind 30 deg - No Ice	35.90	58.35	-101.18	-6463.09	-3702.96	-17.63
1.2 Dead+1.6 Wind 45 deg - No Ice	47.87	81.98	-82.04	-5253.59	-5213.47	-53.33
0.9 Dead+1.6 Wind 45 deg - No Ice	35.90	81.98	-82.04	-5250.14	-5209.96	-53.33
1.2 Dead+1.6 Wind 60 deg - No Ice	47.87	99.74	-57.60	-3697.28	-6352.42	-84.73
0.9 Dead+1.6 Wind 60 deg - No Ice	35.90	99.74	-57.60	-3693.82	-6348.91	-84.73
1.2 Dead+1.6 Wind 90 deg - No Ice	47.87	116.78	0.04	-5.97	-7412.49	-131.53
0.9 Dead+1.6 Wind 90 deg - No Ice	35.90	116.78	0.04	-2.51	-7408.97	-131.53
1.2 Dead+1.6 Wind 120 deg - No Ice	47.87	105.28	60.85	3833.20	-6620.02	-149.77
0.9 Dead+1.6 Wind 120 deg - No Ice	35.90	105.28	60.85	3836.65	-6616.50	-149.77
1.2 Dead+1.6 Wind 135 deg - No Ice	47.87	82.05	82.10	5237.05	-5224.59	-138.51
0.9 Dead+1.6 Wind 135 deg - No Ice	35.90	82.05	82.10	5240.51	-5221.07	-138.51
1.2 Dead+1.6 Wind 150 deg - No Ice	47.87	58.43	101.22	6446.75	-3720.08	-113.90
0.9 Dead+1.6 Wind 150 deg - No Ice	35.90	58.43	101.22	6450.21	-3716.56	-113.90

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
1.2 Dead+1.6 Wind 180 deg - No Ice	47.87	0.04	115.27	7366.69	-21.92	-54.28
0.9 Dead+1.6 Wind 180 deg - No Ice	35.90	0.04	115.27	7370.15	-18.40	-54.28
1.2 Dead+1.6 Wind 210 deg - No Ice	47.87	-58.35	101.18	6438.90	3678.35	17.63
0.9 Dead+1.6 Wind 210 deg - No Ice	35.90	-58.35	101.18	6442.35	3681.86	17.63
1.2 Dead+1.6 Wind 225 deg - No Ice	47.87	-81.98	82.04	5225.94	5185.35	53.33
0.9 Dead+1.6 Wind 225 deg - No Ice	35.90	-81.98	82.04	5229.40	5188.87	53.33
1.2 Dead+1.6 Wind 240 deg - No Ice	47.87	-105.24	60.77	3819.59	6584.04	90.28
0.9 Dead+1.6 Wind 240 deg - No Ice	35.90	-105.24	60.77	3823.05	6587.55	90.28
1.2 Dead+1.6 Wind 270 deg - No Ice	47.87	-116.78	-0.04	-21.68	7384.37	131.53
0.9 Dead+1.6 Wind 270 deg - No Ice	35.90	-116.78	-0.04	-18.23	7387.88	131.53
1.2 Dead+1.6 Wind 300 deg - No Ice	47.87	-99.78	-57.67	-3710.89	6332.16	139.00
0.9 Dead+1.6 Wind 300 deg - No Ice	35.90	-99.78	-57.67	-3707.43	6335.67	139.00
1.2 Dead+1.6 Wind 315 deg - No Ice	47.87	-82.05	-82.10	-5264.70	5196.46	138.51
0.9 Dead+1.6 Wind 315 deg - No Ice	35.90	-82.05	-82.10	-5261.25	5199.98	138.51
1.2 Dead+1.6 Wind 330 deg - No Ice	47.87	-58.43	-101.22	-6474.40	3691.96	113.90
0.9 Dead+1.6 Wind 330 deg - No Ice	35.90	-58.43	-101.22	-6470.95	3695.47	113.90
1.2 Dead+1.0 Ice+1.0 Temp	206.08	-0.00	0.00	-249.86	-103.64	-0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	206.08	-0.01	-43.35	-2797.43	-102.44	13.63
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	206.08	21.37	-37.06	-2433.24	-1359.17	-28.98
1.2 Dead+1.0 Wind 45 deg+1.0 Ice+1.0 Temp	206.08	30.17	-30.19	-2029.19	-1876.82	-47.78
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	206.08	36.87	-21.30	-1505.46	-2272.06	-63.22
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	206.08	42.77	0.01	-248.66	-2616.79	-81.17
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	206.08	37.53	21.69	1024.96	-2302.97	-78.31
1.2 Dead+1.0 Wind 135 deg+1.0 Ice+1.0 Temp	206.08	30.19	30.21	1531.16	-1878.52	-67.78
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	206.08	21.40	37.07	1934.71	-1361.25	-52.19
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	206.08	0.01	42.62	2263.40	-104.84	-13.33
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	206.08	-21.37	37.06	1933.51	1151.89	28.98
1.2 Dead+1.0 Wind 225 deg+1.0 Ice+1.0 Temp	206.08	-30.17	30.19	1529.46	1669.54	47.78
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	206.08	-37.51	21.66	1022.88	2094.48	64.68
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	206.08	-42.77	-0.01	-251.07	2409.51	81.17
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	206.08	-36.89	-21.32	-1507.54	2065.98	76.55

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
1.2 Dead+1.0 Wind 315 deg+1.0 Ice+1.0 Temp	206.08	-30.19	-30.21	-2030.89	1671.24	67.78
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	206.08	-21.40	-37.07	-2434.44	1153.97	52.19
Dead+Wind 0 deg - Service	39.89	-0.01	-25.29	-1608.60	-10.08	12.37
Dead+Wind 30 deg - Service	39.89	12.13	-21.04	-1353.31	-779.52	-3.67
Dead+Wind 45 deg - Service	39.89	17.05	-17.06	-1101.09	-1092.89	-11.09
Dead+Wind 60 deg - Service	39.89	20.74	-11.98	-777.46	-1329.73	-17.62
Dead+Wind 90 deg - Service	39.89	24.28	0.01	-9.89	-1550.16	-27.35
Dead+Wind 120 deg - Service	39.89	21.89	12.65	788.44	-1385.37	-31.14
Dead+Wind 135 deg - Service	39.89	17.06	17.07	1080.36	-1095.20	-28.80
Dead+Wind 150 deg - Service	39.89	12.15	21.05	1331.90	-782.35	-23.68
Dead+Wind 180 deg - Service	39.89	0.01	23.97	1523.20	-13.35	-11.29
Dead+Wind 210 deg - Service	39.89	-12.13	21.04	1330.27	756.09	3.67
Dead+Wind 225 deg - Service	39.89	-17.05	17.06	1078.04	1069.46	11.09
Dead+Wind 240 deg - Service	39.89	-21.88	12.64	785.61	1360.30	18.77
Dead+Wind 270 deg - Service	39.89	-24.28	-0.01	-13.15	1526.72	27.35
Dead+Wind 300 deg - Service	39.89	-20.75	-11.99	-780.29	1307.92	28.90
Dead+Wind 315 deg - Service	39.89	-17.06	-17.07	-1103.40	1071.77	28.80
Dead+Wind 330 deg - Service	39.89	-12.15	-21.05	-1354.94	758.92	23.68

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-39.89	0.00	0.00	39.89	-0.00	0.000%
2	-0.04	-47.87	-121.62	0.04	47.87	121.62	0.000%
3	-0.04	-35.90	-121.62	0.04	35.90	121.62	0.000%
4	58.35	-47.87	-101.18	-58.35	47.87	101.18	0.000%
5	58.35	-35.90	-101.18	-58.35	35.90	101.18	0.000%
6	81.98	-47.87	-82.04	-81.98	47.87	82.04	0.000%
7	81.98	-35.90	-82.04	-81.98	35.90	82.04	0.000%
8	99.74	-47.87	-57.60	-99.74	47.87	57.60	0.000%
9	99.74	-35.90	-57.60	-99.74	35.90	57.60	0.000%
10	116.78	-47.87	0.04	-116.78	47.87	-0.04	0.000%
11	116.78	-35.90	0.04	-116.78	35.90	-0.04	0.000%
12	105.28	-47.87	60.85	-105.28	47.87	-60.85	0.000%
13	105.28	-35.90	60.85	-105.28	35.90	-60.85	0.000%
14	82.05	-47.87	82.10	-82.05	47.87	-82.10	0.000%
15	82.05	-35.90	82.10	-82.05	35.90	-82.10	0.000%
16	58.43	-47.87	101.22	-58.43	47.87	-101.22	0.000%
17	58.43	-35.90	101.22	-58.43	35.90	-101.22	0.000%
18	0.04	-47.87	115.27	-0.04	47.87	-115.27	0.000%
19	0.04	-35.90	115.27	-0.04	35.90	-115.27	0.000%
20	-58.35	-47.87	101.18	58.35	47.87	-101.18	0.000%
21	-58.35	-35.90	101.18	58.35	35.90	-101.18	0.000%
22	-81.98	-47.87	82.04	81.98	47.87	-82.04	0.000%
23	-81.98	-35.90	82.04	81.98	35.90	-82.04	0.000%
24	-105.24	-47.87	60.77	105.24	47.87	-60.77	0.000%
25	-105.24	-35.90	60.77	105.24	35.90	-60.77	0.000%
26	-116.78	-47.87	-0.04	116.78	47.87	0.04	0.000%
27	-116.78	-35.90	-0.04	116.78	35.90	0.04	0.000%
28	-99.78	-47.87	-57.67	99.78	47.87	57.67	0.000%
29	-99.78	-35.90	-57.67	99.78	35.90	57.67	0.000%
30	-82.05	-47.87	-82.10	82.05	47.87	82.10	0.000%
31	-82.05	-35.90	-82.10	82.05	35.90	82.10	0.000%
32	-58.43	-47.87	-101.22	58.43	47.87	101.22	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
33	-58.43	-35.90	-101.22	58.43	35.90	101.22	0.000%
34	0.00	-206.08	0.00	0.00	206.08	-0.00	0.000%
35	-0.01	-206.08	-43.35	0.01	206.08	43.35	0.000%
36	21.37	-206.08	-37.06	-21.37	206.08	37.06	0.000%
37	30.17	-206.08	-30.19	-30.17	206.08	30.19	0.000%
38	36.87	-206.08	-21.30	-36.87	206.08	21.30	0.000%
39	42.77	-206.08	0.01	-42.77	206.08	-0.01	0.000%
40	37.53	-206.08	21.69	-37.53	206.08	-21.69	0.000%
41	30.19	-206.08	30.21	-30.19	206.08	-30.21	0.000%
42	21.40	-206.08	37.07	-21.40	206.08	-37.07	0.000%
43	0.01	-206.08	42.62	-0.01	206.08	-42.62	0.000%
44	-21.37	-206.08	37.06	21.37	206.08	-37.06	0.000%
45	-30.17	-206.08	30.19	30.17	206.08	-30.19	0.000%
46	-37.51	-206.08	21.66	37.51	206.08	-21.66	0.000%
47	-42.77	-206.08	-0.01	42.77	206.08	0.01	0.000%
48	-36.89	-206.08	-21.32	36.89	206.08	21.32	0.000%
49	-30.19	-206.08	-30.21	30.19	206.08	30.21	0.000%
50	-21.40	-206.08	-37.07	21.40	206.08	37.07	0.000%
51	-0.01	-39.89	-25.29	0.01	39.89	25.29	0.000%
52	12.13	-39.89	-21.04	-12.13	39.89	21.04	0.000%
53	17.05	-39.89	-17.06	-17.05	39.89	17.06	0.000%
54	20.74	-39.89	-11.98	-20.74	39.89	11.98	0.000%
55	24.28	-39.89	0.01	-24.28	39.89	-0.01	0.000%
56	21.89	-39.89	12.65	-21.89	39.89	-12.65	0.000%
57	17.06	-39.89	17.07	-17.06	39.89	-17.07	0.000%
58	12.15	-39.89	21.05	-12.15	39.89	-21.05	0.000%
59	0.01	-39.89	23.97	-0.01	39.89	-23.97	0.000%
60	-12.13	-39.89	21.04	12.13	39.89	-21.04	0.000%
61	-17.05	-39.89	17.06	17.05	39.89	-17.06	0.000%
62	-21.88	-39.89	12.64	21.88	39.89	-12.64	0.000%
63	-24.28	-39.89	-0.01	24.28	39.89	0.01	0.000%
64	-20.75	-39.89	-11.99	20.75	39.89	11.99	0.000%
65	-17.06	-39.89	-17.07	17.06	39.89	17.07	0.000%
66	-12.15	-39.89	-21.05	12.15	39.89	21.05	0.000%

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	120 - 116.667	1.940	51	0.1065	0.0196
T2	116.667 - 108.333	1.866	51	0.1065	0.0195
T3	108.333 - 100	1.673	51	0.1067	0.0204
T4	100 - 91.6667	1.477	51	0.1061	0.0213
T5	91.6667 - 83.3333	1.281	51	0.1041	0.0206
T6	83.3333 - 75	1.093	51	0.1002	0.0198
T7	75 - 50	0.913	51	0.0942	0.0187
T8	50 - 25	0.427	51	0.0737	0.0134
T9	25 - 0	0.109	51	0.0359	0.0068

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
138.00	Lightning Rod 5/8x4'	51	1.940	0.1065	0.0196	68791
120.00	16'x3" Omni (inverted)	51	1.940	0.1065	0.0196	68791
117.00	6' DISH (SOLID)	51	1.873	0.1065	0.0195	68791
115.00	6' DISH (SOLID)	51	1.828	0.1065	0.0195	68791
114.00	Rohn 6' Side-Arm(1)	51	1.805	0.1065	0.0196	73783
113.00	Pirod 4' Side Mount Standoff (1)	51	1.782	0.1066	0.0197	84945
112.00	Junction Box	51	1.759	0.1066	0.0198	104467
111.00	6' DISH (SOLID)	51	1.736	0.1066	0.0200	135678
110.00	6'8"x4" Pipe Mount	51	1.712	0.1067	0.0201	185467
109.00	10'x2" Dipole Antenna (inverted)	51	1.689	0.1067	0.0203	267709
107.00	6'8"x4" Pipe Mount	51	1.642	0.1067	0.0206	588473
106.00	16'x3" Omni (inverted)	51	1.618	0.1066	0.0207	795917
105.00	SE419-SWBPALDF Panel Antenna	51	1.595	0.1066	0.0209	930763
104.00	AP13-850/065D w/Mount Pipe	51	1.571	0.1065	0.0210	801245
103.00	TMA 432-83H-01T	51	1.548	0.1064	0.0211	700482
101.00	SE419-SWBPALDF Panel Antenna	51	1.501	0.1062	0.0212	752388
100.00	PD458-406	51	1.477	0.1061	0.0213	Inf
96.00	3'4"x4" Pipe Mount (horizontal)	51	1.383	0.1053	0.0211	242773
95.00	SC479-HF1LDF (inverted)	51	1.359	0.1051	0.0210	184713
92.00	PD458-406	51	1.289	0.1042	0.0207	114461
88.00	SC479-HF1LDF (inverted)	51	1.197	0.1027	0.0203	91632
87.00	4'6"x3" Pipe Mount (horizontal)	51	1.174	0.1022	0.0202	89319
86.00	20' 4-Bay Dipole	51	1.152	0.1017	0.0201	87672
82.00	3' Yagi	51	1.063	0.0994	0.0197	91942
81.00	3' Yagi	51	1.041	0.0987	0.0196	96904
80.00	Face Mount	51	1.020	0.0980	0.0194	103625
77.00	20' 4-Bay Dipole	51	0.955	0.0957	0.0190	130961
76.00	3'4"x4" Pipe Mount (horizontal)	51	0.934	0.0950	0.0188	138389
72.00	Face Mount	51	0.850	0.0921	0.0181	125319
67.00	4'6"x3" Pipe Mount (horizontal)	51	0.747	0.0886	0.0172	88114
65.00	6' Yagi w/ Mount	51	0.706	0.0872	0.0168	78568
63.00	GPS	51	0.666	0.0857	0.0163	70889
55.00	20' 4-Bay Dipole w/ 2' Sidearm Mount	51	0.515	0.0790	0.0146	50963
53.00	1.0" Dia 4' Omni w/Pipe Mount	51	0.479	0.0770	0.0141	47638
48.00	10'x6" Dipole Antenna	51	0.394	0.0713	0.0129	41542
47.00	5'x1.5in dia Whip Antenna /w mount	51	0.378	0.0700	0.0126	40632
43.00	3' Whip (3in diameter) /w mount	51	0.317	0.0645	0.0116	37469
41.00	4 FT DISH	51	0.288	0.0615	0.0111	36071
40.00	1'x1' Panel Antenna	51	0.274	0.0600	0.0108	35411
39.00	6'x1" Whip Antenna w/ Mount	51	0.260	0.0585	0.0106	34774

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	120 - 116.667	9.267	2	0.5084	0.0941
T2	116.667 - 108.333	8.914	2	0.5084	0.0935
T3	108.333 - 100	7.994	2	0.5091	0.0981
T4	100 - 91.6667	7.057	2	0.5060	0.1022
T5	91.6667 - 83.3333	6.123	2	0.4964	0.0991
T6	83.3333 - 75	5.223	2	0.4781	0.0952
T7	75 - 50	4.365	2	0.4496	0.0898
T8	50 - 25	2.045	2	0.3520	0.0643
T9	25 - 0	0.524	2	0.1717	0.0326

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
138.00	Lightning Rod 5/8x4'	2	9.267	0.5084	0.0941	14476
120.00	16'x3" Omni (inverted)	2	9.267	0.5084	0.0941	14476
117.00	6' DISH (SOLID)	2	8.950	0.5084	0.0935	14476
115.00	6' DISH (SOLID)	2	8.734	0.5085	0.0939	14476
114.00	Rohn 6' Side-Arm(1)	2	8.625	0.5086	0.0942	15545
113.00	Pirod 4' Side Mount Standoff (1)	2	8.515	0.5088	0.0948	17925
112.00	Junction Box	2	8.404	0.5089	0.0954	22097
111.00	6' DISH (SOLID)	2	8.293	0.5090	0.0961	28801
110.00	6'8"x4" Pipe Mount	2	8.181	0.5091	0.0968	39582
109.00	10'x2" Dipole Antenna (inverted)	2	8.069	0.5091	0.0976	57596
107.00	6'8"x4" Pipe Mount	2	7.844	0.5090	0.0991	129506
106.00	16'x3" Omni (inverted)	2	7.732	0.5088	0.0998	176135
105.00	SE419-SWBPALDF Panel Antenna	2	7.620	0.5085	0.1004	205030
104.00	AP13-850/065D w/Mount Pipe	2	7.507	0.5082	0.1010	179953
103.00	TMA 432-83H-01T	2	7.395	0.5078	0.1015	157386
101.00	SE419-SWBPALDF Panel Antenna	2	7.170	0.5067	0.1021	173096
100.00	PD458-406	2	7.057	0.5060	0.1022	253348
96.00	3'4"x4" Pipe Mount (horizontal)	2	6.607	0.5023	0.1013	51004
95.00	SC479-HF1LDF (inverted)	2	6.495	0.5011	0.1008	38719
92.00	PD458-406	2	6.160	0.4970	0.0993	23963
88.00	SC479-HF1LDF (inverted)	2	5.722	0.4898	0.0974	19283
87.00	4'6"x3" Pipe Mount (horizontal)	2	5.614	0.4876	0.0970	18828
86.00	20' 4-Bay Dipole	2	5.506	0.4853	0.0964	18511
82.00	3' Yagi	2	5.083	0.4740	0.0946	19485
81.00	3' Yagi	2	4.979	0.4708	0.0941	20543
80.00	Face Mount	2	4.876	0.4674	0.0935	21970
77.00	20' 4-Bay Dipole	2	4.568	0.4567	0.0914	27755
76.00	3'4"x4" Pipe Mount (horizontal)	2	4.466	0.4532	0.0906	29317
72.00	Face Mount	2	4.064	0.4393	0.0872	26457
67.00	4'6"x3" Pipe Mount (horizontal)	2	3.571	0.4227	0.0826	18541
65.00	6' Yagi w/ Mount	2	3.378	0.4160	0.0806	16519
63.00	GPS	2	3.188	0.4090	0.0786	14895
55.00	20' 4-Bay Dipole w/ 2' Sidearm Mount	2	2.463	0.3772	0.0700	10690
53.00	1.0" Dia 4' Omni w/Pipe Mount	2	2.292	0.3677	0.0677	9989
48.00	10'x6" Dipole Antenna	2	1.887	0.3404	0.0619	8707
47.00	5'x1.5in dia Whip Antenna /w mount	2	1.810	0.3342	0.0607	8516
43.00	3' Whip (3in diameter) /w mount	2	1.516	0.3079	0.0558	7852
41.00	4 FT DISH	2	1.378	0.2937	0.0533	7559
40.00	1'x1' Panel Antenna	2	1.312	0.2865	0.0520	7420
39.00	6'x1" Whip Antenna w/ Mount	2	1.247	0.2791	0.0508	7287

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load K	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	120	Diagonal	A325X	0.7500	1	0.50	31.32	0.016 ✔	1	Member Bearing
		Top Girt	A325X	0.6250	2	0.12	7.19	0.017 ✔	1	Member Block Shear
T2	116.667	Diagonal	A325X	0.7500	1	5.37	17.94	0.299 ✔	1	Member Block Shear
		Horizontal	A325X	0.6250	2	1.96	7.19	0.272 ✔	1	Member Block Shear
T3	108.333	Diagonal	A325X	0.7500	1	9.11	17.94	0.507 ✔	1	Member Block Shear
		Horizontal	A325X	0.6250	2	2.96	7.19	0.412 ✔	1	Member Block Shear
T4	100	Leg	A325X	0.7500	6	2.97	29.82	0.100 ✔	1	Bolt Tension
		Diagonal	A325X	0.7500	1	13.20	17.94	0.736 ✔	1	Member Block Shear
		Top Girt	A325X	0.6250	2	4.21	10.26	0.410 ✔	1	Member Block Shear
T5	91.6667	Diagonal	A325X	0.7500	1	16.84	26.81	0.628 ✔	1	Member Block Shear
		Top Girt	A325X	0.6250	2	5.52	10.26	0.538 ✔	1	Member Block Shear
T6	83.3333	Diagonal	A325X	0.7500	1	21.41	35.89	0.597 ✔	1	Member Block Shear
		Top Girt	A325X	0.6250	2	7.32	10.26	0.713 ✔	1	Member Block Shear
T7	75	Leg	A325X	0.7500	6	23.43	29.82	0.786 ✔	1	Bolt Tension
		Diagonal	A325X	0.7500	1	30.35	35.34	0.859 ✔	1	Member Bearing
		Horizontal	A325X	0.6250	2	10.93	13.03	0.839 ✔	1	Member Block Shear
		Top Girt	A325X	0.6250	2	9.66	14.38	0.672 ✔	1	Member Block Shear
T8	50	Leg	A490X	0.8750	6	40.33	50.96	0.791 ✔	1	Bolt Tension
		Diagonal	A325X	0.7500	1	37.32	42.41	0.880 ✔	1	Member Bearing
		Horizontal	A325X	0.6250	2	13.90	15.19	0.915 ✔	1	Bolt Shear
		Top Girt	A325X	0.6250	2	11.66	15.19	0.768 ✔	1	Bolt Shear
T9	25	Leg	A325X	1.0000	8	41.70	53.01	0.787 ✔	1	Bolt Tension
		Diagonal	A325X	1.0000	1	49.76	54.84	0.907 ✔	1	Member Block Shear
		Horizontal	A490X	0.6250	2	15.75	18.98	0.830 ✔	1	Bolt Shear
		Top Girt	A325X	0.6250	2	14.84	15.19	0.977 ✔	1	Bolt Shear

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	120 - 116.667	P.5x.250	3.34	3.34	23.8 K=1.00	3.7306	-1.33	161.06	0.008 [1] ✔
T2	116.667 - 108.333	P.5x.250	8.34	8.34	59.5 K=1.00	3.7306	-4.55	129.56	0.035 [1] ✔
T3	108.333 - 100	P.5x.250	8.34	8.34	59.5 K=1.00	3.7306	-9.82	129.56	0.076 [1] ✔
T4	100 - 91.6667	P.5x.250	8.34	8.34	59.5 K=1.00	3.7306	-22.93	129.56	0.177 [1] ✔
T5	91.6667 - 83.3333	P.5x.250	8.34	8.34	59.5 K=1.00	3.7306	-39.90	129.56	0.308 [1] ✔
T6	83.3333 - 75	P.5x.250	8.34	8.34	59.5 K=1.00	3.7306	-62.66	129.56	0.484 [1] ✔
T7	75 - 50	P5x.375	25.03	8.34	54.4 K=1.00	6.1120	-160.76	221.46	0.726 [1] ✔
T8	50 - 25	P.5x.400	25.03	4.17	30.7 K=1.00	5.7805	-272.39	287.44	0.948 [1] ✔
T9	25 - 0	P6.875x.400	25.03	6.26	32.7 K=1.00	8.1367	-374.04	399.96	0.935 [1] ✔

[1] P_u / ϕP_n controls

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	120 - 116.667	2L2 1/2x2x3/16	6.73	6.21	94.4 K=1.00	1.6200	-0.50	32.83	0.015 [1] ✔
T2	116.667 - 108.333	2L2 1/2x2x3/16	10.37	9.75	148.1 K=1.00	1.6200	-5.49	16.68	0.329 [1] ✔
T3	108.333 - 100	2L2 1/2x2x3/16	10.58	9.97	151.4 K=1.00	1.6200	-9.22	15.97	0.578 [1] ✔
T4	100 - 91.6667	2L2 1/2x2x3/16	10.78	10.18	154.7 K=1.00	1.6200	-13.37	15.29	0.874 [1] ✔
T5	91.6667 - 83.3333	2L2 1/2x2 1/2x1/4	11.00	10.41	162.4 K=1.00	2.3800	-17.06	20.38	0.837 [1] ✔
T6	83.3333 - 75	2L2 1/2x2x3/8	11.22	10.64	166.2 K=1.00	3.0900	-21.69	25.27	0.858 [1] ✔
T7	75 - 50	2L3x3x5/16	11.91	11.32	147.3 K=1.00	3.5500	-30.71	36.97	0.831 [1] ✔
T8	50 - 25	2L3x3x3/8	12.65	12.10	114.3 K=1.00	4.2200	-38.04	72.96	0.521 [1] ✔
T9	25 - 0	2L3 1/2x3 1/2x3/8	16.33	15.56	126.1 K=1.00	4.9700	-50.57	70.59	0.716 [1] ✔

[1] P_u / ϕP_n controls

Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T2	116.667 - 108.333	L2 1/2x2 1/2x3/16	11.68	5.43	129.0 K=0.98	0.9020	-3.92	12.17	0.322 [1] ✔
T3	108.333 - 100	L2 1/2x2 1/2x3/16	12.35	5.77	135.1 K=0.97	0.9020	-6.04	11.16	0.542 [1] ✔
T7	75 - 50	L3 1/2x3 1/2x1/4	16.35	7.75	130.7 K=0.98	1.6900	-21.67	22.37	0.969 [1] ✔
T8	50 - 25	L4x4x5/16	18.35	8.77	130.0 K=0.98	2.4000	-27.63	32.10	0.861 [1] ✔
T9	25 - 0	L4x4x3/8	20.02	9.52	139.1 K=0.96	2.8600	-31.47	33.38	0.943 [1] ✔

[1] $P_u / \phi P_n$ controls

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	120 - 116.667	L2 1/2x2 1/2x3/16	11.41	5.30	126.5 K=0.98	0.9020	-0.25	12.58	0.020 [1] ✔
T4	100 - 91.6667	L3x3x1/4	13.02	6.10	122.8 K=0.99	1.4400	-8.41	21.08	0.399 [1] ✔
T5	91.6667 - 83.3333	L3x3x1/4	13.68	6.43	128.0 K=0.98	1.4400	-11.00	19.70	0.559 [1] ✔
T6	83.3333 - 75	L3x3x1/4	14.35	6.77	133.1 K=0.97	1.4400	-14.56	18.35	0.794 [1] ✔
T7	75 - 50	L3x3x5/16	15.02	7.10	138.9 K=0.96	1.7800	-19.24	20.86	0.923 [1] ✔
T8	50 - 25	L3 1/2x3 1/2x5/16	17.02	8.08	135.7 K=0.97	2.0900	-23.26	25.66	0.906 [1] ✔
T9	25 - 0	L4x4x5/16	19.02	9.10	133.8 K=0.97	2.4000	-29.49	30.27	0.974 [1] ✔

[1] $P_u / \phi P_n$ controls

Redundant Horizontal (1) Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T8	50 - 25	L2 1/2x2 1/2x1/4	4.59	4.38	113.5 K=1.06	1.1900	-4.72	19.57	0.241 [1] ✔
T9	25 - 0	L2 1/2x2 1/2x1/4	5.00	4.72	117.7 K=1.02	1.1900	-6.49	18.60	0.349 [1] ✔

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$

[1] P_u / ϕP_n controls

Redundant Diagonal (1) Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T8	50 - 25	L2 1/2x2 1/2x1/4	6.08	5.79	141.5 K=1.00	1.1900	-3.13	13.43	0.233 [1] ✔
T9	25 - 0	L2 1/2x2 1/2x1/4	7.85	7.38	180.4 K=1.00	1.1900	-5.09	8.26	0.616 [1] ✔

[1] P_u / ϕP_n controls

Inner Bracing Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T4	100 - 91.6667	L2 1/2x2x3/16	6.51	6.51	182.9 K=1.00	0.8090	-0.15	5.46	0.027 [1] ✔
T5	91.6667 - 83.3333	L2 1/2x2x3/16	6.84	6.84	192.3 K=1.00	0.8090	-0.19	4.94	0.039 [1] ✔
T6	83.3333 - 75	L2 1/2x2x3/16	7.17	7.17	201.6 K=1.00	0.8090	-0.26	4.50	0.057 [1] ✔
T7	75 - 50	L2 1/2x2x3/16	7.51	7.51	211.0 K=1.00	0.8090	-0.34	4.11	0.082 [1] ✔
T8	50 - 25	L2 1/2x2x3/16	8.51	8.51	239.1 K=1.00	0.8090	-0.41	3.20	0.128 [1] ✔
T9	25 - 0	L2 1/2x2 1/2x3/16	9.51	9.51	230.5 K=1.00	0.9020	-0.52	3.83	0.135 [1] ✔

[1] P_u / ϕP_n controls

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	120 - 116.667	P.5x.250	3.34	3.34	23.8	3.7306	0.42	167.88	0.002 [1] ✔
T2	116.667 - 108.333	P.5x.250	8.34	8.34	59.5	3.7306	0.19	167.88	0.001 [1] ✔
T3	108.333 - 100	P.5x.250	8.34	8.34	59.5	3.7306	6.89	167.88	0.041 [1] ✔
T4	100 - 91.6667	P.5x.250	8.34	8.34	59.5	3.7306	17.83	167.88	0.106 [1] ✔
T5	91.6667 - 83.3333	P.5x.250	8.34	8.34	59.5	3.7306	32.34	167.88	0.193 [1] ✔
T6	83.3333 - 75	P.5x.250	8.34	8.34	59.5	3.7306	51.89	167.88	0.309 [1] ✔
T7	75 - 50	P5x.375	25.03	8.34	54.4	6.1120	140.58	275.04	0.511 [1] ✔
T8	50 - 25	P.5x.400	25.03	4.17	30.7	5.7805	242.26	312.15	0.776 [1] ✔
T9	25 - 0	P6.875x.400	25.03	6.26	32.7	8.1367	333.99	439.38	0.760 [1] ✔

[1] P_u / ϕP_n controls

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	120 - 116.667	2L2 1/2x2x3/16	6.73	6.21	98.5	0.9689	0.18	42.15	0.004 [1] ✔
T2	116.667 - 108.333	2L2 1/2x2x3/16	10.37	9.75	152.3	0.9689	5.37	42.15	0.127 [1] ✔
T3	108.333 - 100	2L2 1/2x2x3/16	10.58	9.97	155.5	0.9689	9.11	42.15	0.216 [1] ✔
T4	100 - 91.6667	2L2 1/2x2x3/16	10.78	10.18	158.8	0.9689	13.20	42.15	0.313 [1] ✔
T5	91.6667 - 83.3333	2L2 1/2x2 1/2x1/4	11.00	10.41	166.6	1.4569	16.84	71.02	0.237 [1] ✔
T6	83.3333 - 75	2L2 1/2x2x3/8	11.22	10.64	170.4	1.8253	21.41	79.40	0.270 [1] ✔
T7	75 - 50	2L3x3x5/16	11.91	11.32	150.8	2.2523	30.35	109.80	0.276 [1] ✔
T8	50 - 25	2L3x3x3/8	12.65	12.10	116.9	2.6728	37.32	130.30	0.286 [1] ✔
T9	25 - 0	2L3 1/2x3 1/2x3/8	16.33	15.56	128.8	3.0947	49.76	150.87	0.330 [1] ✔

[1] P_u / ϕP_n controls

Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T2	116.667 - 108.333	L2 1/2x2 1/2x3/16	11.68	5.43	130.3	0.5710	3.91	24.84	0.157 [1] ✔
T3	108.333 - 100	L2 1/2x2 1/2x3/16	12.35	5.77	138.0	0.5710	5.92	24.84	0.238 [1] ✔
T7	75 - 50	L3 1/2x3 1/2x1/4	16.35	7.75	87.4	1.1269	21.87	54.94	0.398 [1] ✔
T8	50 - 25	L4x4x5/16	18.35	8.77	86.8	1.6242	27.81	79.18	0.351 [1] ✔
T9	25 - 0	L4x4x3/8	20.02	9.52	94.9	1.9341	31.51	94.29	0.334 [1] ✔

[1] P_u / ϕP_n controls

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	120 - 116.667	L2 1/2x2 1/2x3/16	11.41	5.30	127.2	0.5710	0.25	24.84	0.010 [1] ✔
T4	100 - 91.6667	L3x3x1/4	13.02	6.10	81.3	0.9394	8.42	40.86	0.206 [1] ✔
T5	91.6667 - 83.3333	L3x3x1/4	13.68	6.43	85.6	0.9394	11.04	40.86	0.270 [1] ✔
T6	83.3333 - 75	L3x3x1/4	14.35	6.77	89.9	0.9394	14.64	40.86	0.358 [1] ✔
T7	75 - 50	L3x3x5/16	15.02	7.10	95.0	1.1592	19.31	56.51	0.342 [1] ✔
T8	50 - 25	L3 1/2x3 1/2x5/16	17.02	8.08	92.0	1.3917	23.33	67.85	0.344 [1] ✔
T9	25 - 0	L4x4x5/16	19.02	9.10	90.0	1.6242	29.67	79.18	0.375 [1] ✔

[1] P_u / ϕP_n controls

Redundant Horizontal (1) Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T8	50 - 25	L2 1/2x2 1/2x1/4	4.59	4.38	68.3	1.1900	4.72	38.56	0.123 [1] ✔
T9	25 - 0	L2 1/2x2 1/2x1/4	5.00	4.72	73.6	1.1900	6.49	38.56	0.168 [1] ✔

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$

[1] P_u / ϕP_n controls

Redundant Diagonal (1) Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T8	50 - 25	L2 1/2x2 1/2x1/4	5.84	5.55	86.6	1.1900	3.24	38.56	0.084 [1] ✔
T9	25 - 0	L2 1/2x2 1/2x1/4	7.71	7.23	112.9	1.1900	5.26	38.56	0.136 [1] ✔

[1] P_u / ϕP_n controls

Inner Bracing Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T4	100 - 91.6667	L2 1/2x2x3/16	6.51	6.51	130.2	0.8090	0.14	26.21	0.006 [1] ✔
T5	91.6667 - 83.3333	L2 1/2x2x3/16	6.84	6.84	136.9	0.8090	0.19	26.21	0.007 [1] ✔
T6	83.3333 - 75	L2 1/2x2x3/16	7.17	7.17	143.6	0.8090	0.25	26.21	0.010 [1] ✔
T7	75 - 50	L2 1/2x2x3/16	7.51	7.51	150.2	0.8090	0.33	26.21	0.013 [1] ✔
T8	50 - 25	L2 1/2x2x3/16	8.51	8.51	170.2	0.8090	0.40	26.21	0.015 [1] ✔
T9	25 - 0	L2 1/2x2 1/2x3/16	9.51	9.51	146.7	0.9020	0.51	29.22	0.017 [1] ✔

[1] P_u / ϕP_n controls

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T1	120 - 116.667	Leg	P.5x.250	1	-1.33	161.06	2.0	Pass
		Leg	P.5x.250	2	-1.18	161.06	1.6	Pass
		Leg	P.5x.250	3	-1.10	161.06	1.5	Pass
T2	116.667 - 108.333	Leg	P.5x.250	13	-4.55	129.56	3.5	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
		Leg	P.5x.250	14	-4.14	129.56	3.2	Pass
		Leg	P.5x.250	15	-3.77	129.56	2.9	Pass
T3	108.333 - 100	Leg	P.5x.250	25	-8.94	129.56	6.9	Pass
		Leg	P.5x.250	26	-8.61	129.56	6.6	Pass
		Leg	P.5x.250	27	-9.82	129.56	7.6	Pass
T4	100 - 91.6667	Leg	P.5x.250	37	-22.02	129.56	17.0	Pass
		Leg	P.5x.250	38	-21.67	129.56	16.7	Pass
		Leg	P.5x.250	39	-22.93	129.56	17.7	Pass
T5	91.6667 - 83.3333	Leg	P.5x.250	52	-38.15	129.56	29.4	Pass
		Leg	P.5x.250	53	-38.04	129.56	29.4	Pass
		Leg	P.5x.250	54	-39.90	129.56	30.8	Pass
T6	83.3333 - 75	Leg	P.5x.250	67	-60.07	129.56	46.4	Pass
		Leg	P.5x.250	68	-60.27	129.56	46.5	Pass
		Leg	P.5x.250	69	-62.66	129.56	48.4	Pass
T7	75 - 50	Leg	P5x.375	82	-156.94	221.46	70.9 77.3 (b)	Pass
		Leg	P5x.375	83	-157.99	221.46	71.3 77.4 (b)	Pass
		Leg	P5x.375	84	-160.76	221.46	72.6 78.6 (b)	Pass
T8	50 - 25	Leg	P.5x.400	121	-267.99	287.44	93.2	Pass
		Leg	P.5x.400	122	-269.71	287.44	93.8	Pass
		Leg	P.5x.400	123	-272.39	287.44	94.8	Pass
T9	25 - 0	Leg	P6.875x.400	196	-369.42	399.96	92.4	Pass
		Leg	P6.875x.400	197	-371.51	399.96	92.9	Pass
		Leg	P6.875x.400	198	-374.04	399.96	93.5	Pass
T1	120 - 116.667	Diagonal	2L2 1/2x2x3/16	7	-0.49	32.83	1.5 1.6 (b)	Pass
		Diagonal	2L2 1/2x2x3/16	8	-0.48	32.83	1.5 1.5 (b)	Pass
		Diagonal	2L2 1/2x2x3/16	9	-0.50	32.83	1.5 1.6 (b)	Pass
		Diagonal	2L2 1/2x2x3/16	10	-0.49	32.83	1.5 1.6 (b)	Pass
		Diagonal	2L2 1/2x2x3/16	11	-0.47	32.83	1.4 1.5 (b)	Pass
		Diagonal	2L2 1/2x2x3/16	12	-0.49	32.83	1.5 1.6 (b)	Pass
T2	116.667 - 108.333	Diagonal	2L2 1/2x2x3/16	17	-5.39	16.68	32.3	Pass
		Diagonal	2L2 1/2x2x3/16	18	-5.40	16.68	32.4	Pass
		Diagonal	2L2 1/2x2x3/16	20	-4.21	16.68	25.3	Pass
		Diagonal	2L2 1/2x2x3/16	21	-4.22	16.68	25.3	Pass
		Diagonal	2L2 1/2x2x3/16	23	-5.49	16.68	32.9	Pass
		Diagonal	2L2 1/2x2x3/16	24	-5.47	16.68	32.8	Pass
T3	108.333 - 100	Diagonal	2L2 1/2x2x3/16	29	-8.48	15.97	53.1	Pass
		Diagonal	2L2 1/2x2x3/16	30	-8.49	15.97	53.1	Pass
		Diagonal	2L2 1/2x2x3/16	32	-7.09	15.97	44.4	Pass
		Diagonal	2L2 1/2x2x3/16	33	-7.10	15.97	44.4	Pass
		Diagonal	2L2 1/2x2x3/16	35	-9.22	15.97	57.8	Pass
		Diagonal	2L2 1/2x2x3/16	36	-9.21	15.97	57.7	Pass
T4	100 - 91.6667	Diagonal	2L2 1/2x2x3/16	43	-11.15	15.29	72.9	Pass
		Diagonal	2L2 1/2x2x3/16	44	-11.16	15.29	73.0	Pass
		Diagonal	2L2 1/2x2x3/16	45	-11.03	15.29	72.1	Pass
		Diagonal	2L2 1/2x2x3/16	46	-11.03	15.29	72.1	Pass
		Diagonal	2L2 1/2x2x3/16	47	-13.37	15.29	87.4	Pass
		Diagonal	2L2 1/2x2x3/16	48	-13.37	15.29	87.4	Pass
T5	91.6667 - 83.3333	Diagonal	2L2 1/2x2 1/2x1/4	58	-14.29	20.38	70.1	Pass
		Diagonal	2L2 1/2x2 1/2x1/4	59	-14.30	20.38	70.1	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
		Diagonal	2L2 1/2x2 1/2x1/4	60	-14.84	20.38	72.8	Pass
		Diagonal	2L2 1/2x2 1/2x1/4	61	-14.84	20.38	72.8	Pass
		Diagonal	2L2 1/2x2 1/2x1/4	62	-17.06	20.38	83.7	Pass
		Diagonal	2L2 1/2x2 1/2x1/4	63	-17.06	20.38	83.7	Pass
T6	83.3333 - 75	Diagonal	2L2 1/2x2x3/8	73	-17.91	25.27	70.9	Pass
		Diagonal	2L2 1/2x2x3/8	74	-17.92	25.27	70.9	Pass
		Diagonal	2L2 1/2x2x3/8	75	-20.29	25.27	80.3	Pass
		Diagonal	2L2 1/2x2x3/8	76	-20.27	25.27	80.2	Pass
		Diagonal	2L2 1/2x2x3/8	77	-21.67	25.27	85.7	Pass
		Diagonal	2L2 1/2x2x3/8	78	-21.69	25.27	85.8	Pass
T7	75 - 50	Diagonal	2L3x3x5/16	89	-25.79	36.97	69.7 71.9 (b)	Pass
		Diagonal	2L3x3x5/16	90	-25.77	36.97	69.7 72.0 (b)	Pass
		Diagonal	2L3x3x5/16	92	-30.71	36.97	83.1 85.8 (b)	Pass
		Diagonal	2L3x3x5/16	93	-30.69	36.97	83.0 85.9 (b)	Pass
		Diagonal	2L3x3x5/16	95	-29.86	36.97	80.8 83.6 (b)	Pass
		Diagonal	2L3x3x5/16	96	-29.90	36.97	80.9 83.5 (b)	Pass
		Diagonal	2L3x3x5/16	101	-25.12	38.56	65.1 70.1 (b)	Pass
		Diagonal	2L3x3x5/16	102	-25.11	38.56	65.1 70.1 (b)	Pass
		Diagonal	2L3x3x5/16	104	-29.21	38.56	75.8 81.7 (b)	Pass
		Diagonal	2L3x3x5/16	105	-29.20	38.56	75.7 81.7 (b)	Pass
		Diagonal	2L3x3x5/16	107	-29.01	38.56	75.2 81.2 (b)	Pass
		Diagonal	2L3x3x5/16	108	-29.03	38.56	75.3 81.1 (b)	Pass
		Diagonal	2L3x3x5/16	112	-23.65	40.22	58.8 66.0 (b)	Pass
		Diagonal	2L3x3x5/16	113	-23.64	40.22	58.8 66.0 (b)	Pass
		Diagonal	2L3x3x5/16	114	-27.25	40.22	67.8 76.1 (b)	Pass
		Diagonal	2L3x3x5/16	115	-27.24	40.22	67.7 76.2 (b)	Pass
		Diagonal	2L3x3x5/16	116	-27.76	40.22	69.0 77.7 (b)	Pass
		Diagonal	2L3x3x5/16	117	-27.78	40.22	69.1 77.6 (b)	Pass
T8	50 - 25	Diagonal	2L3x3x3/8	128	-30.65	72.96	42.0 70.5 (b)	Pass
		Diagonal	2L3x3x3/8	131	-30.62	72.96	42.0 70.6 (b)	Pass
		Diagonal	2L3x3x3/8	135	-38.04	72.96	52.1 87.9 (b)	Pass
		Diagonal	2L3x3x3/8	138	-38.04	72.96	52.1 88.0 (b)	Pass
		Diagonal	2L3x3x3/8	142	-35.55	72.96	48.7 82.2 (b)	Pass
		Diagonal	2L3x3x3/8	145	-35.80	72.96	49.1 82.6 (b)	Pass
		Diagonal	2L3x3x3/8	152	-29.33	75.95	38.6 67.5 (b)	Pass
		Diagonal	2L3x3x3/8	155	-29.31	75.95	38.6	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
							67.6 (b)	
		Diagonal	2L3x3x3/8	159	-36.31	75.95	47.8	Pass
							84.0 (b)	
		Diagonal	2L3x3x3/8	162	-36.32	75.95	47.8	Pass
							84.1 (b)	
		Diagonal	2L3x3x3/8	166	-34.17	75.95	45.0	Pass
							79.1 (b)	
		Diagonal	2L3x3x3/8	169	-34.32	75.95	45.2	Pass
							79.3 (b)	
		Diagonal	2L3x3x3/8	175	-27.55	78.85	34.9	Pass
							63.6 (b)	
		Diagonal	2L3x3x3/8	178	-27.56	78.85	35.0	Pass
							63.7 (b)	
		Diagonal	2L3x3x3/8	181	-32.75	78.85	41.5	Pass
							75.8 (b)	
		Diagonal	2L3x3x3/8	184	-32.75	78.85	41.5	Pass
							75.9 (b)	
		Diagonal	2L3x3x3/8	187	-31.88	78.85	40.4	Pass
							73.9 (b)	
		Diagonal	2L3x3x3/8	190	-31.86	78.85	40.4	Pass
							73.7 (b)	
T9	25 - 0	Diagonal	2L3 1/2x3 1/2x3/8	203	-40.10	70.59	56.8	Pass
							71.6 (b)	
		Diagonal	2L3 1/2x3 1/2x3/8	206	-40.06	70.59	56.8	Pass
							71.7 (b)	
		Diagonal	2L3 1/2x3 1/2x3/8	210	-50.57	70.59	71.6	Pass
							90.7 (b)	
		Diagonal	2L3 1/2x3 1/2x3/8	213	-50.56	70.59	71.6	Pass
							90.7 (b)	
		Diagonal	2L3 1/2x3 1/2x3/8	217	-46.45	70.59	65.8	Pass
							83.3 (b)	
		Diagonal	2L3 1/2x3 1/2x3/8	220	-46.67	70.59	66.1	Pass
							83.5 (b)	
		Diagonal	2L3 1/2x3 1/2x3/8	226	-39.40	73.56	53.6	Pass
							70.3 (b)	
		Diagonal	2L3 1/2x3 1/2x3/8	229	-39.37	73.56	53.5	Pass
							70.3 (b)	
		Diagonal	2L3 1/2x3 1/2x3/8	232	-49.14	73.56	66.8	Pass
							88.0 (b)	
		Diagonal	2L3 1/2x3 1/2x3/8	235	-49.14	73.56	66.8	Pass
							88.1 (b)	
		Diagonal	2L3 1/2x3 1/2x3/8	238	-45.57	73.56	62.0	Pass
							81.7 (b)	
		Diagonal	2L3 1/2x3 1/2x3/8	241	-45.91	73.56	62.4	Pass
							82.1 (b)	
T2	116.667 - 108.333	Horizontal	L2 1/2x2 1/2x3/16	16	-3.80	12.17	31.2	Pass
		Horizontal	L2 1/2x2 1/2x3/16	19	-3.08	12.17	25.3	Pass
		Horizontal	L2 1/2x2 1/2x3/16	22	-3.92	12.17	32.2	Pass
T3	108.333 - 100	Horizontal	L2 1/2x2 1/2x3/16	28	-5.60	11.16	50.2	Pass
		Horizontal	L2 1/2x2 1/2x3/16	31	-4.54	11.16	40.7	Pass
		Horizontal	L2 1/2x2 1/2x3/16	34	-6.04	11.16	54.2	Pass
T7	75 - 50	Horizontal	L3 1/2x3 1/2x1/4	88	-18.14	22.37	81.1	Pass
		Horizontal	L3 1/2x3 1/2x1/4	91	-21.67	22.37	96.9	Pass
		Horizontal	L3 1/2x3 1/2x1/4	94	-21.07	22.37	94.2	Pass
		Horizontal	L3 1/2x3 1/2x1/4	100	-17.37	23.95	72.5	Pass
		Horizontal	L3 1/2x3 1/2x1/4	103	-20.28	23.95	84.7	Pass
		Horizontal	L3 1/2x3 1/2x1/4	106	-20.07	23.95	83.8	Pass
T8	50 - 25	Horizontal	L4x4x5/16	127	-22.00	32.10	68.5	Pass
							73.0 (b)	
		Horizontal	L4x4x5/16	134	-27.63	32.10	86.1	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
							91.5 (b)	
		Horizontal	L4x4x5/16	141	-25.89	32.10	80.7	Pass
							85.7 (b)	
		Horizontal	L4x4x5/16	151	-20.83	34.09	61.1	Pass
							69.0 (b)	
		Horizontal	L4x4x5/16	158	-26.03	34.09	76.4	Pass
							86.1 (b)	
		Horizontal	L4x4x5/16	165	-24.70	34.09	72.5	Pass
							81.6 (b)	
T9	25 - 0	Horizontal	L4x4x3/8	202	-24.61	33.38	73.7	Pass
		Horizontal	L4x4x3/8	209	-31.47	33.38	94.3	Pass
		Horizontal	L4x4x3/8	216	-29.24	33.38	87.6	Pass
T1	120 - 116.667	Top Girt	L2 1/2x2 1/2x3/16	4	-0.25	12.58	2.0	Pass
		Top Girt	L2 1/2x2 1/2x3/16	5	-0.21	12.58	1.7	Pass
		Top Girt	L2 1/2x2 1/2x3/16	6	-0.11	12.58	0.9	Pass
T4	100 - 91.6667	Top Girt	L3x3x1/4	40	-7.44	21.08	35.3	Pass
							35.4 (b)	
		Top Girt	L3x3x1/4	41	-7.22	21.08	34.3	Pass
							35.2 (b)	
		Top Girt	L3x3x1/4	42	-8.41	21.08	39.9	Pass
							41.0 (b)	
T5	91.6667 - 83.3333	Top Girt	L3x3x1/4	55	-9.41	19.70	47.8	Pass
		Top Girt	L3x3x1/4	56	-9.85	19.70	50.0	Pass
		Top Girt	L3x3x1/4	57	-11.00	19.70	55.9	Pass
T6	83.3333 - 75	Top Girt	L3x3x1/4	70	-11.82	18.35	64.4	Pass
		Top Girt	L3x3x1/4	71	-13.85	18.35	75.5	Pass
		Top Girt	L3x3x1/4	72	-14.56	18.35	79.4	Pass
T7	75 - 50	Top Girt	L3x3x5/16	85	-16.00	20.86	76.7	Pass
		Top Girt	L3x3x5/16	86	-19.00	20.86	91.1	Pass
		Top Girt	L3x3x5/16	87	-19.24	20.86	92.3	Pass
T8	50 - 25	Top Girt	L3 1/2x3 1/2x5/16	124	-19.43	25.66	75.7	Pass
		Top Girt	L3 1/2x3 1/2x5/16	125	-23.26	25.66	90.6	Pass
		Top Girt	L3 1/2x3 1/2x5/16	126	-22.62	25.66	88.2	Pass
T9	25 - 0	Top Girt	L4x4x5/16	199	-23.34	30.27	77.1	Pass
							77.5 (b)	
		Top Girt	L4x4x5/16	200	-29.49	30.27	97.4	Pass
							97.7 (b)	
		Top Girt	L4x4x5/16	201	-27.45	30.27	90.7	Pass
							90.9 (b)	
T8	50 - 25	Redund Horz 1 Bracing	L2 1/2x2 1/2x1/4	129	-4.65	19.57	23.7	Pass
		Redund Horz 1 Bracing	L2 1/2x2 1/2x1/4	132	-4.68	19.57	23.9	Pass
		Redund Horz 1 Bracing	L2 1/2x2 1/2x1/4	136	-4.68	19.57	23.9	Pass
		Redund Horz 1 Bracing	L2 1/2x2 1/2x1/4	139	-4.72	19.57	24.1	Pass
		Redund Horz 1 Bracing	L2 1/2x2 1/2x1/4	143	-4.72	19.57	24.1	Pass
		Redund Horz 1 Bracing	L2 1/2x2 1/2x1/4	146	-4.65	19.57	23.7	Pass
		Redund Horz 1 Bracing	L2 1/2x2 1/2x1/4	153	-4.65	20.04	23.2	Pass
		Redund Horz 1 Bracing	L2 1/2x2 1/2x1/4	156	-4.68	20.04	23.3	Pass
		Redund Horz 1 Bracing	L2 1/2x2 1/2x1/4	160	-4.68	20.04	23.3	Pass
		Redund Horz 1 Bracing	L2 1/2x2 1/2x1/4	163	-4.72	20.04	23.6	Pass
		Redund Horz 1	L2 1/2x2 1/2x1/4	167	-4.72	20.04	23.6	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
		Bracing						
		Redund Horz 1 Bracing	L2 1/2x2 1/2x1/4	170	-4.65	20.04	23.2	Pass
		Redund Horz 1 Bracing	L2 1/2x2 1/2x1/4	176	-4.65	20.52	22.6	Pass
		Redund Horz 1 Bracing	L2 1/2x2 1/2x1/4	179	-4.68	20.52	22.8	Pass
		Redund Horz 1 Bracing	L2 1/2x2 1/2x1/4	182	-4.68	20.52	22.8	Pass
		Redund Horz 1 Bracing	L2 1/2x2 1/2x1/4	185	-4.72	20.52	23.0	Pass
		Redund Horz 1 Bracing	L2 1/2x2 1/2x1/4	188	-4.72	20.52	23.0	Pass
		Redund Horz 1 Bracing	L2 1/2x2 1/2x1/4	191	-4.65	20.52	22.6	Pass
T9	25 - 0	Redund Horz 1 Bracing	L2 1/2x2 1/2x1/4	204	-6.41	18.60	34.4	Pass
		Redund Horz 1 Bracing	L2 1/2x2 1/2x1/4	207	-6.44	18.60	34.6	Pass
		Redund Horz 1 Bracing	L2 1/2x2 1/2x1/4	211	-6.44	18.60	34.6	Pass
		Redund Horz 1 Bracing	L2 1/2x2 1/2x1/4	214	-6.49	18.60	34.9	Pass
		Redund Horz 1 Bracing	L2 1/2x2 1/2x1/4	218	-6.49	18.60	34.9	Pass
		Redund Horz 1 Bracing	L2 1/2x2 1/2x1/4	221	-6.41	18.60	34.4	Pass
		Redund Horz 1 Bracing	L2 1/2x2 1/2x1/4	227	-6.41	19.31	33.2	Pass
		Redund Horz 1 Bracing	L2 1/2x2 1/2x1/4	230	-6.44	19.31	33.4	Pass
		Redund Horz 1 Bracing	L2 1/2x2 1/2x1/4	233	-6.44	19.31	33.4	Pass
		Redund Horz 1 Bracing	L2 1/2x2 1/2x1/4	236	-6.49	19.31	33.6	Pass
		Redund Horz 1 Bracing	L2 1/2x2 1/2x1/4	239	-6.49	19.31	33.6	Pass
		Redund Horz 1 Bracing	L2 1/2x2 1/2x1/4	242	-6.41	19.31	33.2	Pass
T8	50 - 25	Redund Diag 1 Bracing	L2 1/2x2 1/2x1/4	130	-3.08	13.43	22.9	Pass
		Redund Diag 1 Bracing	L2 1/2x2 1/2x1/4	133	-3.10	13.43	23.1	Pass
		Redund Diag 1 Bracing	L2 1/2x2 1/2x1/4	137	-3.10	13.43	23.1	Pass
		Redund Diag 1 Bracing	L2 1/2x2 1/2x1/4	140	-3.13	13.43	23.3	Pass
		Redund Diag 1 Bracing	L2 1/2x2 1/2x1/4	144	-3.13	13.43	23.3	Pass
		Redund Diag 1 Bracing	L2 1/2x2 1/2x1/4	147	-3.08	13.43	22.9	Pass
		Redund Diag 1 Bracing	L2 1/2x2 1/2x1/4	154	-3.13	14.00	22.3	Pass
		Redund Diag 1 Bracing	L2 1/2x2 1/2x1/4	157	-3.15	14.00	22.5	Pass
		Redund Diag 1 Bracing	L2 1/2x2 1/2x1/4	161	-3.15	14.00	22.5	Pass
		Redund Diag 1 Bracing	L2 1/2x2 1/2x1/4	164	-3.18	14.00	22.7	Pass
		Redund Diag 1 Bracing	L2 1/2x2 1/2x1/4	168	-3.18	14.00	22.7	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
		Redund Diag 1 Bracing	L2 1/2x2 1/2x1/4	171	-3.13	14.00	22.3	Pass
		Redund Diag 1 Bracing	L2 1/2x2 1/2x1/4	177	-3.19	14.60	21.8	Pass
		Redund Diag 1 Bracing	L2 1/2x2 1/2x1/4	180	-3.21	14.60	22.0	Pass
		Redund Diag 1 Bracing	L2 1/2x2 1/2x1/4	183	-3.21	14.60	22.0	Pass
		Redund Diag 1 Bracing	L2 1/2x2 1/2x1/4	186	-3.24	14.60	22.2	Pass
		Redund Diag 1 Bracing	L2 1/2x2 1/2x1/4	189	-3.24	14.60	22.2	Pass
		Redund Diag 1 Bracing	L2 1/2x2 1/2x1/4	192	-3.19	14.60	21.8	Pass
T9	25 - 0	Redund Diag 1 Bracing	L2 1/2x2 1/2x1/4	205	-5.03	8.26	60.9	Pass
		Redund Diag 1 Bracing	L2 1/2x2 1/2x1/4	208	-5.06	8.26	61.2	Pass
		Redund Diag 1 Bracing	L2 1/2x2 1/2x1/4	212	-5.06	8.26	61.2	Pass
		Redund Diag 1 Bracing	L2 1/2x2 1/2x1/4	215	-5.09	8.26	61.6	Pass
		Redund Diag 1 Bracing	L2 1/2x2 1/2x1/4	219	-5.09	8.26	61.6	Pass
		Redund Diag 1 Bracing	L2 1/2x2 1/2x1/4	222	-5.03	8.26	60.9	Pass
		Redund Diag 1 Bracing	L2 1/2x2 1/2x1/4	228	-5.19	8.60	60.3	Pass
		Redund Diag 1 Bracing	L2 1/2x2 1/2x1/4	231	-5.22	8.60	60.7	Pass
		Redund Diag 1 Bracing	L2 1/2x2 1/2x1/4	234	-5.22	8.60	60.7	Pass
		Redund Diag 1 Bracing	L2 1/2x2 1/2x1/4	237	-5.26	8.60	61.1	Pass
		Redund Diag 1 Bracing	L2 1/2x2 1/2x1/4	240	-5.26	8.60	61.1	Pass
		Redund Diag 1 Bracing	L2 1/2x2 1/2x1/4	243	-5.19	8.60	60.3	Pass
T4	100 - 91.6667	Inner Bracing	L2 1/2x2x3/16	49	-0.13	5.46	2.4	Pass
		Inner Bracing	L2 1/2x2x3/16	50	-0.15	5.46	2.7	Pass
		Inner Bracing	L2 1/2x2x3/16	51	-0.15	5.46	2.7	Pass
T5	91.6667 - 83.3333	Inner Bracing	L2 1/2x2x3/16	64	-0.17	4.94	3.5	Pass
		Inner Bracing	L2 1/2x2x3/16	65	-0.19	4.94	3.9	Pass
		Inner Bracing	L2 1/2x2x3/16	66	-0.19	4.94	3.9	Pass
T6	83.3333 - 75	Inner Bracing	L2 1/2x2x3/16	79	-0.24	4.50	5.4	Pass
		Inner Bracing	L2 1/2x2x3/16	80	-0.26	4.50	5.7	Pass
		Inner Bracing	L2 1/2x2x3/16	81	-0.26	4.50	5.7	Pass
T7	75 - 50	Inner Bracing	L2 1/2x2x3/16	97	-0.02	3.46	1.2	Pass
		Inner Bracing	L2 1/2x2x3/16	98	-0.02	3.46	1.2	Pass
		Inner Bracing	L2 1/2x2x3/16	99	-0.02	3.46	1.2	Pass
		Inner Bracing	L2 1/2x2x3/16	109	-0.02	3.76	1.1	Pass
		Inner Bracing	L2 1/2x2x3/16	110	-0.02	3.76	1.1	Pass
		Inner Bracing	L2 1/2x2x3/16	111	-0.02	3.76	1.1	Pass
		Inner Bracing	L2 1/2x2x3/16	118	-0.33	4.11	8.1	Pass
		Inner Bracing	L2 1/2x2x3/16	119	-0.34	4.11	8.2	Pass
		Inner Bracing	L2 1/2x2x3/16	120	-0.34	4.11	8.2	Pass
T8	50 - 25	Inner Bracing	L2 1/2x2x3/16	148	-0.03	2.75	1.3	Pass
		Inner Bracing	L2 1/2x2x3/16	149	-0.03	2.75	1.3	Pass
		Inner Bracing	L2 1/2x2x3/16	150	-0.03	2.75	1.3	Pass
		Inner Bracing	L2 1/2x2x3/16	172	-0.03	2.96	1.3	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
		Inner Bracing	L2 1/2x2x3/16	173	-0.03	2.96	1.3	Pass
		Inner Bracing	L2 1/2x2x3/16	174	-0.03	2.96	1.3	Pass
		Inner Bracing	L2 1/2x2x3/16	193	-0.41	3.20	12.8	Pass
		Inner Bracing	L2 1/2x2x3/16	194	-0.41	3.20	12.8	Pass
		Inner Bracing	L2 1/2x2x3/16	195	-0.40	3.20	12.4	Pass
T9	25 - 0	Inner Bracing	L2 1/2x2 1/2x3/16	223	-0.03	3.46	1.2	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	224	-0.03	3.46	1.2	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	225	-0.03	3.46	1.2	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	244	-0.52	3.83	13.5	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	245	-0.52	3.83	13.5	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	246	-0.48	3.83	12.6	Pass
							Summary	
						Leg (T8)	94.8	Pass
						Diagonal (T9)	90.7	Pass
						Horizontal (T7)	96.9	Pass
						Top Girt (T9)	97.7	Pass
						Redund Horz 1 Bracing (T9)	34.9	Pass
						Redund Diag 1 Bracing (T9)	61.6	Pass
						Inner Bracing (T9)	13.5	Pass
						Bolt Checks	97.7	Pass
						RATING =	**97.7**	**Pass**

ANCHOR BOLT ANALYSIS

ANCHOR BOLT ANALYSIS

Input Data

Tower Reactions:

Uplift: $Uplift := 393 \cdot kips$ *user input*

Shear: $Shear := 66 \cdot kips$ *user input*

Compression: $Compression := 439 \cdot kips$ *user input*

Anchor Bolt Data:

Use ASTM A36 (actual material strength unknown therefore assume min design values)

Number of Anchor Bolts = N $N := 6$ *user input*

Bolt Ultimate Strength: $F_u := 58 \cdot ksi$ *user input*

Bolt Yield Strength: $Fy := 36 \cdot ksi$ *user input*

Bolt Modulus: $E := 29000 \cdot ksi$ *user input*

Thickness of Anchor Bolts $D := 1.50in$ *user input*

Threads per Inch: $n := 6$ *user input*

Coefficient of Friction: $\mu := 0.55$ *user input*

(for baseplate with grout ASCE 10-15)

Length from top of pier to bottom of leveling nut: $L_{ar} := 0in$ *user input*

Bolt Modulus: $E := 29000 \cdot ksi$ *user input*

MODified Anchorage - Steel Bolts

Number of Anchor Bolts = N $N_{M1} := 0$ *user input*

Bolt Ultimate Strength: $F_{u.M1} := 72.5 \cdot ksi$ *user input*

Bolt Yield Strength: $Fy_{M1} := 58 \cdot ksi$ *user input*

Bolt Modulus: $E_{M1} := 29000 \cdot ksi$ *user input*

Thickness of Anchor Bolts $D_{M1} := 1.25in$ *user input*

Threads per Inch: $n_{M1} := 7$ *user input*

Anchor Bolt Section Properties:

Gross Area of Bolt:

$A_{ge} := N\frac{\pi}{4}\cdot D^2$ $A_{ge} = 10.6\cdot in^2$ $A_{g.pm} := N_{M1}\frac{\pi}{4}\cdot D_{M1}^2$ $A_{g.pm} = 0\cdot in^2$

Net Area of Bolt:

$A_{ne} := N\cdot\left[\frac{\pi}{4}\cdot\left(D - \frac{0.9743\cdot in}{n}\right)^2\right]$ $A_{n.pm} := N_{M1}\cdot\left[\frac{\pi}{4}\cdot\left(D_{M1} - \frac{0.9743\cdot in}{n_{M1}}\right)^2\right]$

$A_{ne} = 8.43\cdot in^2$ $A_{n.pm} = 0\cdot in^2$

Net Diameter:

$D_{ne} := N\left(D - \frac{0.9743in}{n}\right)$ $D_{ne} = 8.03\cdot in$ $D_{n.pm} := N_{M1}\cdot\left(D_{M1} - \frac{0.9743\cdot in}{n_{M1}}\right)$ $D_{n.pm} = 0\cdot in$

Radius of Gyration of Bolt:

$r_e := N\cdot\frac{\left(D - \frac{0.9743in}{n}\right)}{4}$ $r_e = 2.01\cdot in$ $r_{pm} := N_{M1}\cdot\frac{\left(D_{M1} - \frac{0.9743\cdot in}{n_{M1}}\right)}{4}$ $r_{pm} = 0\cdot in$

Plastic Section Modulus of Bolt:

$Z_{xe} := N\frac{\left(D - \frac{0.9743in}{n}\right)^3}{6}$ $Z_{xe} = 2.39\cdot in^3$ $Z_{x.pm} := N_{M1}\frac{\left(D_{M1} - \frac{0.9743\cdot in}{n_{M1}}\right)^3}{6}$ $Z_{x.pm} = 0\cdot in^3$

Forces:

Tension Force:

$T_u := \frac{Uplift}{1}$

$T_u = 393\cdot kip$ $T_{ub} := T_u$

Shear Force:

$V_u := \frac{Shear}{1}$

$V_u = 66\cdot kip$ $V_{ub} := V_u$

Resistance Factor for Flexure (ANSI/TIA-222-G 4.7):

$\phi_f := 0.9$

Resistance Factor for Anchor Bolt (ANSI/TIA-222-G 4.5.4.2):

$\phi_b := 0.80$

Resistance Factor for Tension (ANSI/TIA-222-G 4.9.6.1):

$\phi_t := 0.75$ $\phi_{t.pm} := 0.65$

Resistance Factor for Shear (ANSI/TIA-222-G 4.9.6.3):

$\phi_v := 0.75$ $\phi_{v.pm} := 0.60$

ANSI/TIA-222-G 4.7.1 Flexural Members:

Nominal Flexure Strength, Mn:

$M_n := Fy \cdot Z_{xe} + Fy \cdot Z_{x.pm}$

$M_n = 7.18 \cdot ft \cdot kip$

$\phi_f \cdot M_n = 6.46 \cdot ft \cdot kip$

Applied Moment due to Shear (worst case lever arm), Mu:

$M_u := L_{ar} \cdot V_u$

$M_u = 0 \cdot ft \cdot kip$

Flexure Check:

$FlexureCheck := if\left(M_u \le \phi_f \cdot M_n, "OK", "NO\ GOOD"\right)$

FlexureCheck = "OK"

$\frac{M_u}{\phi_f \cdot M_n} = 0 \cdot \%$

ANSI/TIA-222-G 4.9.6.1 Tensile Strength:

Design Tensile Strength, Rnt:

$R_{nt} := F_u \cdot A_{ne}$ $\quad R_{nt.pm} := F_u \cdot A_{n.pm}$

$R_{nt} = 489.03 \cdot ft \cdot kip$ $\quad R_{nt.pm} = 0 \cdot ft \cdot kip$

$\phi_t \cdot R_{nt} = 366.77 \cdot ft \cdot kip$ $\quad \phi_{t.pm} \cdot R_{nt.pm} = 0 \cdot ft \cdot kip$

Tension Check:

$TensionCheck := if\left[T_u \le \left(\phi_t \cdot R_{nt} + \phi_{t.pm} \cdot R_{nt.pm}\right), "OK", "NO\ GOOD"\right]$

TensionCheck = "NO GOOD"

$\frac{T_u}{\phi_t \cdot R_{nt} + \phi_{t.pm} \cdot R_{nt.pm}} = 107.15 \cdot \%$

ANSI/TIA-222-G 4.9.6.3 Design Shear Strength:

Design Shear Strength, Rnv:

$R_{nv} := 0.45 \cdot F_u \cdot A_{ge}$ $\quad R_{nv.pm} := 0.45 \cdot F_u \cdot A_{g.pm}$

$R_{nv} = 276.74 \cdot ft \cdot kip$ $\quad R_{nv.pm} = 0 \cdot ft \cdot kip$

$\phi_v \cdot R_{nv} = 207.55 \cdot ft \cdot kip$ $\quad \phi_{v.pm} \cdot R_{nv.pm} = 0 \cdot ft \cdot kip$

Shear Check:

$ShearCheck := if\left[V_u \le \left(\phi_v \cdot R_{nv} + \phi_{v.pm} \cdot R_{nv.pm}\right), "OK", "NO\ GOOD"\right]$

ShearCheck = "OK"

$\frac{V_u}{\phi_v \cdot R_{nv} + \phi_{v.pm} \cdot R_{nv.pm}} = 31.8 \cdot \%$

ANSI/TIA-222-G 4.9.6.4 Combined Shear and Tension:

$$\left[\frac{V_{ub}}{(\phi_v \cdot R_{nv})}\right]^2 + \left[\frac{T_{ub}}{(\phi_t \cdot R_{nt})}\right]^2 \le 1$$

$$\left[\frac{V_{ub}}{(\phi_v \cdot R_{nv} + \phi_{v.pm} \cdot R_{nv.pm})}\right]^2 + \left[\frac{T_{ub}}{(\phi_t \cdot R_{nt} + \phi_{t.pm} \cdot R_{nt.pm})}\right]^2 = 1.25$$

Combined Shear and Tension Check:

$$\text{ShearAndTensionCheck} := \text{if}\left[\left[\frac{V_{ub}}{(\phi_v \cdot R_{nv} + \phi_{v.pm} \cdot R_{nv.pm})}\right]^2 + \left[\frac{T_{ub}}{(\phi_t \cdot R_{nt} + \phi_{t.pm} \cdot R_{nt.pm})}\right]^2 \le 1, \text{"OK"}, \text{"NO GOOD"}\right]$$

ShearAndTensionCheck = "NO GOOD"

ANSI/TIA-222-G 4.9.9 Anchor Rods (Capacity):

$$\frac{\left[T_u + \left(\frac{V_u}{\eta}\right)\right]}{\phi_b \cdot P_n} \le 1$$

$\eta := 0.55$ *user input from ANSI/TIA-222-G 4.9.9*

$$\frac{\left[T_u + \left(\frac{V_u}{\eta}\right)\right]}{(\phi_b \cdot F_u \cdot A_{ne}) + (\phi_t \cdot F_u \cdot A_{g.pm})} = 1.31$$

Capacity Check:

$$\text{CapacityCheck} := \text{if}\left[\frac{\left[T_u + \left(\frac{V_u}{\eta}\right)\right]}{(\phi_b \cdot F_u \cdot A_{ne}) + (\phi_t \cdot F_u \cdot A_{g.pm})} \le 1, \text{"OK"}, \text{"NO GOOD"}\right]$$

CapacityCheck = "NO GOOD"

$$T_u + \left(\frac{V_u}{\eta}\right) = 513 \cdot \text{kip}$$

$\phi_b \cdot F_{up} \cdot A_{ne} = \blacksquare \cdot \text{kip}$

$$(\phi_b \cdot F_u \cdot A_{ne}) + (\phi_t \cdot F_u \cdot A_{g.pm}) = 391.22 \cdot \text{kip}$$

$513\text{kip} - 391.22\text{kip} = 121.78 \cdot \text{kip}$

Above force required for additional anchorage required for uplift resistance for Strength Design (LRFD) - see prevously instlled anchors for Strength design check. (Disregard above note if value is negative)

ANCHOR BOLT ANALYSIS

Input Data

Tower Reactions:

Uplift: $Uplift := 393 \cdot kips$ *user input*

Shear: $Shear := 66 \cdot kips$ *user input*

Compression: $Compression := 439 \cdot kips$ *user input*

Anchor Bolt Data:

Use ASTM A36 (actual material strength unknown therefore assume min design values)

Number of Anchor Bolts = N $N := 6$ *user input*

Bolt Ultimate Strength: $F_u := 58 \cdot ksi$ *user input*

Bolt Yield Strength: $Fy := 36 \cdot ksi$ *user input*

Bolt Modulus: $E := 29000 \cdot ksi$ *user input*

Thickness of Anchor Bolts $D := 1.50in$ *user input*

Threads per Inch: $n := 6$ *user input*

Coefficient of Friction: $\mu := 0.55$ *user input*

(for baseplate with grout ASCE 10-15)

Length from top of pier to bottom of leveling nut: $L_{ar} := 0in$ *user input*

Bolt Modulus: $E := 29000 \cdot ksi$ *user input*

MODified Anchorage - Steel Bolts

Number of Anchor Bolts = N $N_{M1} := 2$ *user input*

Bolt Ultimate Strength: $F_{u.M1} := 150 \cdot ksi$ *user input*

Bolt Yield Strength: $Fy_{M1} := 120 \cdot ksi$ *user input*

Bolt Modulus: $E_{M1} := 29000 \cdot ksi$ *user input*

Thickness of Anchor Bolts $D_{M1} := 1.42in$ *user input*

Threads per Inch: $n_{M1} := 7$ *user input*

Anchor Bolt Section Properties:

Gross Area of Bolt:

$A_{ge} := N\frac{\pi}{4}\cdot D^2$ $A_{ge} = 10.6\cdot in^2$ $A_{g.pm} := N_{M1}\frac{\pi}{4}\cdot D_{M1}^2$ $A_{g.pm} = 3.17\cdot in^2$

Net Area of Bolt:

$A_{ne} := N\cdot\left[\frac{\pi}{4}\cdot\left(D - \frac{0.9743\cdot in}{n}\right)^2\right]$ $A_{n.pm} := N_{M1}\cdot\left[\frac{\pi}{4}\cdot\left(D_{M1} - \frac{0.9743\cdot in}{n_{M1}}\right)^2\right]$

$A_{ne} = 8.43\cdot in^2$ $A_{n.pm} = 2.58\cdot in^2$

Net Diameter:

$D_{ne} := N\left(D - \frac{0.9743in}{n}\right)$ $D_{ne} = 8.03\cdot in$ $D_{n.pm} := N_{M1}\cdot\left(D_{M1} - \frac{0.9743\cdot in}{n_{M1}}\right)$ $D_{n.pm} = 2.56\cdot in$

Radius of Gyration of Bolt:

$r_e := N\cdot\frac{\left(D - \frac{0.9743in}{n}\right)}{4}$ $r_e = 2.01\cdot in$ $r_{pm} := N_{M1}\cdot\frac{\left(D_{M1} - \frac{0.9743\cdot in}{n_{M1}}\right)}{4}$ $r_{pm} = 0.64\cdot in$

Plastic Section Modulus of Bolt:

$Z_{xe} := N\frac{\left(D - \frac{0.9743in}{n}\right)^3}{6}$ $Z_{xe} = 2.39\cdot in^3$ $Z_{x.pm} := N_{M1}\frac{\left(D_{M1} - \frac{0.9743\cdot in}{n_{M1}}\right)^3}{6}$ $Z_{x.pm} = 0.7\cdot in^3$

Forces:

Tension Force:

$T_u := \frac{Uplift}{1}$

$T_u = 393\cdot kip$ $T_{ub} := T_u$

Shear Force:

$V_u := \frac{Shear}{1}$

$V_u = 66\cdot kip$ $V_{ub} := V_u$

Resistance Factor for Flexure (ANSI/TIA-222-G 4.7):

$\phi_f := 0.9$

Resistance Factor for Anchor Bolt (ANSI/TIA-222-G 4.5.4.2):

$\phi_b := 0.80$

Resistance Factor for Tension (ANSI/TIA-222-G 4.9.6.1):

$\phi_t := 0.75$ $\phi_{t.pm} := 0.65$

Resistance Factor for Shear (ANSI/TIA-222-G 4.9.6.3):

$\phi_v := 0.75$ $\phi_{v.pm} := 0.60$

ANSI/TIA-222-G 4.7.1 Flexural Members:

Nominal Flexure Strength, Mn:

$M_n := Fy \cdot Z_{xe} + Fy \cdot Z_{x.pm}$

$M_n = 9.28 \cdot ft \cdot kip$

$\phi_f \cdot M_n = 8.35 \cdot ft \cdot kip$

Applied Moment due to Shear (worst case lever arm), Mu:

$M_u := L_{ar} \cdot V_u$

$M_u = 0 \cdot ft \cdot kip$

Flexure Check:

$FlexureCheck := if\left(M_u \le \phi_f \cdot M_n, "OK", "NO\ GOOD"\right)$

FlexureCheck = "OK"

$\frac{M_u}{\phi_f \cdot M_n} = 0 \cdot \%$

ANSI/TIA-222-G 4.9.6.1 Tensile Strength:

Design Tensile Strength, Rnt:

$R_{nt} := F_u \cdot A_{ne}$ $\quad R_{nt.pm} := F_u \cdot A_{n.pm}$

$R_{nt} = 489.03 \cdot ft \cdot kip$ $\quad R_{nt.pm} = 149.46 \cdot ft \cdot kip$

$\phi_t \cdot R_{nt} = 366.77 \cdot ft \cdot kip$ $\quad \phi_{t.pm} \cdot R_{nt.pm} = 97.15 \cdot ft \cdot kip$

Tension Check:

$TensionCheck := if\left[T_u \le \left(\phi_t \cdot R_{nt} + \phi_{t.pm} \cdot R_{nt.pm}\right), "OK", "NO\ GOOD"\right]$

TensionCheck = "OK"

$\frac{T_u}{\phi_t \cdot R_{nt} + \phi_{t.pm} \cdot R_{nt.pm}} = 84.71 \cdot \%$

ANSI/TIA-222-G 4.9.6.3 Design Shear Strength:

Design Shear Strength, Rnv:

$R_{nv} := 0.45 \cdot F_u \cdot A_{ge}$ $\quad R_{nv.pm} := 0.45 \cdot F_u \cdot A_{g.pm}$

$R_{nv} = 276.74 \cdot ft \cdot kip$ $\quad R_{nv.pm} = 82.67 \cdot ft \cdot kip$

$\phi_v \cdot R_{nv} = 207.55 \cdot ft \cdot kip$ $\quad \phi_{v.pm} \cdot R_{nv.pm} = 49.6 \cdot ft \cdot kip$

Shear Check:

$ShearCheck := if\left[V_u \le \left(\phi_v \cdot R_{nv} + \phi_{v.pm} \cdot R_{nv.pm}\right), "OK", "NO\ GOOD"\right]$

ShearCheck = "OK"

$\frac{V_u}{\phi_v \cdot R_{nv} + \phi_{v.pm} \cdot R_{nv.pm}} = 25.67 \cdot \%$

ANSI/TIA-222-G 4.9.6.4 Combined Shear and Tension:

$$\left[\frac{V_{ub}}{(\phi_v \cdot R_{nv})}\right]^2 + \left[\frac{T_{ub}}{(\phi_t \cdot R_{nt})}\right]^2 \le 1$$

$$\left[\frac{V_{ub}}{(\phi_v \cdot R_{nv} + \phi_{v.pm} \cdot R_{nv.pm})}\right]^2 + \left[\frac{T_{ub}}{(\phi_t \cdot R_{nt} + \phi_{t.pm} \cdot R_{nt.pm})}\right]^2 = 0.78$$

Combined Shear and Tension Check:

$$\text{ShearAndTensionCheck} := \text{if}\left[\left[\frac{V_{ub}}{(\phi_v \cdot R_{nv} + \phi_{v.pm} \cdot R_{nv.pm})}\right]^2 + \left[\frac{T_{ub}}{(\phi_t \cdot R_{nt} + \phi_{t.pm} \cdot R_{nt.pm})}\right]^2 \le 1, \text{"OK"}, \text{"NO GOOD"}\right]$$

ShearAndTensionCheck = "OK"

ANSI/TIA-222-G 4.9.9 Anchor Rods (Capacity):

$$\frac{\left[T_u + \left(\frac{V_u}{\eta}\right)\right]}{\phi_b \cdot P_n} \le 1$$

$\eta := 0.55$ *user input from ANSI/TIA-222-G 4.9.9*

$$\frac{\left[T_u + \left(\frac{V_u}{\eta}\right)\right]}{(\phi_b \cdot F_u \cdot A_{ne}) + (\phi_t \cdot F_u \cdot A_{g.pm})} = 0.970$$

Capacity Check:

$$\text{CapacityCheck} := \text{if}\left[\frac{\left[T_u + \left(\frac{V_u}{\eta}\right)\right]}{(\phi_b \cdot F_u \cdot A_{ne}) + (\phi_t \cdot F_u \cdot A_{g.pm})} \le 1, \text{"OK"}, \text{"NO GOOD"}\right]$$

CapacityCheck = "OK"

NOTE: Because the reinforcement of additional bolts are within capacity, the anchor bolts are considered to be OK for the design loads. Apply the previously calculated force that is not contained by the existing anchorage (prior to the additional anchorage modifications) with the previously installed anchorage to verify the capacity of the existing anchorage system.

$$T_u + \left(\frac{V_u}{\eta}\right) = 513 \cdot \text{kip}$$

$$\phi_b \cdot F_{up} \cdot A_{ne} = \blacksquare \cdot \text{kip}$$

$$(\phi_b \cdot F_u \cdot A_{ne}) + (\phi_t \cdot F_u \cdot A_{g.pm}) = 529 \cdot \text{kip}$$

$$513\text{kip} - 529\text{kip} = -16.00 \cdot \text{kip}$$

Above force required for additional anchorage required for uplift resistance for Strength Design (LRFD) - see prevously instlled anchors for Strength design check. (Disregard above note if value is negative)

WELDED BEAM TO LEG ANCHOR ANALYSIS

NOTE: The following calculation sheets are checking the capacity of the welded connection and anchorage for the New Haven / Hamden (CSP), CT Tower.

* From the Mathcad analysis for anchor bolts, the force required to be contained (by the additional anchors) -->

$$Des_{Uplift} := \frac{(513kip - 391.22kip)}{N_{M1}} = 60890 \cdot lbf$$

"d" arm --> $d := 1ft + 2in$

* Identify Existing Conditions (Materials and Weld Length)

Yield Steel (f.y) --> $F_y := 50ksi$

Modulus Steel (E) --> $E := 29000ksi$

WT 10.5x31 --> $t_w := 0.40in$ $t_f := 0.615in$

$d_{WT} := (10.5 - t_f)in$

Weld Length: $l_{weld} := 30in$

Area (WT 8x45 Stem) --> $A_{stem} := t_w \cdot l_{weld} = 12 \cdot in^2$

Section Modulus (x-axis) (Stem) --> $S_{stem} := \frac{t_w \cdot l_{weld}^2}{6} = 60 \cdot in^3$

$$\sigma_{force.M} := \frac{Des_{Uplift} \cdot d}{S_{stem}} = 14207.67 \cdot psi \qquad \sigma_{force.P} := \frac{Des_{Uplift}}{A_{stem}} = 5074.17 \cdot psi$$

* CHECK - Flexure in WT (AISC - LRFD Method):

* Apply AISC Chapter F - Flexure, Section F9, Equation F9-10 (governs design): $\theta_f := 0.90$

$$F_{cr} := \left(1.43 - 0.515 \cdot \frac{d_{WT} + t_f}{t_w} \cdot \sqrt{\frac{F_y}{E}}\right) \cdot F_y = 41.93 \cdot ksi$$

$$M_{capacity.beam} := F_{cr} \cdot \frac{t_w \cdot l_{weld}^2}{6} \cdot \theta_f = 2264.02 \cdot kip \cdot in$$

* CHECK - Flexure in WT (AISC - LRFD Method):

$$CHECK_1 := if\left(\frac{Des_{Uplift} \cdot d}{M_{capacity.beam}} < 1.0, "OK", "No\ Good"\right) \qquad \frac{Des_{Uplift} \cdot d}{M_{capacity.beam}} = 0.38$$

$CHECK_1 = "OK"$

* CHECK - Axial Stress in WT (AISC - LRFD Method):

$$CHECK_2 := if\left(\frac{\sigma_{force.M} + \sigma_{force.P}}{F_{cr} \cdot \theta_f} < 1.0, "OK", "No\ Good"\right) \qquad \frac{\sigma_{force.M} + \sigma_{force.P}}{F_{cr} \cdot \theta_f} = 0.51$$

$CHECK_2 = "OK"$

* CHECK - Shear in WT (AISC - LRFD Method):

* Apply AISC Chapter G - Shear, Section G2, Equation G2-1:

$\theta_v := 0.90$

$V_{cap} := 0.6 \cdot F_y \cdot A_w \cdot C_v$ ----> $C_v := 1.0$ $A_w := t_w \cdot (d_{WT} - 0.630in) = 3.93 \cdot in^2$ $F_y = 50 \cdot ksi$

$V_{cap} := \theta_v \cdot 0.6 \cdot F_y \cdot A_w \cdot C_v = 106.04 \cdot kip$

* CHECK - Shear in WT (AISC - LRFD Method):

$CHECK_3 := if\left(\frac{Des_{Uplift}}{V_{cap}} < 1.0, "OK", "No\ Good"\right)$ $\frac{Des_{Uplift}}{V_{cap}} = 0.57$ $CHECK_3 = "OK"$

* CHECK - Shear Stress in WT (AISC - LRFD Method):

$CHECK_4 := if\left(\frac{\sigma_{force.P}}{F_y \cdot \theta_v \cdot 0.6} < 1.0, "OK", "No\ Good"\right)$ $\frac{\sigma_{force.P}}{F_y \cdot \theta_v \cdot 0.6} = 0.19$ $CHECK_4 = "OK"$

* CHECK - Combined Flexure - Shear Stress in WT (AISC - LRFD Method):

$CHECK_5 := if\left[\frac{\sigma_{force.M} + \sigma_{force.P}}{F_{cr} \cdot \theta_f} + \frac{\sigma_{force.P}}{(F_y \cdot \theta_v \cdot 0.6)} < 1.0, "OK", "No\ Good"\right]$ $\frac{\sigma_{force.M} + \sigma_{force.P}}{F_{cr} \cdot \theta_f} + \frac{\sigma_{force.P}}{(F_y \cdot \theta_v \cdot 0.6)} = 0.7$

$CHECK_5 = "OK"$

* CHECK - Combined Flexure - Shear Force in WT (AISC - LRFD Method):

$CHECK_6 := if\left(\frac{Des_{Uplift} \cdot d}{M_{capacity.beam}} + \frac{Des_{Uplift}}{V_{cap}} < 1.0, "OK", "No\ Good"\right)$ $\frac{Des_{Uplift} \cdot d}{M_{capacity.beam}} + \frac{Des_{Uplift}}{V_{cap}} = 0.95$

$CHECK_6 = "OK"$

* CHECK - Weld in WT (AISC - LRFD Method):

$t_{weld} := \frac{3}{8}in$ $\quad Fy_{Electrode} := 70ksi$ $\quad \theta_{weld} := 0.75$

$$S_{x.weld} := 2 \cdot \frac{t_{weld} \cdot \left(l_{weld} - \frac{9}{16}in\right)^2}{6} = 108.32 \cdot in^3$$

* Moment Induced into Weld (AISC - LRFD Method):

$$M_{applied} := Des_{Uplift} \cdot d = 852.46 \cdot kip \cdot in$$

* Stress Caused by Moment on Weld (AISC - LRFD Method):

$$\sigma_{applied.M} := \frac{M_{applied}}{S_{x.weld}} = 7.87 \cdot ksi$$

* Stress Capacity in Weld (AISC - LRFD Method):

$$\sigma_{weld} := Fy_{Electrode} \cdot 0.6 \cdot \theta_{weld} = 31.5 \cdot ksi$$

* CHECK - Stress in Weld on WT - Moment Induced (AISC - LRFD Method):

$$CHECK_7 := if\left(\frac{\sigma_{applied.M}}{\sigma_{weld}} < 1.0, "OK", "No\ Good"\right) \qquad \frac{\sigma_{applied.M}}{\sigma_{weld}} = 0.25$$

$CHECK_7 = "OK"$

* CHECK - Stress in Weld on WT - Shear Induced (AISC - LRFD Method):

$$CHECK_8 := if\left(\frac{\frac{Des_{Uplift}}{A_w}}{\sigma_{weld}} < 1.0, "OK", "No\ Good"\right) \qquad \frac{\frac{Des_{Uplift}}{A_w}}{\sigma_{weld}} = 0.49$$

$CHECK_8 = "OK"$

* CHECK - Combined Flexure - Shear Stress Force in Weld on WT (AISC - LRFD Method):

$$CHECK_9 := if\left(\frac{\frac{Des_{Uplift}}{A_w}}{\sigma_{weld}} + \frac{\sigma_{applied.M}}{\sigma_{weld}} < 1.0, "OK", "No\ Good"\right) \qquad \frac{\frac{Des_{Uplift}}{A_w}}{\sigma_{weld}} + \frac{\sigma_{applied.M}}{\sigma_{weld}} = 0.74$$

$CHECK_9 = "OK"$

FOUNDATION ANALYSIS

AECOM

				Page	of
Job	120' Stainless Lattice Tower - New Haven, CT	Project No.		Sheet 1	of 3
Description	Foundation with Rock Anchors - TIA-222-G Check	Computed by	MCD	Date	08/14/18
	Structural Analysis (after Tower MODification)	Checked by		Date	

FOUNDATION CHECK

INPUT DATA

Factored Max Pier Reactions:

Uplift: $Uplift := 393 \cdot kips$

Shear: $Shear := 66 kips$

Compression: $Compression := 439 \cdot kips$

Foundation Structure

Footing Width: $B_{ftg} := 6ft$

Footing Length: $L_{ftg} := 6ft$

Footing Thickness: $TH_{ftg} := 2.5ft$

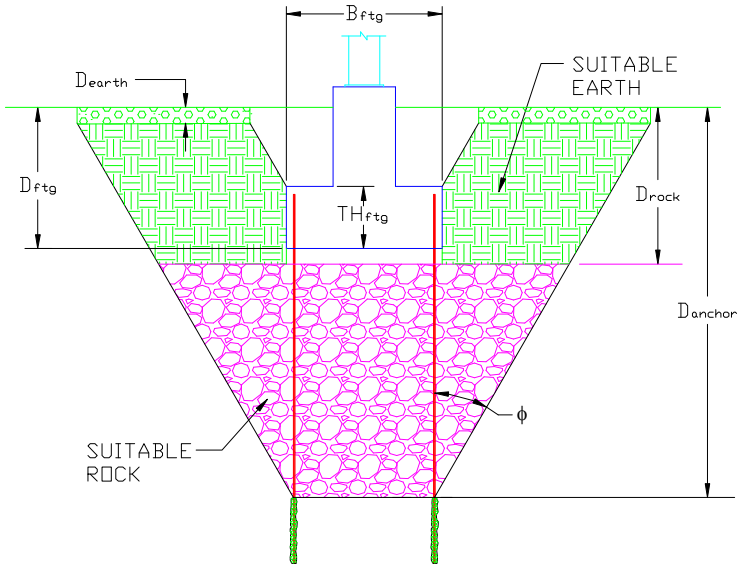
Depths:

Depth to Bottom of Footing: (from grade line) $D_{ftg} := 3.50ft$

Depth to Suitable Rock: (from grade line) $D_{rock} := 2.5ft$

Depth to Suitable Earth: (from grade line) $D_{earth} := 1ft$

Anchor Depth: $D_{anchor} := 24.5ft$



Soil Properties:

Internal Friction Angle: $\phi := 30deg$

Unit Weight of Earth: $\gamma_{earth} := 120 \frac{lb}{ft^3}$

Unit Weight of Rock: $\gamma_{rock} := 165 \frac{lb}{ft^3}$

Allowable Bearing: $Bearing := 11500 \cdot psf$

Ultimate Bearing: $U_{Bearing} := 2 \cdot Bearing$

$$DL_{foot} := \left[\left(B_{ftg} \cdot L_{ftg} \cdot TH_{ftg} \right) + \left[\frac{\pi}{4} \cdot (2ft)^2 \cdot 2.0ft \right] \right] \cdot 0.150 \frac{kips}{ft^3} \qquad DL_{foot} = 14442.48\ lb$$

$$DL_{Soil} := \left[B_{ftg} \cdot L_{ftg} \cdot D_{earth} - \left[\frac{\pi}{4} \cdot (3ft)^2 \cdot D_{earth} \right] + \left[\frac{1}{2} \cdot (1.5ft) \cdot \tan(\phi) \cdot (1.5ft) \cdot 4 \cdot B_{ftg} \right] \right] \cdot \gamma_{earth} \qquad DL_{Soil} = 5342.38\ lb$$

Anchors:

Number of Anchors (along width): $NW_{anchor} := 2$

Number of Anchors (along length): $NL_{anchor} := 2$

Anchor Spacing* (along width): $SW_{anchor} := 3\,ft$

Anchor Spacing* (along length): $SL_{anchor} := 3\,ft$

Hole Diameter: $hole_d := 2.5\,in$

Ultimate Bond Stress: $\sigma_{bond} := 200 \cdot psi$

NOTE: Ultimate Bond Stress is 2x allowable per TIA-222-G, Section 9.

Ultimate Bond Stress: $\sigma_{Work.bond} := \frac{\sigma_{bond}}{2}$

Force (per anchor): $P_{design} := \frac{Uplift - \left[0.9 \cdot \left(DL_{foot} + DL_{Soil}\right)\right]}{NW_{anchor} + NL_{anchor}}$

$P_{design} = 93.80 \cdot kips$

CALCULATE RESISTANCE

Intermediate Dimensions:

Suitable Earth Height: $H := D_{rock} - D_{earth}$ $H = 1.50\,ft$

Suitable Rock Height: $Z := D_{anchor} - D_{earth} - D_{rock}$ $Z = 21.00\,ft$

Total Anchor Width: $W := \left(NW_{anchor} - 1\right) \cdot SW_{anchor}$ $W = 3.00\,ft$

Total Anchor Length: $L := \left(NL_{anchor} - 1\right) \cdot SL_{anchor}$ $L = 3.00\,ft$

Earth Above Footing: $PD := D_{ftg} - TH_{ftg} + 6\,in$ $PD = 1.50\,ft$

Volumes:

Gross Volume:

$GV_1 := W \cdot L \cdot (Z + H)$ $GV_1 = 202.50 \cdot ft^3$

$GV_2 := \left[\frac{1}{2} \cdot (Z + H) \cdot \tan(\phi) \cdot (Z + H)\right] \cdot (W + L) \cdot 2$ $GV_2 = 1753.70 \cdot ft^3$

$GV_3 := \frac{1}{3} \cdot \pi \cdot [(Z + H) \cdot \tan(\phi)]^2 \cdot (Z + H)$ $GV_3 = 3976.08 \cdot ft^3$

$GV := GV_1 + GV_2 + GV_3$ $GV = 5932.28 \cdot ft^3$

Rock Volume:

$RV_1 := W \cdot L \cdot (Z)$ $RV_1 = 189.00 \cdot ft^3$

$RV_2 := \left[\frac{1}{2} \cdot (Z) \cdot \tan(\phi) \cdot (Z)\right] \cdot (W + L) \cdot 2$ $RV_2 = 1527.67 \cdot ft^3$

$RV_3 := \frac{1}{3} \cdot \pi \cdot [(Z) \cdot \tan(\phi)]^2 \cdot (Z)$ $RV_3 = 3232.70 \cdot ft^3$

$RV := RV_1 + RV_2 + RV_3$ $RV = 4949.37 \cdot ft^3$

Volume of Neglect Above Footing:

$NV_1 := B_{ftg} \cdot L_{ftg} \cdot H - \frac{\pi}{4} \cdot (3ft)^2 \cdot H$ $NV_1 = 43.40 \cdot ft^3$

$NV_2 := \left[\frac{1}{2} \cdot (PD) \cdot \tan(\phi) \cdot (PD)\right] \cdot \left(B_{ftg} + L_{ftg}\right) \cdot 2$ $NV_2 = 15.59 \cdot ft^3$

$NV_3 := \frac{1}{3} \cdot \pi \cdot [(PD) \cdot \tan(\phi)]^2 \cdot (PD)$ $NV_3 = 1.18 \cdot ft^3$

$NV := NV_1 + NV_2 + NV_3$ $NV = 60.16 \cdot ft^3$

Total Suitable Earth Volume: $EV := GV - RV - NV$ $EV = 922.75 \cdot ft^3$

Resisting Forces:

Resisting Rock Force: $F_{rock} := RV \cdot \gamma_{rock}$ $F_{rock} = 816.65 \cdot kips$

Resisting Earth Force: $F_{earth} := EV \cdot \gamma_{earth}$ $F_{earth} = 110.73 \cdot kips$

Total Resisting Force: $F_{total} := (F_{rock} + F_{earth}) \cdot 0.9$ $F_{total} = 834.64 \cdot kips$

NOTE: "0.9" is TIA-222-G Reducing factor for uplift resistance (LC2)

Check Uplift:

$$Condition1 := if\left(\frac{F_{total} \cdot 0.75}{Uplift} \geq 1.00, "OK", "Overstressed"\right) \qquad \frac{F_{total} \cdot 0.75}{Uplift} = 1.59$$

Condition1 = "OK"

Embedment Length:

$$L_b := \frac{P_{design}}{\pi \cdot hole_d \cdot \sigma_{Work.bond} \cdot 0.60} \qquad L_b = 16.59\,ft$$

NOTE: "0.60" reduction factor from TIA-222-G for uplift resistance for Rock Anchor

$$Condition2 := if\left(\frac{Z}{L_b} \geq 1.00, "OK", "Overstressed"\right) \qquad \frac{Z}{L_b} = 1.27$$

Condition2 = "OK"

Check Bearing:

$$MaxBearing := \frac{Compression + 1.2 \cdot DL_{foot}}{B_{ftg} \cdot L_{ftg}} \qquad MaxBearing = 12675.86 \cdot psf$$

$$Condition3 := if\left(\frac{MaxBearing}{U_{Bearing} \cdot 0.75} \leq 1.00, "OK", "Overstressed"\right)$$

NOTE: "0.75" is TIA-222-G Reducing factor for bearing resistance

$$\frac{MaxBearing}{U_{Bearing} \cdot 0.75} = 0.7348$$

Condition3 = "OK"

GEOTECHNICAL STUDY

WELTI GEOTECHNICAL, P.C.
Formerly Dr. Clarence Welti, PE. PC.

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August 13, 2018

Mr. Ignacio C. Artaiz
AECOM
500 Enterprise Drive, Suite 3B
Rocky Hill, CT 06067

Ref: Geotechnical Review of Existing State Police Communications Tower #27
West Rock, New Haven, CT

Dear Naish:

1.0 The existing tower foundation plan notes from Stainless, Inc. dated 12/9/93 indicate that the foundation design was based on a geotechnical assessment by Dr. Clarence Welti, P.E., P.C. (CWPEPC) dated 12/29/93. The foundation plan and notes and foundation design calculations dated 11/16/93 have been reviewed and for conformance with the recommendations in the geotechnical report and to evaluate the adequacy of existing lattice tower foundation with an increase in loading on the structure.

2.0 The geotechnical assessment by CWPEPC dated 12/29/93 was based on boring B-4 which encountered hard Basalt bedrock at 1.5 feet below the ground surface. The report recommended that the foundations be placed at least 2 feet into the bedrock to resist shear loading and that rock anchors be used to resist uplift. The recommended foundation design parameters were as follows.

Parameter	Value
Allowable Bearing on Hard Bedrock	40 Tons/sf
Allowable Lateral Loading on Hard Bedrock	20 Kips/sf
Allowable Cement/Rock Bond Value for the design of rock anchors	100 psi
Friction between Rock and Concrete Foundation	0.70

3.0 The foundation plans and notes by Stainless Inc. dated 12/9/1993 (with revisions to 7/5/94) show the tower foundation design includes a lattice tower with three legs, spaced at 21 feet apart, supported on individual piers and footings. Each of the footings is set a minimum 2'-6" into the bedrock with 4 rock anchors installed to a minimum 20 feet into the bedrock. The plan notes indicated that one anchor from each foundation should be proof tested to 85 Kips and that the foundation design is based on a maximum bearing pressure of 11,500 psf. The rock anchors are 1" dia. (150 ksi) bars with an allowable design loading of 76.5 Kips (0.65Fy).

3.1 The foundation design calculations indicate that the tension load on the anchors was up to 74.12 Kips/anchor and the maximum cement/rock bond stress was up to 39.3 psi. If additional resistance to up lift is needed to address new loading or code requirements, additional anchors or concrete weight would be required.

4.0 This report has been prepared for specific a application to the subject project in accordance with generally accepted soil and foundation engineering practices. No other warranty, express or implied, is made. In the event that any changes in the nature, design and location of structures are planned, the conclusions and recommendations contained in this report should not be considered valid unless the changes are reviewed and conclusions of this report modified or verified in writing.

The analyses and recommendations submitted in this report are based in part upon data obtained from referenced explorations. The extent of variations between explorations may not become evident until construction. If variations then appear evident, it will be necessary to re-evaluate the recommendations of this report.

Welti Geotechnical, P.C., should perform a general review of the final design and specifications in order that geotechnical design recommendations may be properly interpreted and implemented as they were intended.

If you have any questions please call me.

Very truly yours,

Max Welti, P. E.

About AECOM

AECOM (NYSE: ACM) is a global provider of professional technical and management support services to a broad range of markets, including transportation, facilities, environmental, energy, water and government. With approximately 45,000 employees around the world, AECOM is a leader in all of the key markets that it serves. AECOM provides a blend of global reach, local knowledge, innovation, and collaborative technical excellence in delivering solutions that enhance and sustain the world's built, natural, and social environments. A Fortune 500 company, AECOM serves clients in more than 100 countries and has annual revenue in excess of $6 billion.

More information on AECOM and its services can be found at www.aecom.com.

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Exhibit E

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860.529.8882 tel
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November 5, 2018

Mr. Sheldon Freincle
Northeast Site Solutions
420 Main Street
Sturbridge, MA 01566

Reference: **Analysis of Antenna Mount:**
T-Mobile Site: CT11086B
Connecticut State Police Tower #27
Baldwin Drive, New Haven Connecticut
AECOM Project Number: NSS-045

Dear Mr. Freincle,

AECOM has been authorized by Northeast Site Solutions, on behalf of T-Mobile, to conduct a structural evaluation of the proposed antenna modification to the existing antenna mount frame attached to an existing transmission tower structure located at Baldwin Drive in New Haven, Connecticut.

The proposed antenna modification will consist of the removal of three (3) Ericsson AIR 21 B2A/B4P panel antennas, three (3) Commscope LNX-65615DS-A1M panel antennas and three (3) Ericsson RRUS-11 Remote Radio Units and the installation of three (3) RFS APXVAARR24_43-U-NA20 Panel Antennas, three (3) Ericsson AIR 3246 B66 Panel Antennas, three (3) Ericsson 2217 B2 Remote Radio Units, three (3) Ericsson 4449 B71+B12 Remote Radio Units mounted to the existing antenna mount frame at 95 feet above tower base. The existing antenna mount frame applies the use of SitePro1 Product # EUSF10-U Ultimate Sector Frame (one mount per antenna Sector).

An independent structural analysis was conducted considering the antenna pipe mounted frame mounted to the existing tower structure for its strength design. This analysis did not consider the loading of the proposed antenna mounting frame attached to the tower structure. A previous tower structure analysis has been designed (by AECOM, project # 60579905 / NSS-044) addressing the antenna modifications associated for this mount assembly stated above and herein.

Two load conditions were evaluated as shown below which were compared to allowable stresses according to AISC and TIA-222-G.

Load Condition 1 = 97 mph (3-second gust) Wind Load (without ice) + (Antenna + Mount) Dead Load
Load Condition 2 = 50 mph (3-second gust) Wind Load (with ice) + 0.75” Ice Load + (Antenna + Mount) Dead Load

NOTE: The 0.75” Ice load thickness obtained from the TIA-222-G and the ASCE 7-10 Standard are considered to increase in thickness with the height of the Antenna and Mount assembly.

The independent structural analysis also considered the following site conditions (following the TIA-222-G Standard):

- Structure Class 3 – Substantial Communications
- Topographic Category 4 – Structure located on upper half of ridge – Wind Speed-up considered
    - Crest Height for surrounding terrain to site location = 150 feet
- Exposure Class C – Open Terrain with scattered obstructions

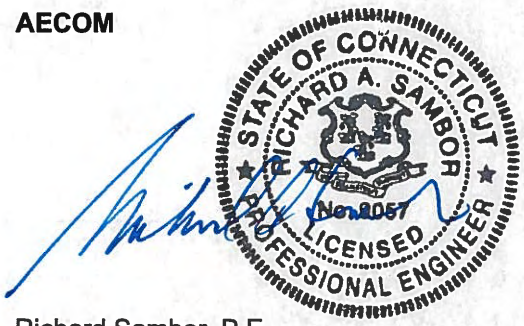
The independent structural analysis was conducted using the STAAD.Pro V8i software design program to assess the strength design of the antenna mount frame. The analysis was conducted in compliance with the Codes and Standards of the TIA-222 Revision G with Addendum 2, the ASCE 7-2010 Minimum Design Loads Standard, the 2015 International Building Code, and the 2018 State of Connecticut Building code amendments to the 2015 International Building Code The results of our independent structural analysis has determined that the proposed antenna upgrades to the existing antenna pipe mounts are in compliance with the Codes and Standards previously mentioned.

Per the included mount analysis, the controlling stress for the design mount is noted ***at 94.9%*** structural capacity rating.

Should there be any questions, please do not hesitate to contact me at (860) 990-6767.

Sincerely,

AECOM



Richard Sambor, P.E.
Senior Structural Engineer

cc: ICA, MJE, CF/Book – AECOM

AECOM

Job New Haven/CSP #27 | Project No. NSS-045 | Page 1 of 10

Description Antenna Mount Frame Analysis | Computed by MCD | Sheet ___ of ___

Checked by MCD | Date 11/5/2018 | Date 11/5/2018

Reference

NEW HAVEN/HAMDEN (CSP#27), CT – ANTENNA STRENGTH DESIGN ANALYSIS CALCULATIONS (ANTENNA MOUNT)

- **DESIGN CRITERIA USED FOR PROPOSED ANTENNA ASSESSMENT**
  - 2015 International Building Code (IBC) with 2018 State of Connecticut Building Code amendments to the 2015 IBC
  - Telecommunications Industry Association Design Standard TIA-222-G (Structural Standard for Antenna Supporting Structures and Antennas with Addendum 2 (December 2009)
- **DESIGN ASSUMPTIONS CONSIDERED DURING ANALYSIS**
  - Existing antenna mount pipe is assumed to be 2.5 Schedule 40 ASTM A36 material
  - Stresses applied to the existing metal wall and supporting steel members solely for the existing wall were not considered as part of this analysis
  - Antenna u-bolted connection points are assumed to be sufficient for installation and were not considered as part of this analysis calculation
  - Localized seismic effects are assumed to be contained by the tower structure and are not considered as part of the antenna assessment design.
- **DESIGN CALCULATION APPLIED FOR ANTENNA ASSESSMENT OF STRESS AND OF THE MOUNT CLASSIFICATION LISTING REQUIRED FOR BARE AND ICED MOUNTS.**
  - Topographic Category of Structure = "Category 4" – Structure located on upper half of ridge – wind speed-up considered
    - Crest Height of hill = 150.0 feet
  - Exposure Category of Structure = "Exposure "C" – Open Terrain
  - Antenna supporting stresses checked through STAAD design program considering forces obtained from TIA-222-G Standard (V.asd)
  - Antenna supporting stresses checked through STAAD design program considering forces obtained from ASCE 7-2010 (V.ultimate)
  - Antenna mount classification for iced considerations following design criteria (design thickness per ASCE 7-2010 and TIA-222-G Standards).
    - ***NOTE:*** Calculation references to the use of "TIA-222-H" in the STAAD design program (not currently approved design Standard) applied as a design and loading guidance for Serviceability/Maintenance work on mount not specifically identified per the TIA-222-G design Standard. Maintenance loads consist of a 500lbf vertical load @ antenna mount pipes and 250lbf vertical load @ end of horizontal cantilevered member. (Load Combination # 5 & 6 within analysis herein).

- **ANTENNAS LOCATED IN THE ALPHA/BETA/GAMMA SECTOR WITH AN ANTENNA CENTERLINE ELEVATION OF 95'-0" ABOVE GROUND.**
  - 3 Antennas in total in per Sector position on tower structure.
    - Antennas to remain (per sector):
      - (1) Ericsson Panel Antenna (Model #: AIR 32 KRD901146-1_B66A_B2A)
      - (1) Generic Twin TMA Unit (AWS)
    - Removed existing antennas (to be removed and/or swapped for Proposed Antennas)
      - (1) Ericsson Panel Antenna (Model #: AIR21 KRC 118023-1_B2A/B4P)
      - (1) Andrew Panel Antenna (Model #: LNX-6515DS-A1M)
      - (1) Ericsson Remote Radio Unit (Model #: RRUS-11 B12)
    - Proposed Antennas to be Installed (per sector):
      - (1) RFS Panel Antenna (Model #: APXVAARR24_43-U-NA20)
      - (1) Ericsson Panel Antenna (Model #: IR3246 B66)
      - (1) Ericsson Remote Radio Unit (Model #: 2217 B2)
      - (1) Ericsson Remote Radio Unit (Model #: 4449 B71+B12)

- **ANTENNA MOUNT DESIGN CONSIDERATION/CONDITIONS USED FOR STRUCTURAL ANALYSIS AND ASSESSMENT OF PROPOSED ANTENANNA**
  - For the purposes of design, the SitePro1 Product # EUSF10-U was considered for strength design of the antenna mount.
  - The following image is a graphical representation of the Antenna Mount Frame with antenna pipe mounts on the existing tower leg as a reference for the STAAD Design Model used for Strength Design cases.
    - Wind loading considered the worst case surface are of contact considering Bare and Iced Antenna conditions
    - Load combinations used are in reference to the TIA-222-G Section 2.3.2 for Strength Design Load Combinations.
- **CALCULATED LOAD COMBINATIONS FOR CONSIDERATION (LRFD):**
  - **LC#1: 1.2*Dead Load + 1.0 Wind w/o ice load**
  - **LC#2: 0.9*Dead Load + 1.0 Wind w/o ice load**
  - **LC#3: 1.2*Dead Load + 1.0 Dead Load (ice) + 1.0 Wind w/ ice load**
  - **LC#4: 1.4*Dead Load**
  - **LC#5: 1.2*Dead Load + 1.5*Maintenance Load (500 lbf) – Antenna Mounting Pipe + 1.0 Wind w/o ice load**
  - **LC#6: 1.2*Dead Load + 1.5*Maintenance Load (250 lbf) – Cantilever end of Mount Pipe Assembly**

- **DETERMINE BARE (NO ICE) FORCE APPLIED TO ANTENNA (TIA-222-G STANDARD)**

TIA-222-G Section 2.6.6.2 – Design Wind Force on Appurtenances and Mount Frame

$F_a = q_z * G_h * (EPA)_A$

where: $q_z = 0.00256 * K_z * K_{zt} * K_d * V^2 * I$

where, $K_z = 2.01 * \left(\frac{z}{z_g}\right)^{\frac{2}{\alpha}}$ [TIA-222-G Section 2.6.5.2]

where: $z = height\ above\ ground\ level = 95\ feet$

$z_g = 900$ [TIA-222-G Table 2-4 – Exposure Category "C"]

$\alpha = 9.5$ [TIA-222-G Table 2-4 – Exposure Category "C"]

$K_{t.min} = 0.72$ [TIA-222-G Table 2-5 – Topographic Category 4]

$K_z = 2.01 * \left(\frac{95}{900}\right)^{\frac{2}{9.5}} = 1.252$

$K_{zt} \rightarrow for\ Topographic\ Category\ 4$ [TIA-222-G Section 2.6.6.4]

where, $K_{zt} = \left[1 + \frac{K_e K_t}{K_h}\right]^2$ [TIA-222-G Section 2.6.6.4]

where: $K_e = Terrain\ Constant = 1.00$ [TIA-222-G Table 2-4; Exposure Cat. "C"]

$K_t = Topographic\ Constant = 0.72$ [TIA-222-G Table 2-5; Topo. Cat. "4"]

$K_h = e^{\left(\frac{f*z}{H}\right)}$, where

$f = Height\ Attenuation\ Factor = 1.50$ [TIA-222-G; Table 2-5; Topographic Category "4"]

$z = height\ above\ ground\ level\ at\ the\ base\ of\ the\ structure = 95\ feet$

$H = Height\ of\ Crest\ above\ Surrounding\ Terrain = 150\ feet$

$K_h = e^{\left(\frac{1.50*95\,feet}{150\,feet}\right)} = 2.5857$

$K_{zt} = \left[1 + \frac{1.00*0.72}{2.5857}\right]^2 = 1.6344$

$K_d = 0.85$ [TIA-222-G Table 2-2]

V = [Connecticut State Building Code 2016 – Appendix N and IBC 2012 Section 1609.1.1 – Determination of Wind Loads – Exception 5 "Designs using TIA-222" applies for determination for Design Wind load obtained as "V.ult" are to be converted to "V.asd" when applying the TIA-222-G design Standard (under Section 1609.3) for Basic Wind Speed)

$V_{asd} = 97mph\ for\ Structure\ Class\ 3\ (Risk\ Category\ 3/4)$

I = Importance Factor = Structure Class 3 = 1.15 [TIA-222-G Table 2-3]

$G_h = Gust\ Height\ Factor$ [TIA-222-G Section 2.6.7]

$0.85 \leq G_h \leq 1.0$ → Apply G.h = 1.0 for antenna mount frames

$q_z = 0.00256 * 1.252 * 1.573 * 0.95 * 97^2 * 1.15 = 51.8248\ (psf)$

Reference

Distributed Wind to Antenna Frame:

Outside Diameter of Pipe = 2.8750 in

Effective Projected Area on Mount Pipe (Pound (force) per linear Inch):

$$F_a = q_z * G_h * C_A * A_A = 51.8248\ (psf) * 1.0 * 0.8 * \frac{2.3750in * 126in}{\frac{12in}{ft}} = 86.1587\ lbf$$

$$Dist\ Load = \frac{F_a}{126in} = 0.6838\ lb/in$$

(Normal to Surface to Wind), where:

$q_z = 51.8248\ (psf)$ design wind pressure (calculated earlier)

$G_h = 1.00$ Gust Height Factor

$C_A = 0.8$ for Round Surfaces (assuming Aspect Ratio = 7 (Slightly Conservative))

$A_A = 2.8750in * 126in = 362.25in^2$ for Round Pipe (for design purposes, height of pipe used to determine load per linear inch.)

Distributed Wind to Antenna on Mount Frame:

Antenna #1 Height x Width = 46.6 inches x 17.9 inches

$$C_A A_A * q_z * G_h = 1.4 * \frac{46.6in * 17.9in}{\frac{144in^2}{ft^2}} * 51.8248\ (psf) * 1.0 = 420.3567lbf \rightarrow \frac{420.3567lbf}{36in} = 11.6766lb/in$$

$C_A = 1.4$ for Flat Surfaces (assuming Aspect Ratio = 7 (Slightly Conservative))

Antenna #2 Height x Width = 95.9 inches x 24 inches

$$C_A A_A * q_z * G_h = 1.4 * \frac{95.9in * 24in}{\frac{144in^2}{ft^2}} * 51.8248\ (psf) * 1.0 = 1159.7468lbf \rightarrow \frac{1159.75lbf}{36in} = 32.2152lb/in$$

$C_A = 1.4$ for Flat Surfaces (assuming Aspect Ratio = 7 (Slightly Conservative))

Antenna #3 Height x Width = 58 inches x 15.75 inches

$$C_A A_A * q_z * G_h = 1.4 * \frac{58in * 15.75in}{\frac{144in^2}{ft^2}} * 51.8248\ (psf) * 1.0 = 460.3370lbf \rightarrow \frac{460.3370lbf}{36in} = 12.7871lb/in$$

$C_A = 1.4$ for Flat Surfaces (assuming Aspect Ratio = 7 (Slightly Conservative))

Dead Load of Antennas, Connection Frame and Mount Pipe

DL weight of Antenna #1 (w/ Pipe) = 132 lbs

DL weight of Antenna #2 (w/ Pipe) = 327 lbs

DL weight of Antenna #3 (w/ Pipe) = 195 lbs

DL weight of Mount = 285 lbs

DL Weight of Generic Twin TMA Unit = 25 lbs

DL Weight of RRH Unit 2217 B2 = 45 lbs

DL Weight of RRH Unit B71+B12 = 80 lbs

Antenna loading to top of Pipe in STAAD Model shall consist of the following (per RFDS Layout):

Pipe Mount #1:

- (DL) Ericsson AIR 32 KRD901146-1_B66A/B2A Panel w/ Pipe wt: = 132 lbs

Pipe Mount #2:

- (DL) RFS APXVAARR24_43-U-NA20 Panel w/ Pipe wt: = 177 lbs
- (DL) Generic Twin TMA Unit attached to existing Pipe = 25 lbs
- (DL) Ericsson 2271 B12 Unit attached to existing Pipe = 45 lbs
- (DL) Ericsson 4449 B71+B12 Unit attached to existing Pipe = 80 lbs
- Total (Unfactored) DL = 327 lbs

Pipe Mount #3:

- (DL) Ericsson AIR 3246_B66 Panel w/ Pipe wt. = 195 lbs

- **DETERMINE ICED FORCES APPLIED TO ANTENNA (TIA-222-G STANDARD)**

TIA-222-G Section 2.6.6.2 – Design Wind Force on Appurtenances and Mount Frame

$F_a = q_z * G_h * (EPA)_A$

where: $q_z = 0.00256 * K_z * K_{zt} * K_d * V^2 * I$

where, $K_z = 2.01 * \left(\frac{z}{z_g}\right)^{\frac{2}{\alpha}}$ [TIA-222-G Section 2.6.5.2]

where: $z = height\ above\ ground\ level = 95\ feet$

$z_g = 900$ [TIA-222-G Table 2-4 – Exposure Category "C"]

$\alpha = 9.5$ [TIA-222-G Table 2-4 – Exposure Category "C"]

$K_{t.min} = 0.72$ [TIA-222-G Table 2-5 – Topographic Category 4]

$K_z = 2.01 * \left(\frac{95}{900}\right)^{\frac{2}{9.5}} = 1.252$

$K_{zt} \rightarrow for\ Topographic\ Category\ 4$ [TIA-222-G Section 2.6.6.4]

where, $K_{zt} = \left[1 + \frac{K_e K_t}{K_h}\right]^2$ [TIA-222-G Section 2.6.6.4]

where: $K_e = Terrain\ Constant = 1.00$ [TIA-222-G Table 2-4; Exposure Cat. "C"]

$K_t = Topographic\ Constant = 0.72$ [TIA-222-G Table 2-5; Topo. Cat. "4"]

$K_h = e^{\left(\frac{f*z}{H}\right)}$, where

$f = Height\ Attenuation\ Factor = 1.50$ [TIA-222-G; Table 2-5; Topographic Category "4"]

$z = height\ above\ ground\ level\ at\ the\ base\ of\ the\ structure = 95\ feet$

$H = Height\ of\ Crest\ above\ Surrounding\ Terrain = 150\ feet$

$K_h = e^{\left(\frac{1.50*95\,feet}{150\,feet}\right)} = 2.5857$

$K_{zt} = \left[1 + \frac{1.00*0.72}{2.5857}\right]^2 = 1.6344$

$K_d = 0.85$ [TIA-222-G Table 2-2]

V = [Connecticut State Building Code 2016 – Appendix N and IBC 2012 Section 1609.1.1 – Determination of Wind Loads – Exception 5 "Designs using TIA-222" applies for determination for Design Wind load obtained as "V.ult" are to be converted to "V.asd" when applying the TIA-222-G design Standard (under Section 1609.3) for Basic Wind Speed)

$V_{asd} = 50mph\ for\ Structure\ Class\ 3\ (Risk\ Category\ 3/4)$

I = Importance Factor = Structure Class 3 = 1.00 [TIA-222-G Table 2-3]

$G_h = Gust\ Height\ Factor$ [TIA-222-G Section 2.6.7]

$0.85 \leq G_h \leq 1.0$ → Apply G.h = 1.0 for antenna mount frames

$q_z = 0.00256 * 1.252 * 1.573 * 0.95 * 50^2 * 1.00 = 11.974\ (psf)$

Reference

Design Ice Thickness (TIA-222-G / ASCE 7):

$$t_{iz} = 2.0 * t_i * I * K_{iz} * (K_{zt})^{0.35} = 2.0 * 0.75in * 1.25 * 1.111 * 1.6344^{0.35} = 2.4739in$$

where:

$t_i = 0.75\ inch$ Ice Thickness – Region Specific

$I = 1.25$ Ice Importance Factor per Structure Class [TIA-222-G Table 2-3]

$K_{iz} = \left(\frac{z}{33}\right)^{0.10} \leq 1.4 \rightarrow \left(\frac{95ft}{33}\right)^{0.10} = 1.111 \leq 1.4 \rightarrow (1.111 = K_{iz})$

$(K_{zt})^{0.35} = (1.6344)^{0.35}$ (K.zt calculated earlier)

Area of Design Ice Thickness – for Weight:

Horizontal / Vertical Pipes (2-3/8" O.D.)

$$A_{iz} = \pi * t_{iz} * (D_c + t_{iz}) = \pi * 2.4739in * (2.375in + 2.4739in) = 37.6856in^2$$

$$Wt_{ice} = \frac{A_{iz}}{144in^2} * 56pcf * \frac{Length\ (in)}{\frac{12in}{ft}} = \frac{37.6856in^2}{144in^2} * \frac{126in}{\frac{12in}{ft}} = 156.3433\ lbs \rightarrow \frac{156lb}{126in} = 1.2408lb/in$$

Volume of Design Ice Thickness – for Weight:

Antenna #1 Height x Width x Depth:

- Dimensions with Design Ice thickness = (51.6" x 22.9" x 13.7") = 16188 in^3
- Dimensions Antenna = (46.6" x 17.9" x 8.7") = 7257 in^3
  - $\frac{(16188 - 7257)}{12^3} * 56pcf = 289.4\ lbs\ (ice)$

Antenna #2a Height x Width x Depth (Panel Antenna):

- Dimensions with Design Ice thickness = (101" x 29" x 13.7") = 40127 in^3
- Dimensions Antenna = (95.9" x 24" x 8.7") = 20024 in^3
  - $\frac{(40127 - 20024)}{12^3} * 56pcf = 651.5\ lbs\ (ice)$

Antenna #2b Height x Width x Depth (Generic TMAs):

- Dimensions with Design Ice thickness = (16.8" x 8.7" x 14.8") = 2163 in^3
- Dimensions Antenna = (11.8" x 3.7" x 9.8") = 428 in^3
  - $\frac{(2163 - 428)}{12^3} * 56pcf = 56.25\ lbs\ (ice)$

Antenna #2c Height x Width x Depth (Ericsson 2217 B12):

- Dimensions with Design Ice thickness = (22" x 21" x 21") = 9702 in^3
- Dimensions Antenna = (17" x 16" x 16") = 4352 in^3
  - $\frac{(9702 - 4352)}{12^3} * 56pcf = 173\ lbs\ (ice)$

Antenna #2d Height x Width x Depth:

- Dimensions with Design Ice thickness = (20" x 18.25" x 14.25") = 5201.25 in^3
- Dimensions Antenna = (15" x 13.25" x 9.25") = 1838.5 in^3
  - $\frac{(5201 - 1839)}{12^3} * 56pcf = 109\ lbs\ (ice)$

Total Antenna #2 Weight = (651.5 + 56.25 + 173 + 109) lbs = 989.25 lbs

Antenna #3 Height x Width x Depth:

- Dimensions with Design Ice thickness = (63" x 20.75" x 14.375") = 18792 in^3
- Dimensions Antenna = (58" x 15.75" x 9.375") = 8564 in^3
  - $\frac{(18792-8564)}{12^3} * 56pcf = 331.5\ lbs\ (ice)$

Distributed Wind to Antenna Frame (with ice) :

Outside Diameter of Pipe = 2.8750 in + 2*2.5 in

Effective Projected Area on Mount Pipe (Pound (force) per linear Inch):

$$F_a = q_z * G_h * C_A * A_A = 11.974\ (psf) * 1.0 * 0.8 * \frac{966.125in^2}{\left(\frac{12in}{ft}\right)^2} = 64.2682\ lbf$$

$$Dist\ Load = \frac{F_a}{126in} = 0.5101\ lb/in$$

(Normal to Surface to Wind), where:

$q_z = 11.974\ (psf)$ design wind pressure (calculated earlier)

$G_h = 1.00$ Gust Height Factor

$C_A = 0.8$ for Round Surfaces (assuming Aspect Ratio = 7 (Slightly Conservative))

$A_A = (2.8750in + 5in) * 126in = 966.125in^2$ for Round Pipe (for design purposes, height of pipe used to determine load per linear inch.)

Distributed Wind to Mount Frame (with ice):

Antenna #1 Height x Width = 51.6 inches x 22.9 inches

$$C_A A_A * q_z * G_h = 1.4 * \frac{51.6in * 22.9in}{\frac{144in^2}{ft^2}} * 11.9739\ (psf) * 1.0 = 137.6167lbf \rightarrow \frac{137.6167lbf}{36in} = 3.8333lb/in$$

$C_A = 1.4$ for Flat Surfaces (assuming Aspect Ratio = 7 (Slightly Conservative))

Antenna #2 Height x Width = 101 inches x 29 inches

$$C_A A_A * q_z * G_h = 1.4 * \frac{101in * 29in}{\frac{144in^2}{ft^2}} * 11.9739\ (psf) * 1.0 = 341lbf \rightarrow \frac{341bf}{36in} = 9.4724lb/in$$

$C_A = 1.4$ for Flat Surfaces (assuming Aspect Ratio = 7 (Slightly Conservative))

Antenna #3 Height x Width = 63 inches x 20.75 inches

$$C_A A_A * q_z * G_h = 1.4 * \frac{63in * 20.75in}{\frac{144in^2}{ft^2}} * 11.9739\ (psf) * 1.0 = 152.1683lbf \rightarrow \frac{152.1683lbf}{36in} = 4.2222lb/in$$

$C_A = 1.4$ for Flat Surfaces (assuming Aspect Ratio = 7 (Slightly Conservative))

- **DETERMINE SERVICE/MAINTENANCE FORCE APPLIED TO ANTENNA (TIA-222-G STANDARD)**

TIA-222-G Section 2.6.6.2 – Design Wind Force on Appurtenances and Mount Frame

$F_a = q_z * G_h * (EPA)_A$

where: $q_z = 0.00256 * K_z * K_{zt} * K_d * V^2 * I$

where, $K_z = 2.01 * \left(\frac{z}{z_g}\right)^{\frac{2}{\alpha}}$ [TIA-222-G Section 2.6.5.2]

where: $z = height\ above\ ground\ level = 95\ feet$

$z_g = 900$ [TIA-222-G Table 2-4 – Exposure Category "C"]

$\alpha = 9.5$ [TIA-222-G Table 2-4 – Exposure Category "C"]

$K_{t.min} = 0.72$ [TIA-222-G Table 2-5 – Topographic Category 4]

$K_z = 2.01 * \left(\frac{95}{900}\right)^{\frac{2}{9.5}} = 1.252$

$K_{zt} \rightarrow for\ Topographic\ Category\ 4$ [TIA-222-G Section 2.6.6.4]

where, $K_{zt} = \left[1 + \frac{K_e K_t}{K_h}\right]^2$ [TIA-222-G Section 2.6.6.4]

where: $K_e = Terrain\ Constant = 1.00$ [TIA-222-G Table 2-4; Exposure Cat. "C"]

$K_t = Topographic\ Constant = 0.72$ [TIA-222-G Table 2-5; Topo. Cat. "4"]

$K_h = e^{\left(\frac{f*z}{H}\right)}$, where

$f = Height\ Attenuation\ Factor = 1.50$ [TIA-222-G; Table 2-5; Topographic Category "4"]

$z = height\ above\ ground\ level\ at\ the\ base\ of\ the\ structure = 95\ feet$

$H = Height\ of\ Crest\ above\ Surrounding\ Terrain = 150\ feet$

$K_h = e^{\left(\frac{1.50*95\,feet}{150\,feet}\right)} = 2.5857$

$K_{zt} = \left[1 + \frac{1.00*0.72}{2.5857}\right]^2 = 1.6344$

$K_d = 0.85$ [TIA-222-G Table 2-2]

V = [Connecticut State Building Code 2016 – Appendix N and IBC 2012 Section 1609.1.1 – Determination of Wind Loads – Exception 5 "Designs using TIA-222" applies for determination for Design Wind load obtained as "V.ult" are to be converted to "V.asd" when applying the TIA-222-G design Standard (under Section 1609.3) for Basic Wind Speed)

$V_{asd} = 30mph\ for\ Structure\ Class\ 3\ (Risk\ Category\ 3/4)$

I = Importance Factor = Structure Class 3 = 1.15 [TIA-222-G Table 2-3]

$G_h = Gust\ Height\ Factor$ [TIA-222-G Section 2.6.7]

$0.85 \leq G_h \leq 1.0$ → Apply G.h = 1.0 for antenna mount frames

$q_z = 0.00256 * 1.252 * 1.573 * 0.95 * 30^2 * 1.15 = 4.9572\ (psf)$

Reference

Distributed Wind to Antenna Frame:

Outside Diameter of Pipe = 2.8750 in

Effective Projected Area on Mount Pipe (Pound (force) per linear Inch):

$$F_a = q_z * G_h * C_A * A_A = 4.9572\ (psf) * 1.0 * 0.8 * \frac{2.3750in * 126in}{\frac{12in}{ft}} = 8.2413\ lbf$$

$$Dist\ Load = \frac{F_a}{126in} = 0.0654\ lb/in$$

(Normal to Surface to Wind), where:

$q_z = 4.9572\ (psf)$ design wind pressure (calculated earlier)
$G_h = 1.00$ Gust Height Factor
$C_A = 0.8$ for Round Surfaces (assuming Aspect Ratio = 7 (Slightly Conservative))
$A_A = 2.8750in * 126in = 362.25in^2$ for Round Pipe (for design purposes, height of pipe used to determine load per linear inch.)

Distributed Wind to Antenna on Mount Frame:

Antenna #1 Height x Width = 46.6 inches x 17.9 inches

$$C_A A_A * q_z * G_h = 1.4 * \frac{46.6in * 17.9in}{\frac{144in^2}{ft^2}} * 4.9572\ (psf) * 1.0 = 40.2084lbf \rightarrow \frac{40.2084lbf}{36in} = 1.1169lb/in$$

$C_A = 1.4$ for Flat Surfaces (assuming Aspect Ratio = 7 (Slightly Conservative))

Antenna #2 Height x Width = 95.9 inches x 24 inches

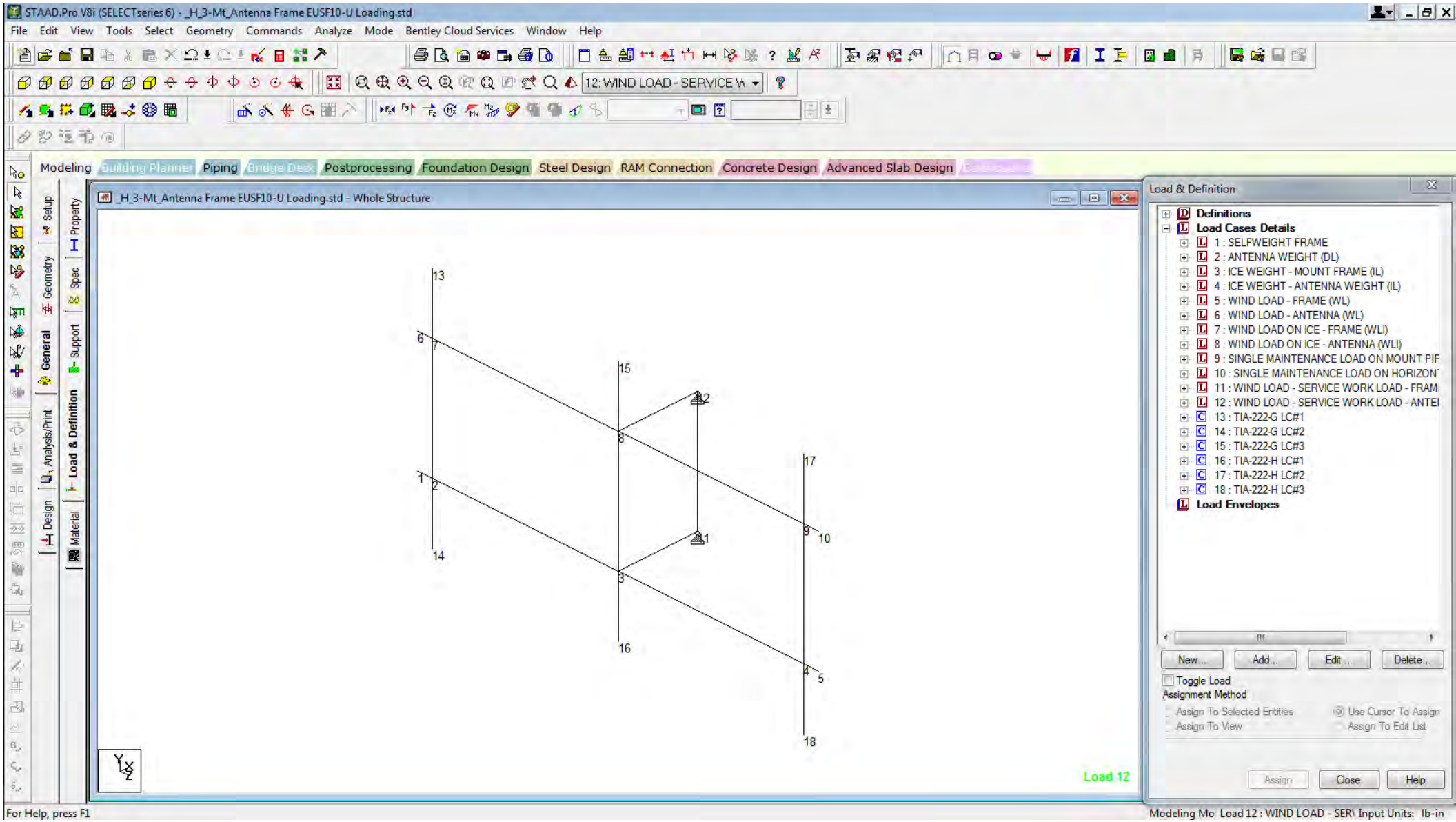
$$C_A A_A * q_z * G_h = 1.4 * \frac{95.9in * 24in}{\frac{144in^2}{ft^2}} * 4.9572\ (psf) * 1.0 = 110.9256lbf \rightarrow \frac{110.9256lbf}{36in} = 3.0813lb/in$$

$C_A = 1.4$ for Flat Surfaces (assuming Aspect Ratio = 7 (Slightly Conservative))

Antenna #3 Height x Width = 58 inches x 15.75 inches

$$C_A A_A * q_z * G_h = 1.4 * \frac{58in * 15.75in}{\frac{144in^2}{ft^2}} * 4.9572\ (psf) * 1.0 = 44.0296lbf \rightarrow \frac{44.0296bf}{36in} = 1.2230lb/in$$

$C_A = 1.4$ for Flat Surfaces (assuming Aspect Ratio = 7 (Slightly Conservative))


STAAD.Pro V8i (SELECTseries 6) - _H_3-Mt_Antenna Frame EUSF10-U Loading.std
File Edit View Tools Select Geometry Commands Analyze Mode Bentley Cloud Services Window Help
12: WIND LOAD - SERVICE W
Modeling Building Planner Piping Bridge Deck Postprocessing Foundation Design Steel Design RAM Connection Concrete Design Advanced Slab Design
Setup Geometry General Analysis/Print Design
Property Spec Support Load & Definition Material
_H_3-Mt_Antenna Frame EUSF10-U Loading.std - Whole Structure
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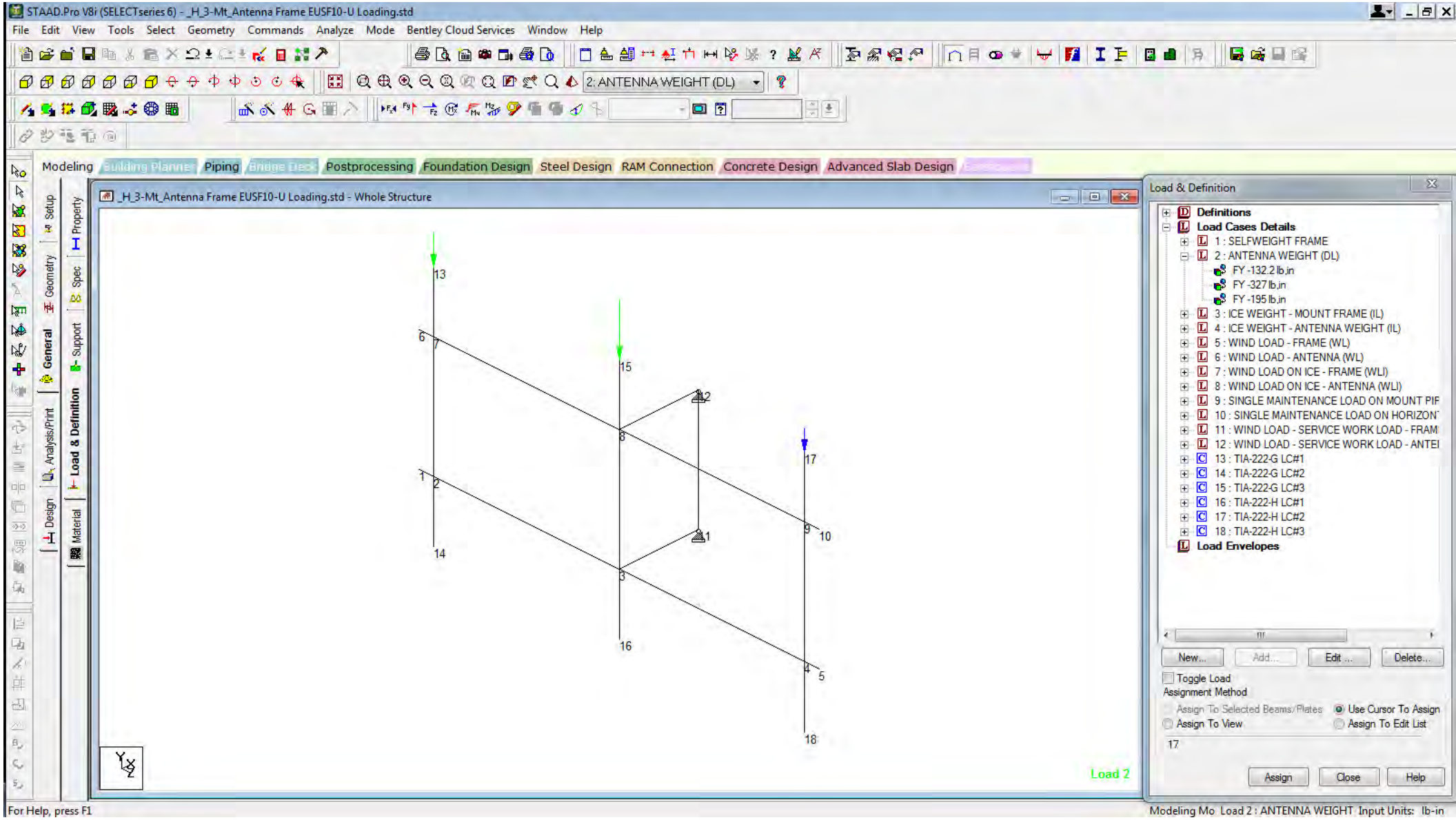
Load 12
Load & Definition
Definitions
Load Cases Details
1 : SELFWEIGHT FRAME
2 : ANTENNA WEIGHT (DL)
3 : ICE WEIGHT - MOUNT FRAME (IL)
4 : ICE WEIGHT - ANTENNA WEIGHT (IL)
5 : WIND LOAD - FRAME (WL)
6 : WIND LOAD - ANTENNA (WL)
7 : WIND LOAD ON ICE - FRAME (WLI)
8 : WIND LOAD ON ICE - ANTENNA (WLI)
9 : SINGLE MAINTENANCE LOAD ON MOUNT PIF
10 : SINGLE MAINTENANCE LOAD ON HORIZON
11 : WIND LOAD - SERVICE WORK LOAD - FRAM
12 : WIND LOAD - SERVICE WORK LOAD - ANTEI
13 : TIA-222-G LC#1
14 : TIA-222-G LC#2
15 : TIA-222-G LC#3
16 : TIA-222-H LC#1
17 : TIA-222-H LC#2
18 : TIA-222-H LC#3
Load Envelopes
New... Add... Edit... Delete...
Toggle Load
Assignment Method
Assign To Selected Entities
Use Cursor To Assign
Assign To View
Assign To Edit List
Assign Close Help
For Help, press F1
Modeling Mo Load 12 : WIND LOAD - SER\ Input Units: lb-in


STAAD.Pro V8i (SELECTseries 6) - _H_3-Mt_Antenna Frame EUSF10-U Loading.std
File Edit View Tools Select Geometry Commands Analyze Mode Bentley Cloud Services Window Help
2: ANTENNA WEIGHT (DL)
Modeling Building Planner Piping Bridge Deck Postprocessing Foundation Design Steel Design RAM Connection Concrete Design Advanced Slab Design
Setup Geometry General Analysis/Print Design
Property Spec Support Load & Definition Material
_H_3-Mt_Antenna Frame EUSF10-U Loading.std - Whole Structure
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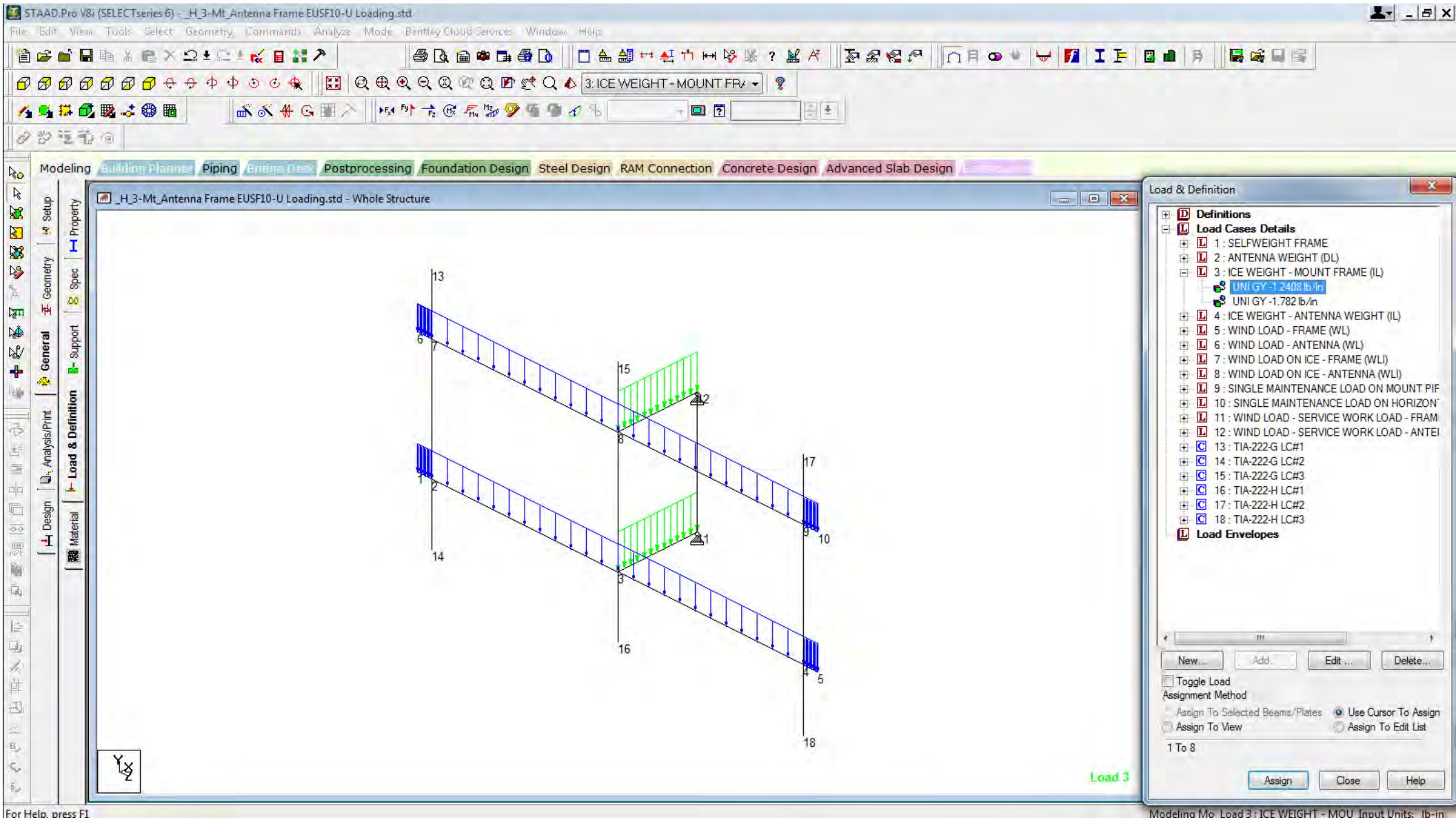
Load 2
Load & Definition
Definitions
Load Cases Details
1 : SELFWEIGHT FRAME
2 : ANTENNA WEIGHT (DL)
FY -132.2 lb,in
FY -327 lb,in
FY -195 lb,in
3 : ICE WEIGHT - MOUNT FRAME (IL)
4 : ICE WEIGHT - ANTENNA WEIGHT (IL)
5 : WIND LOAD - FRAME (WL)
6 : WIND LOAD - ANTENNA (WL)
7 : WIND LOAD ON ICE - FRAME (WLI)
8 : WIND LOAD ON ICE - ANTENNA (WLI)
9 : SINGLE MAINTENANCE LOAD ON MOUNT PIF
10 : SINGLE MAINTENANCE LOAD ON HORIZON
11 : WIND LOAD - SERVICE WORK LOAD - FRAM
12 : WIND LOAD - SERVICE WORK LOAD - ANTEI
13 : TIA-222-G LC#1
14 : TIA-222-G LC#2
15 : TIA-222-G LC#3
16 : TIA-222-H LC#1
17 : TIA-222-H LC#2
18 : TIA-222-H LC#3
Load Envelopes
New... Add... Edit ... Delete...
Toggle Load
Assignment Method
Assign To Selected Beams/Plates
Use Cursor To Assign
Assign To View
Assign To Edit List
17
Assign Close Help
For Help, press F1
Modeling Mo Load 2 : ANTENNA WEIGHT Input Units: lb-in


STAAD.Pro V8i (SELECTseries 6) - _H_3-Mt_Antenna Frame EUSF10-U Loading.std
File Edit View Tools Select Geometry Commands Analyze Mode Bentley Cloud Services Window Help
3: ICE WEIGHT - MOUNT FRA
Modeling Building Planner Piping Bridge Deck Postprocessing Foundation Design Steel Design RAM Connection Concrete Design Advanced Slab Design
Setup Geometry General Analysis/Print Design
Property Spec Support Load & Definition Material
_H_3-Mt_Antenna Frame EUSF10-U Loading.std - Whole Structure
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5
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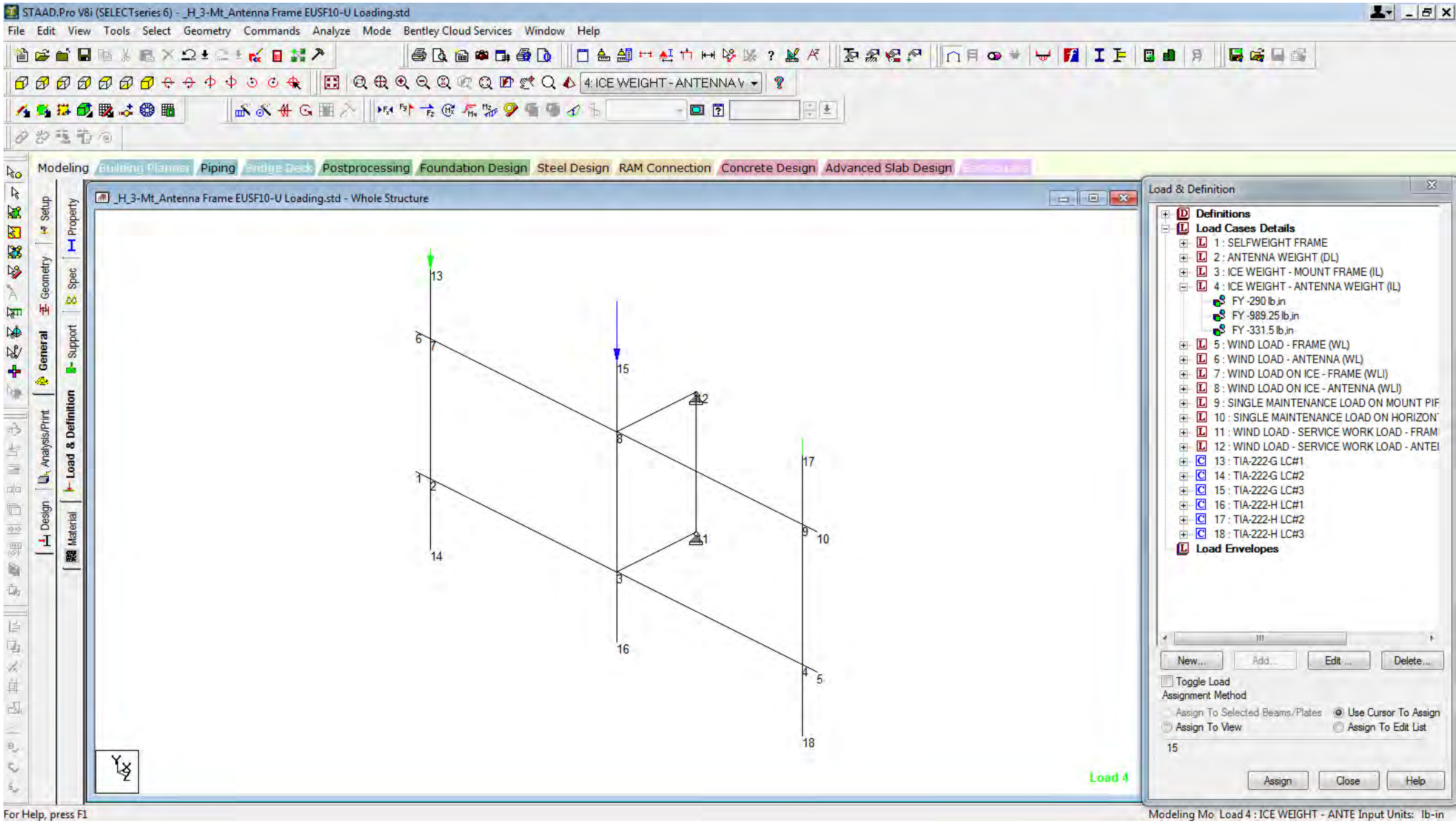
Load 3
Load & Definition
Definitions
Load Cases Details
1 : SELFWEIGHT FRAME
2 : ANTENNA WEIGHT (DL)
3 : ICE WEIGHT - MOUNT FRAME (IL)
UNI GY -1.2408 lb/in
UNI GY -1.782 lb/in
4 : ICE WEIGHT - ANTENNA WEIGHT (IL)
5 : WIND LOAD - FRAME (WL)
6 : WIND LOAD - ANTENNA (WL)
7 : WIND LOAD ON ICE - FRAME (WLI)
8 : WIND LOAD ON ICE - ANTENNA (WLI)
9 : SINGLE MAINTENANCE LOAD ON MOUNT PIF
10 : SINGLE MAINTENANCE LOAD ON HORIZON
11 : WIND LOAD - SERVICE WORK LOAD - FRAM
12 : WIND LOAD - SERVICE WORK LOAD - ANTEI
13 : TIA-222-G LC#1
14 : TIA-222-G LC#2
15 : TIA-222-G LC#3
16 : TIA-222-H LC#1
17 : TIA-222-H LC#2
18 : TIA-222-H LC#3
Load Envelopes
New... Add... Edit... Delete...
Toggle Load
Assignment Method
Assign To Selected Beams/Plates
Use Cursor To Assign
Assign To View
Assign To Edit List
1 To 8
Assign Close Help
For Help, press F1
Modeling Mo Load 3 : ICE WEIGHT - MOU Input Units: lb-in


STAAD.Pro V8i (SELECTseries 6) - _H_3-Mt_Antenna Frame EUSF10-U Loading.std
File Edit View Tools Select Geometry Commands Analyze Mode Bentley Cloud Services Window Help
4: ICE WEIGHT - ANTENNA V
Modeling Building Planner Piping Bridge Deck Postprocessing Foundation Design Steel Design RAM Connection Concrete Design Advanced Slab Design
Setup Geometry General Analysis/Print Design
Property Spec Support Load & Definition Material
_H_3-Mt_Antenna Frame EUSF10-U Loading.std - Whole Structure
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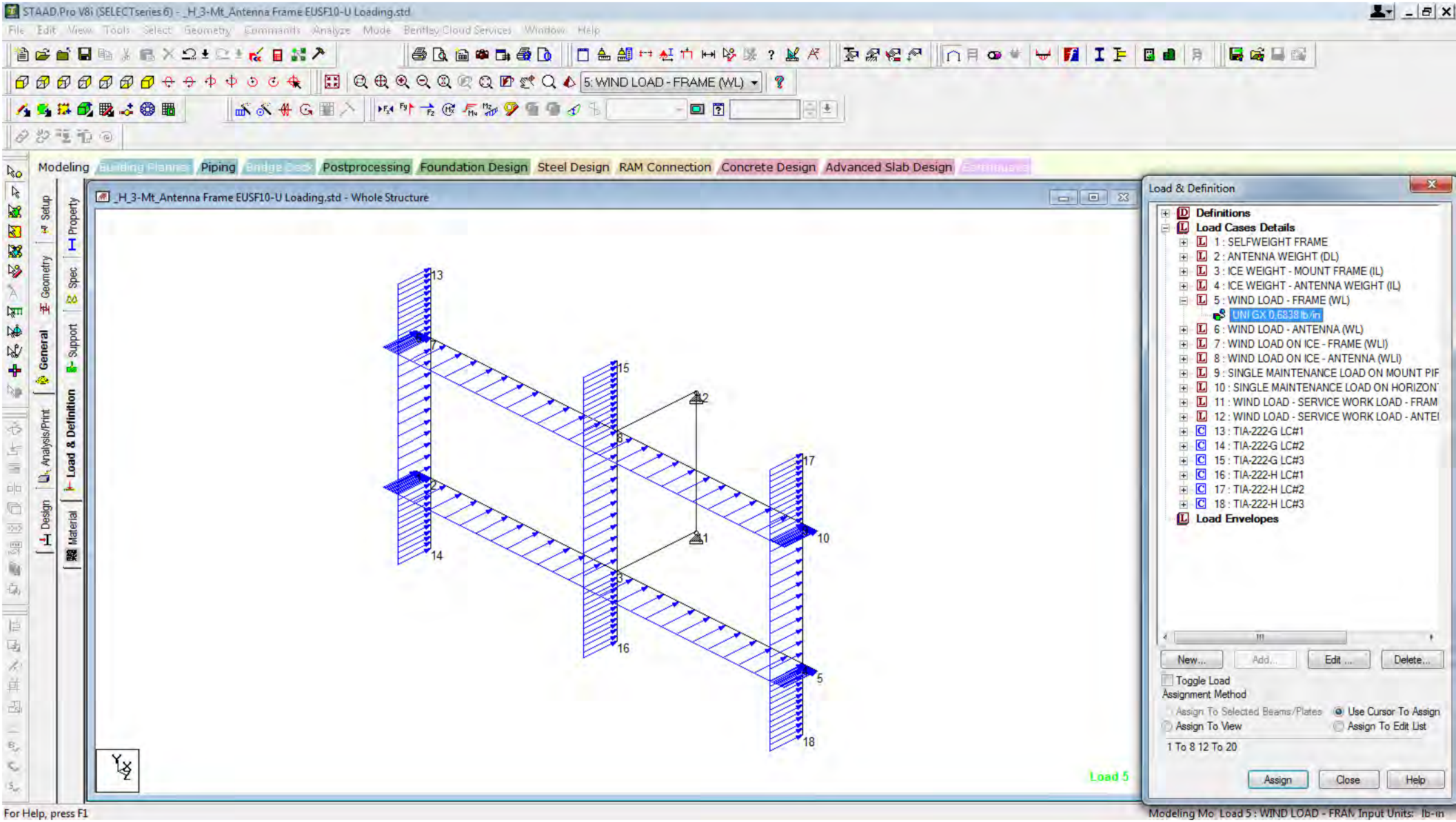
Load 4
Load & Definition
Definitions
Load Cases Details
1 : SELFWEIGHT FRAME
2 : ANTENNA WEIGHT (DL)
3 : ICE WEIGHT - MOUNT FRAME (IL)
4 : ICE WEIGHT - ANTENNA WEIGHT (IL)
FY -290 lb,in
FY -989.25 lb,in
FY -331.5 lb,in
5 : WIND LOAD - FRAME (WL)
6 : WIND LOAD - ANTENNA (WL)
7 : WIND LOAD ON ICE - FRAME (WLI)
8 : WIND LOAD ON ICE - ANTENNA (WLI)
9 : SINGLE MAINTENANCE LOAD ON MOUNT PIF
10 : SINGLE MAINTENANCE LOAD ON HORIZON
11 : WIND LOAD - SERVICE WORK LOAD - FRAM
12 : WIND LOAD - SERVICE WORK LOAD - ANTEI
13 : TIA-222-G LC#1
14 : TIA-222-G LC#2
15 : TIA-222-G LC#3
16 : TIA-222-H LC#1
17 : TIA-222-H LC#2
18 : TIA-222-H LC#3
Load Envelopes
New... Add... Edit ... Delete...
Toggle Load
Assignment Method
Assign To Selected Beams/Plates
Use Cursor To Assign
Assign To View
Assign To Edit List
15
Assign Close Help
For Help, press F1
Modeling Mo Load 4 : ICE WEIGHT - ANTE Input Units: lb-in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File Edit View Tools Select Geometry Commands Analyze Mode Bentley Cloud Services Window Help
5: WIND LOAD - FRAME (WL)
Modeling Building Planner Piping Bridge Deck Postprocessing Foundation Design Steel Design RAM Connection Concrete Design Advanced Slab Design
Setup Geometry General Analysis/Print Design
Property Spec Support Load & Definition Material
_H_3-Mt_Antenna Frame EUSF10-U Loading.std - Whole Structure
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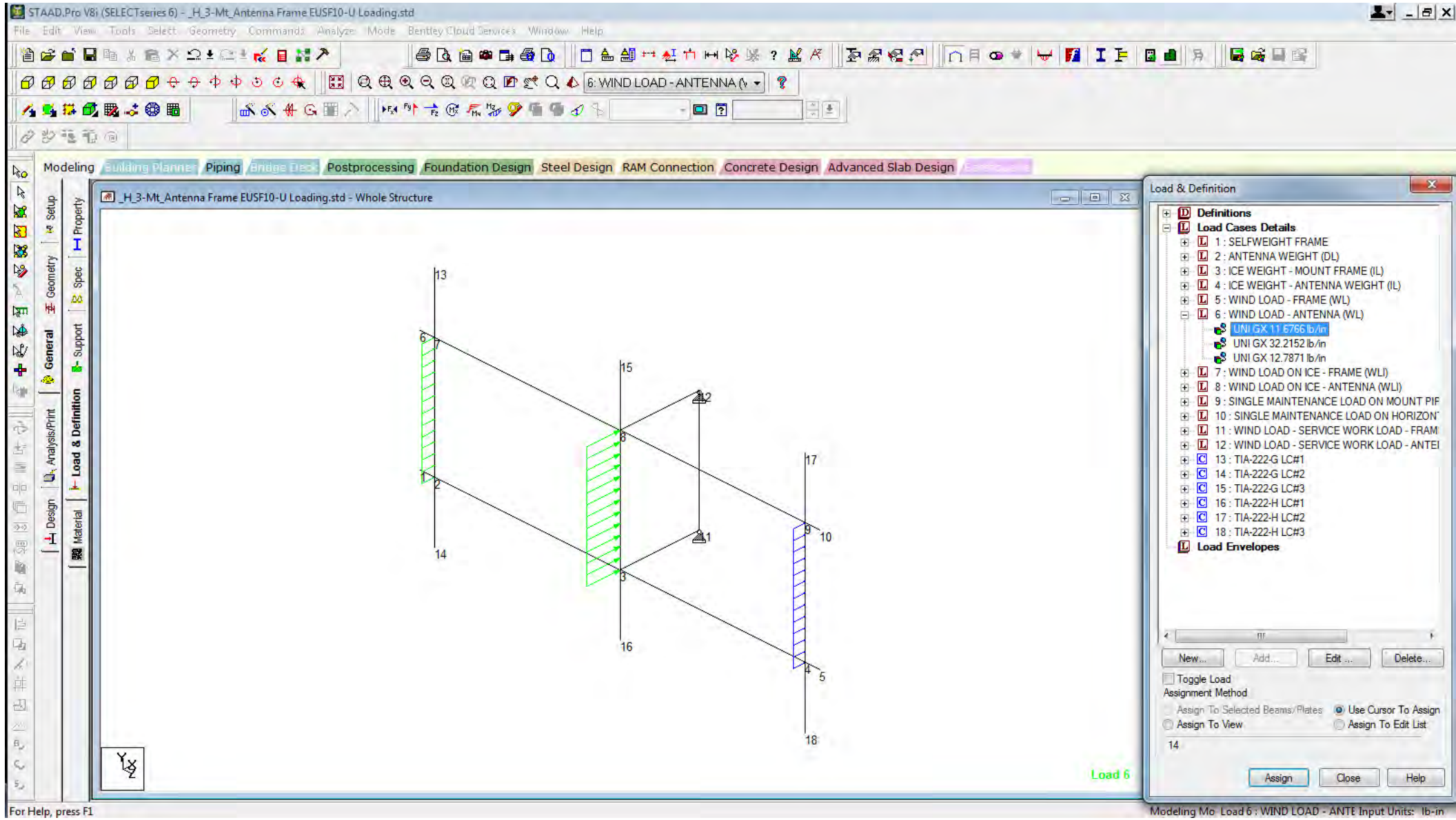
Load 5
Load & Definition
Definitions
Load Cases Details
1 : SELFWEIGHT FRAME
2 : ANTENNA WEIGHT (DL)
3 : ICE WEIGHT - MOUNT FRAME (IL)
4 : ICE WEIGHT - ANTENNA WEIGHT (IL)
5 : WIND LOAD - FRAME (WL)
UNI GX 0.6838 lb/in
6 : WIND LOAD - ANTENNA (WL)
7 : WIND LOAD ON ICE - FRAME (WLI)
8 : WIND LOAD ON ICE - ANTENNA (WLI)
9 : SINGLE MAINTENANCE LOAD ON MOUNT PIF
10 : SINGLE MAINTENANCE LOAD ON HORIZON
11 : WIND LOAD - SERVICE WORK LOAD - FRAM
12 : WIND LOAD - SERVICE WORK LOAD - ANTEI
13 : TIA-222-G LC#1
14 : TIA-222-G LC#2
15 : TIA-222-G LC#3
16 : TIA-222-H LC#1
17 : TIA-222-H LC#2
18 : TIA-222-H LC#3
Load Envelopes
New... Add... Edit ... Delete...
Toggle Load Assignment Method
Assign To Selected Beams/Plates
Use Cursor To Assign
Assign To View
Assign To Edit List
1 To 8 12 To 20
Assign Close Help
For Help, press F1
Modeling Mo Load 5 : WIND LOAD - FRAM Input Units: lb-in


STAAD.Pro V8i (SELECTseries 6) - _H_3-Mt_Antenna Frame EUSF10-U Loading.std
File Edit View Tools Select Geometry Commands Analyze Mode Bentley Cloud Services Window Help
6: WIND LOAD - ANTENNA (W
Modeling Building Planner Piping Bridge Deck Postprocessing Foundation Design Steel Design RAM Connection Concrete Design Advanced Slab Design
Setup Geometry General Analysis/Print Design
Property Spec Support Load & Definition Material
_H_3-Mt_Antenna Frame EUSF10-U Loading.std - Whole Structure
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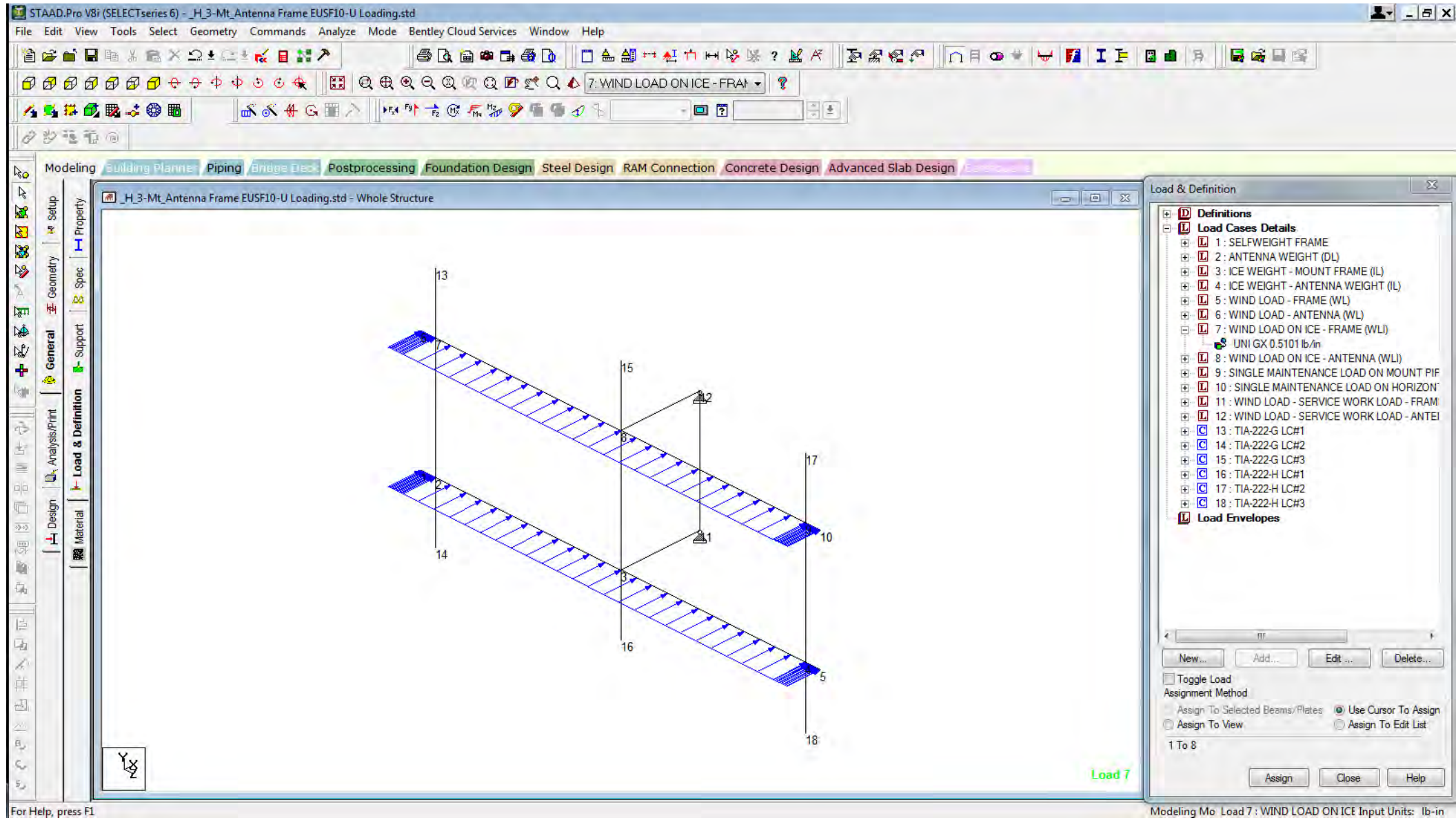
Load 6
Load & Definition
Definitions
Load Cases Details
1 : SELFWEIGHT FRAME
2 : ANTENNA WEIGHT (DL)
3 : ICE WEIGHT - MOUNT FRAME (IL)
4 : ICE WEIGHT - ANTENNA WEIGHT (IL)
5 : WIND LOAD - FRAME (WL)
6 : WIND LOAD - ANTENNA (WL)
UNI GX 11.6766 lb/in
UNI GX 32.2152 lb/in
UNI GX 12.7871 lb/in
7 : WIND LOAD ON ICE - FRAME (WLI)
8 : WIND LOAD ON ICE - ANTENNA (WLI)
9 : SINGLE MAINTENANCE LOAD ON MOUNT PIF
10 : SINGLE MAINTENANCE LOAD ON HORIZON
11 : WIND LOAD - SERVICE WORK LOAD - FRAM
12 : WIND LOAD - SERVICE WORK LOAD - ANTEI
13 : TIA-222-G LC#1
14 : TIA-222-G LC#2
15 : TIA-222-G LC#3
16 : TIA-222-H LC#1
17 : TIA-222-H LC#2
18 : TIA-222-H LC#3
Load Envelopes
New... Add... Edit ... Delete...
Toggle Load
Assignment Method
Assign To Selected Beams/Plates
Use Cursor To Assign
Assign To View
Assign To Edit List
14
Assign Close Help
For Help, press F1
Modeling Mo Load 6 : WIND LOAD - ANTE Input Units: lb-in


STAAD.Pro V8i (SELECTseries 6) - _H_3-Mt_Antenna Frame EUSF10-U Loading.std
File Edit View Tools Select Geometry Commands Analyze Mode Bentley Cloud Services Window Help
7: WIND LOAD ON ICE - FRAM
Modeling Building Planner Piping Bridge Deck Postprocessing Foundation Design Steel Design RAM Connection Concrete Design Advanced Slab Design
_H_3-Mt_Antenna Frame EUSF10-U Loading.std - Whole Structure
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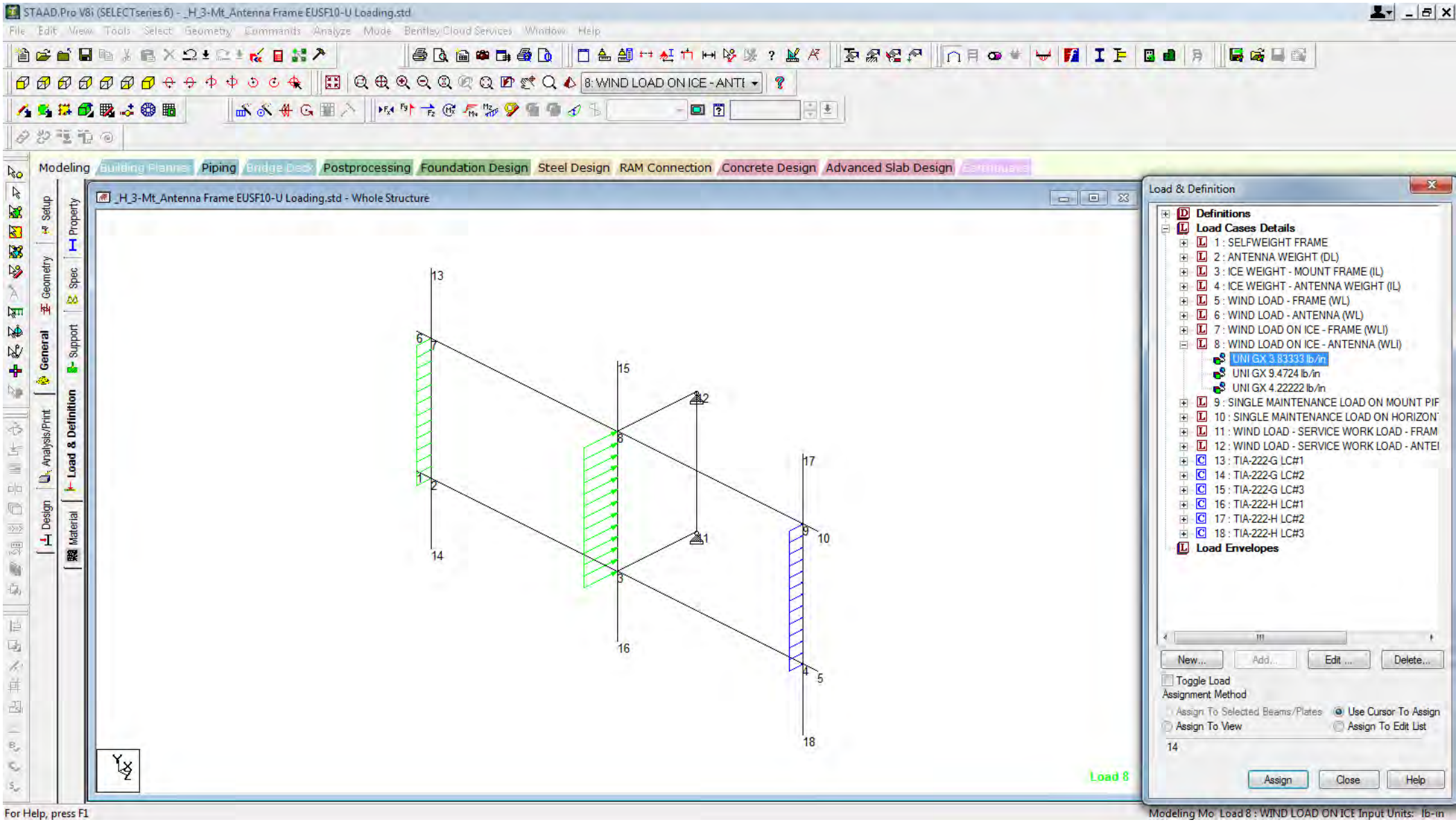
Load 7
Load & Definition
Definitions
Load Cases Details
1 : SELFWEIGHT FRAME
2 : ANTENNA WEIGHT (DL)
3 : ICE WEIGHT - MOUNT FRAME (IL)
4 : ICE WEIGHT - ANTENNA WEIGHT (IL)
5 : WIND LOAD - FRAME (WL)
6 : WIND LOAD - ANTENNA (WL)
7 : WIND LOAD ON ICE - FRAME (WLI)
UNI GX 0.5101 lb/in
8 : WIND LOAD ON ICE - ANTENNA (WLI)
9 : SINGLE MAINTENANCE LOAD ON MOUNT PIF
10 : SINGLE MAINTENANCE LOAD ON HORIZON
11 : WIND LOAD - SERVICE WORK LOAD - FRAM
12 : WIND LOAD - SERVICE WORK LOAD - ANTEI
13 : TIA-222-G LC#1
14 : TIA-222-G LC#2
15 : TIA-222-G LC#3
16 : TIA-222-H LC#1
17 : TIA-222-H LC#2
18 : TIA-222-H LC#3
Load Envelopes
New... Add... Edit ... Delete...
Toggle Load
Assignment Method
Assign To Selected Beams/Plates
Use Cursor To Assign
Assign To View
Assign To Edit List
1 To 8
Assign Close Help
Setup Geometry General Analysis/Print Design
Property Spec Support Load & Definition Material
For Help, press F1
Modeling Mo Load 7 : WIND LOAD ON ICE Input Units: lb-in


STAAD.Pro V8i (SELECTseries 6) - _H_3-Mt_Antenna Frame EUSF10-U Loading.std
File Edit View Tools Select Geometry Commands Analyze Mode Bentley Cloud Services Window Help
8: WIND LOAD ON ICE - ANTI
Modeling Building Planner Piping Bridge Deck Postprocessing Foundation Design Steel Design RAM Connection Concrete Design Advanced Slab Design Estimation
Setup Geometry General Analysis/Print Design
Property Spec Support Load & Definition Material
_H_3-Mt_Antenna Frame EUSF10-U Loading.std - Whole Structure
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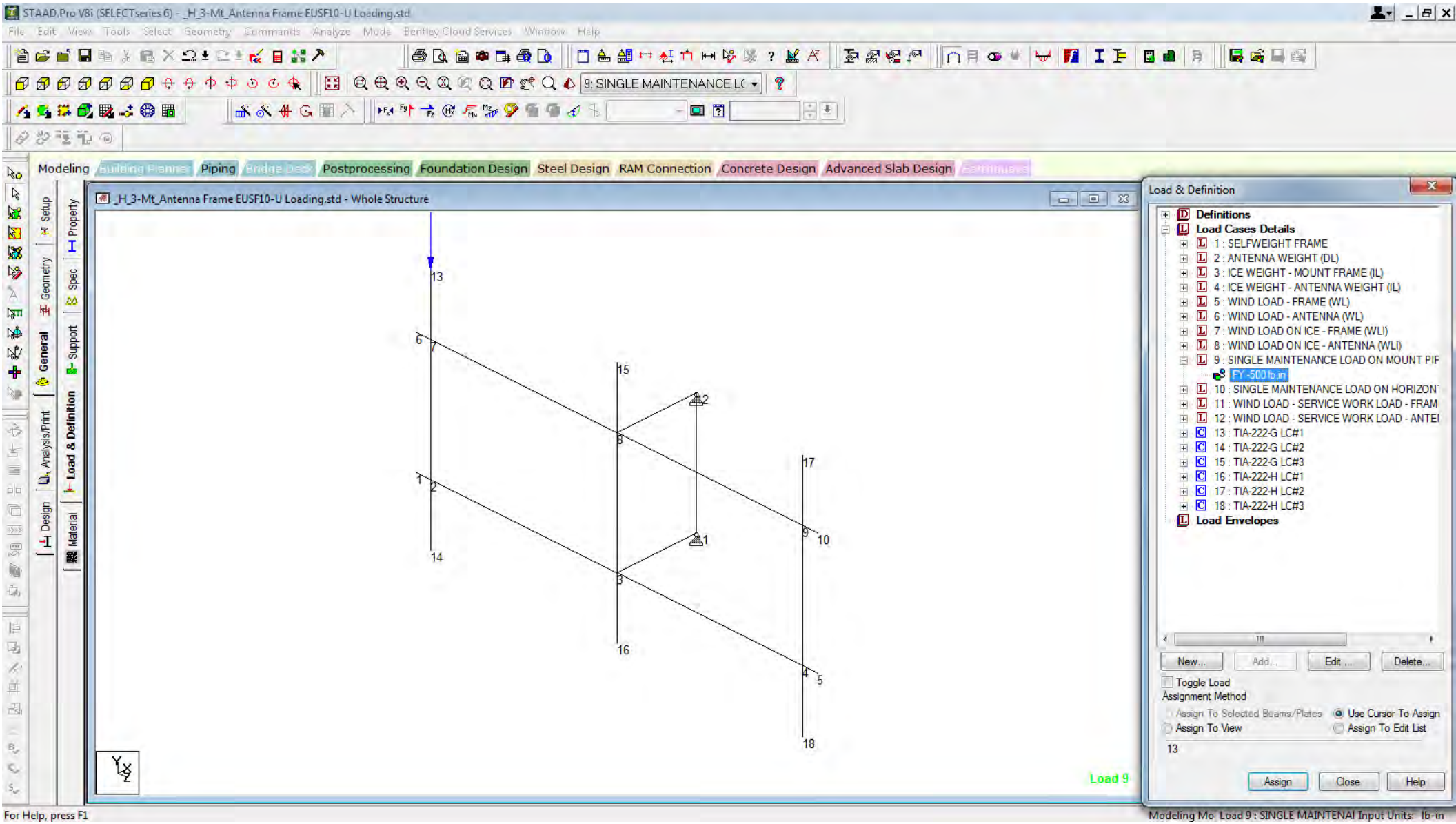
Load 8
Load & Definition
Definitions
Load Cases Details
1 : SELFWEIGHT FRAME
2 : ANTENNA WEIGHT (DL)
3 : ICE WEIGHT - MOUNT FRAME (IL)
4 : ICE WEIGHT - ANTENNA WEIGHT (IL)
5 : WIND LOAD - FRAME (WL)
6 : WIND LOAD - ANTENNA (WL)
7 : WIND LOAD ON ICE - FRAME (WLI)
8 : WIND LOAD ON ICE - ANTENNA (WLI)
UNI GX 3.83333 lb/in
UNI GX 9.4724 lb/in
UNI GX 4.22222 lb/in
9 : SINGLE MAINTENANCE LOAD ON MOUNT PIF
10 : SINGLE MAINTENANCE LOAD ON HORIZON
11 : WIND LOAD - SERVICE WORK LOAD - FRAM
12 : WIND LOAD - SERVICE WORK LOAD - ANTEI
13 : TIA-222-G LC#1
14 : TIA-222-G LC#2
15 : TIA-222-G LC#3
16 : TIA-222-H LC#1
17 : TIA-222-H LC#2
18 : TIA-222-H LC#3
Load Envelopes
New... Add... Edit ... Delete...
Toggle Load Assignment Method
Assign To Selected Beams/Plates
Use Cursor To Assign
Assign To View
Assign To Edit List
14
Assign Close Help
For Help, press F1
Modeling Mo Load 8 : WIND LOAD ON ICE Input Units: lb-in


STAAD.Pro V8i (SELECTseries 6) - _H_3-Mt_Antenna Frame EUSF10-U Loading.std
File Edit View Tools Select Geometry Commands Analyze Mode Bentley Cloud Services Window Help
9: SINGLE MAINTENANCE LC
Modeling Building Planner Piping Bridge Deck Postprocessing Foundation Design Steel Design RAM Connection Concrete Design Advanced Slab Design
Setup Geometry General Analysis/Print Design
Property Spec Support Load & Definition Material
_H_3-Mt_Antenna Frame EUSF10-U Loading.std - Whole Structure
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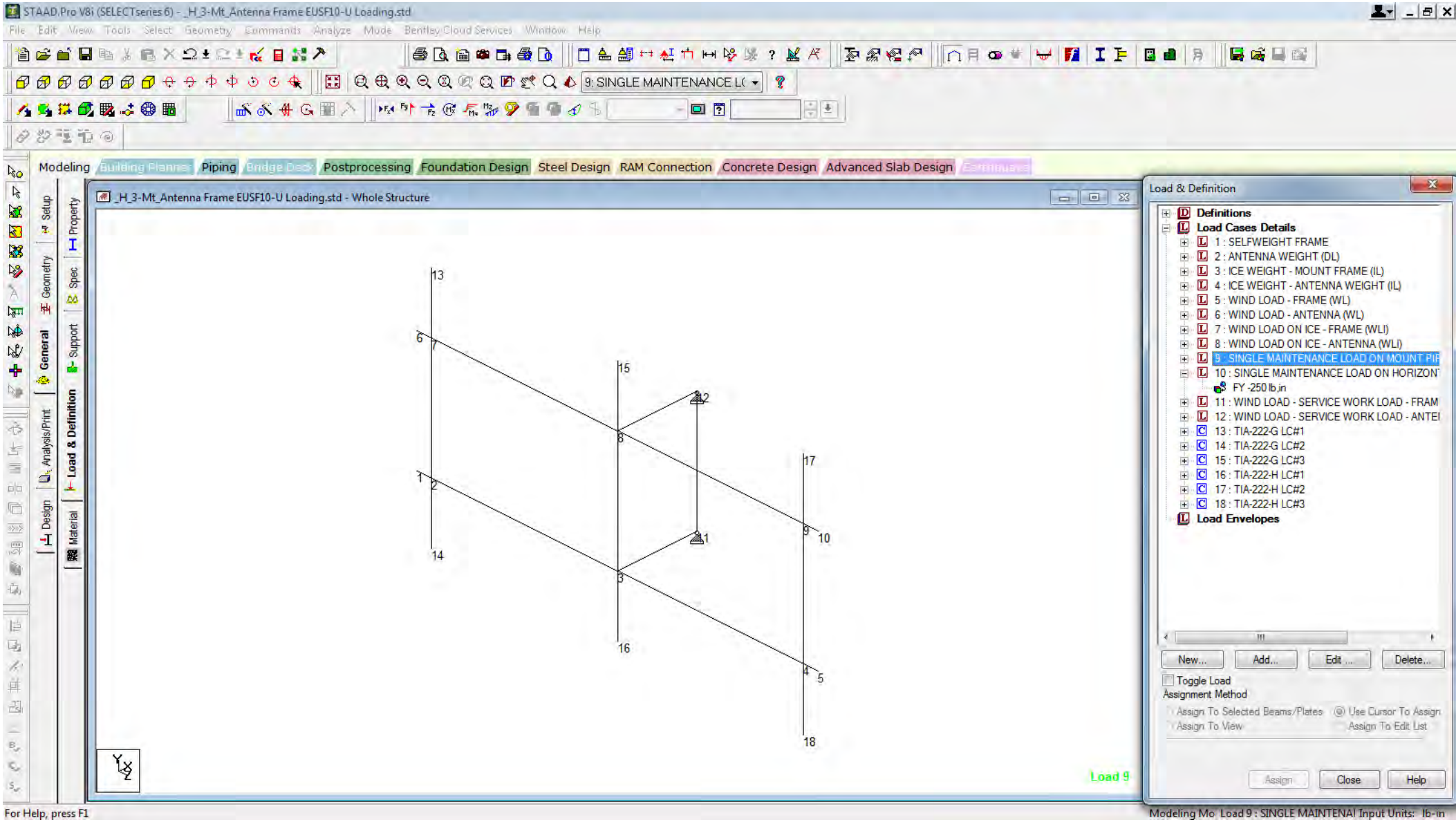
X
Z
Load 9
Load & Definition
Definitions
Load Cases Details
1 : SELFWEIGHT FRAME
2 : ANTENNA WEIGHT (DL)
3 : ICE WEIGHT - MOUNT FRAME (IL)
4 : ICE WEIGHT - ANTENNA WEIGHT (IL)
5 : WIND LOAD - FRAME (WL)
6 : WIND LOAD - ANTENNA (WL)
7 : WIND LOAD ON ICE - FRAME (WLI)
8 : WIND LOAD ON ICE - ANTENNA (WLI)
9 : SINGLE MAINTENANCE LOAD ON MOUNT PIF
FY -500 lb,in
10 : SINGLE MAINTENANCE LOAD ON HORIZON
11 : WIND LOAD - SERVICE WORK LOAD - FRAM
12 : WIND LOAD - SERVICE WORK LOAD - ANTEI
13 : TIA-222-G LC#1
14 : TIA-222-G LC#2
15 : TIA-222-G LC#3
16 : TIA-222-H LC#1
17 : TIA-222-H LC#2
18 : TIA-222-H LC#3
Load Envelopes
New... Add... Edit ... Delete...
Toggle Load
Assignment Method
Assign To Selected Beams/Plates
Use Cursor To Assign
Assign To View
Assign To Edit List
13
Assign Close Help
For Help, press F1
Modeling Mo Load 9 : SINGLE MAINTENAI Input Units: lb-in


STAAD.Pro V8i (SELECTseries 6) - _H_3-Mt_Antenna Frame EUSF10-U Loading.std
File Edit View Tools Select Geometry Commands Analyze Mode Bentley Cloud Services Window Help
9: SINGLE MAINTENANCE L(
Modeling Building Planner Piping Bridge Deck Postprocessing Foundation Design Steel Design RAM Connection Concrete Design Advanced Slab Design Estimation
Setup Geometry General Analysis/Print Design
Property Spec Support Load & Definition Material
_H_3-Mt_Antenna Frame EUSF10-U Loading.std - Whole Structure
13
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16
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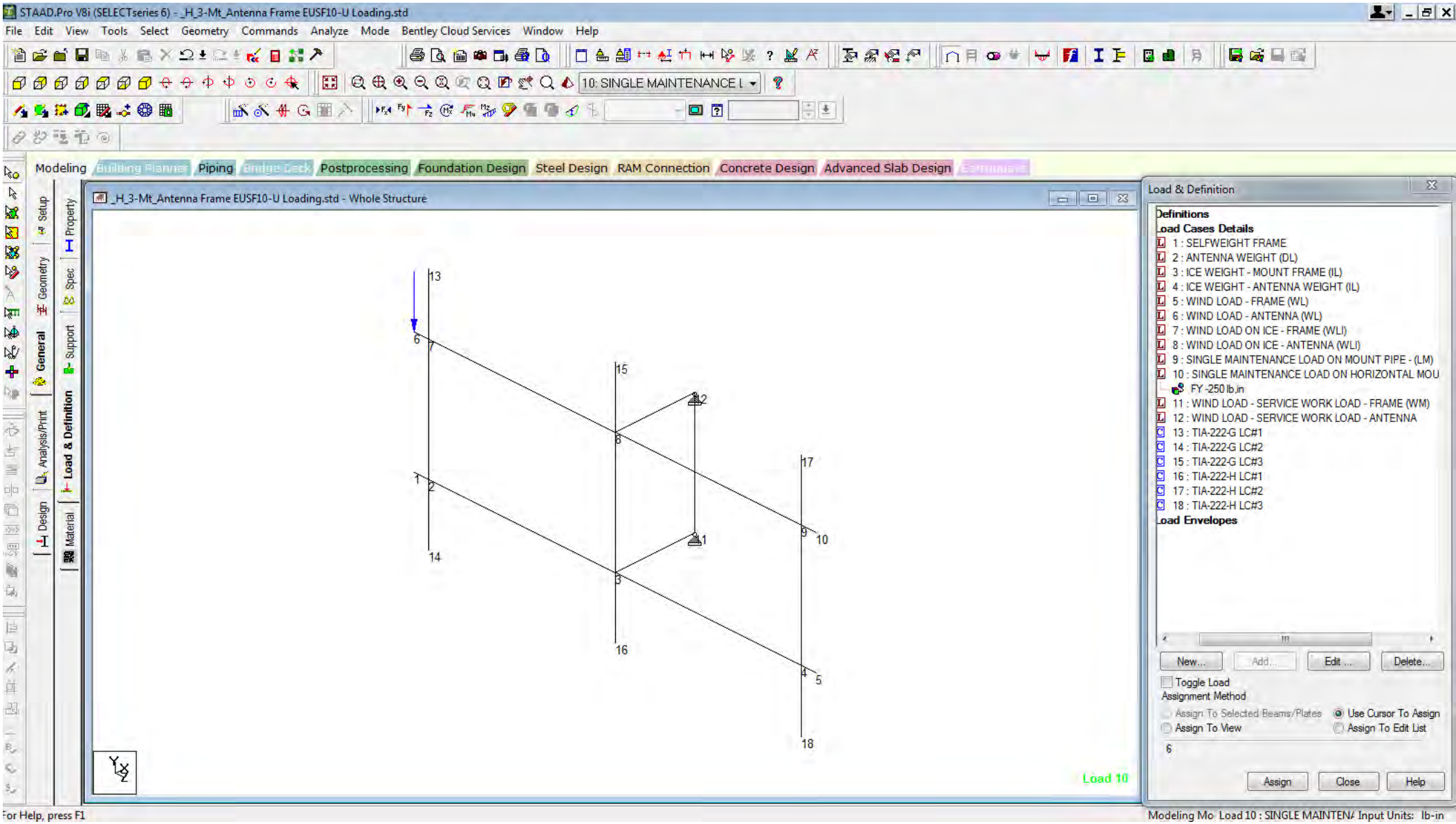
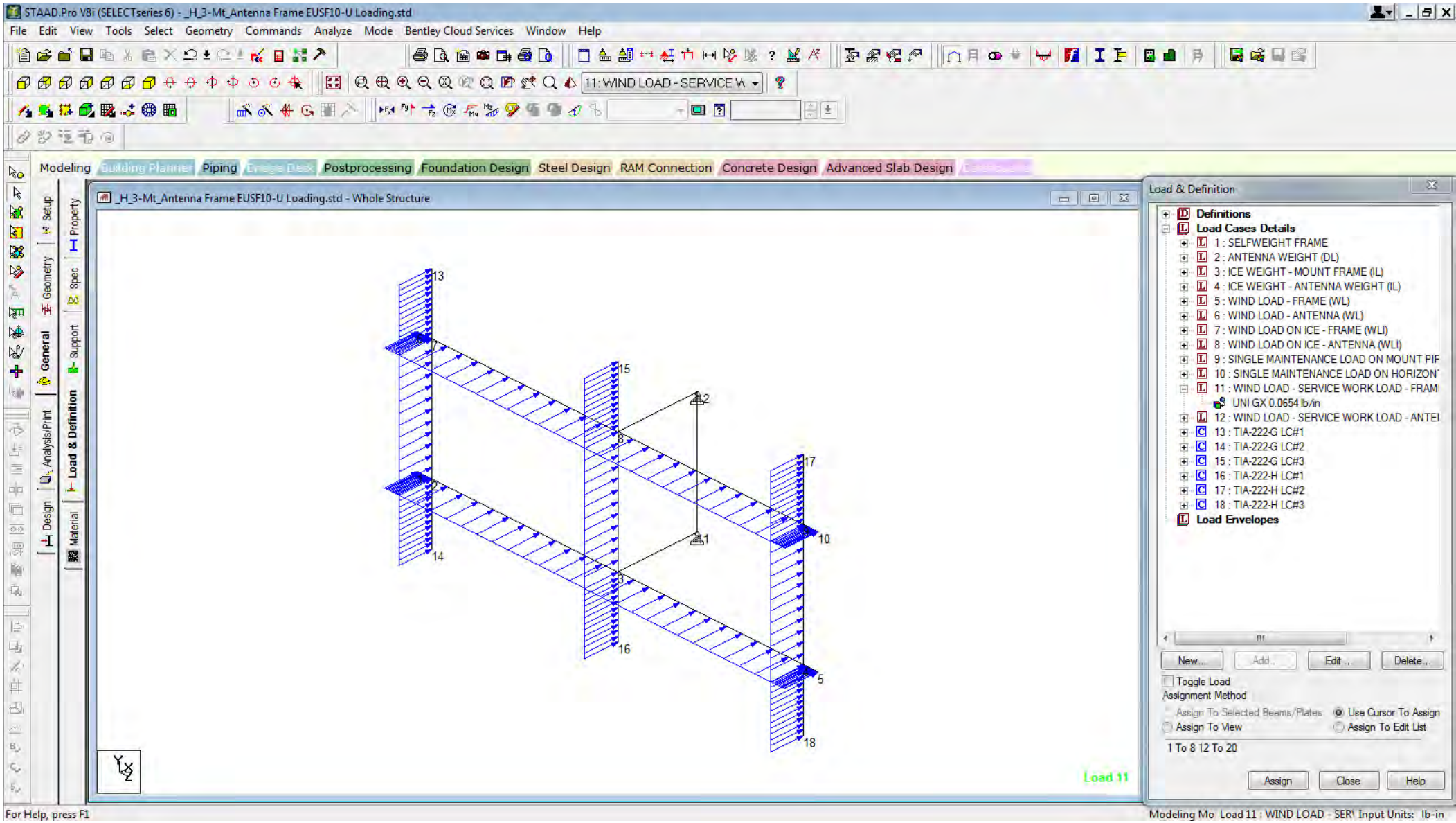
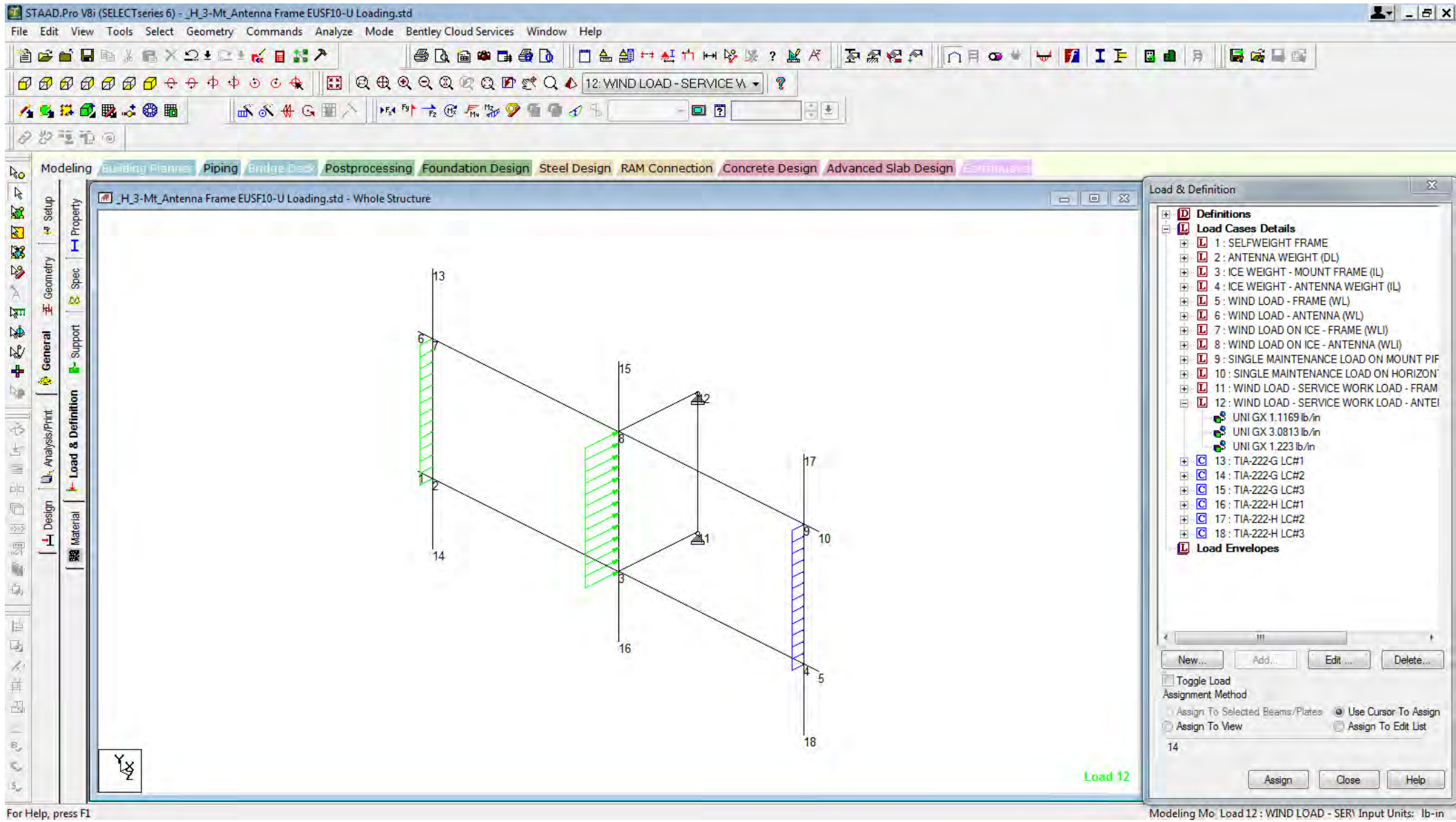
18
Load 9
Load & Definition
Definitions
Load Cases Details
1 : SELFWEIGHT FRAME
2 : ANTENNA WEIGHT (DL)
3 : ICE WEIGHT - MOUNT FRAME (IL)
4 : ICE WEIGHT - ANTENNA WEIGHT (IL)
5 : WIND LOAD - FRAME (WL)
6 : WIND LOAD - ANTENNA (WL)
7 : WIND LOAD ON ICE - FRAME (WLI)
8 : WIND LOAD ON ICE - ANTENNA (WLI)
9 : SINGLE MAINTENANCE LOAD ON MOUNT PIP
10 : SINGLE MAINTENANCE LOAD ON HORIZON
FY -250 lb,in
11 : WIND LOAD - SERVICE WORK LOAD - FRAM
12 : WIND LOAD - SERVICE WORK LOAD - ANTEI
13 : TIA-222-G LC#1
14 : TIA-222-G LC#2
15 : TIA-222-G LC#3
16 : TIA-222-H LC#1
17 : TIA-222-H LC#2
18 : TIA-222-H LC#3
Load Envelopes
New... Add... Edit ... Delete...
Toggle Load
Assignment Method
Assign To Selected Beams/Plates
Use Cursor To Assign
Assign To View
Assign To Edit List
Assign Close Help
For Help, press F1
Modeling Mo Load 9 : SINGLE MAINTENAI Input Units: lb-in


STAAD.Pro V8i (SELECTseries 6) - _H_3-Mt_Antenna Frame EUSF10-U Loading.std
File Edit View Tools Select Geometry Commands Analyze Mode Bentley Cloud Services Window Help
10: SINGLE MAINTENANCE L
Modeling Building Planner Piping Bridge Deck Postprocessing Foundation Design Steel Design RAM Connection Concrete Design Advanced Slab Design
Setup Geometry General Analysis/Print Design
Property Spec Support Load & Definition Material
_H_3-Mt_Antenna Frame EUSF10-U Loading.std - Whole Structure
13
6
7
15
8
2
17
1
2
9
10
1
14
3
16
4
5
18
Load 10
Load & Definition
Definitions
Load Cases Details
1 : SELFWEIGHT FRAME
2 : ANTENNA WEIGHT (DL)
3 : ICE WEIGHT - MOUNT FRAME (IL)
4 : ICE WEIGHT - ANTENNA WEIGHT (IL)
5 : WIND LOAD - FRAME (WL)
6 : WIND LOAD - ANTENNA (WL)
7 : WIND LOAD ON ICE - FRAME (WLI)
8 : WIND LOAD ON ICE - ANTENNA (WLI)
9 : SINGLE MAINTENANCE LOAD ON MOUNT PIPE - (LM)
10 : SINGLE MAINTENANCE LOAD ON HORIZONTAL MOU
FY -250 lb.in
11 : WIND LOAD - SERVICE WORK LOAD - FRAME (WM)
12 : WIND LOAD - SERVICE WORK LOAD - ANTENNA
13 : TIA-222-G LC#1
14 : TIA-222-G LC#2
15 : TIA-222-G LC#3
16 : TIA-222-H LC#1
17 : TIA-222-H LC#2
18 : TIA-222-H LC#3
Load Envelopes
New... Add... Edit... Delete...
Toggle Load
Assignment Method
Assign To Selected Beams/Plates
Use Cursor To Assign
Assign To View
Assign To Edit List
6
Assign Close Help
For Help, press F1
Modeling Mo Load 10 : SINGLE MAINTENA Input Units: lb-in


STAAD.Pro V8i (SELECTseries 6) - _H_3-Mt_Antenna Frame EUSF10-U Loading.std
File Edit View Tools Select Geometry Commands Analyze Mode Bentley Cloud Services Window Help
11: WIND LOAD - SERVICE W
Modeling Building Planner Piping Bridge Deck Postprocessing Foundation Design Steel Design RAM Connection Concrete Design Advanced Slab Design
Setup Geometry General Analysis/Print Design
Property Spec Support Load & Definition Material
_H_3-Mt_Antenna Frame EUSF10-U Loading.std - Whole Structure
13
15
12
8
17
7
2
10
14
1
3
16
5
18
Load 11
Load & Definition
Definitions
Load Cases Details
1 : SELFWEIGHT FRAME
2 : ANTENNA WEIGHT (DL)
3 : ICE WEIGHT - MOUNT FRAME (IL)
4 : ICE WEIGHT - ANTENNA WEIGHT (IL)
5 : WIND LOAD - FRAME (WL)
6 : WIND LOAD - ANTENNA (WL)
7 : WIND LOAD ON ICE - FRAME (WLI)
8 : WIND LOAD ON ICE - ANTENNA (WLI)
9 : SINGLE MAINTENANCE LOAD ON MOUNT PIF
10 : SINGLE MAINTENANCE LOAD ON HORIZON
11 : WIND LOAD - SERVICE WORK LOAD - FRAM
UNI GX 0.0654 lb/in
12 : WIND LOAD - SERVICE WORK LOAD - ANTEI
13 : TIA-222-G LC#1
14 : TIA-222-G LC#2
15 : TIA-222-G LC#3
16 : TIA-222-H LC#1
17 : TIA-222-H LC#2
18 : TIA-222-H LC#3
Load Envelopes
New... Add... Edit... Delete...
Toggle Load
Assignment Method
Assign To Selected Beams/Plates
Use Cursor To Assign
Assign To View
Assign To Edit List
1 To 8 12 To 20
Assign Close Help
For Help, press F1
Modeling Mo Load 11 : WIND LOAD - SER\ Input Units: lb-in


STAAD.Pro V8i (SELECTseries 6) - _H_3-Mt_Antenna Frame EUSF10-U Loading.std
File Edit View Tools Select Geometry Commands Analyze Mode Bentley Cloud Services Window Help
12: WIND LOAD - SERVICE W
Modeling Building Planner Piping Bridge Deck Postprocessing Foundation Design Steel Design RAM Connection Concrete Design Advanced Slab Design Estimation
Setup Geometry General Analysis/Print Design
Property Spec Support Load & Definition Material
_H_3-Mt_Antenna Frame EUSF10-U Loading.std - Whole Structure
13
6
7
15
2
8
1
2
14
17
9
10
1
3
16
4
5
18
Load 12
Load & Definition
Definitions
Load Cases Details
1 : SELFWEIGHT FRAME
2 : ANTENNA WEIGHT (DL)
3 : ICE WEIGHT - MOUNT FRAME (IL)
4 : ICE WEIGHT - ANTENNA WEIGHT (IL)
5 : WIND LOAD - FRAME (WL)
6 : WIND LOAD - ANTENNA (WL)
7 : WIND LOAD ON ICE - FRAME (WLI)
8 : WIND LOAD ON ICE - ANTENNA (WLI)
9 : SINGLE MAINTENANCE LOAD ON MOUNT PIF
10 : SINGLE MAINTENANCE LOAD ON HORIZON
11 : WIND LOAD - SERVICE WORK LOAD - FRAM
12 : WIND LOAD - SERVICE WORK LOAD - ANTEI
UNI GX 1.1169 lb/in
UNI GX 3.0813 lb/in
UNI GX 1.223 lb/in
13 : TIA-222-G LC#1
14 : TIA-222-G LC#2
15 : TIA-222-G LC#3
16 : TIA-222-H LC#1
17 : TIA-222-H LC#2
18 : TIA-222-H LC#3
Load Envelopes
New... Add... Edit ... Delete...
Toggle Load
Assignment Method
Assign To Selected Beams/Plates
Use Cursor To Assign
Assign To View
Assign To Edit List
14
Assign Close Help
For Help, press F1
Modeling Mo Load 12 : WIND LOAD - SER\ Input Units: lb-in

```
**************************************************
*                                                *
*           STAAD.Pro V8i SELECTseries6           *
*           Version  20.07.11.90                 *
*           Proprietary Program of               *
*           Bentley Systems, Inc.                *
*           Date=    NOV  5, 2018                *
*           Time=    18:42:41                    *
*                                                *
*      USER ID: AECOM                            *
**************************************************
```

```
    1. STAAD SPACE
INPUT FILE: P:\Projects\Telcom\StructuralsByLocation\Connecticut\NewHavenCSP#27\06a_NSS-045 Mount Anal.. .STD
    2. START JOB INFORMATION
    3. ENGINEER DATE 22-OCT-18
    4. ENGINEER NAME MCD
    5. CHECKER NAME MCD
    6. CHECKER DATE 23-OCT-18
    7. END JOB INFORMATION
    8. INPUT WIDTH 79
    9. UNIT INCHES POUND
   10. JOINT COORDINATES
   11. 1 0 0 0; 2 0 0 4.5; 3 0 0 63; 4 0 0 121.5; 5 0 0 126; 6 0 36 0; 7 0 36 4.5
   12. 8 0 36 63; 9 0 36 121.5; 10 0 36 126; 11 25 0 63; 12 25 36 63; 13 0 54 4.5
   13. 14 0 -18 4.5; 15 0 54 63; 16 0 -18 63; 17 0 54 121.5; 18 0 -18 121.5
   14. MEMBER INCIDENCES
   15. 1 1 2; 2 2 3; 3 3 4; 4 4 5; 5 6 7; 6 7 8; 7 8 9; 8 9 10; 9 8 12; 10 3 11
   16. 11 12 11; 12 7 2; 13 8 3; 14 4 9; 15 7 13; 16 8 15; 17 9 17; 18 2 14; 19 3 16
   17. 20 4 18
   18. DEFINE MATERIAL START
   19. ISOTROPIC STEEL
   20. E 2.9E+007
   21. POISSON 0.3
   22. DENSITY 0.283
   23. ALPHA 6E-006
   24. DAMP 0.03
   25. TYPE STEEL
   26. STRENGTH FY 36000 FU 58000 RY 1.5 RT 1.2
   27. END DEFINE MATERIAL
   28. MEMBER PROPERTY AMERICAN
   29. 6 TABLE ST PIPS20
   30. 1 TO 3 5 7 11 TO 20 TABLE ST PIPS20
   31. 4 8 TABLE ST PIPS20
   32. 9 10 TABLE ST HSST3X3X0.188
   33. CONSTANTS
   34. MATERIAL STEEL ALL
   35. SUPPORTS
   36. 11 12 PINNED
   37. LOAD 1 LOADTYPE NONE  TITLE SELFWEIGHT FRAME
   38. SELFWEIGHT Y -1
```

```
    39. LOAD 2 LOADTYPE NONE  TITLE ANTENNA WEIGHT (DL)
    40. JOINT LOAD
    41. 17 FY -132.2
    42. 15 FY -327
    43. 13 FY -195
    44. LOAD 3 LOADTYPE NONE  TITLE ICE WEIGHT - MOUNT FRAME (IL)
    45. MEMBER LOAD
    46. 1 TO 8 UNI GY -1.2408
    47. 9 10 UNI GY -1.782
    48. LOAD 4 LOADTYPE NONE  TITLE ICE WEIGHT - ANTENNA WEIGHT (IL)
    49. JOINT LOAD
    50. 17 FY -290
    51. 15 FY -989.25
    52. 13 FY -331.5
    53. LOAD 5 LOADTYPE NONE  TITLE WIND LOAD - FRAME (WL)
    54. MEMBER LOAD
    55. 1 TO 8 12 TO 20 UNI GX 0.6838
    56. LOAD 6 LOADTYPE NONE  TITLE WIND LOAD - ANTENNA (WL)
    57. MEMBER LOAD
    58. 14 UNI GX 11.6766
    59. 13 UNI GX 32.2152
    60. 12 UNI GX 12.7871
    61. LOAD 7 LOADTYPE NONE  TITLE WIND LOAD ON ICE - FRAME (WLI)
    62. MEMBER LOAD
    63. 1 TO 8 UNI GX 0.5101
    64. LOAD 8 LOADTYPE NONE  TITLE WIND LOAD ON ICE - ANTENNA (WLI)
    65. MEMBER LOAD
    66. 14 UNI GX 3.83333
    67. 13 UNI GX 9.4724
    68. 12 UNI GX 4.22222
    69. LOAD 9 LOADTYPE NONE  TITLE SINGLE MAINTENANCE LOAD ON MOUNT PIPE - (LM)
    70. JOINT LOAD
    71. 13 FY -500
WARNING- Load Command line is too long and will be truncated.
    72. LOAD 10 LOADTYPE NONE  TITLE SINGLE MAINTENANCE LOAD ON HORIZONTAL MOUNT FRAME
    73. JOINT LOAD
    74. 6 FY -250
    75. LOAD 11 LOADTYPE NONE  TITLE WIND LOAD - SERVICE WORK LOAD - FRAME (WM)
    76. MEMBER LOAD
    77. 1 TO 8 12 TO 20 UNI GX 0.0654
    78. LOAD 12 LOADTYPE NONE  TITLE WIND LOAD - SERVICE WORK LOAD - ANTENNA
    79. MEMBER LOAD
    80. 14 UNI GX 1.1169
    81. 13 UNI GX 3.0813
    82. 12 UNI GX 1.223
    83. LOAD COMB 13 TIA-222-G LC#1
    84. 1 1.2 2 1.2 5 1.0 6 1.0
    85. LOAD COMB 14 TIA-222-G LC#2
    86. 1 0.9 2 0.9 5 1.0 6 1.0
    87. LOAD COMB 15 TIA-222-G LC#3
    88. 1 1.2 2 1.2 3 1.0 4 1.0 7 1.0 8 1.0
    89. LOAD COMB 16 TIA-222-H LC#1
    90. 1 1.4 2 1.4
    91. LOAD COMB 17 TIA-222-H LC#2
    92. 1 1.2 2 1.2 9 1.5 11 1.0
    93. LOAD COMB 18 TIA-222-H LC#3
```

```
  94. 1 1.2 2 1.2 10 1.5
  95. ******
  96. PERFORM ANALYSIS
```

P R O B L E M S T A T I S T I C S

NUMBER OF JOINTS	**18**	**NUMBER OF MEMBERS**	**20**
NUMBER OF PLATES	**0**	**NUMBER OF SOLIDS**	**0**
NUMBER OF SURFACES	**0**	**NUMBER OF SUPPORTS**	**2**

SOLVER USED IS THE OUT-OF-CORE BASIC SOLVER

```
  ORIGINAL/FINAL BAND-WIDTH=    14/     8/     51 DOF
TOTAL      PRIMARY LOAD CASES =    12, TOTAL DEGREES OF FREEDOM =     102
TOTAL LOAD COMBINATION  CASES =     6  SO FAR.
  SIZE OF STIFFNESS MATRIX =        6 DOUBLE  KILO-WORDS
  REQRD/AVAIL. DISK SPACE  =     12.1/********* MB


***WARNING -  INSTABILITY AT JOINT    17   DIRECTION = MY
 PROBABLE CAUSE SINGULAR-ADDING WEAK SPRING
 K-MATRIX DIAG=  7.7705139E+02 L-MATRIX DIAG=  2.9536977E-09 EQN NO     101
 ***NOTE - VERY WEAK SPRING ADDED FOR STABILITY

  **NOTE** STAAD DETECTS INSTABILITIES AS EXCESSIVE LOSS OF SIGNIFICANT DIGITS
           DURING DECOMPOSITION. WHEN A DECOMPOSED DIAGONAL IS LESS THAN THE
           BUILT-IN REDUCTION FACTOR TIMES THE ORIGINAL STIFFNESS MATRIX DIAGONAL,
           STAAD PRINTS A SINGULARITY NOTICE. THE BUILT-IN REDUCTION FACTOR
           IS   1.000E-09

           THE ABOVE CONDITIONS COULD ALSO BE CAUSED BY VERY STIFF OR VERY WEAK
           ELEMENTS AS WELL AS TRUE SINGULARITIES.


  97. LOAD LIST 13 TO 18
  98. PARAMETER 1
  99. CODE AISC UNIFIED 2010
 100. CHECK CODE ALL
```

STAAD.PRO CODE CHECKING - (AISC-360-10-LRFD) v1.4a
****

ALL UNITS ARE - POUN INCH (UNLESS OTHERWISE Noted)

MEMBER	TABLE	RESULT/ FX	CRITICAL COND/ MY	RATIO/ MZ	LOADING/ LOCATION
1 ST	PIPS20		(AISC SECTIONS)		
		PASS	Eq. H1-1b	0.001	15
		0.00	-5.17	16.07	4.50
2 ST	PIPS20		(AISC SECTIONS)		
		PASS	Eq. H1-1b	0.941	17
		760.86 C	-4874.95	16500.98	58.50
3 ST	PIPS20		(AISC SECTIONS)		
		PASS	Eq. H1-1b	0.859	13
		146.38 C	-16345.63	3425.75	0.00
4 ST	PIPS20		(AISC SECTIONS)		
		PASS	Eq. H1-1b	0.001	15
		0.00	-5.16	16.07	0.00
5 ST	PIPS20		(AISC SECTIONS)		
		PASS	Eq. H1-1b	0.073	18
		0.00	0.00	1691.01	4.50
6 ST	PIPS20		(AISC SECTIONS)		
		PASS	Eq. H1-1b	0.914	17
		760.86 T	4339.92	16506.01	58.50

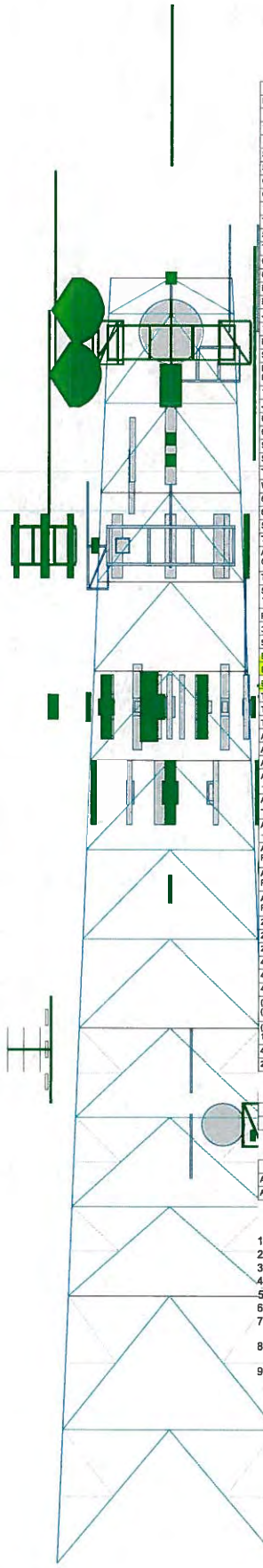
7	ST	PIPS20	(AISC SECTIONS)			
		PASS	Eq. H1-1b	0.851	13	
		146.38 T	-16178.11	3418.85	0.00	
8	ST	PIPS20	(AISC SECTIONS)			
		PASS	Eq. H1-1b	0.001	15	
		0.00	-5.16	16.07	0.00	
9	ST	HSST3X3X0.188	(AISC SECTIONS)			
		PASS	Eq. H3-6	0.469	17	
		591.02 T	12249.75	-10923.95	0.00	
10	ST	HSST3X3X0.188	(AISC SECTIONS)			
		PASS	Eq. H3-6	0.470	17	
		621.62 C	-12249.75	-10903.57	0.00	
11	ST	PIPS20	(AISC SECTIONS)			
		PASS	Eq. H1-1b	0.949	17	
		6.24 T	-11408.50	10506.00	0.00	
12	ST	PIPS20	(AISC SECTIONS)			
		PASS	Eq. H1-1b	0.670	17	
		498.16 C	13693.28	-1597.82	36.00	
13	ST	PIPS20	(AISC SECTIONS)			
		PASS	Eq. H1-1b	0.804	15	
		738.00 C	215.18	-18288.60	36.00	

14 ST	PIPS20		(AISC SECTIONS)			
		PASS	Eq. H1-1b	0.342	15	
	230.75 C		-7259.65	541.02	0.00	
15 ST	PIPS20		(AISC SECTIONS)			
		PASS	Sec. E1	0.031	17	
	990.24 C		0.00	10.59	0.00	
16 ST	PIPS20		(AISC SECTIONS)			
		PASS	Sec. E1	0.043	15	
	1387.89 C		0.00	0.00	0.00	
17 ST	PIPS20		(AISC SECTIONS)			
		PASS	Eq. H3-1	0.107	13	
	164.88 C		0.00	110.78	0.00	
18 ST	PIPS20		(AISC SECTIONS)			
		PASS	Eq. H1-1b	0.005	13	
	6.24 T		0.00	-110.78	0.00	
19 ST	PIPS20		(AISC SECTIONS)			
		PASS	Eq. H1-1b	0.005	13	
	6.24 T		0.00	-110.78	0.00	
20 ST	PIPS20		(AISC SECTIONS)			
		PASS	Eq. H1-1b	0.005	13	
	6.24 T		0.00	-110.78	0.00	

101. FINISH

********** END OF THE STAAD.Pro RUN **********

**** DATE= NOV 5,2018 TIME= 18:42:45 ****



Section	T8	T7	T6	T5	T4	T3	T2	T1
Legs	P6.875x.400	P5x.375	P5x.400	A500-50	P.5x.250			
Leg Grade	A572-60							
Diagonals	2L3 1/2x3 1/2x3/8	L2 1/2x2 1/2x3/16	2L3x3x3/8	2L2 1/2x2 1/2x3/8	2L2 1/2x2 1/2x1/4	2L2 1/2x2x3/16		
Diagonal Grade	A529-50			A36	A529-50	A36		
Top Girts	L4x4x5/16	L3 1/2x3 1/2x5/16	L3x3x5/16		L3x3x1/4	N.A.		A
Horizontals	L4x4x3/8	L3 1/2x3 1/2x1/4	L4x4x5/16	N.A.		L2 1/2x2 1/2x3/16		N.A.
Red. Horizontals		N.A.						
Red. Diagonals	L2 1/2x2 1/2x1/4							
Inner Bracing	L2 1/2x2 1/2x3/16	N.A.						
Face Width (ft) 21.0[6][8]	19.01[5]	17.01[7]	15.01[2]	13.6822	13.9153	12.3483	11.6814	11.4146
# Panels @ (ft)	2 @ 12.5	11 @ 3.33333					B	
Weight (K) 24.6	7.2	6.1	5.8	5.3	5.1	5.0	5.0	5.0

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod 5/8x4' (#27)	138	3' Yagi (#13 - CSP-11)	82
16'x2.5" Pipe Mount (#27 Mount)	138	3' Yagi (#12)	81
16'x3" Omni (inverted) (#23-A - CSP-22)	120 - 106	RRUS-32 (ATT)	80
16'x3" Omni (inverted) (#23-B - CSP-23)	120 - 106	SBNH-1D6565C (ATT)	80
SC479-HF1LDF (inverted) (#24-B)	120 - 106	DC6-48-60-18-8F (Squid) Suppressor (ATT)	80
SC479-HF1LDF (#24-C - CSP#21)	120	TPA-65R-LCUUUU-H8 Panel w/ RET (ATT)	80
OGT9-840 (#24-D - CSP#8)	120	RRUS-11 (ATT)	80
OGT9-840 (#25-B - CSP#7)	120	RRUS-32 (ATT)	80
10'x2" Dipole Antenna (#28 - CSP-15)	120	HPA-65R-BUU-H8 Panel (ATT)	80
TMA 432-83H-01T (CSP-24)	120	RRUS-32 (ATT)	80
SC479-HF1LDF (inverted) (CSP - 9 (P))	120 - 106	SBNH-1D6565C (ATT)	80
TMA 432-83H-01T (CSP-24)	120	(2) DTMABP7819VG12A TMA (ATT)	80
6' DISH (SOLID) (#19 - CSP-3)	117	QS66512-2 Panel Antenna (ATT)	80
6' DISH (SOLID) (#21 - CSP-5)	115	RRUS-11 (ATT)	80
Rohn 6' Side-Arm(1) (#24 Antennas Mount)	114	(2) RRUS-32 (ATT)	80
Rohn 6' Side-Arm(1) (#24 Antennas Mount)	114	HPA-65R-BUU-H8 Panel (ATT)	80
Junction Box (#24-A)	114	800-10966 Kathrein Panel w/ Pipe Mt. (ATT - Proposed)	80
10'x2" Dipole Antenna (inverted) (#24-E)	114 - 104	RRUS-12 (ATT - Proposed)	80
Rohn 6' Side-Arm(1) (#25 Antennas Mount)	114	4478 Radio Unit (4x40W) (ATT - Proposed)	80
SC479-HF1LDF (inverted) (#25-A - CSP-17)	114 - 100	800-10966 Kathrein Panel w/ Pipe Mt. (ATT - Proposed)	80
Pirod 4' Side Mount Standoff (1) (#22, 23-A, 23-B Mount)	113	RRUS-12 (ATT - Proposed)	80
16'x3" Omni (#22)	113	4478 Radio Unit (4x40W) (ATT - Proposed)	80
Junction Box (#23-C)	112	800-10965 Kathrein Panel w/ Pipe Mount (ATT - Proposed)	80
6' DISH (SOLID) (#20 - CSP-6)	111	RRUS-12 (ATT - Proposed)	80
6'8"x4" Pipe Mount (#21 - Dish Mount)	110	4478 Radio Unit (4x40W) (ATT - Proposed)	80
SC479-HF1LDF (CSP-18 (New Install))	110	DC6-48-60-0-8F (Squid) Unit (ATT - Proposed)	80
SC479-HF1LDF (inverted) (CSP-19 (New Install))	110 - 96	RRUS-11 (ATT)	80
TMA 432-83H-01T (CSP-20)	110	RRUS-32 (ATT)	80
WPA-70040-4CF-EDIN Panel (CSP-28)	110	DC6-48-60-18-8F (Squid) Suppressor (ATT)	80
6'8"x4" Pipe Mount (#19 - Dish Mount)	107	Face Mount ((#11) ATT)	80
6'8"x4" Pipe Mount (#20 - Dish Mount)	107	Face Mount ((#11) ATT)	80
SE419-SWBPALDF Panel Antenna (CSP-29)	105	Face Mount ((#11) ATT)	80
TMA 432-83H-01T (CSP-30)	105	HPA-65R-BUU-H8 Panel (ATT)	80
AP13-850/065D w/Mount Pipe (#18-B - CSP-12(E))	104	TPA-65R-LCUUUU-H8 Panel w/ RET (ATT)	80
TMA 432-83H-01T (CSP-32)	103	20' 4-Bay Dipole (#14)	77
SE419-SWBPALDF Panel Antenna (#18-A - CSP 13(P))	101	3'4"x4" Pipe Mount (horizontal) ((Bottom mount) #15)	76
PD458-406 (# 16-B - CSP-2)	100 - 92	Face Mount (Sprint)	72
3'4"x4" Pipe Mount (horizontal) ((Top Mount) #15)	95	Face Mount (Sprint)	72
SC479-HF1LDF (inverted) (# 16-A - CSP-10)	95 - 81	Face Mount (Sprint)	72
EUSF10-U ((#17) T-Mobile)	95	ALU 4x45W (1900 MHz) (Sprint)	72
EUSF10-U ((#17) T-Mobile)	95	ALU 4x45W (1900 MHz) (Sprint)	72
EUSF10-U ((#17) T-Mobile)	95	ALU 4x45W (1900 MHz) (Sprint)	72
TMA2093F00V1-1 Twin TMA ((#17) T-Mobile)	95	ALU TD-RRH-8x20-25 (Sprint)	72
TMA2093F00V1-1 Twin TMA ((#17) T-Mobile)	95	ALU TD-RRH-8x20-25 (Sprint)	72
TMA2093F00V1-1 Twin TMA ((#17) T-Mobile)	95	ALU TD-RRH-8x20-25 (Sprint)	72
AIR32 B66Aa/B2a Antenna Panel ((#17) T-Mobile)	95	ALU 800MHz 2x50W (Sprint)	72
AIR32 B66Aa/B2a Antenna Panel ((#17) T-Mobile)	95	ALU 800MHz 2x50W (Sprint)	72
AIR32 B66Aa/B2a Antenna Panel ((#17) T-Mobile)	95	ALU 800MHz 2x50W (Sprint)	72
APXVAARR24_43-U-NA20 Panel (RFS) (T-Mobile - Proposed)	95	NNVV-65B-R4 Panel Antenna (Sprint)	72
APXVAARR24_43-U-NA20 Panel (RFS) (T-Mobile - Proposed)	95	NNVV-65B-R4 Panel Antenna (Sprint)	72
APXVAARR24_43-U-NA20 Panel (RFS) (T-Mobile - Proposed)	95	NNVV-65B-R4 Panel Antenna (Sprint)	72
AIR 3246 B66 Panel Antenna (T-Mobile - Proposed)	95	AAHC Panel Antenna (Sprint)	72
AIR 3246 B66 Panel Antenna (T-Mobile - Proposed)	95	AAHC Panel Antenna (Sprint)	72
AIR 3246 B66 Panel Antenna (T-Mobile - Proposed)	95	AAHC Panel Antenna (Sprint)	72
2217 B2 Radio Unit (T-Mobile - Proposed)	95	4'6"x3" Pipe Mount (horizontal) ((Bottom mount) #14)	67
2217 B2 Radio Unit (T-Mobile - Proposed)	95	6' Yagi w/ Mount (#9)	65
2217 B2 Radio Unit (T-Mobile - Proposed)	95	GPS (#8)	63
4449 B71 + B12 Radio Unit (T-Mobile - Proposed)	95	2'6"x4" Pipe Mount (For #8)	63
4449 B71 + B12 Radio Unit (T-Mobile - Proposed)	95	20' 4-Bay Dipole w/ 2' Sidearm Mount (#7 - CSP-4)	55
4449 B71 + B12 Radio Unit (T-Mobile - Proposed)	95	1.0" Dia 4' Omni w/Pipe Mount (#6 - CSP#16)	53
(2) (Horizontal) 8'x2 1/2" Pipe Mount (Invert #16-A) (# 16-AB)	92	3' Yagi (#4-B)	48
(2) (Horizontal) 8'x2 1/2" Pipe Mount (Upright # 16-B) (# 16-AB)	92	Pirod 4' Side Mount Standoff (1) (#4-AB)	48
4'6"x3" Pipe Mount (horizontal) ((Top Mount) #14)	87	10'x8" Dipole Antenna (#4-A)	48
20' 4-Bay Dipole (#15)	86	5'x1.5in dia Whip Antenna /w mount (#3)	47
		3' Whip (3in diameter) /w mount (#2)	43
		4 FT DISH (#1-A)	41
		Pirod 6' Side Mount Standoff (1) (#1-A Dish Mount)	41
		1'x1' Panel Antenna (#1-B (mount Share #1-A))	40
		5'x1" Whip Antenna w/ Mount (#5 - CSP#14)	39

SYMBOL LIST

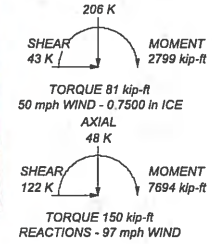
MARK	SIZE	MARK	SIZE
A	L2 1/2x2 1/2x3/16	B	1 @ 3.33333

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A500-50	50 ksi	62 ksi	A529-50	50 ksi	65 ksi
A36	36 ksi	58 ksi	A572-60	60 ksi	75 ksi

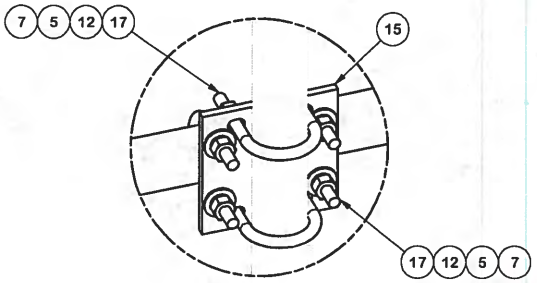
TOWER DESIGN NOTES

1. Tower designed for Exposure C to the TIA-222-G Standard.
2. Tower designed for a 97 mph basic wind in accordance with the TIA-222-G Standard.
3. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 60 mph wind.
5. Tower Structure Class III.
6. Topographic Category 4 with Crest Height of 150.00 ft
7. Antenna/Mount/Cable's marked (# ##) refer to site tower climb identification numbers. Tower climb by D and K Nationwide Communications, Inc. (March 30, 2016).
8. Antenna/Mount/Cable's marked (CSP-#) refer to Connecticut State Police inventory obtained via e-mail dated April 8, 2016.
9. TOWER RATING: 97.7%

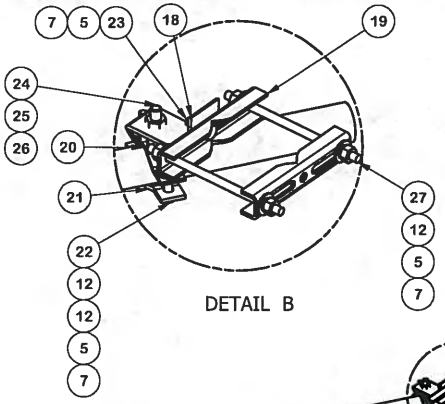


AECOM
500 Enterprise Drive, Suite 3B
Rocky Hill, CT
Phone: 860-529-8882
FAX: 860-529-3991

Job: 120' Self-Supporting Lattice Tower
Project: Connecticut State Police Tower - West Rock - MODification
Client: SMK-003 / ASM-010 / NSS-044 / (AT&T) / (Sprint) / (T-Mobile) Drawn by: MCD App'd:
Code: TIA-222-G Date: 08/14/18 Scale: NTS
Path: Dwg No. E-1



DETAIL A



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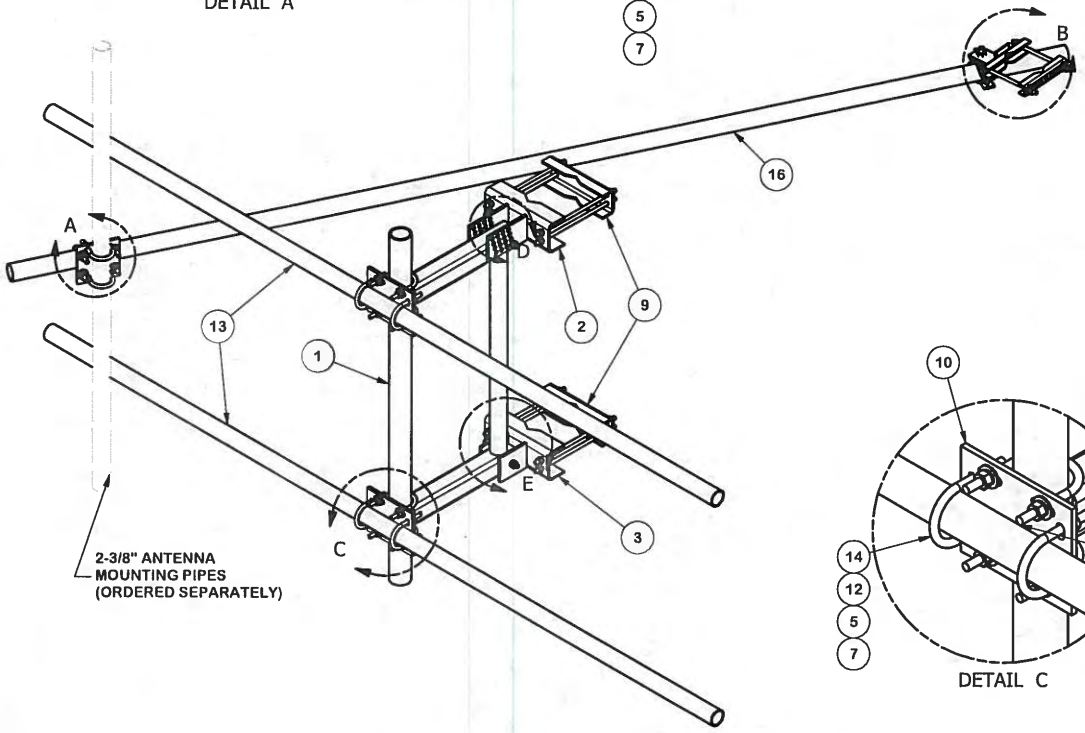
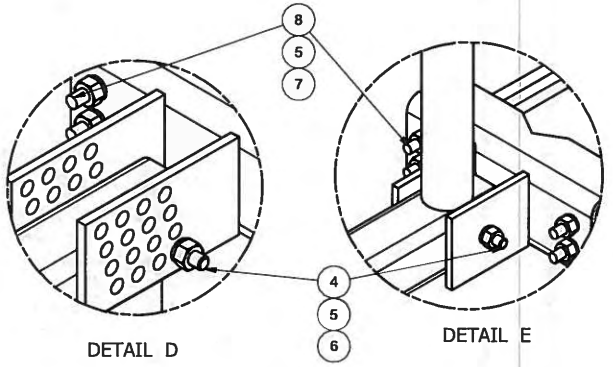


DETAIL C



DETAIL D

DETAIL E

PARTS LIST

ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	1	2PBG	24" PIPE MOUNT STANDOFF ARM		71.96	71.96
2	1	CFM	UPPER GATE FOOT WELDMENT		13.90	13.90
3	1	CFS	LOWER GATE FOOT WELDMENT		12.72	12.72
4	2	A1205	1/2" x 5" A325 HDG BOLT	5 in.	0.34	0.69
5	49	G12LW	1/2" HDG LOCKWASHER		0.01	0.68
6	2	A12NUT	1/2" HDG A325 HEX NUT		0.07	0.14
7	47	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	3.37
8	8	G12R-12	1/2" x 12" THREADED ROD (HDG.)		0.35	2.81
8	8	G12R-15	1/2" x 15" THREADED ROD (HDG.)		0.84	6.69
9	2	GBB	GATE BACKING BAR		4.53	9.06
10	2	SCX4	CROSSOVER PLATE	8.500 in	6.02	12.04
11	4	X-UB1358	1/2" X 3-5/8" X 5-1/2" X 3" U-BOLT (HDG.)		0.66	2.63
12	32	G12FW	1/2" HDG USS FLATWASHER		0.03	1.09
13	2	P2126	2-3/8" OD X 126" SCH 40 GALVANIZED PIPE	126	40.37	80.74
14	4	X-UB1300	1/2" X 3" X 5" X 2" U-BOLT (HDG.)		0.66	2.63
15	1	SCX1	CROSSOVER PLATE 2-3/8" X 2-3/8"		3.71	3.71
16	1	P2150	2-3/8" OD X 150" SCH 40 GALVANIZED PIPE	150.0000 in	48.06	48.06
17	4	X-UB1212	1/2" X 2-1/2" X 4-1/2" X 2" U-BOLT (HDG.)		0.63	2.50
18	1	X-STA3	STIFF ARM ANGLE BRACKET	2.500 in	1.39	1.39
19	2	X-STU	STIFF ARM CHANNEL BRACKET		1.37	2.74
20	1	SAM	STIFF ARM MOUNT CLAMP		0.77	0.77
21	1	ACP	4-1/16" CLAMP HALF, 1/4" THK.		0.65	0.65
22	2	G1203	1/2" x 3" HDG HEX BOLT GR5 FULL THREAD	3	0.22	0.43
23	1	G12112	1/2" x 1-1/2" HDG HEX BOLT GR5	1 1/2	0.15	0.15
24	1	G58112	5/8" x 1-1/2" HDG BOLT	1.5	0.25	0.25
25	1	G58LW	5/8" HDG LOCKWASHER		0.03	0.03
26	1	G58NUT	5/8" HDG HEAVY 2H HEX NUT		0.13	0.13
27	2	G12R-10	1/2" x 10" THREADED ROD (HDG.)		0.35	0.70
					TOTAL WT. #	286.24

TOLERANCE NOTES

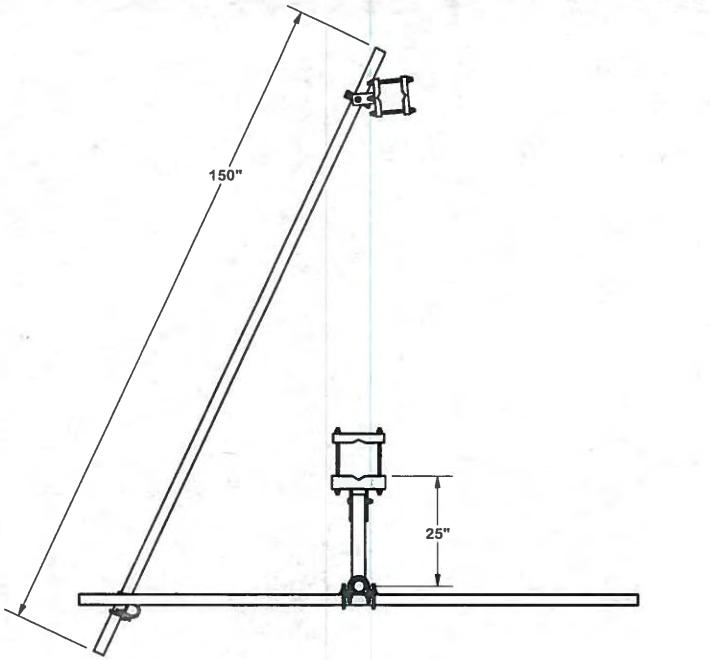
TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES *(± 0.030")*
DRILLED AND GAS CUT HOLES *(± 0.030")* - NO CONING OF HOLES
LASER CUT EDGES AND HOLES *(± 0.010")* - NO CONING OF HOLES
BENDS ARE ± 1/2 DEGREE
ALL OTHER MACHINING *(± 0.030")*
ALL OTHER ASSEMBLY *(± 0.060")*

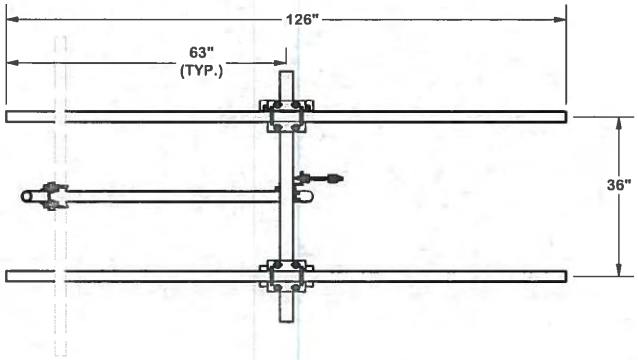
DESCRIPTION
BUILD-A-FRAME
ULTIMATE SECTOR FRAME
WITH ONE STIFF ARM

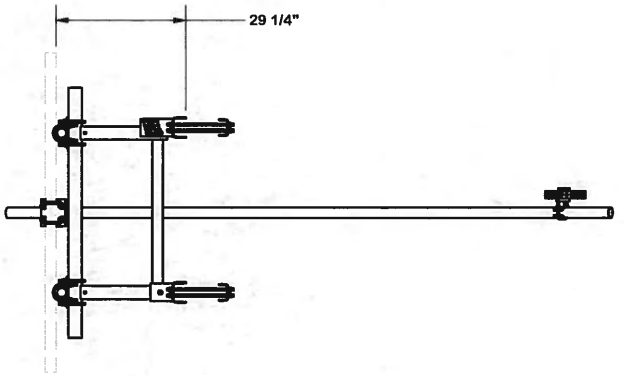
SITE PRO 1
A valmont COMPANY
Engineering Support Team: 1-888-753-7446
Locations: New York, NY; Atlanta, GA; Los Angeles, CA; Plymouth, IN; Salem, OR; Dallas, TX

CPD NO.	DRAWN BY	ENG. APPROVAL	PART NO.
5001	CEK 4/11/2011		EUSF10-U

CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
81	01	CUSTOMER	BMC 4/28/2011	EUSF10-U







TOLERANCE NOTES

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

DESCRIPTION
BUILD-A-FRAME
ULTIMATE SECTOR FRAME
WITH ONE STIFF ARM

SITE PRO 1
A valmont COMPANY

Engineering Support Team:
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Locations:
New York, NY
Atlanta, GA
Los Angeles, CA
Plymouth, IN
Salem, OR
Dallas, TX

CPD NO.	DRAWN BY	ENG. APPROVAL	PART NO.
5001	CEK 4/11/2011		EUSF10-U

CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
81	01	CUSTOMER	BMC 4/28/2011	EUSF10-U

Exhibit F

EBI Consulting
environmental | engineering | due diligence

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

T-Mobile Existing Facility

Site ID: CT11086B

New Haven/ WC X59
142 Baldwin Drive (West Rock State Park)
New Haven, CT 06514

August 28, 2018

EBI Project Number: 6218005885

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general population allowable limit:	**40.28%**

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

August 28, 2018

T-Mobile USA
Attn: Jason Overbey, RF Manager
35 Griffin Road South
Bloomfield, CT 06002

Emissions Analysis for Site: **CT11086B – New Haven/ WC X59**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **142 Baldwin Drive (West Rock State Park), New Haven, CT**, for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

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

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

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

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) and 2100 MHz (AWS) 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 T-Mobile Wireless antenna facility located at **142 Baldwin Drive (West Rock State Park), New Haven, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

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

1) 1 GSM channels (PCS Band - 1900 MHz) was considered for each sector of the proposed installation. These Channels have a transmit power of 15 Watts per Channel.

2) 1 UMTS channel (PCS Band - 1900 MHz) was considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

3) 1 UMTS channel (AWS Band – 2100 MHz) was considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

4) 2 LTE channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

5) 2 LTE channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

6) 2 LTE channels (600 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

7) 2 LTE channels (700 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 20 Watts per Channel.

8) 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.

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

10) The antennas used in this modeling are the **Ericsson AIR 3246 B66, Ericsson AIR32 B66A/B2A** and the **RFS APXVAARR24_43-U-NA20** for 600 MHz, 700 MHz, 1900 MHz and 2100 MHz channel. 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 manufactures supplied specifications, minus 10 dB for directional panel antennas, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

11) The antenna mounting height centerline of the proposed antennas is **95 feet** above ground level (AGL).

12) 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.

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

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	Ericsson AIR 3246 B66	Make / Model:	Ericsson AIR 3246 B66	Make / Model:	Ericsson AIR 3246 B66
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	95 feet	Height (AGL):	95 feet	Height (AGL):	95 feet
Frequency Bands	2100 MHz (AWS)	Frequency Bands	2100 MHz (AWS)	Frequency Bands	2100 MHz (AWS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	160	Total TX Power(W):	160	Total TX Power(W):	160
ERP (W):	6,224.72	ERP (W):	6,224.72	ERP (W):	6,224.72
Antenna A1 MPE%	**2.83**	Antenna B1 MPE%	**2.83**	Antenna C1 MPE%	**2.83**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	Ericsson AIR32 B66A/B2A	Make / Model:	Ericsson AIR32 B66A/B2A	Make / Model:	Ericsson AIR32 B66A/B2A
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	95 feet	Height (AGL):	95 feet	Height (AGL):	95 feet
Frequency Bands	1900 MHz (PCS)	Frequency Bands	1900 MHz (PCS)	Frequency Bands	1900 MHz (PCS)
Channel Count	2	Channel Count	2	Channel Count	2
Total TX Power(W):	80	Total TX Power(W):	80	Total TX Power(W):	80
ERP (W):	3,112.36	ERP (W):	3,112.36	ERP (W):	3,112.36
Antenna A2 MPE%	**1.41**	Antenna B2 MPE%	**1.41**	Antenna C2 MPE%	**1.41**
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**
Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20
Gain:	12.95 / 13.35 / 15.65 / 16.35 dBd	Gain:	12.95 / 13.35 / 15.65 / 16.35 dBd	Gain:	12.95 / 13.35 / 15.65 / 16.35 dBd
Height (AGL):	95 feet	Height (AGL):	95 feet	Height (AGL):	95 feet
Frequency Bands	600 MHz / 700 MHz / 1900 MHz / 2100 MHz	Frequency Bands	600 MHz / 700 MHz / 1900 MHz / 2100 MHz	Frequency Bands	600 MHz / 700 MHz / 1900 MHz / 2100 MHz
Channel Count	7	Channel Count	7	Channel Count	7
Total TX Power(W):	215	Total TX Power(W):	215	Total TX Power(W):	215
ERP (W):	6,189.15	ERP (W):	6,189.15	ERP (W):	6,189.15
Antenna A3 MPE%	**4.33**	Antenna B3 MPE%	**4.33**	Antenna C3 MPE%	**4.33**

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile (Per Sector Max)	**8.57 %**
AT&T	**7.80** %
CTT	**1.73** %
CSP	**3.17** %
Sprint	**2.86** %
DOT	**1.40** %
FBI	**8.50** %
IRS	**3.35** %
OEM	**2.90** %
Site Total MPE %:	**40.28 %**

T-Mobile Sector A Total:	8.57 %
T-Mobile Sector B Total:	8.57 %
T-Mobile Sector C Total:	8.57 %
Site Total:	40.28 %

T-Mobile Maximum MPE Power Values (Per Sector)

T-Mobile _Frequency Band / Technology (Per Sector)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
T-Mobile AWS - 2100 MHz LTE	4	1,556.18	95	28.25	AWS - 2100 MHz	1000.00	2.83%
T-Mobile PCS - 1900 MHz LTE	2	1,556.18	95	14.13	PCS - 1900 MHz	1000.00	1.41%
T-Mobile 600 MHz LTE	2	788.97	95	7.16	600 MHz	400.00	1.79%
T-Mobile 700 MHz LTE	2	432.54	95	3.93	700 MHz	467.00	0.84%
T-Mobile PCS - 1900 MHz GSM	1	550.92	95	2.50	PCS - 1900 MHz	1000.00	0.25%
T-Mobile PCS - 1900 MHz UMTS	1	1,469.13	95	6.67	PCS - 1900 MHz	1000.00	0.67%
T-Mobile AWS - 2100 MHz UMTS	1	1,726.08	95	7.83	AWS - 2100 MHz	1000.00	0.78%
						Total:	**8.57%**

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 T-Mobile 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:

T-Mobile Sector	Power Density Value (%)
Sector A:	8.57 %
Sector B:	8.57 %
Sector C:	8.57 %
T-Mobile Maximum MPE % (Per Sector):	8.57 %
Site Total:	40.28 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **40.28%** 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.

Exhibit G

UPS Internet Shipping: View/Print Label

1. **Ensure there are no other shipping or tracking labels attached to your package.** Select the Print button on the print dialog box that appears. Note: If your browser does not support this function select Print from the File menu to print the label.

2. **Fold the printed label at the solid line below.** Place the label in a UPS Shipping Pouch. If you do not have a pouch, affix the folded label using clear plastic shipping tape over the entire label.

3. **GETTING YOUR SHIPMENT TO UPS**
   Customers with a Daily Pickup
   Your driver will pickup your shipment(s) as usual.

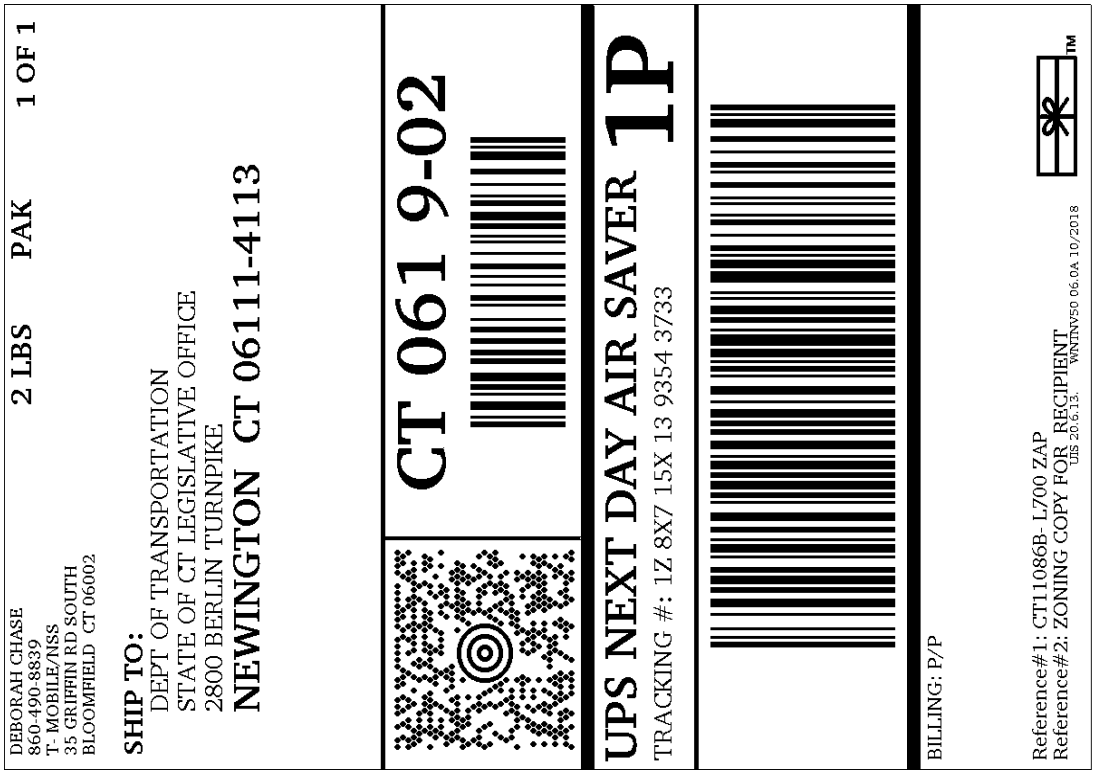
   Customers without a Daily Pickup
   Take your package to any location of The UPS Store®, UPS Access Point(TM) location, UPS Drop Box, UPS Customer Center, Staples® or Authorized Shipping Outlet near you. Items sent via UPS Return Services(SM) (including via Ground) are also accepted at Drop Boxes. To find the location nearest you, please visit the 'Find Locations' Quick link at ups.com.
   Schedule a same day or future day Pickup to have a UPS driver pickup all of your Internet Shipping packages.
   Hand the package to any UPS driver in your area.

UPS Access Point™
GEISSLER'S SUPERMARKET 40
40 TUNXIS AVE
BLOOMFIELD ,CT 06002

UPS Access Point™
THE UPS STORE
542 HOPMEADOW ST
SIMSBURY ,CT 06070

UPS Access Point™
GEISSLER'S SUPERMARKET
318 BROAD ST
WINDSOR ,CT 06095

FOLD HERE



UPS Internet Shipping: View/Print Label

1. **Ensure there are no other shipping or tracking labels attached to your package.** Select the Print button on the print dialog box that appears. Note: If your browser does not support this function select Print from the File menu to print the label.

2. **Fold the printed label at the solid line below.** Place the label in a UPS Shipping Pouch. If you do not have a pouch, affix the folded label using clear plastic shipping tape over the entire label.

3. **GETTING YOUR SHIPMENT TO UPS**
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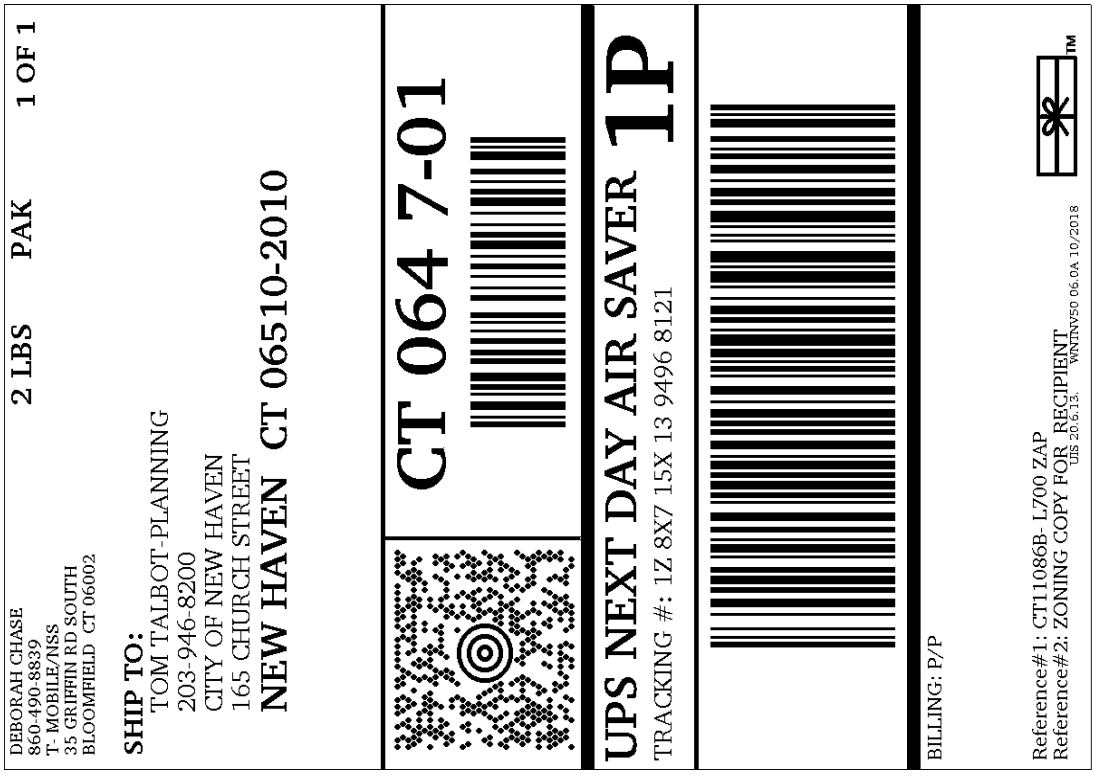

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