Alex Murshteyn, Site Acquisition Consultant
c/o Cellco Partnership d/b/a Verizon Wireless
Centerline Communications, LLC
750 West Center Street, Floor 3
West Bridgewater, MA 02379
Mobile: (508) 821-0159
AMurshteyn@centerlinecommunications.com

March 11, 2020

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

**RE: Notice of Exempt Modification // Site: Madison 2 CT (ATC: 302540)**
**8 Old Route 79, Madison, CT 06443**
**N 41.2855 // W -72.6013**

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless currently maintains 9 antennas at the 140-foot mount on the existing 148-foot monopole tower, located at 8 Old Route 79, Madison, CT (aka 8 Meeting House Lane to Verizon). The Council approved Verizon Wireless shared use of the existing tower in 2000. The tower is owned by American Tower. The revenue stream at the property is owned by the Town of Madison its original owner and CK Builders LLC now owns the land. Verizon Wireless now intends to add 3 antennas for LTE (700/850/1900/2100/3500 MHz) as part of it its PCS/LTE/AWS/CBRS upgrade. Additionally, Verizon Wireless will replace all of its remote radio head units (RRUs) with 9 new RRUs and add 3 diplexers; altogether updating leased equipment rights, as reflected by the final configuration outlined in the structural analysis and proposed hereby.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies §16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Peggy Lyons, First Selectwoman for the Town of Madison, which is also the original landowner, continuing ground lessor and revenue stream holder, its Town Planner David Anderson, including for the Planning & Zoning Commission, American Tower, the tower owner and the underlying property owner, CK Builders LLC.

The planned modifications to the facility fall squarely within those activities explicitly provided for in R.C.S.A. § 16-50j-72(b)(2). Enclosed to accommodate this filing are construction drawings dated March 6, 2020 by Tower Engineering Professionals, a structural analysis dated

November 20, 2019 plus structural mount analysis dated January 22, 2020 by A.T. Engineering Service, PLLC, and radio frequency (RF) analysis table showing worst-case RF emission calculation by Verizon Wireless RF Design Engineering.

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 new 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, as shown in the attached structural and mount analyses by A.T. Engineering, PLLC, dated November 20, 2019 and January 22, 2020, respectively.

For the foregoing reasons, Verizon Wireless 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,

Alex Murshteyn, Site Acquisition Consultant
c/o Cellco Partnership d/b/a Verizon Wireless
Centerline Communications, LLC
750 West Center Street, Floor 3
West Bridgewater, MA 02379
Mobile: (508) 821-0159
AMurshteyn@centerlinecommunications.com

Attachments

cc: Peggy Lyons, First Selectwoman - as chief elected official c/o original landowner
David Anderson, Town Planner - as P&Z official
American Tower Corporation - as tower owner
CK Builders LLC - as property owner

**UPS CampusShip: View/Print Label**

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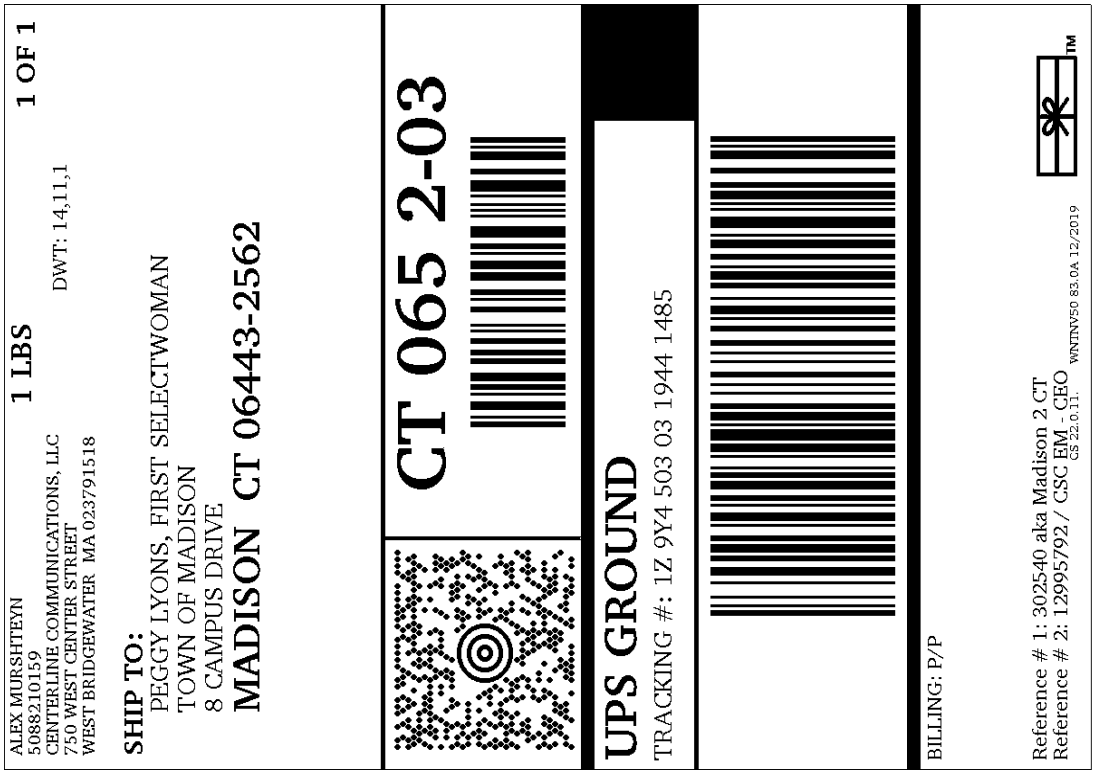

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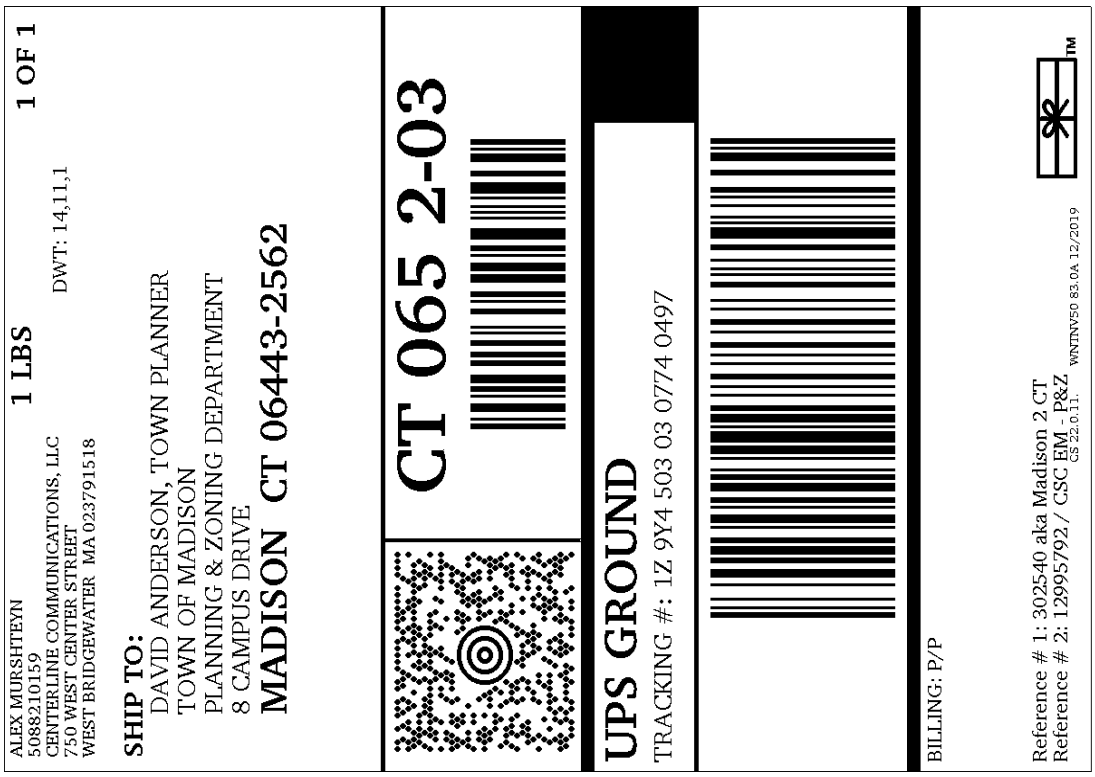

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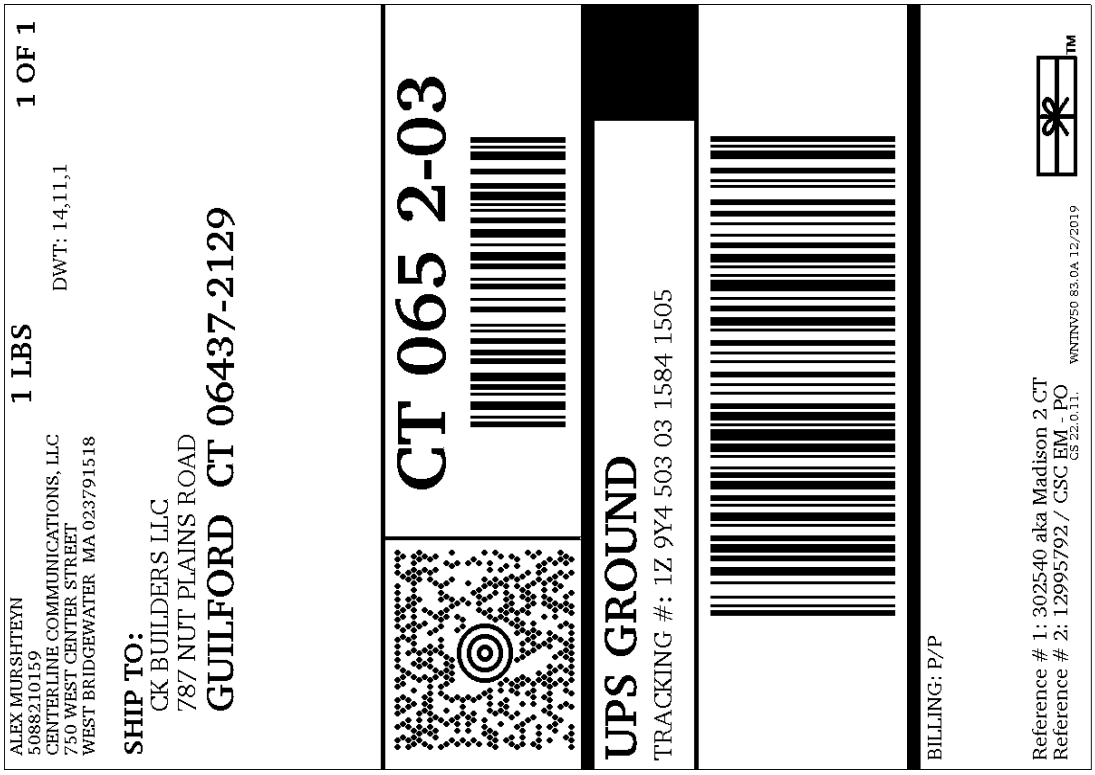

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# TOWN OF MADISON

CONNECTICUT

LAND USE OFFICE

8 CAMPUS DRIVE
MADISON, CONNECTICUT 06443-2563
(203) 245-5632
FAX (203) 245-5613

003478

## MADISON PLANNING AND ZONING COMMISSION

## CERTIFICATION OF SPECIAL EXCEPTION PERMIT or MODIFICATION OF SPECIAL EXCEPTION PERMIT

**APPLICANT NO.:** 99-14D **DATE OF APPROVAL:** March 25, 1999

This certifies that on the above date a **SPECIAL EXCEPTION PERMIT** was granted by the Madison Planning and Zoning Commission to:

**OWNER OF RECORD:** **Town of Madison, 8 Campus Drive, Madison, CT 06443**

under the provisions of Sec. 3.4(b) of the Zoning Regulations of the town of Madison on property located at:

**STREET ADDRESS OR LOCATION:** **8 OLD ROUTE 79**

**TO ALLOW:** **Removal of existing lattice tower and replacement with monopole tower of the same height; also to allow construction of an equipment room addition to the police station and an addition to the existing equipment shelter, as presented at the hearing and as shown on the plans submitted by URS Greiner Woodward Clyde, 8 pages, revised to 01-19-99, with landscaping notations by John Cunningham on sheet C-1.**

*In accordance with Section 4.6 of said Regulations, this approval and permit are conditioned upon completion of all proposed improvements in accordance with approved plans within five years from date of approval, and shall become null and void in the event of failure to complete such improvements within said five year period or any extension thereof granted by the Commission.*

Applicant: Ronald C. Clark
Smart SMR of New York, Inc.
100 Corporate Place
Rocky Hill, CT 06067

William B. Bilcheck
Chairman, Planning and Zoning Commission

Received for Record _____, 19___

SCANNED

at _____h_____m

MADISON, CONN
RECEIVED FOR RECORD

Signature of Town Clerk 99 JUN 22 AM 8:52

Ruth L. Harris
TOWN CLERKS OFFICE

VOL0863 PG174

8 CAMPUS DRIVE
MADISON, CONNECTICUT 06443-2563
(203) 245-5632
FAX (203) 245-5613

# TOWN OF MADISON

CONNECTICUT

LAND USE OFFICE

## ZONING BOARD OF APPEALS

## CERTIFICATE OF VARIANCE

**APPEAL NO.: 7283** **DATE GRANTED: March 2, 1999**

This certifies that on the above date, a variance was granted to:

**NAME OF OWNER OF RECORD: Town of Madison**

**ADDRESS OF OWNER OF RECORD: 8 Campus Drive, Madison, CT 06443**

by the Zoning Board of Appeals of the Town of Madison to vary the application of

**Secs. 2.7, 3.5(f) and 11.2.1** of the Zoning Regulations at:

**LOCATION OF PROPERTY: 8 OLD ROUTE 79**

**ASSESSOR'S MAP NO.: 48** **LOT NO.: 53**

**ZONE AND NATURE OF PROPERTY: R-1 Residential**

**NATURE OF VARIANCE GRANTED: To allow a 31 ft. front yard variance to permit addition to the existing equipment building; also to allow 123 ft. front yard, 51 ft. side yard and 47 ft. rear yard variances to permit a 150 ft. monopole tower to be set approximately 27 ft. from the front line, 99 ft. side yard and 103 ft. from the other yard, all as presented at the hearing and as shown on the plans submitted dated 11-09-98 and amended to 1-19-99 by URS Greiner Woodward Cylde, 8 sheets.**

*This variance shall not become effective until a copy of this Certificate of Variance, certified by the Zoning Board of Appeals, is recorded in the land records of the Town of Madison at the expense of the record owner.*

**Applicant: Smart SMR of New York, Inc.**
**dba Nextel Communications**
**100 Corporate Place**
**Rocky Hill, CT 06067**

**Signature** _____
**Chairman, Zoning Board of Appeals**

**Received for Record** _____, 19____

_____ **h** _____ **m**

_____
**Signature of Town Clerk**

MADISON, CONN
RECEIVED FOR RECORD
99 JUN 22 AM 8:51
Ruth A. Kates
TOWN CLERKS OFFICE

003477

# TOWN OF MADISON

CONNECTICUT

LAND USE OFFICE

8 CAMPUS DRIVE
MADISON, CONNECTICUT 06443-2562
(203) 245-5632
FAX (203) 245-5613

MADISON PLANNING AND ZONING COMMISSION

CERTIFICATION OF SPECIAL EXCEPTION PERMIT OR
MODIFICATION OF SPECIAL EXCEPTION PERMIT

APPL. NO.: 94-42D (A) DATE OF APPROVAL: February 16, 1995

This certifies that on the above date a SPECIAL EXCEPTION PERMIT was granted by the Madison Planning and Zoning Commission to:

OWNERS OF RECORD: Town of Madison

under the provisions of Sec. 3.4(b) of the Zoning Regulations of the Town of Madison on property located at:

STREET ADDRESS OR LOCATION: 8 OLD RTE. 79

TO ALLOW: Removal of existing 100 ft. lattice tower, replacement with a 150 ft. lattice tower and construction of a 10 ft. x 20 ft. x 10 ft. high equipment shelter for a public utility building, with a waiver of Secs. 29.2 q,s, and t of the Zoning Regulations. This approval is with the condition that the tower be constructed on the same location as the old tower and that additional screening be provided.

*In accordance with Section 4.6 of said Regulations, this approval and permit are conditioned upon completion of all proposed improvements in accordance with approved plans within two years from date of approval, and shall become null and void in the event of failure to complete such improvements within said two year period or any extension thereof granted by the Commission.*

Appl.: SMART SMR OF NEW YORK, INC.
1 North Broadway, 2nd Floor
White Plains, NY 10601

Chairman, Planning and Zoning Commission

Received for Record_____, 19____

at_____h_____m

Signature of Town Clerk

Filed 8/4/95

FRM.SEPERMIT 6/91

8 CAMPUS DRIVE
MADISON, CONNECTICUT 06443-2563
(203) 245-5632
FAX (203) 245-5613

# TOWN OF MADISON

## CONNECTICUT

## LAND USE OFFICE

## PLANNING & ZONING COMMISSION

## REGULAR MEETING

## AGENDA

**Thursday, March 25, 1999** — **7:30 P.M.** — **Meeting Room A, Madison Town Campus**

## REGULAR MEETING - 7:30 P.M.

--- **ELECTION OF OFFICERS**
--- **EXECUTIVE SESSION**
--- **OTHER BUSINESS**

## PUBLIC HEARING - 8:00 P.M.

**99-8:** **REGULATION AMENDMENT.** Applicant: Planning and Zoning Commission. Request to amend Sec. 6.3.1 by changing "CA-2" to "DW" and changing the word "lot" to "line". Amend Sec. 6.4.4.2 by changing: In the "DW" district: Minimum side yards shall be 6 feet instead of 12 feet. Repeal Section 5A – Environmental Conservation Rural District. Also add Section 26.4 5) – Deed restrictions must be filed by the applicant prior to issuance of any building permits.

**99-14D:** **8 OLD ROUTE 79.** Map 48, Lot 53. Owner: Town of Madison; Applicant: Smart SMR of New York, Inc., dba Nextel Communications. Request for a Special Exception Permit to remove the existing lattice tower and replace it with a monopole tower of same height; also to construct an equipment room addition to the police station and an addition to the existing equipment shelter. R-1 Zone.

**99-17:** **REGULATION AMENDMENT – BRADLEY ROAD.** Map 38, Lots 76, 77, 78. Owners: Robert Dowler/Samuel and Jane DeBurra; Applicant: Court Street Companies, Inc. Request for an amendment to the Madison Zoning Regulations to permit construction and operation of an assisted living facility. D Zone.

continued..

TOWN OF MADISON
CONNECTICUT
LAND USE OFFICE

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FAX (203) 245-5613

# TOWN OF MADISON, CONNECTICUT

## AGENDA

## ADVISORY COMMITTEE ON COMMUNITY APPEARANCE

**Tuesday, March 16, 1999 7:30 P.M. Meeting Room B, Town Hall, Campus Drive**

**99-14D:** **8 OLD ROUTE 79.** Request for Special Exception permit to allow construction of an addition to the existing Police Station for equipment and a new 200 sq. ft. generator room and replacement of existing lattice tower with monopole tower of the same 150' height.

**99-16D:** **1307 BOSTON POST ROAD.** Applicant: Lenny and Joe's Fish Tale. Request for Site Plan Modification for proposed parking lot and pavillion location.

**S-128:** **1301 BOSTON POST ROAD.** Applicant: Lenny and Joe's Fish Tale. Request for illuminated business identification signage.

**99-18D:** **107 BRADLEY ROAD.** Owner/Applicant: The George C. Field Company/Vista. Request for Site Plan Modification including parking and landscaping, signage, and modification of windows and doors

**99-17:** **REGULATION AMENDMENT - 100, 104, 108 BRADLEY ROAD.** Request for Regulation Amendment to allow assisted living development for 105 units,

**S-129:** **62 WALL STREET.** Applicant: TEC Landscape Design. Request for business identification signage.

March 3, 1999

TO WHOM IT MAY CONCERN

NOTICE OF PUBLIC HEARING

Please be advised that there is a public hearing scheduled for Thursday, March 25, 1999 at 8:00 p.m. before the Madison Planning & Zoning Commission. The meeting will be in Meeting Room A located in the Town Campus, 8 Campus Drive, Madison, Connecticut 06443. Attached is a copy of the application.

The applicant is proposing to replace the existing 150' high lattice tower with a 150' high monopole tower and to construct an addition to the existing police department building for equipment space for two cellular providers, Bell Atlantic Mobile and SNET Mobility. A proposed generator room will be constructed adjacent to the existing Nextel equipment building. The proposed additions will match the police department building and the site will have additional landscaping. Most importantly, the replacement monopole will eliminate the need to construct one or more additional telecommunications towers in Madison to accommodate the additional carriers.

The applicant has recently received an approval from the Inland Wetlands Commission for the proposed plan and variances from the Zoning Board of Appeals for the tower and proposed building additions. The additions to the police department building will be no closer to the Route 79 than the existing Nextel equipment building and the proposed monopole will be set back approximately 27' from Route 79 (4' further into the site than the existing lattice tower).

A copy of the application and plans has been filed in the Land Use office. If you have any questions, please contact Douglas Roberts, AIA, at Greiner Engineering at (860) 529-8882, 500 Corporate Drive, Rocky Hill, Connecticut 06067.

February 22, 1999

TO WHOM IT MAY CONCERN

**NOTICE OF PUBLIC HEARING**

Please be advised that there is a public hearing scheduled for Tuesday, March 2, 1999 at 7:30 p.m. before the Madison Zoning Board of Appeals. The meeting will be in Meeting Room A located in the Town Campus, 8 Campus Drive, Madison, Connecticut 06443. Attached is a copy of the application and supporting documents.

The applicant is proposing to replace the existing 150' high lattice tower with a 150' high monopole tower and to construct an addition to the existing police department building for equipment space for two cellular providers, Bell Atlantic Mobile and SNET Mobility. A proposed generator room will be constructed adjacent to the existing Nextel equipment building. The proposed additions will match the police department building and the site will be landscaped as shown on the attached plan.

Most importantly, the replacement monopole will eliminate the need to construct an additional telecommunications tower in Madison to accommodate the additional carriers.

A copy of the application and plans has been filed in the Land Use Office. If you have any questions, please contact Douglas Roberts, AIA, at Greiner Engineering at (860) 529-8882, 500 Corporate Drive, Rocky Hill, Connecticut 06067.

Nash

RECEIVED BY
JAN 29 1999
CRS Gruber Woodward Clyde, Inc

TOWN OF MADISON
CONNECTICUT
LAND USE OFFICE

8 CAMPUS DRIVE
MADISON, CONNECTICUT 06443-2563
(203) 245-5632
FAX (203) 245-5613

# MADISON INLAND WETLANDS AGENCY
# AGENDA FOR REGULAR MEETING

Monday, February 1, 1999 7:30 P.M. Meeting Room A, Town Campus

## REGULAR MEETING - 7:30 P.M.

A. APPROVAL OF BILLS
B. APPROVAL OF MINUTES
C. REMARKS – INLAND WETLANDS CHAIRMAN
- INLAND WETLANDS OFFICER

## D. PUBLIC HEARING - 8:00 P.M.

98-52: 899 DURHAM ROAD. Owner/Applicant: Estate of Pearl G. Shapiro. Request for Regulated Activity Permit to allow filling of 5800 sq. ft. of wetlands area to provide driveway crossing.

## E. APPLICATIONS PRESENTED FOR ACCEPTANCE/APPROVAL OR DATE FOR PUBLIC HEARING:

99-1: CHESTNUT HILL BRIDGE. Applicant: Town of Madison. Request for a Regulated Activity Permit to allow rehabilitation of bridge over the Hammonasset River involving replacement of the existing superstructure, repair to existing abutments and wingwalls, and placement of riprap in the river bed.

99-2: 84 RACE HILL ROAD (Gesner Hill). Owner/Applicant: Mary Lee Pimentel. Request for a Regulated Activity Permit to allow wetlands crossings: one for a new subdivision road and two for driveway access to rear lots.

99-3: 96 DEVONSHIRE LANE (Lot 6 – Brian's Knoll). Owner/Applicant: RCK Builders, Inc. Request for a Regulated Activity Permit to allow sanitary system to be constructed within the buffer area.

99-4: 8 OLD ROUTE 79. Owner: Town of Madison; Applicant: SMART SMR of New York, Inc., dba, Nextel Communications. Request for a Regulated Activity Permit to allow replacement of tower with monopole encroaching into the wetlands buffer area.

## ADJOURNMENT

TOWN OF MADISON
CONNECTICUT
LAND USE OFFICE

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MADISON, CONNECTICUT 06443-2563
(203) 245-5632
FAX (203) 245-5613

# MADISON INLAND WETLANDS AGENCY
# AGENDA FOR REGULAR MEETING

**Monday, February 1, 1999 7:30 P.M. Meeting Room A, Town Campus**

## REGULAR MEETING - 7:30 P.M.

A. APPROVAL OF BILLS
B. APPROVAL OF MINUTES
C. REMARKS – INLAND WETLANDS CHAIRMAN
- INLAND WETLANDS OFFICER

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## ADJOURNMENT

THOMAS R. RYLANDER
FIRST SELECTMAN

# TOWN OF MADISON

CONNECTICUT

BOARD OF SELECTMEN

CHARLES L. COTTRELL
JEREMIAH J. KLEUTSCH
NOREEN S. KOKORUDA
DAVID S. LaFEMINA

## AGENDA
## BOARD OF SELECTMEN
## MONDAY, NOVEMBER 23, 1998
## MADISON ROOM (ROOM A), TOWN CAMPUS

**6:45 p.m. Regular Session (will be adjourned to executive session)**

1. Personnel.
2. Litigation.

**7:30 p.m. Regular Session**

3. Approval of minutes from November 9, 1998.
4. Citizen and Selectmen Comments.

OLD BUSINESS:

5. Discuss and take action on Beach & Recreation Administrative Procedures (Tabled 8/24/98).

6. Discuss and take action on expansion of Nextel Tower at the Madison Police Station (Tabled 11/9/98).

7. Discuss and take action on proposed Police Facility project.

NEW BUSINESS:

8. Discuss and take action on proposed revision to the Town Personnel Policy Manual (Section 2.42).

9. Discuss and take action on the appointment of Robert Hale and Helen Burland to represent the Board of Education on the Long-Range Capital Improvement Committee.

10. Discuss and take action on the following appointments:

| | | |
|---|---|---|
| Sue Zaccanino | Youth Services Board | 1/1/00 |
| Jim Shanley | Police Retirement Board | 1/1/02 |

11. Liaison Reports.
12. Tax Refunds.

8 Campus Drive (203) 245-5602 FAX 245-5609

# TOWN OF MADISON

CONNECTICUT

LAND USE OFFICE

8 CAMPUS DRIVE
MADISON, CONNECTICUT 06443-2563
(203) 245-5632
FAX (203) 245-5613

March 29, 1999

**CERTIFIED MAIL**

Ronald C. Clark
Smart SMR of New York, Inc. d/b/a Nextel Communications
100 Corporate Place
Rocky Hill, CT 06067

**Re: Application #99-14D: 8 Old Rte. 79.** Request for a Special Exception Permit to remove the existing lattice tower and replace it with a monopole tower of the same height; also to construct an equipment room addition to the police station and an addition to the existing equipment shelter. R-1 Zone.

Dear Mr. Clark:

Following Public Hearing on March 25, 1999, the Madison Planning and Zoning Commission granted the permit above referenced to allow removal of the lattice tower and replacement with a monopole tower of the same height; also to construct an equipment room addition to the police station and add to the existing equipment shelter. This permit is granted as presented at the hearing and as shown on the plans submitted by URS Greiner Woodward Clyde, 8 pages, revised to 01-19-99, with landscaping notations by John Cunningham on sheet C-1.

Before this Special Exception Permit will become effective, it is necessary to file a Certificate in the Land Records of the Town for which there is a $10.00 filing fee. At your earliest convenience, please forward this amount to our office so that we may file this Certificate in your behalf. Your check should be made payable to the Town of Madison. When this Certificate is filed at the end of the appeal period, you may apply for building permits through normal Building Department procedures.

Very truly yours,

William McMinn
Planning and Zoning Administrator

: drk

Doug R
Nash

# TOWN OF MADISON

CONNECTICUT

LAND USE OFFICE

RECEIVED BY
MAR 1 9 1999
URS Greiner Woodward Clyde, Inc.

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MADISON, CONNECTICUT 06443-2563
(203) 245-5632
FAX (203) 245-5613

March 5, 1999

**CERTIFIED MAIL**

Ronald C. Clark
Smart SMR of New York, Inc.
d/b/a/ Nextel Communications
100 Corporate Place
Rocky Hill, CT 06067

Re: **Appeal #7283: 8 OLD ROUTE 79.** Request for variance from Secs. 2.7, 3.5(f), 11.2 and 11.2.1 of the Zoning Regulations to allow a 31 ft. front yard variance to permit addition to the existing equipment bulding; also to allow 123 ft. front yard, 51 ft. side yard and 47 ft. rear yard variances to permit a 150 ft. monopole tower to be set approximately 27 ft. from the front line, 99 ft. side yard and 103 from other yard,

Dear Mr. Clark:

Following Public Hearing on March 2, 1999, the Zoning Board of Appeals granted the variance above referenced as presented at the hearing and as shown on the plans submitted dated 11-09-98 and amended to 1-19-99 by URS Greiner Woodward Clyde, 8 sheets.

Before this variance will become effective, it is necessary for us to file a Certificate of Variance in the land records of the Town for which there is a $10.00 filing fee. At your earliest convenience, would you please forward this amount to our office so that we may file this certificate in your behalf after the appeal period has expired. Your check should be made payable to the Town of Madison.

After this filing, at the end of the appeal period, you may apply for any necessary building permits through normal Building Department procedures.

Sincerely,

HELEN VOEGTLI
Clerk

By: _____
William H. McMinn, Planning and Zoning Administrator

:drk

Copy to Douglas Roberts, Greiner Engineering

*Please Note: Any variance granted pursuant to Sec. 13.3.3 for which a building permit is required shall expire after two years unless a Certificate of Occupancy has been obtained within such period.*

LAND USE OFFICE

8 CAMPUS DRIVE
MADISON, CONNECTICUT 06443-2562
(203) 245-5632
FAX (203) 245-5613

February 21, 1995

T C

Z 276 804 959

Receipt for Certified Mail
No Insurance Coverage Provided
Do not Use for International Mail
(See Reverse)

PS Form 3800, March 1993

CERTIFIED MAIL

Sharon Myl, Manager of Real Estate
SMART SMR OF NEW YORK, INC.
1 North Broadway, 2nd Floor
White Plains, NY 10601

**Re: Application #94-420D (A): 8 OLD ROUTE 79.** Request for Special Exception Permit to enable removal of existing 100 ft. lattice tower, replacement with a 150 ft. lattice tower and construction of a 10 ft. x 20 ft. x 10 ft. high equipment shelter for a public utility building. R-1 Zone.

Dear Ms Myl:

Following Public Hearing on February 16, 1995, the Planning and Zoning Commission approved the Special Exception Permit referenced above with a waiver of Secs. 29.2 q, s, and 5 of the Zoning Regulations. This approval is with the condition that the tower be constructed on the same location as the old tower and that additional screening be provided.

Before this Special Exception Permit will be come effective, it is necessary to file a Certificate of Special Exception in the land records of the Town for which there is a $10.00 filing fee. At your earliest convenience, please forward this amount to our office so that we may file this Certificate in your behalf. Your check should be made payable to the Town of Madison.

When this is filed at the end of the appeal period, you may apply for any necessary building permits following normal Building Department procedures.

Very truly yours,

William H. McMinn
Planning and Zoning Administrator

:drk

Copy to Andrew A. Glickson, Esq., Cuddy & Feder
Madison First Selectman Thomas Rylander

# TOWN OF MADISON

CONNECTICUT

LAND USE OFFICE

8 CAMPUS DRIVE
MADISON, CONNECTICUT 06443-2563
(203) 245-5632
FAX (203) 245-5613

February 2, 1999

**CERTIFIED MAIL**

SMART SMR of New York, Inc.
Nextel Communications
100 Corporate Place
Rocky Hill, CT 06067

Re: **Application 99-4: 8 OLD ROUTE 79.** Request for Regulated Activity Permit to allow replacement of tower with monopole encroaching into the wetlands buffer.

Gentlemen:

At their regular meeting on February 1, 1999, the Madison Inland Wetlands Agency approved the application above referenced as presented at the meeting and as shown on the ***Site Plan Modification Plan*** and ***Site Plan Modification Plan Details,*** sheets C-1 and C-2, dated 11-09-98.

The duration of this permit is for two years, unless extended by the Agency, and all activities must be completed within this time.

Very truly yours,

Robert E Kuchta

Robert E. Kuchta
Inland Wetlands Enforcement Officer

For GLENN W. FALK
Chairman, Madison Inland Wetlands Agency

:drk

Copy to URS Greiner Woodward Clyde

PLEASE NOTE: *Any variance granted pursuant to Sec. 13.3.3 for which a building permit is required shall expire after two years unless a Certificate of Occupancy has been obtained within such period.*

# TOWN OF MADISON

CONNECTICUT

LAND USE OFFICE

8 CAMPUS DRIVE
MADISON, CONNECTICUT 06443-2562
(203) 245-5632
FAX (203) 245-5613

July 18, 1995

**CERTIFIED MAIL**

Andrew A. Glickson, Esq.
CUDDY & FEDER
4 Berkley Street
Norwalk, CT 06950

Re: **Appeal #7068: 8 OLD RTOUTE 79.** Request to vary Sections 2.7, 3.5(f) and 11.2 of the Zoning Regulations to permit siting a 150 ft. tower behind municipal police station 142 ft., 102 ft. 11 in., and 19 ft. 10 in. from the property lines and an equipment shelter 12 ft. from the front property line. R-1 Zone.

Gentlemen:

Following Public Hearing on June 6, 1995, the Zoning Board of Appeals granted the variance above-referenced to permit siting a 150 ft. tower behind the municipal police station 142 ft., 102 ft. 11 in., and 19 ft. 10 in. from the property lines and an equipment shelter 12 ft. from the front property line. It was the consensus of the Board that this was in harmony with the intent and purpose of the Zoning Regulations.

Before this variance will be come effective, it is necessary for us to file a Certificate of Variance in the land records of the Town for which there is a $10.00 filing fee. At your earliest convenience, would you please forward this amount to our office so that we may file this certificate in your behalf. Your check should be made payable to the Town of Madison.

After this filing, at the end of the appeal period, you may apply for any necessary building permits through normal Building Department procedures.

Sincerely,

HELEN VOEGTLI
Clerk

By _____
William H. McMinn, Zoning Office Administrator

:drk

Copy to Nextel Communications
Thomas Rylander, First Selectman

AMERICAN TOWER®
CORPORATION

# Structural Analysis Report

| | | |
|---|---|---|
| **Structure** | : | **148 ft Monopole** |
| **ATC Site Name** | : | **Madison CT 6, CT** |
| **ATC Asset Number** | : | **302540** |
| **Engineering Number** | : | **12995792_C3_03** |
| **Proposed Carrier** | : | **VERIZON WIRELESS** |
| **Carrier Site Name** | : | **MADISON 2 CT** |
| **Carrier Site Number** | : | **468845** |
| **Site Location** | : | **8 Old 79**<br>**Madison, CT 06443-2685**<br>**41.285500, -72.601300** |
| **County** | : | **New Haven** |
| **Date** | : | **November 20, 2019** |
| **Max Usage** | : | **52%** |
| **Result** | : | **Pass** |

Prepared By:
Kyle MacPetrie
Structural Engineer

Reviewed By:

STATE OF CONNECTICUT
ESHA KAUSHAL MODI
32508
LICENSED
PROFESSIONAL ENGINEER

Authorized by "EOR"
Nov 22 2019 8:19 AM cosign

**COA: PEC.0001553**

AMERICAN TOWER®
CORPORATION

**Table of Contents**

## Introduction

The purpose of this report is to summarize results of a structural analysis performed on the 148 ft monopole to reflect the change in loading by VERIZON WIRELESS.

## Supporting Documents

| | |
|---|---|
| **Tower Drawings** | Summit, PJF Job #29299-729, dated November 12, 1999 |
| **Foundation Drawing** | Spectrasite Project #F301896.00, dated January 4, 2000 |
| **Geotechnical Report** | Dr. Clarence Welti, P.E., P.C., dated November 19, 1999 |

## Analysis

The tower was analyzed using American Tower Corporation's tower analysis software. This program considers an elastic three-dimensional model and second-order effects per ANSI/TIA-222.

| | |
|---|---|
| **Basic Wind Speed:** | 101 mph (3-Second Gust, $V_{asd}$) / 130 mph (3-Second Gust, $V_{ult}$) |
| **Basic Wind Speed w/ Ice:** | 50 mph (3-Second Gust) w/ 3/4" radial ice concurrent |
| **Code:** | ANSI/TIA-222-G / 2015 IBC / 2018 Connecticut State Building Code |
| **Structure Class:** | II |
| **Exposure Category:** | B |
| **Topographic Category:** | 1 |
| **Crest Height:** | 0 ft |
| **Spectral Response:** | Ss = 0.17, $S_1$ = 0.06 |
| **Site Class:** | D - Stiff Soil |

## Conclusion

Based on the analysis results, the structure meets the requirements per the applicable codes listed above. The tower and foundation can support the equipment as described in this report.

If you have any questions or require additional information, please contact American Tower via email at Engineering@americantower.com. Please include the American Tower site name, site number, and engineering number in the subject line for any questions.

## Existing and Reserved Equipment

| Elev.[1] (ft) | Qty | Antenna | Mount Type | Lines | Carrier |
|---|---|---|---|---|---|
| 157.0 | 1 | Generic 18' Dipole | Low Profile Platform | (5) 7/8" Coax | OTHER |
| 153.0 | 1 | Generic 8' Omni | | | |
| 152.0 | 1 | Generic 8' Dipole | | | |
| 149.0 | 12 | Generic 48" x 8" Panel | | (12) 1 1/4" Coax | SPRINT NEXTEL |
| 140.0 | 2 | Andrew LNX-8513DS-A1M | Low Profile Platform | (11) 1 5/8" Coax<br>(2) 1 5/8" (1.63"-41.3mm) Fiber | VERIZON WIRELESS |
| | 1 | Commscope LNX-6514DS-A1M | | | |
| | 2 | RFS DB-T1-6Z-8AB-0Z | | | |
| | 6 | Commscope JAHH-65B-R3B | | | |
| 138.0 | 3 | Ericsson RRUS 11 (Band 12) (55 lb) | Collar | - | AT&T MOBILITY |
| 132.0 | 6 | Powerwave Allgon TT19-08BP111-001 | Low Profile Platform | (2) 0.39" (10mm) Fiber Trunk<br>(4) 0.78" (19.7mm) 8 AWG 6<br>(12) 1 5/8" Coax<br>(1) 2" conduit | |
| | 3 | Ericsson Radio 4449 B13, B5 | | | |
| | 3 | Ericsson RRUS A2 B2 | | | |
| | 3 | Ericsson RRUS 32 B30 (53 lbs) | | | |
| | 3 | Ericsson RRUS-12 B2 | | | |
| | 3 | KMW AM-X-CD-14-65-00T-RET | | | |
| | 3 | Commscope SBNHH-1D65A | | | |
| | 3 | Kathrein Scala 80010964 | | | |
| | 6 | Powerwave Allgon LGP13519 | | | |
| | 2 | Raycap DC6-48-60-18-8F ("Squid") | | | |
| 120.0 | 4 | Ericsson AIR 21, 1.3 M, B2A B4P | Low Profile Platform | (1) 1 1/4" Hybriflex Cable<br>(16) 1 5/8" Coax<br>(1) 1 5/8" (1.63"-41.3mm) Fiber | T-MOBILE |
| | 4 | Ericsson AIR 21, 1.3M, B4A B2P | | | |
| | 4 | Ericsson KRY 112 144/1 | | | |
| 112.0 | 3 | Generic 48" x 12" Panel | Flush | - | OTHER |
| | 6 | Generic 6.7" x 10.7" TTA | | | |
| 97.5 | 3 | Alcatel-Lucent TD-RRH8x20-25 w/ Solar Shield | Platform with Handrails | (4) 1 1/4" Hybriflex Cable | SPRINT NEXTEL |
| | 3 | Alcatel-Lucent 1900 MHz 4X45 RRH | | | |
| | 3 | RFS APXV9TM14-ALU-I20 | | | |
| | 3 | RFS APXVSPP18-C-A20 | | | |
| | 3 | Alcatel-Lucent 800 MHz 2X50W RRH w/ Filter | | | |
| 86.0 | 3 | RFS APXV18-206517S-C | Flush | (6) 1 5/8" Coax | METRO PCS INC |
| 73.0 | 1 | Generic GPS | Flush | (1) 1/2" Coax | SPRINT NEXTEL |

## Equipment to be Removed

| Elev.[1] (ft) | Qty | Antenna | Mount Type | Lines | Carrier |
|---|---|---|---|---|---|
| 140.0 | 3 | Nokia AHCA AirScale RRH 4T4R B5 160W | - | - | VERIZON WIRELESS |
| | 3 | Alcatel-Lucent RRH4x30W-B25 | | | |
| | 3 | Andrew HBXX-6516DS-A2M | | | |
| | 3 | Alcatel-Lucent B66A RRH 4x45 | | | |
| | 3 | Alcatel-Lucent B13 RRH4x30-4R | | | |

## Proposed Equipment

| Elev.[1] (ft) | Qty | Antenna | Mount Type | Lines | Carrier |
|---|---|---|---|---|---|
| 140.0 | 3 | Commscope CBC78T-DS-43-2X | Low Profile Platform | - | VERIZON WIRELESS |
| | 3 | Samsung Outdoor CBRS 20W RRH | | | |
| | 3 | Samsung Outdoor CBRS 20W RRH –Clip-on Antenna | | | |
| | 3 | Samsung B2/B66A RRH-BR049 | | | |
| | 3 | Samsung B5/B13 RRH-BR04C | | | |

[1] Contracted elevations are shown for appurtenances within contracted installation tolerances. Appurtenances outside of contract limits are shown at installed elevations.

## Structure Usages

| Structural Component | Controlling Usage | Pass/Fail |
|---|---|---|
| Anchor Bolts | 48% | Pass |
| Shaft | 52% | Pass |
| Base Plate | 41% | Pass |

## Foundations

| Reaction Component | Original Design Reactions | Factored Design Reactions* | Analysis Reactions | % of Design |
|---|---|---|---|---|
| Moment (Kips-Ft) | 5,050.0 | 6,817.5 | 3,457.3 | 51% |
| Shear (Kips) | 47.0 | 63.5 | 31.9 | 50% |
| * The design reactions are factored by 1.35 per ANSI/TIA-222-G, Sec. 15.5.1 | | | | |

The structure base reactions resulting from this analysis are acceptable when compared to those shown on the original structure drawings, therefore no modification or reinforcement of the foundation will be required.

## Deflection and Sway*

| Antenna Elevation (ft) | Antenna | Carrier | Deflection (ft) | Sway (Rotation) (°) |
|---|---|---|---|---|
| 140.0 | Commscope CBC78T-DS-43-2X | VERIZON WIRELESS | 0.887 | 0.718 |
| | Samsung Outdoor CBRS 20W RRH | | | |
| | Samsung Outdoor CBRS 20W RRH –Clip-on Antenna | | | |
| | Samsung B2/B66A RRH-BR049 | | | |
| | Samsung B5/B13 RRH-BR04C | | | |

***Deflection and Sway was evaluated considering a design wind speed of 60 mph (3-Second Gust) per ANSI/TIA-222-G**

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## Standard Conditions

All engineering services performed by A.T. Engineering Service, PLLC are prepared on the basis that the information used is current and correct. This information may consist of, but is not limited to the following:

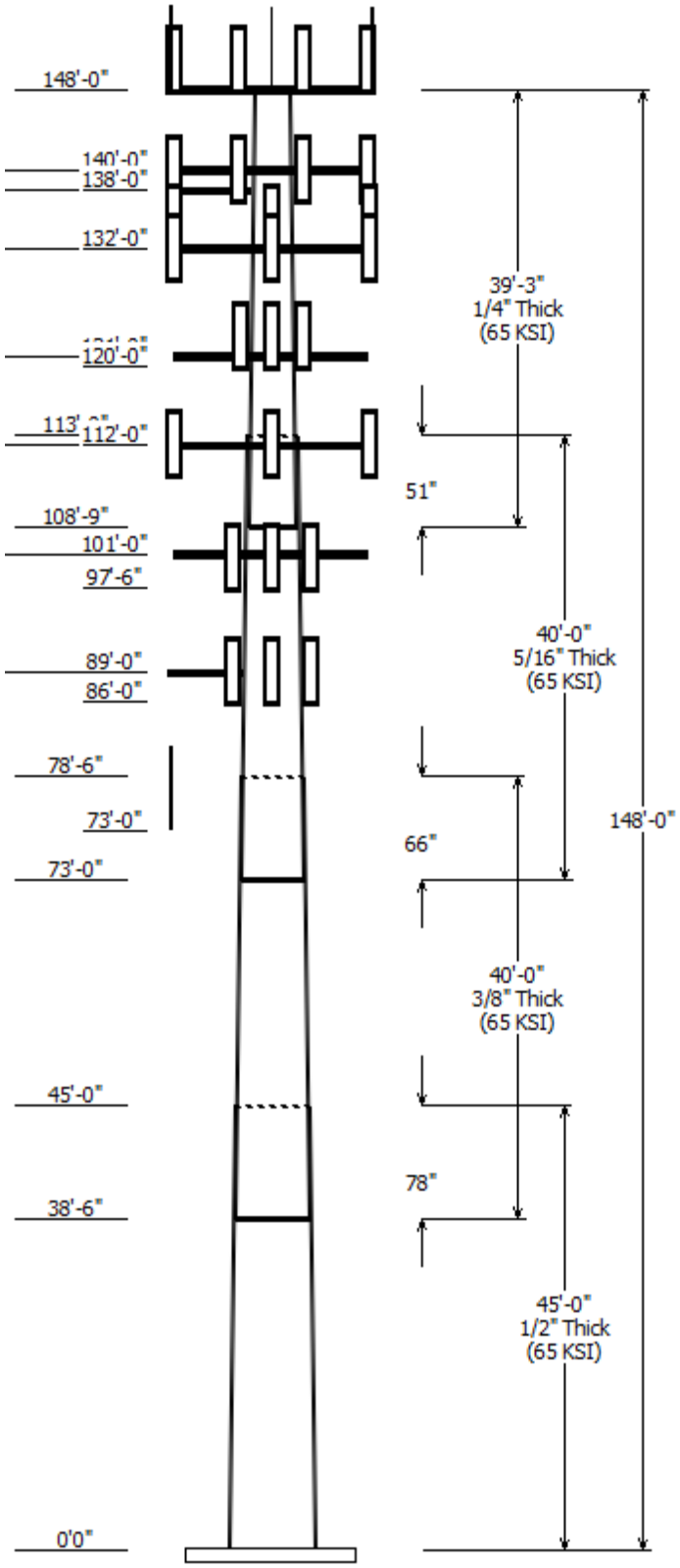
- Information supplied by the client regarding antenna, mounts and feed line loading
- Information from drawings, design and analysis documents, and field notes in the possession of A.T. Engineering Service, PLLC

It is the responsibility of the client to ensure that the information provided to A.T. Engineering Service, PLLC and used in the performance of our engineering services is correct and complete.

All assets of American Tower Corporation, its affiliates and subsidiaries (collectively "American Tower") are inspected at regular intervals. Based upon these inspections and in the absence of information to the contrary, American Tower assumes that all structures were constructed in accordance with the drawings and specifications.

Unless explicitly agreed by both the client and A.T. Engineering Service, PLLC, all services will be performed in accordance with the current revision of ANSI/TIA-222.

All services are performed, results obtained, and recommendations made in accordance with generally accepted engineering principles and practices. A.T. Engineering Service, PLLC is not responsible for the conclusions, opinions and recommendations made by others based on the information supplied herein.




## Job Information

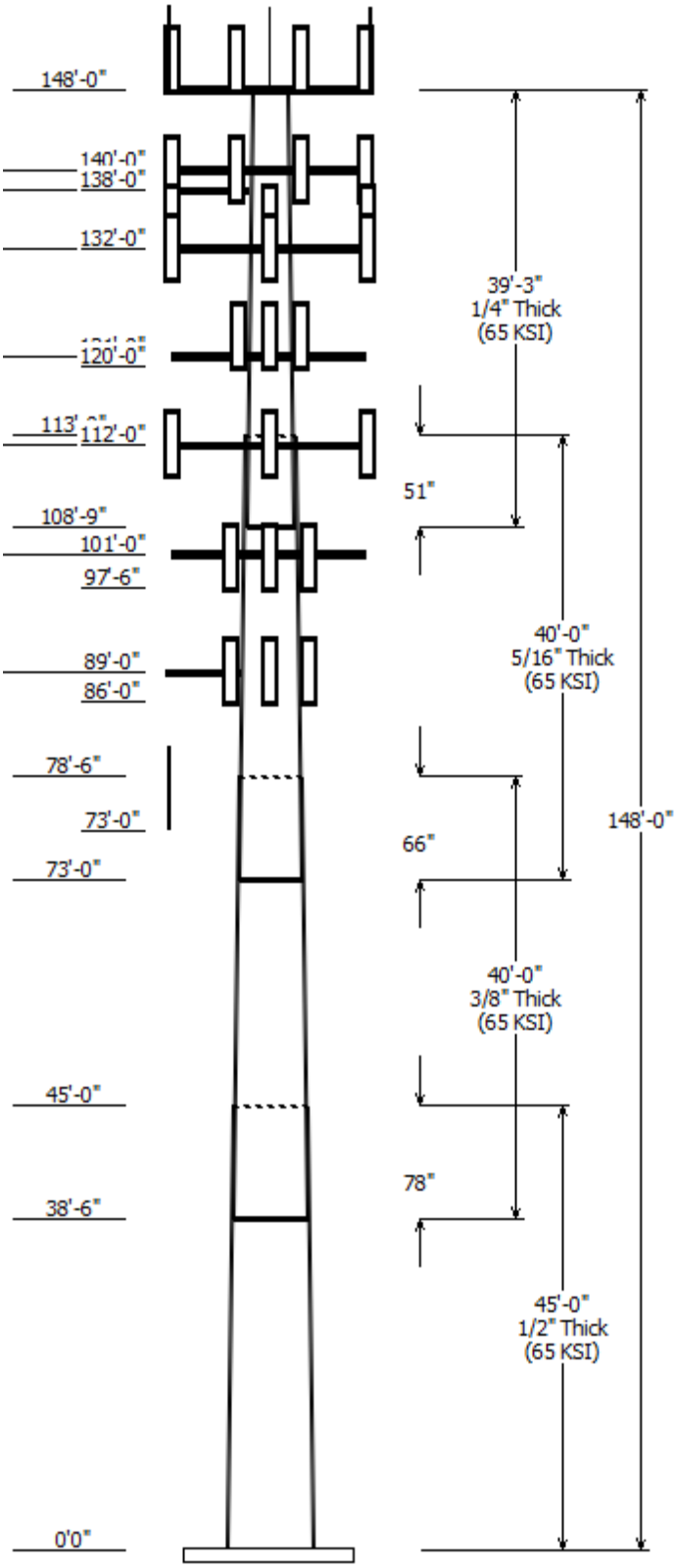
| | | | |
|---|---|---|---|
| Client : | VERIZON WIRELESS | | |
| Pole : | 302540 | Code: | ANSI/TIA-222-G |
| Location : | Madison CT 6, CT | | |
| Description : | 148 ft Summit Monopole | Struct Class : | II |
| Shape : | 18 Sides | Exposure : | B |
| Height : | 148.00 (ft) | Topo : | 1 |
| Base Elev (ft): | 0.00 | | |
| Taper: | 0.263006 (in/ft) | | |

## Sections Properties

| Shaft Section | Length (ft) | Diameter (in) Accross Flats Top | Bottom | Thick (in) | Joint Type | Overlap Length (in) | Shape | Steel Grade (ksi) |
|---|---|---|---|---|---|---|---|---|
| 1 | 45.000 | 49.21 | 61.05 | 0.500 | | 0.000 | 18 Sides | 65 |
| 2 | 40.000 | 41.15 | 51.67 | 0.375 | Slip Joint | 78.000 | 18 Sides | 65 |
| 3 | 40.000 | 32.70 | 43.22 | 0.313 | Slip Joint | 66.000 | 18 Sides | 65 |
| 4 | 39.250 | 24.00 | 34.32 | 0.250 | Slip Joint | 51.000 | 18 Sides | 65 |

## Discrete Appurtenance

| Attach Elev (ft) | Force Elev (ft) | Qty | Description |
|---|---|---|---|
| 148.000 | 149.000 | 12 | Generic 48" x 8" Panel |
| 148.000 | 152.000 | 1 | Generic 8' Dipole |
| 148.000 | 153.000 | 1 | Generic 8' Omni |
| 148.000 | 157.000 | 1 | Generic 18' Dipole |
| 148.000 | 148.000 | 1 | Flat Low Profile Platform |
| 140.000 | 140.000 | 2 | Andrew LNX-8513DS-A1M |
| 140.000 | 140.000 | 1 | Commscope LNX-6514DS-A1M |
| 140.000 | 140.000 | 6 | Commscope JAHH-65B-R3B |
| 140.000 | 140.000 | 2 | RFS DB-T1-6Z-8AB-0Z |
| 140.000 | 140.000 | 3 | Samsung B5/B13 RRH-BR04C |
| 140.000 | 140.000 | 3 | Samsung B2/B66A RRH-BR049 |
| 140.000 | 140.000 | 3 | Samsung Outdoor CBRS 20W |
| 140.000 | 140.000 | 3 | Samsung Outdoor CBRS 20W |
| 140.000 | 140.000 | 3 | Commscope CBC78T-DS-43-2X |
| 140.000 | 140.000 | 1 | Flat Low Profile Platform |
| 138.000 | 138.000 | 1 | Collar |
| 138.000 | 138.000 | 3 | Ericsson RRUS 11 (Band 12) (55 |
| 132.000 | 132.000 | 3 | Kathrein Scala 80010964 |
| 132.000 | 135.000 | 3 | Commscope SBNHH-1D65A |
| 132.000 | 132.000 | 3 | KMW AM-X-CD-14-65-00T-RET |
| 132.000 | 135.000 | 3 | Ericsson RRUS-12 B2 |
| 132.000 | 132.000 | 3 | Ericsson RRUS 32 B30 (53 lbs) |
| 132.000 | 132.000 | 3 | Ericsson RRUS A2 B2 |
| 132.000 | 132.000 | 3 | Ericsson Radio 4449 B13, B5 |
| 132.000 | 135.000 | 2 | Raycap DC6-48-60-18-8F |
| 132.000 | 135.000 | 6 | Powerwave Allgon TT19- |
| 132.000 | 135.000 | 6 | Powerwave Allgon LGP13519 |
| 132.000 | 132.000 | 1 | Flat Low Profile Platform w/ K |
| 121.000 | 121.000 | 1 | Round Low Profile Platform |
| 120.000 | 121.000 | 4 | Ericsson KRY 112 144/1 |
| 120.000 | 121.000 | 4 | Ericsson AIR 21, 1.3M, B4A B2P |
| 120.000 | 121.000 | 4 | Ericsson AIR 21, 1.3 M, B2A B4 |
| 112.000 | 112.000 | 3 | 6.7" x 10.7" TTA |
| 112.000 | 112.000 | 3 | Generic 48" x 12" Panel |
| 112.000 | 112.000 | 6 | Generic 6.7" x 10.7" TTA |
| 101.000 | 101.000 | 1 | Flat Platform w/ Handrails |
| 97.500 | 101.000 | 3 | RFS APXVSPP18-C-A20 |
| 97.500 | 101.000 | 3 | RFS APXV9TM14-ALU-I20 |
| 97.500 | 101.000 | 3 | Alcatel-Lucent TD-RRH8x20-25 |
| 97.500 | 101.000 | 3 | Alcatel-Lucent 1900 MHz 4X45 |
| 97.500 | 101.000 | 3 | Alcatel-Lucent 800 MHz 2X50W |
| 89.000 | 89.000 | 1 | Collar |
| 86.000 | 89.000 | 3 | RFS APXV18-206517S-C |
| 73.000 | 75.000 | 1 | Generic GPS |




## Linear Appurtenance

| Elev (ft) From | To | Description | Exposed To Wind |
|---|---|---|---|
| 0.000 | 73.000 | 1/2" Coax | Yes |
| 0.000 | 86.000 | 1 5/8" Coax | No |
| 0.000 | 97.500 | 1 1/4" Hybriflex | No |
| 0.000 | 120.0 | 1 5/8" (1.63"- | No |
| 0.000 | 120.0 | 1 5/8" Coax | Yes |
| 0.000 | 120.0 | 1 5/8" Coax | No |
| 0.000 | 121.0 | 1 1/4" Hybriflex | Yes |
| 0.000 | 121.0 | 1 5/8" Coax | No |
| 0.000 | 132.0 | 0.39" (10mm) | No |
| 0.000 | 132.0 | 0.78" (19.7mm) 8 | No |
| 0.000 | 132.0 | 1 5/8" Coax | No |
| 0.000 | 132.0 | 2" conduit | No |
| 0.000 | 140.0 | 1 5/8" (1.63"- | No |
| 0.000 | 145.0 | 1 5/8" Coax | No |
| 0.000 | 149.0 | 1 1/4" Coax | No |
| 0.000 | 152.0 | 7/8" Coax | No |
| 0.000 | 153.0 | 7/8" Coax | No |
| 0.000 | 157.0 | 7/8" Coax | No |

## Load Cases

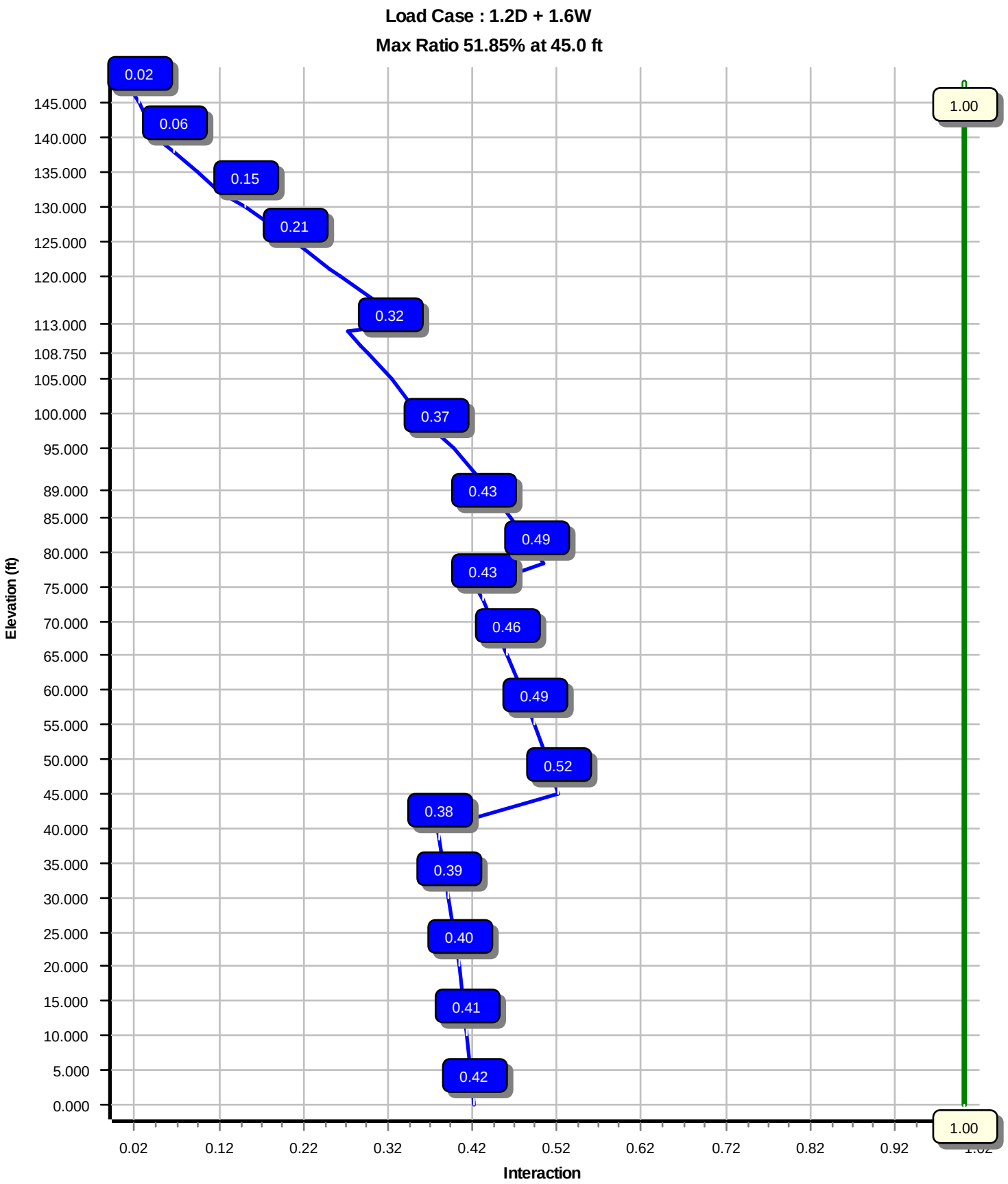
| | |
|---|---|
| 1.2D + 1.6W | 101 mph with No Ice |
| 0.9D + 1.6W | 101 mph with No Ice (Reduced DL) |
| 1.2D + 1.0Di + 1.0Wi | 50 mph with 0.75 in Radial Ice |
| (1.2 + 0.2Sds) * DL + E | Seismic Equivalent Lateral Forces Method |
| (1.2 + 0.2Sds) * DL + E | Seismic Equivalent Modal Analysis Method |
| (0.9 - 0.2Sds) * DL + E | Seismic (Reduced DL) Equivalent Lateral |
| (0.9 - 0.2Sds) * DL + E | Seismic (Reduced DL) Equivalent Modal |
| 1.0D + 1.0W | Serviceability 60 mph |

## Reactions

| Load Case | Moment (kip-ft) | Shear (kip) | Axial (kip) |
|---|---|---|---|
| 1.2D + 1.6W | 3457.25 | 31.93 | 62.09 |
| 0.9D + 1.6W | 3418.00 | 31.82 | 46.56 |
| 1.2D + 1.0Di + 1.0Wi | 959.15 | 9.18 | 87.34 |
| (1.2 + 0.2Sds) * DL + E ELFM | 194.73 | 1.67 | 61.62 |
| (1.2 + 0.2Sds) * DL + E EMAM | 243.44 | 2.11 | 61.62 |
| (0.9 - 0.2Sds) * DL + E ELFM | 192.62 | 1.67 | 43.04 |
| (0.9 - 0.2Sds) * DL + E EMAM | 240.75 | 2.11 | 43.04 |
| 1.0D + 1.0W | 676.76 | 6.28 | 51.77 |

## Dish Deflections

| Load Case | Attach Elev (ft) | Deflection (in) | Rotation (deg) |
|---|---|---|---|
| | 0.00 | 0.000 | 0.000 |


Load Case : 1.2D + 1.6W
Max Ratio 51.85% at 45.0 ft
0.02
0.06
0.15
0.21
0.32
0.37
0.43
0.49
0.43
0.46
0.49
0.52
0.38
0.39
0.40
0.41
0.42
1.00
1.00
145.000
140.000
135.000
130.000
125.000
120.000
113.000
108.750
105.000
100.000
95.000
89.000
85.000
80.000
75.000
70.000
65.000
60.000
55.000
50.000
45.000
40.000
35.000
30.000
25.000
20.000
15.000
10.000
5.000
0.000
Elevation (ft)
0.02
0.12
0.22
0.32
0.42
0.52
0.62
0.72
0.82
0.92
Interaction

Site Number: 302540 Code: ANSI/TIA-222-G 

Site Name: Madison CT 6, CT Engineering Number:12995792_C3_03 11/20/2019 1:40:26 PM

Customer: VERIZON WIRELESS

## Analysis Parameters

| | | | |
|---|---|---|---|
| Location : | New Haven County, CT | Height (ft) : | 148 |
| Code : | ANSI/TIA-222-G | Base Diameter (in) : | 61.05 |
| Shape : | 18 Sides | Top Diameter (in) : | 24.00 |
| Pole Type : | Taper | Taper (in/ft) : | 0.263 |
| Pole Manfacturer : | Summit Manufacturing | Rotation (deg) : | 0.00 |

## Ice & Wind Parameters

| | | | |
|---|---|---|---|
| Structure Class: | II | Design Wind Speed Without Ice: | 101 mph |
| Exposure Category: | B | Design Wind Speed With Ice: | 50 mph |
| Topographic Category: | 1 | Operational Wind Speed: | 60 mph |
| Crest Height: | 0 ft | Design Ice Thickness: | 0.75 in |

## Seismic Parameters

| | | | | | |
|---|---|---|---|---|---|
| Analysis Method: | Equivalent Modal Analysis & Equivalent Lateral Force Methods | | | | |
| Site Class: | D - Stiff Soil | | | | |
| Period Based on Rayleigh Method (sec): | 1.99 | | | | |
| $T_L$ (sec): | 6 | p: | 1 | $C_s$: | 0.032 |
| $S_s$: | 0.171 | $S_1$: | 0.060 | $C_s$ Max: | 0.032 |
| $F_a$: | 1.600 | $F_v$: | 2.400 | $C_s$ Min: | 0.030 |
| $S_{ds}$: | 0.182 | $S_{d1}$: | 0.096 | | |

## Load Cases

| | |
|---|---|
| 1.2D + 1.6W | 101 mph with No Ice |
| 0.9D + 1.6W | 101 mph with No Ice (Reduced DL) |
| 1.2D + 1.0Di + 1.0Wi | 50 mph with 0.75 in Radial Ice |
| (1.2 + 0.2Sds) * DL + E ELFM | Seismic Equivalent Lateral Forces Method |
| (1.2 + 0.2Sds) * DL + E EMAM | Seismic Equivalent Modal Analysis Method |
| (0.9 - 0.2Sds) * DL + E ELFM | Seismic (Reduced DL) Equivalent Lateral Forces Method |
| (0.9 - 0.2Sds) * DL + E EMAM | Seismic (Reduced DL) Equivalent Modal Analysis Method |
| 1.0D + 1.0W | Serviceability 60 mph |

Site Number: 302540 Code: ANSI/TIA-222-G 

Site Name: Madison CT 6, CT Engineering Number:12995792_C3_03 11/20/2019 1:40:26 PM

Customer: VERIZON WIRELESS

## Shaft Section Properties

| Sect Info | Length (ft) | Thick (in) | Fy (ksi) | Joint Type | Slip Joint Len (in) | Weight (lb) | Bottom Dia (in) | Bottom Elev (ft) | Bottom Area (in²) | Bottom Ix (in⁴) | Bottom W/t Ratio | Bottom D/t Ratio | Top Dia (in) | Top Elev (ft) | Top Area (in²) | Top Ix (in⁴) | Top W/t Ratio | Top D/t Ratio | Taper (in/ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1-18 | 45.000 | 0.5000 | 65 | | 0.00 | 13,276 | 61.05 | 0.00 | 96.09 | 44509.7 | 19.77 | 122.10 | 49.21 | 45.00 | 77.31 | 23178.9 | 15.59 | 98.43 | 0.263006 |
| 2-18 | 40.000 | 0.3750 | 65 | Slip | 78.00 | 7,458 | 51.67 | 38.50 | 61.06 | 20300.5 | 22.53 | 137.80 | 41.15 | 78.50 | 48.54 | 10197.2 | 17.59 | 109.74 | 0.263006 |
| 3-18 | 40.000 | 0.3125 | 65 | Slip | 66.00 | 5,083 | 43.22 | 73.00 | 42.56 | 9902.8 | 22.63 | 138.32 | 32.70 | 113.00 | 32.13 | 4259.3 | 16.69 | 104.66 | 0.263006 |
| 4-18 | 39.250 | 0.2500 | 65 | Slip | 51.00 | 3,064 | 34.32 | 108.75 | 27.04 | 3965.7 | 22.45 | 137.29 | 24.00 | 148.00 | 18.84 | 1343.0 | 15.16 | 96.00 | 0.263006 |
| | | | | Shaft Weight | | 28,881 | | | | | | | | | | | | | |

## Discrete Appurtenance Properties

| Attach Elev (ft) | Description | Qty | Ka | Vert Ecc (ft) | No Ice Weight (lb) | No Ice EPAa (sf) | No Ice Orientation Factor | Ice Weight (lb) | Ice EPAa (sf) | Ice Orientation Factor |
|---|---|---|---|---|---|---|---|---|---|---|
| 148.00 | Generic 8' Omni | 1 | 1.00 | 5.000 | 25.00 | 2.400 | 1.00 | 85.97 | 5.146 | 1.00 |
| 148.00 | Generic 8' Dipole | 1 | 1.00 | 4.000 | 25.00 | 3.010 | 1.00 | 114.34 | 7.668 | 1.00 |
| 148.00 | Generic 48" x 8" Panel | 12 | 0.80 | 1.000 | 20.00 | 3.610 | 0.73 | 108.36 | 5.475 | 0.73 |
| 148.00 | Generic 18' Dipole | 1 | 1.00 | 9.000 | 55.00 | 6.770 | 1.00 | 254.26 | 17.454 | 1.00 |
| 148.00 | Flat Low Profile Platform | 1 | 1.00 | 0.000 | 1,500.00 | 26.100 | 1.00 | 2,147.69 | 45.186 | 1.00 |
| 140.00 | Commscope CBC78T-DS-43-2X | 3 | 0.80 | 0.000 | 20.70 | 0.550 | 0.50 | 42.67 | 1.053 | 0.50 |
| 140.00 | Samsung Outdoor CBRS 20W | 3 | 0.80 | 0.000 | 18.60 | 0.860 | 0.50 | 42.46 | 1.486 | 0.50 |
| 140.00 | Samsung Outdoor CBRS 20W | 3 | 0.80 | 0.000 | 4.40 | 0.890 | 0.50 | 22.30 | 1.524 | 0.50 |
| 140.00 | Samsung B2/B66A RRH-BR049 | 3 | 0.80 | 0.000 | 84.40 | 1.880 | 0.50 | 147.84 | 2.780 | 0.50 |
| 140.00 | Samsung B5/B13 RRH-BR04C | 3 | 0.80 | 0.000 | 70.30 | 1.880 | 0.50 | 127.19 | 2.780 | 0.50 |
| 140.00 | RFS DB-T1-6Z-8AB-0Z | 2 | 0.80 | 0.000 | 44.00 | 4.800 | 0.72 | 169.16 | 6.213 | 0.72 |
| 140.00 | Commscope LNX-6514DS-A1M | 1 | 0.80 | 0.000 | 38.80 | 8.170 | 1.00 | 213.76 | 10.972 | 1.00 |
| 140.00 | Andrew LNX-8513DS-A1M | 2 | 0.80 | 0.000 | 39.20 | 8.170 | 0.77 | 214.15 | 10.972 | 0.77 |
| 140.00 | Commscope JAHH-65B-R3B | 6 | 0.80 | 0.000 | 60.60 | 9.110 | 0.69 | 261.78 | 11.868 | 0.69 |
| 140.00 | Flat Low Profile Platform | 1 | 1.00 | 0.000 | 1,500.00 | 26.100 | 1.00 | 2,144.29 | 45.086 | 1.00 |
| 138.00 | Ericsson RRUS 11 (Band 12) (55 | 3 | 1.00 | 0.000 | 55.00 | 2.520 | 0.67 | 121.79 | 3.552 | 0.67 |
| 138.00 | Collar | 1 | 1.00 | 0.000 | 560.00 | 8.500 | 1.00 | 1,024.71 | 15.554 | 1.00 |
| 132.00 | Powerwave Allgon LGP13519 | 6 | 0.80 | 3.000 | 5.30 | 0.290 | 0.50 | 14.67 | 0.672 | 0.50 |
| 132.00 | Powerwave Allgon TT19- | 6 | 0.80 | 3.000 | 16.00 | 0.550 | 0.50 | 35.97 | 1.053 | 0.50 |
| 132.00 | Raycap DC6-48-60-18-8F | 2 | 0.80 | 3.000 | 31.80 | 1.470 | 1.00 | 92.79 | 2.160 | 1.00 |
| 132.00 | Ericsson Radio 4449 B13, B5 | 3 | 0.80 | 0.000 | 70.60 | 1.970 | 0.50 | 134.25 | 2.891 | 0.50 |
| 132.00 | Ericsson RRUS A2 B2 | 3 | 0.80 | 0.000 | 22.00 | 2.060 | 0.67 | 65.59 | 2.991 | 0.67 |
| 132.00 | Ericsson RRUS 32 B30 (53 lbs) | 3 | 0.80 | 0.000 | 53.00 | 2.740 | 0.67 | 125.71 | 3.895 | 0.67 |
| 132.00 | Ericsson RRUS-12 B2 | 3 | 0.80 | 3.000 | 58.00 | 3.150 | 0.62 | 137.97 | 4.298 | 0.62 |
| 132.00 | KMW AM-X-CD-14-65-00T-RET | 3 | 0.80 | 0.000 | 36.40 | 4.990 | 0.66 | 146.43 | 6.835 | 0.66 |
| 132.00 | Commscope SBNHH-1D65A | 3 | 0.80 | 3.000 | 33.50 | 5.880 | 0.69 | 167.31 | 7.982 | 0.69 |
| 132.00 | Kathrein Scala 80010964 | 3 | 0.80 | 0.000 | 83.80 | 10.000 | 0.62 | 286.03 | 12.335 | 0.62 |
| 132.00 | Flat Low Profile Platform w/ | 1 | 1.00 | 0.000 | 1,725.00 | 33.600 | 1.00 | 2,461.56 | 57.897 | 1.00 |
| 121.00 | Round Low Profile Platform | 1 | 1.00 | 0.000 | 2,000.00 | 23.500 | 1.00 | 2,846.88 | 43.883 | 1.00 |
| 120.00 | Ericsson KRY 112 144/1 | 4 | 0.80 | 1.000 | 11.00 | 0.350 | 0.50 | 21.52 | 0.746 | 0.50 |
| 120.00 | Ericsson AIR 21, 1.3 M, B2A B4P | 4 | 0.80 | 1.000 | 83.00 | 6.050 | 0.71 | 225.72 | 8.164 | 0.71 |
| 120.00 | Ericsson AIR 21, 1.3M, B4A B2P | 4 | 0.80 | 1.000 | 81.50 | 6.090 | 0.70 | 223.69 | 8.206 | 0.70 |
| 112.00 | Generic 6.7" x 10.7" TTA | 6 | 1.00 | 0.000 | 9.90 | 0.600 | 0.50 | 18.54 | 1.121 | 0.50 |
| 112.00 | 6.7" x 10.7" TTA | 3 | 1.00 | 0.000 | 100.00 | 3.000 | 0.67 | 147.42 | 4.524 | 0.67 |
| 112.00 | Generic 48" x 12" Panel | 3 | 1.00 | 0.000 | 30.00 | 5.070 | 0.66 | 140.08 | 6.890 | 0.66 |
| 101.00 | Flat Platform w/ Handrails | 1 | 1.00 | 0.000 | 2,000.00 | 42.400 | 1.00 | 3,368.19 | 62.590 | 1.00 |
| 97.50 | Alcatel-Lucent 800 MHz 2X50W | 3 | 0.75 | 3.500 | 64.00 | 2.060 | 0.67 | 137.85 | 2.979 | 0.67 |
| 97.50 | Alcatel-Lucent 1900 MHz 4X45 | 3 | 0.75 | 3.500 | 60.00 | 2.320 | 0.67 | 137.25 | 3.355 | 0.67 |
| 97.50 | Alcatel-Lucent TD-RRH8x20-25 | 3 | 0.75 | 3.500 | 70.00 | 4.050 | 0.61 | 160.59 | 5.324 | 0.61 |
| 97.50 | RFS APXV9TM14-ALU-I20 | 3 | 0.75 | 3.500 | 55.10 | 6.380 | 0.66 | 187.01 | 8.480 | 0.66 |
| 97.50 | RFS APXVSPP18-C-A20 | 3 | 0.75 | 3.500 | 57.00 | 8.020 | 0.69 | 222.35 | 10.692 | 0.69 |
| 89.00 | Collar | 1 | 1.00 | 0.000 | 560.00 | 8.500 | 1.00 | 1,004.50 | 15.247 | 1.00 |
| 86.00 | RFS APXV18-206517S-C | 3 | 1.00 | 3.000 | 26.40 | 5.160 | 0.68 | 114.17 | 7.401 | 0.68 |
| 73.00 | Generic GPS | 1 | 1.00 | 2.000 | 10.00 | 0.900 | 1.00 | 37.23 | 1.495 | 1.00 |
| Totals | Num Loadings:44 | 129 | | | 14,941.20 | | | 30,268.17 | | |

## Linear Appurtenance Properties

Load Case Azimuth (deg) : 30

| Elev From (ft) | Elev To (ft) | Qty | Description | Coax Dia (in) | Coax Wt (lb/ft) | Flat | Max Coax / Row | Dist Between Rows (in) | Dist Between Cols (in) | Azimuth (deg) | Dist From Face (in) | Exposed To Wind | Carrier |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 157.00 | 2 | 7/8" Coax | 1.09 | 0.33 | N | 0 | 0.00 | 0.00 | 0 | 0.00 | N | Other |
| 0.00 | 153.00 | 1 | 7/8" Coax | 1.09 | 0.33 | N | 0 | 0.00 | 0.00 | 0 | 0.00 | N | Other |
| 0.00 | 152.00 | 2 | 7/8" Coax | 1.09 | 0.33 | N | 0 | 0.00 | 0.00 | 0 | 0.00 | N | OTHER |
| 0.00 | 149.00 | 12 | 1 1/4" Coax | 1.55 | 0.63 | N | 0 | 0.00 | 0.00 | 0 | 0.00 | N | SPRINT NEXTEL |
| 0.00 | 145.00 | 11 | 1 5/8" Coax | 1.98 | 0.82 | N | 0 | 0.00 | 0.00 | 0 | 0.00 | N | VERIZON WIRELESS |
| 0.00 | 140.00 | 2 | 1 5/8" (1.63"-41.3mm) | 1.63 | 1.61 | N | 0 | 0.00 | 0.00 | 0 | 0.00 | N | VERIZON WIRELESS |
| 0.00 | 132.00 | 2 | 0.39" (10mm) Fiber | 0.39 | 0.06 | N | 0 | 0.00 | 0.00 | 0 | 0.00 | N | AT&T MOBILITY |
| 0.00 | 132.00 | 4 | 0.78" (19.7mm) 8 AWG | 0.78 | 0.59 | N | 0 | 0.00 | 0.00 | 0 | 0.00 | N | AT&T MOBILITY |
| 0.00 | 132.00 | 12 | 1 5/8" Coax | 1.98 | 0.82 | N | 0 | 0.00 | 0.00 | 0 | 0.00 | N | AT&T MOBILITY |
| 0.00 | 132.00 | 1 | 2" conduit | 2.38 | 3.65 | N | 0 | 0.00 | 0.00 | 0 | 0.00 | N | AT&T MOBILITY |
| 0.00 | 121.00 | 1 | 1 1/4" Hybriflex Cable | 1.54 | 1.00 | N | 1 | 0.00 | 0.00 | 75 | 0.00 | Y | T-MOBILE |
| 0.00 | 121.00 | 2 | 1 5/8" Coax | 1.98 | 0.82 | N | 0 | 0.00 | 0.00 | 0 | 0.00 | N | T-MOBILE |
| 0.00 | 120.00 | 1 | 1 5/8" (1.63"-41.3mm) | 1.63 | 1.61 | N | 0 | 0.00 | 0.00 | 0 | 0.00 | N | T-MOBILE |
| 0.00 | 120.00 | 10 | 1 5/8" Coax | 1.98 | 0.82 | N | 5 | 0.00 | 0.00 | 60 | 0.00 | Y | T-MOBILE |
| 0.00 | 120.00 | 4 | 1 5/8" Coax | 1.98 | 0.82 | N | 0 | 0.00 | 0.00 | 0 | 0.00 | N | T- MOBILE |
| 0.00 | 97.50 | 4 | 1 1/4" Hybriflex Cable | 1.54 | 1.00 | N | 0 | 0.00 | 0.00 | 0 | 0.00 | N | SPRINT NEXTEL |
| 0.00 | 86.00 | 6 | 1 5/8" Coax | 1.98 | 0.82 | N | 0 | 0.00 | 0.00 | 0 | 0.00 | N | METRO PCS INC |
| 0.00 | 73.00 | 1 | 1/2" Coax | 0.63 | 0.15 | N | 1 | 0.00 | 0.00 | 0 | 0.00 | Y | SPRINT NEXTEL |

## Segment Properties (Max Len : 5. ft)

| Seg Top Elev (ft) | Description | Thick (in) | Flat Dia (in) | Area ($in^2$) | Ix ($in^4$) | W/t Ratio | D/t Ratio | F'y (ksi) | S ($in^3$) | Z ($in^3$) | Weight (lb) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | | 0.5000 | 61.050 | 96.089 | 44,509.7 | 19.77 | 122.10 | 78.2 | 1436. | 0.0 | 0.0 |
| 5.00 | | 0.5000 | 59.735 | 94.002 | 41,672.2 | 19.30 | 119.47 | 78.7 | 1374. | 0.0 | 1,617.1 |
| 10.00 | | 0.5000 | 58.420 | 91.915 | 38,958.0 | 18.84 | 116.84 | 79.2 | 1313. | 0.0 | 1,581.6 |
| 15.00 | | 0.5000 | 57.105 | 89.829 | 36,364.2 | 18.37 | 114.21 | 79.8 | 1254. | 0.0 | 1,546.1 |
| 20.00 | | 0.5000 | 55.790 | 87.742 | 33,888.2 | 17.91 | 111.58 | 80.3 | 1196. | 0.0 | 1,510.6 |
| 25.00 | | 0.5000 | 54.475 | 85.655 | 31,527.3 | 17.45 | 108.95 | 80.9 | 1139. | 0.0 | 1,475.1 |
| 30.00 | | 0.5000 | 53.160 | 83.568 | 29,278.6 | 16.98 | 106.32 | 81.4 | 1084. | 0.0 | 1,439.6 |
| 35.00 | | 0.5000 | 51.845 | 81.481 | 27,139.4 | 16.52 | 103.69 | 82.0 | 1031. | 0.0 | 1,404.1 |
| 38.50 | Bot - Section 2 | 0.5000 | 50.924 | 80.020 | 25,705.8 | 16.20 | 101.85 | 82.4 | 994.2 | 0.0 | 961.7 |
| 40.00 | | 0.5000 | 50.530 | 79.394 | 25,107.1 | 16.06 | 101.06 | 82.5 | 978.7 | 0.0 | 717.3 |
| 45.00 | Top - Section 1 | 0.3750 | 49.965 | 59.022 | 18,337.8 | 21.73 | 133.24 | 75.8 | 722.9 | 0.0 | 2,350.6 |
| 50.00 | | 0.3750 | 48.650 | 57.457 | 16,917.3 | 21.11 | 129.73 | 76.6 | 684.9 | 0.0 | 990.9 |
| 55.00 | | 0.3750 | 47.335 | 55.892 | 15,572.1 | 20.49 | 126.23 | 77.3 | 648.0 | 0.0 | 964.2 |
| 60.00 | | 0.3750 | 46.020 | 54.326 | 14,300.2 | 19.88 | 122.72 | 78.0 | 612.0 | 0.0 | 937.6 |
| 65.00 | | 0.3750 | 44.705 | 52.761 | 13,099.5 | 19.26 | 119.21 | 78.8 | 577.1 | 0.0 | 911.0 |
| 70.00 | | 0.3750 | 43.389 | 51.196 | 11,967.9 | 18.64 | 115.71 | 79.5 | 543.3 | 0.0 | 884.4 |
| 73.00 | Bot - Section 3 | 0.3750 | 42.600 | 50.257 | 11,321.4 | 18.27 | 113.60 | 79.9 | 523.4 | 0.0 | 517.8 |
| 75.00 | | 0.3750 | 42.074 | 49.631 | 10,903.5 | 18.02 | 112.20 | 80.2 | 510.4 | 0.0 | 627.8 |
| 78.50 | Top - Section 2 | 0.3125 | 41.779 | 41.128 | 8,934.8 | 21.81 | 133.69 | 75.7 | 421.2 | 0.0 | 1,079.8 |
| 80.00 | | 0.3125 | 41.384 | 40.737 | 8,682.2 | 21.59 | 132.43 | 76.0 | 413.2 | 0.0 | 208.9 |
| 85.00 | | 0.3125 | 40.069 | 39.432 | 7,874.7 | 20.85 | 128.22 | 76.9 | 387.1 | 0.0 | 682.0 |
| 86.00 | | 0.3125 | 39.806 | 39.172 | 7,719.4 | 20.70 | 127.38 | 77.1 | 382.0 | 0.0 | 133.7 |
| 89.00 | | 0.3125 | 39.017 | 38.389 | 7,265.9 | 20.25 | 124.86 | 77.6 | 366.8 | 0.0 | 395.9 |
| 90.00 | | 0.3125 | 38.754 | 38.128 | 7,118.8 | 20.10 | 124.01 | 77.8 | 361.8 | 0.0 | 130.2 |
| 95.00 | | 0.3125 | 37.439 | 36.824 | 6,412.9 | 19.36 | 119.81 | 78.6 | 337.4 | 0.0 | 637.6 |
| 97.50 | | 0.3125 | 36.782 | 36.172 | 6,078.2 | 18.99 | 117.70 | 79.1 | 325.5 | 0.0 | 310.5 |
| 100.0 | | 0.3125 | 36.124 | 35.520 | 5,755.4 | 18.62 | 115.60 | 79.5 | 313.8 | 0.0 | 304.9 |
| 101.0 | | 0.3125 | 35.861 | 35.259 | 5,629.5 | 18.47 | 114.76 | 79.7 | 309.2 | 0.0 | 120.4 |
| 105.0 | | 0.3125 | 34.809 | 34.215 | 5,144.3 | 17.88 | 111.39 | 80.4 | 291.1 | 0.0 | 472.8 |
| 108.7 | Bot - Section 4 | 0.3125 | 33.823 | 33.237 | 4,715.6 | 17.32 | 108.23 | 81.0 | 274.6 | 0.0 | 430.4 |
| 110.0 | | 0.3125 | 33.494 | 32.911 | 4,578.2 | 17.14 | 107.18 | 81.2 | 269.2 | 0.0 | 255.1 |
| 112.0 | | 0.3125 | 32.968 | 32.389 | 4,363.9 | 16.84 | 105.50 | 81.6 | 260.7 | 0.0 | 403.0 |
| 113.0 | Top - Section 3 | 0.2500 | 33.205 | 26.149 | 3,588.0 | 21.66 | 132.82 | 75.9 | 212.8 | 0.0 | 199.1 |
| 115.0 | | 0.2500 | 32.679 | 25.732 | 3,419.0 | 21.29 | 130.72 | 76.4 | 206.1 | 0.0 | 176.5 |
| 120.0 | | 0.2500 | 31.364 | 24.688 | 3,019.7 | 20.36 | 125.46 | 77.5 | 189.6 | 0.0 | 428.9 |
| 121.0 | | 0.2500 | 31.101 | 24.480 | 2,943.7 | 20.17 | 124.40 | 77.7 | 186.4 | 0.0 | 83.7 |
| 125.0 | | 0.2500 | 30.049 | 23.645 | 2,652.7 | 19.43 | 120.20 | 78.5 | 173.9 | 0.0 | 327.5 |
| 130.0 | | 0.2500 | 28.734 | 22.601 | 2,316.8 | 18.50 | 114.94 | 79.6 | 158.8 | 0.0 | 393.4 |
| 132.0 | | 0.2500 | 28.208 | 22.184 | 2,190.8 | 18.13 | 112.83 | 80.1 | 153.0 | 0.0 | 152.4 |
| 135.0 | | 0.2500 | 27.419 | 21.558 | 2,010.5 | 17.58 | 109.68 | 80.7 | 144.4 | 0.0 | 223.3 |
| 138.0 | | 0.2500 | 26.630 | 20.932 | 1,840.4 | 17.02 | 106.52 | 81.4 | 136.1 | 0.0 | 216.9 |
| 140.0 | | 0.2500 | 26.104 | 20.514 | 1,732.5 | 16.65 | 104.42 | 81.8 | 130.7 | 0.0 | 141.0 |
| 145.0 | | 0.2500 | 24.789 | 19.471 | 1,481.3 | 15.72 | 99.16 | 82.6 | 117.7 | 0.0 | 340.2 |
| 148.0 | | 0.2500 | 24.000 | 18.845 | 1,343.0 | 15.16 | 96.00 | 82.6 | 110.2 | 0.0 | 195.6 |
| | | | | | | | | | | | 28,881.1 |

**Load Case:** 1.2D + 1.6W — 101 mph with No Ice — 22 Iterations

Gust Response Factor :1.10 — Wind Importance Factor 1.00
Dead Load Factor :1.20
Wind Load Factor :1.60

## Applied Segment Forces Summary

| Seg Elev (ft) | Description | Shaft Forces Wind FX (lb) | Shaft Forces Dead Load (lb) | Discrete Forces Wind FX (lb) | Discrete Forces Torsion MY (lb-ft) | Discrete Forces Moment MZ (lb-ft) | Discrete Forces Dead Load (lb) | Linear Forces Wind FX (lb) | Linear Forces Dead Load (lb) | Sum of Forces Wind FX (lb) | Sum of Forces Dead Load (lb) | Sum of Forces Torsion MY (lb-ft) | Sum of Forces Moment MZ (lb) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | | 253.8 | 0.0 | | | | | 0.0 | 0.0 | 253.8 | 0.0 | 0.0 | 0.0 |
| 5.00 | | 502.1 | 1,940.5 | | | | | 0.0 | 373.3 | 502.1 | 2,313.8 | 0.0 | 0.0 |
| 10.00 | | 491.1 | 1,897.9 | | | | | 0.0 | 373.3 | 491.1 | 2,271.2 | 0.0 | 0.0 |
| 15.00 | | 480.0 | 1,855.3 | | | | | 0.0 | 373.3 | 480.0 | 2,228.6 | 0.0 | 0.0 |
| 20.00 | | 468.9 | 1,812.7 | | | | | 0.0 | 373.3 | 468.9 | 2,186.0 | 0.0 | 0.0 |
| 25.00 | | 457.9 | 1,770.1 | | | | | 0.0 | 373.3 | 457.9 | 2,143.4 | 0.0 | 0.0 |
| 30.00 | | 452.1 | 1,727.5 | | | | | 0.0 | 373.3 | 452.1 | 2,100.8 | 0.0 | 0.0 |
| 35.00 | | 386.3 | 1,684.9 | | | | | 0.0 | 373.3 | 386.3 | 2,058.2 | 0.0 | 0.0 |
| 38.50 | Bot - Section 2 | 230.5 | 1,154.1 | | | | | 0.0 | 261.3 | 230.5 | 1,415.4 | 0.0 | 0.0 |
| 40.00 | | 305.4 | 860.7 | | | | | 0.0 | 112.0 | 305.4 | 972.7 | 0.0 | 0.0 |
| 45.00 | Top - Section 1 | 471.7 | 2,820.7 | | | | | 0.0 | 373.3 | 471.7 | 3,194.0 | 0.0 | 0.0 |
| 50.00 | | 473.4 | 1,189.1 | | | | | 0.0 | 373.3 | 473.4 | 1,562.4 | 0.0 | 0.0 |
| 55.00 | | 473.3 | 1,157.1 | | | | | 0.0 | 373.3 | 473.3 | 1,530.4 | 0.0 | 0.0 |
| 60.00 | | 471.8 | 1,125.1 | | | | | 0.0 | 373.3 | 471.8 | 1,498.5 | 0.0 | 0.0 |
| 65.00 | | 468.9 | 1,093.2 | | | | | 0.0 | 373.3 | 468.9 | 1,466.5 | 0.0 | 0.0 |
| 70.00 | | 372.7 | 1,061.2 | | | | | 0.0 | 373.3 | 372.7 | 1,434.6 | 0.0 | 0.0 |
| 73.00 | Bot - Section 3 | 232.6 | 621.4 | 35.8 | 0.0 | 71.5 | 12.0 | 0.0 | 224.0 | 268.4 | 857.4 | 0.0 | 0.0 |
| 75.00 | | 256.2 | 753.3 | | | | | 0.0 | 149.0 | 256.2 | 902.3 | 0.0 | 0.0 |
| 78.50 | Top - Section 2 | 231.9 | 1,295.8 | | | | | 0.0 | 260.7 | 231.9 | 1,556.5 | 0.0 | 0.0 |
| 80.00 | | 298.0 | 250.7 | | | | | 0.0 | 111.7 | 298.0 | 362.4 | 0.0 | 0.0 |
| 85.00 | | 274.0 | 818.4 | | | | | 0.0 | 372.4 | 274.0 | 1,190.8 | 0.0 | 0.0 |
| 86.00 | Appurtenance(s) | 180.4 | 160.5 | 439.3 | 0.0 | 1,318.0 | 95.0 | 0.0 | 74.5 | 619.7 | 330.0 | 0.0 | 0.0 |
| 89.00 | Appurtenance(s) | 179.8 | 475.1 | 354.8 | 0.0 | 0.0 | 672.0 | 0.0 | 205.7 | 534.6 | 1,352.8 | 0.0 | 0.0 |
| 90.00 | | 267.4 | 156.2 | | | | | 0.0 | 68.6 | 267.4 | 224.8 | 0.0 | 0.0 |
| 95.00 | | 333.2 | 765.1 | | | | | 0.0 | 342.9 | 333.2 | 1,108.0 | 0.0 | 0.0 |
| 97.50 | Appurtenance(s) | 220.6 | 372.6 | 1,475.0 | 0.0 | 5,162.6 | 1,102.0 | 0.0 | 171.5 | 1,695.6 | 1,646.0 | 0.0 | 0.0 |
| 100.00 | | 153.9 | 365.9 | | | | | 0.0 | 159.5 | 153.9 | 525.4 | 0.0 | 0.0 |
| 101.00 | Appurtenance(s) | 218.3 | 144.5 | 1,834.8 | 0.0 | 0.0 | 2,400.0 | 0.0 | 63.8 | 2,053.0 | 2,608.3 | 0.0 | 0.0 |
| 105.00 | | 336.4 | 567.4 | | | | | 0.0 | 255.1 | 336.4 | 822.5 | 0.0 | 0.0 |
| 108.75 | Bot - Section 4 | 216.5 | 516.4 | | | | | 0.0 | 239.2 | 216.5 | 755.6 | 0.0 | 0.0 |
| 110.00 | | 141.2 | 306.1 | | | | | 0.0 | 79.7 | 141.2 | 385.9 | 0.0 | 0.0 |
| 112.00 | Appurtenance(s) | 130.0 | 483.6 | 796.4 | 0.0 | 0.0 | 539.3 | 0.0 | 127.6 | 926.4 | 1,150.4 | 0.0 | 0.0 |
| 113.00 | Top - Section 3 | 128.9 | 238.9 | | | | | 0.0 | 63.8 | 128.9 | 302.7 | 0.0 | 0.0 |
| 115.00 | | 297.6 | 211.8 | | | | | 0.0 | 127.6 | 297.6 | 339.4 | 0.0 | 0.0 |
| 120.00 | Appurtenance(s) | 251.0 | 514.7 | 1,273.4 | 0.0 | 1,273.4 | 842.4 | 0.0 | 318.9 | 1,524.5 | 1,676.0 | 0.0 | 0.0 |
| 121.00 | Appurtenance(s) | 193.1 | 100.4 | 1,070.8 | 0.0 | 0.0 | 2,400.0 | 0.0 | 48.1 | 1,263.8 | 2,548.5 | 0.0 | 0.0 |
| 125.00 | | 340.9 | 393.0 | | | | | 0.0 | 179.6 | 340.9 | 572.6 | 0.0 | 0.0 |
| 130.00 | | 259.9 | 472.1 | | | | | 0.0 | 224.5 | 259.9 | 696.6 | 0.0 | 0.0 |
| 132.00 | Appurtenance(s) | 180.5 | 182.9 | 3,988.3 | 0.0 | 2,650.5 | 3,586.0 | 0.0 | 89.8 | 4,168.8 | 3,858.6 | 0.0 | 0.0 |
| 135.00 | | 212.7 | 267.9 | | | | | 0.0 | 77.2 | 212.7 | 345.1 | 0.0 | 0.0 |
| 138.00 | Appurtenance(s) | 173.9 | 260.2 | 641.8 | 0.0 | 0.0 | 870.0 | 0.0 | 77.2 | 815.7 | 1,207.5 | 0.0 | 0.0 |
| 140.00 | Appurtenance(s) | 235.8 | 169.2 | 4,069.9 | 0.0 | 0.0 | 3,196.8 | 0.0 | 51.5 | 4,305.7 | 3,417.5 | 0.0 | 0.0 |
| 145.00 | | 263.9 | 408.2 | | | | | 0.0 | 109.4 | 263.9 | 517.6 | 0.0 | 0.0 |
| 148.00 | Appurtenance(s) | 96.9 | 234.7 | 3,078.7 | 0.0 | 5,384.4 | 2,214.0 | 0.0 | 33.2 | 3,175.6 | 2,481.8 | 0.0 | 0.0 |
| | | | | | | | | Totals: | | 32,124.0 | 62,119.6 | 0.00 | 0.00 |

Load Case: 1.2D + 1.6W 101 mph with No Ice 22 Iterations

Gust Response Factor :1.10 Wind Importance Factor 1.00
Dead Load Factor :1.20
Wind Load Factor :1.60

## Calculated Forces

| Seg Elev (ft) | Pu FY (-) (kips) | Vu FX (-) (kips) | Tu MY (ft-kips) | Mu MZ (ft-kips) | Mu MX (ft-kips) | Resultant Moment (ft-kips) | phi Pn (kips) | phi Vn (kips) | phi Tn (ft-kips) | phi Mn (ft-kips) | Total Deflect (in) | Rotation (deg) | Ratio |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | -62.09 | -31.93 | 0.00 | -3,457.25 | 0.00 | 3,457.25 | 6,758.61 | 3,379.30 | 16,808.8 | 8,416.91 | 0.00 | 0.00 | 0.420 |
| 5.00 | -59.72 | -31.54 | 0.00 | -3,297.60 | 0.00 | 3,297.60 | 6,657.97 | 3,328.99 | 16,195.9 | 8,110.02 | 0.06 | -0.11 | 0.416 |
| 10.00 | -57.39 | -31.15 | 0.00 | -3,139.91 | 0.00 | 3,139.91 | 6,555.28 | 3,277.64 | 15,589.2 | 7,806.19 | 0.23 | -0.22 | 0.411 |
| 15.00 | -55.10 | -30.77 | 0.00 | -2,984.15 | 0.00 | 2,984.15 | 6,450.55 | 3,225.27 | 14,988.8 | 7,505.57 | 0.52 | -0.33 | 0.406 |
| 20.00 | -52.86 | -30.39 | 0.00 | -2,830.30 | 0.00 | 2,830.30 | 6,343.76 | 3,171.88 | 14,395.2 | 7,208.34 | 0.93 | -0.44 | 0.401 |
| 25.00 | -50.65 | -30.02 | 0.00 | -2,678.34 | 0.00 | 2,678.34 | 6,234.93 | 3,117.46 | 13,808.7 | 6,914.66 | 1.45 | -0.56 | 0.396 |
| 30.00 | -48.50 | -29.64 | 0.00 | -2,528.25 | 0.00 | 2,528.25 | 6,124.04 | 3,062.02 | 13,229.7 | 6,624.69 | 2.10 | -0.68 | 0.390 |
| 35.00 | -46.39 | -29.31 | 0.00 | -2,380.03 | 0.00 | 2,380.03 | 6,011.11 | 3,005.56 | 12,658.4 | 6,338.62 | 2.87 | -0.80 | 0.383 |
| 38.50 | -44.95 | -29.11 | 0.00 | -2,277.43 | 0.00 | 2,277.43 | 5,930.84 | 2,965.42 | 12,263.3 | 6,140.77 | 3.49 | -0.88 | 0.379 |
| 40.00 | -43.94 | -28.85 | 0.00 | -2,233.76 | 0.00 | 2,233.76 | 5,896.13 | 2,948.06 | 12,095.2 | 6,056.60 | 3.77 | -0.92 | 0.376 |
| 45.00 | -40.69 | -28.41 | 0.00 | -2,089.50 | 0.00 | 2,089.50 | 4,028.70 | 2,014.35 | 8,211.50 | 4,111.85 | 4.80 | -1.04 | 0.518 |
| 50.00 | -39.07 | -28.01 | 0.00 | -1,947.43 | 0.00 | 1,947.43 | 3,959.47 | 1,979.74 | 7,854.78 | 3,933.23 | 5.96 | -1.16 | 0.505 |
| 55.00 | -37.48 | -27.60 | 0.00 | -1,807.40 | 0.00 | 1,807.40 | 3,888.20 | 1,944.10 | 7,501.64 | 3,756.40 | 7.26 | -1.32 | 0.491 |
| 60.00 | -35.92 | -27.20 | 0.00 | -1,669.38 | 0.00 | 1,669.38 | 3,814.87 | 1,907.44 | 7,152.43 | 3,581.53 | 8.74 | -1.48 | 0.476 |
| 65.00 | -34.39 | -26.78 | 0.00 | -1,533.40 | 0.00 | 1,533.40 | 3,739.50 | 1,869.75 | 6,807.48 | 3,408.80 | 10.37 | -1.64 | 0.459 |
| 70.00 | -32.91 | -26.44 | 0.00 | -1,399.49 | 0.00 | 1,399.49 | 3,662.08 | 1,831.04 | 6,467.12 | 3,238.36 | 12.18 | -1.80 | 0.441 |
| 73.00 | -32.02 | -26.19 | 0.00 | -1,320.10 | 0.00 | 1,320.10 | 3,614.64 | 1,807.32 | 6,265.24 | 3,137.28 | 13.34 | -1.90 | 0.430 |
| 75.00 | -31.09 | -25.95 | 0.00 | -1,267.72 | 0.00 | 1,267.72 | 3,582.60 | 1,791.30 | 6,131.68 | 3,070.40 | 14.15 | -1.96 | 0.422 |
| 78.50 | -29.50 | -25.71 | 0.00 | -1,176.90 | 0.00 | 1,176.90 | 2,803.82 | 1,401.91 | 4,778.86 | 2,392.98 | 15.63 | -2.07 | 0.503 |
| 80.00 | -29.10 | -25.45 | 0.00 | -1,138.34 | 0.00 | 1,138.34 | 2,786.75 | 1,393.37 | 4,704.23 | 2,355.61 | 16.29 | -2.12 | 0.494 |
| 85.00 | -27.88 | -25.18 | 0.00 | -1,011.08 | 0.00 | 1,011.08 | 2,728.49 | 1,364.25 | 4,457.31 | 2,231.97 | 18.61 | -2.30 | 0.464 |
| 86.00 | -27.54 | -24.59 | 0.00 | -984.58 | 0.00 | 984.58 | 2,716.60 | 1,358.30 | 4,408.29 | 2,207.42 | 19.09 | -2.33 | 0.456 |
| 89.00 | -26.18 | -24.03 | 0.00 | -910.82 | 0.00 | 910.82 | 2,680.41 | 1,340.21 | 4,262.00 | 2,134.17 | 20.60 | -2.44 | 0.437 |
| 90.00 | -25.93 | -23.80 | 0.00 | -886.80 | 0.00 | 886.80 | 2,668.19 | 1,334.09 | 4,213.50 | 2,109.88 | 21.11 | -2.47 | 0.430 |
| 95.00 | -24.79 | -23.47 | 0.00 | -767.82 | 0.00 | 767.82 | 2,605.84 | 1,302.92 | 3,973.13 | 1,989.52 | 23.79 | -2.64 | 0.396 |
| 97.50 | -23.19 | -21.73 | 0.00 | -703.99 | 0.00 | 703.99 | 2,573.89 | 1,286.95 | 3,854.35 | 1,930.04 | 25.20 | -2.72 | 0.374 |
| 100.00 | -22.65 | -21.57 | 0.00 | -649.67 | 0.00 | 649.67 | 2,541.44 | 1,270.72 | 3,736.55 | 1,871.05 | 26.64 | -2.80 | 0.356 |
| 101.00 | -20.12 | -19.42 | 0.00 | -628.10 | 0.00 | 628.10 | 2,528.31 | 1,264.16 | 3,689.71 | 1,847.60 | 27.23 | -2.83 | 0.348 |
| 105.00 | -19.28 | -19.08 | 0.00 | -550.42 | 0.00 | 550.42 | 2,474.99 | 1,237.49 | 3,504.07 | 1,754.64 | 29.66 | -2.95 | 0.322 |
| 108.75 | -18.52 | -18.85 | 0.00 | -478.88 | 0.00 | 478.88 | 2,423.81 | 1,211.90 | 3,332.62 | 1,668.79 | 32.02 | -3.06 | 0.295 |
| 110.00 | -18.12 | -18.70 | 0.00 | -455.32 | 0.00 | 455.32 | 2,406.49 | 1,203.24 | 3,276.05 | 1,640.46 | 32.82 | -3.09 | 0.285 |
| 112.00 | -17.01 | -17.72 | 0.00 | -417.92 | 0.00 | 417.92 | 2,378.52 | 1,189.26 | 3,186.16 | 1,595.45 | 34.13 | -3.15 | 0.269 |
| 113.00 | -16.70 | -17.59 | 0.00 | -400.20 | 0.00 | 400.20 | 1,786.91 | 893.46 | 2,420.38 | 1,211.99 | 34.79 | -3.17 | 0.340 |
| 115.00 | -16.35 | -17.30 | 0.00 | -365.02 | 0.00 | 365.02 | 1,768.50 | 884.25 | 2,356.91 | 1,180.21 | 36.14 | -3.23 | 0.319 |
| 120.00 | -14.75 | -15.70 | 0.00 | -277.24 | 0.00 | 277.24 | 1,721.02 | 860.51 | 2,199.92 | 1,101.60 | 39.59 | -3.36 | 0.261 |
| 121.00 | -12.26 | -14.30 | 0.00 | -261.54 | 0.00 | 261.54 | 1,711.28 | 855.64 | 2,168.83 | 1,086.03 | 40.29 | -3.38 | 0.248 |
| 125.00 | -11.69 | -13.95 | 0.00 | -204.33 | 0.00 | 204.33 | 1,671.50 | 835.75 | 2,045.59 | 1,024.32 | 43.17 | -3.47 | 0.207 |
| 130.00 | -11.00 | -13.66 | 0.00 | -134.60 | 0.00 | 134.60 | 1,619.92 | 809.96 | 1,894.26 | 948.54 | 46.86 | -3.57 | 0.149 |
| 132.00 | -7.40 | -9.26 | 0.00 | -104.63 | 0.00 | 104.63 | 1,598.72 | 799.36 | 1,834.65 | 918.69 | 48.36 | -3.60 | 0.119 |
| 135.00 | -7.06 | -9.03 | 0.00 | -76.86 | 0.00 | 76.86 | 1,566.30 | 783.15 | 1,746.27 | 874.43 | 50.63 | -3.63 | 0.093 |
| 138.00 | -5.91 | -8.14 | 0.00 | -49.77 | 0.00 | 49.77 | 1,533.15 | 766.57 | 1,659.21 | 830.84 | 52.92 | -3.66 | 0.064 |
| 140.00 | -2.77 | -3.62 | 0.00 | -33.50 | 0.00 | 33.50 | 1,510.63 | 755.32 | 1,601.94 | 802.16 | 54.45 | -3.67 | 0.044 |
| 145.00 | -2.27 | -3.33 | 0.00 | -15.37 | 0.00 | 15.37 | 1,446.60 | 723.30 | 1,455.26 | 728.71 | 58.31 | -3.69 | 0.023 |

Code: ANSI/TIA-222-G
Engineering Number:12995792_C3_03





Load Case: 1.2D + 1.6W — 101 mph with No Ice — 22 Iterations

Gust Response Factor :1.10
Dead Load Factor :1.20
Wind Load Factor :1.60

Wind Importance Factor 1.00

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 148.00 | 0.00 | -3.18 | 0.00 | -5.38 | 0.00 | 5.38 | 1,400.09 | 700.04 | 1,362.73 | 682.38 | 60.63 | -3.70 | 0.008 |

**Load Case:** 0.9D + 1.6W — 101 mph with No Ice (Reduced DL) — 22 Iterations

Gust Response Factor :1.10
Dead Load Factor :0.90
Wind Load Factor :1.60

Wind Importance Factor 1.00

## Applied Segment Forces Summary

| Seg Elev (ft) | Description | Shaft Forces Wind FX (lb) | Shaft Forces Dead Load (lb) | Discrete Forces Wind FX (lb) | Discrete Forces Torsion MY (lb-ft) | Discrete Forces Moment MZ (lb-ft) | Discrete Forces Dead Load (lb) | Linear Forces Wind FX (lb) | Linear Forces Dead Load (lb) | Sum of Forces Wind FX (lb) | Sum of Forces Dead Load (lb) | Sum of Forces Torsion MY (lb-ft) | Sum of Forces Moment MZ (lb) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | | 253.8 | 0.0 | | | | | 0.0 | 0.0 | 253.8 | 0.0 | 0.0 | 0.0 |
| 5.00 | | 502.1 | 1,455.4 | | | | | 0.0 | 280.0 | 502.1 | 1,735.4 | 0.0 | 0.0 |
| 10.00 | | 491.1 | 1,423.4 | | | | | 0.0 | 280.0 | 491.1 | 1,703.4 | 0.0 | 0.0 |
| 15.00 | | 480.0 | 1,391.5 | | | | | 0.0 | 280.0 | 480.0 | 1,671.5 | 0.0 | 0.0 |
| 20.00 | | 468.9 | 1,359.5 | | | | | 0.0 | 280.0 | 468.9 | 1,639.5 | 0.0 | 0.0 |
| 25.00 | | 457.9 | 1,327.6 | | | | | 0.0 | 280.0 | 457.9 | 1,607.6 | 0.0 | 0.0 |
| 30.00 | | 452.1 | 1,295.6 | | | | | 0.0 | 280.0 | 452.1 | 1,575.6 | 0.0 | 0.0 |
| 35.00 | | 386.3 | 1,263.7 | | | | | 0.0 | 280.0 | 386.3 | 1,543.6 | 0.0 | 0.0 |
| 38.50 | Bot - Section 2 | 230.5 | 865.5 | | | | | 0.0 | 196.0 | 230.5 | 1,061.5 | 0.0 | 0.0 |
| 40.00 | | 305.4 | 645.6 | | | | | 0.0 | 84.0 | 305.4 | 729.6 | 0.0 | 0.0 |
| 45.00 | Top - Section 1 | 471.7 | 2,115.5 | | | | | 0.0 | 280.0 | 471.7 | 2,395.5 | 0.0 | 0.0 |
| 50.00 | | 473.4 | 891.8 | | | | | 0.0 | 280.0 | 473.4 | 1,171.8 | 0.0 | 0.0 |
| 55.00 | | 473.3 | 867.8 | | | | | 0.0 | 280.0 | 473.3 | 1,147.8 | 0.0 | 0.0 |
| 60.00 | | 471.8 | 843.9 | | | | | 0.0 | 280.0 | 471.8 | 1,123.8 | 0.0 | 0.0 |
| 65.00 | | 468.9 | 819.9 | | | | | 0.0 | 280.0 | 468.9 | 1,099.9 | 0.0 | 0.0 |
| 70.00 | | 372.7 | 795.9 | | | | | 0.0 | 280.0 | 372.7 | 1,075.9 | 0.0 | 0.0 |
| 73.00 | Bot - Section 3 | 232.6 | 466.1 | 35.8 | 0.0 | 71.5 | 9.0 | 0.0 | 168.0 | 268.4 | 643.0 | 0.0 | 0.0 |
| 75.00 | | 256.2 | 565.0 | | | | | 0.0 | 111.7 | 256.2 | 676.7 | 0.0 | 0.0 |
| 78.50 | Top - Section 2 | 231.9 | 971.8 | | | | | 0.0 | 195.5 | 231.9 | 1,167.4 | 0.0 | 0.0 |
| 80.00 | | 298.0 | 188.0 | | | | | 0.0 | 83.8 | 298.0 | 271.8 | 0.0 | 0.0 |
| 85.00 | | 274.0 | 613.8 | | | | | 0.0 | 279.3 | 274.0 | 893.1 | 0.0 | 0.0 |
| 86.00 | Appurtenance(s) | 180.4 | 120.4 | 439.3 | 0.0 | 1,318.0 | 71.3 | 0.0 | 55.9 | 619.7 | 247.5 | 0.0 | 0.0 |
| 89.00 | Appurtenance(s) | 179.8 | 356.3 | 354.8 | 0.0 | 0.0 | 504.0 | 0.0 | 154.3 | 534.5 | 1,014.6 | 0.0 | 0.0 |
| 90.00 | | 265.8 | 117.2 | | | | | 0.0 | 51.4 | 265.8 | 168.6 | 0.0 | 0.0 |
| 95.00 | | 330.0 | 573.9 | | | | | 0.0 | 257.2 | 330.0 | 831.0 | 0.0 | 0.0 |
| 97.50 | Appurtenance(s) | 216.7 | 279.4 | 1,475.0 | 0.0 | 5,162.6 | 826.5 | 0.0 | 128.6 | 1,691.7 | 1,234.5 | 0.0 | 0.0 |
| 100.00 | | 150.5 | 274.4 | | | | | 0.0 | 119.6 | 150.5 | 394.0 | 0.0 | 0.0 |
| 101.00 | Appurtenance(s) | 211.9 | 108.4 | 1,834.8 | 0.0 | 0.0 | 1,800.0 | 0.0 | 47.8 | 2,046.7 | 1,956.2 | 0.0 | 0.0 |
| 105.00 | | 324.8 | 425.5 | | | | | 0.0 | 191.3 | 324.8 | 616.9 | 0.0 | 0.0 |
| 108.75 | Bot - Section 4 | 207.6 | 387.3 | | | | | 0.0 | 179.4 | 207.6 | 566.7 | 0.0 | 0.0 |
| 110.00 | | 134.5 | 229.6 | | | | | 0.0 | 59.8 | 134.5 | 289.4 | 0.0 | 0.0 |
| 112.00 | Appurtenance(s) | 123.4 | 362.7 | 796.4 | 0.0 | 0.0 | 404.5 | 0.0 | 95.7 | 919.8 | 862.8 | 0.0 | 0.0 |
| 113.00 | Top - Section 3 | 122.1 | 179.2 | | | | | 0.0 | 47.8 | 122.1 | 227.0 | 0.0 | 0.0 |
| 115.00 | | 280.1 | 158.9 | | | | | 0.0 | 95.7 | 280.1 | 254.6 | 0.0 | 0.0 |
| 120.00 | Appurtenance(s) | 238.0 | 386.0 | 1,273.4 | 0.0 | 1,273.4 | 631.8 | 0.0 | 239.2 | 1,511.5 | 1,257.0 | 0.0 | 0.0 |
| 121.00 | Appurtenance(s) | 193.1 | 75.3 | 1,070.8 | 0.0 | 0.0 | 1,800.0 | 0.0 | 36.1 | 1,263.8 | 1,911.3 | 0.0 | 0.0 |
| 125.00 | | 340.9 | 294.8 | | | | | 0.0 | 134.7 | 340.9 | 429.5 | 0.0 | 0.0 |
| 130.00 | | 259.9 | 354.1 | | | | | 0.0 | 168.4 | 259.9 | 522.5 | 0.0 | 0.0 |
| 132.00 | Appurtenance(s) | 180.5 | 137.2 | 3,988.3 | 0.0 | 2,650.5 | 2,689.5 | 0.0 | 67.4 | 4,168.8 | 2,894.0 | 0.0 | 0.0 |
| 135.00 | | 212.7 | 200.9 | | | | | 0.0 | 57.9 | 212.7 | 258.9 | 0.0 | 0.0 |
| 138.00 | Appurtenance(s) | 173.9 | 195.2 | 641.8 | 0.0 | 0.0 | 652.5 | 0.0 | 57.9 | 815.7 | 905.6 | 0.0 | 0.0 |
| 140.00 | Appurtenance(s) | 235.8 | 126.9 | 4,069.9 | 0.0 | 0.0 | 2,397.6 | 0.0 | 38.6 | 4,305.7 | 2,563.1 | 0.0 | 0.0 |
| 145.00 | | 263.9 | 306.1 | | | | | 0.0 | 82.0 | 263.9 | 388.2 | 0.0 | 0.0 |
| 148.00 | Appurtenance(s) | 96.9 | 176.0 | 3,078.7 | 0.0 | 5,384.4 | 1,660.5 | 0.0 | 24.9 | 3,175.6 | 1,861.4 | 0.0 | 0.0 |
| | | | | | | | | Totals: | | 32,034.4 | 46,589.7 | 0.00 | 0.00 |

Load Case: 0.9D + 1.6W 101 mph with No Ice (Reduced DL) 22 Iterations

Gust Response Factor :1.10 Wind Importance Factor 1.00
Dead Load Factor :0.90
Wind Load Factor :1.60

## Calculated Forces

| Seg Elev (ft) | Pu FY (-) (kips) | Vu FX (-) (kips) | Tu MY (ft-kips) | Mu MZ (ft-kips) | Mu MX (ft-kips) | Resultant Moment (ft-kips) | phi Pn (kips) | phi Vn (kips) | phi Tn (ft-kips) | phi Mn (ft-kips) | Total Deflect (in) | Rotation (deg) | Ratio |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | -46.56 | -31.82 | 0.00 | -3,418.00 | 0.00 | 3,418.00 | 6,758.61 | 3,379.30 | 16,808.8 | 8,416.91 | 0.00 | 0.00 | 0.413 |
| 5.00 | -44.77 | -31.41 | 0.00 | -3,258.88 | 0.00 | 3,258.88 | 6,657.97 | 3,328.99 | 16,195.9 | 8,110.02 | 0.06 | -0.11 | 0.409 |
| 10.00 | -43.00 | -30.99 | 0.00 | -3,101.86 | 0.00 | 3,101.86 | 6,555.28 | 3,277.64 | 15,589.2 | 7,806.19 | 0.23 | -0.22 | 0.404 |
| 15.00 | -41.28 | -30.58 | 0.00 | -2,946.90 | 0.00 | 2,946.90 | 6,450.55 | 3,225.27 | 14,988.8 | 7,505.57 | 0.51 | -0.33 | 0.399 |
| 20.00 | -39.58 | -30.18 | 0.00 | -2,793.98 | 0.00 | 2,793.98 | 6,343.76 | 3,171.88 | 14,395.2 | 7,208.34 | 0.92 | -0.44 | 0.394 |
| 25.00 | -37.92 | -29.79 | 0.00 | -2,643.07 | 0.00 | 2,643.07 | 6,234.93 | 3,117.46 | 13,808.7 | 6,914.66 | 1.44 | -0.55 | 0.388 |
| 30.00 | -36.29 | -29.39 | 0.00 | -2,494.14 | 0.00 | 2,494.14 | 6,124.04 | 3,062.02 | 13,229.7 | 6,624.69 | 2.08 | -0.67 | 0.383 |
| 35.00 | -34.70 | -29.05 | 0.00 | -2,347.18 | 0.00 | 2,347.18 | 6,011.11 | 3,005.56 | 12,658.4 | 6,338.62 | 2.84 | -0.79 | 0.376 |
| 38.50 | -33.61 | -28.84 | 0.00 | -2,245.52 | 0.00 | 2,245.52 | 5,930.84 | 2,965.42 | 12,263.3 | 6,140.77 | 3.45 | -0.87 | 0.371 |
| 40.00 | -32.84 | -28.57 | 0.00 | -2,202.27 | 0.00 | 2,202.27 | 5,896.13 | 2,948.06 | 12,095.2 | 6,056.60 | 3.73 | -0.91 | 0.369 |
| 45.00 | -30.40 | -28.12 | 0.00 | -2,059.44 | 0.00 | 2,059.44 | 4,028.70 | 2,014.35 | 8,211.50 | 4,111.85 | 4.74 | -1.03 | 0.509 |
| 50.00 | -29.17 | -27.69 | 0.00 | -1,918.85 | 0.00 | 1,918.85 | 3,959.47 | 1,979.74 | 7,854.78 | 3,933.23 | 5.88 | -1.15 | 0.495 |
| 55.00 | -27.96 | -27.27 | 0.00 | -1,780.39 | 0.00 | 1,780.39 | 3,888.20 | 1,944.10 | 7,501.64 | 3,756.40 | 7.17 | -1.31 | 0.481 |
| 60.00 | -26.77 | -26.85 | 0.00 | -1,644.03 | 0.00 | 1,644.03 | 3,814.87 | 1,907.44 | 7,152.43 | 3,581.53 | 8.62 | -1.46 | 0.466 |
| 65.00 | -25.61 | -26.42 | 0.00 | -1,509.80 | 0.00 | 1,509.80 | 3,739.50 | 1,869.75 | 6,807.48 | 3,408.80 | 10.24 | -1.62 | 0.450 |
| 70.00 | -24.49 | -26.07 | 0.00 | -1,377.71 | 0.00 | 1,377.71 | 3,662.08 | 1,831.04 | 6,467.12 | 3,238.36 | 12.02 | -1.78 | 0.432 |
| 73.00 | -23.82 | -25.81 | 0.00 | -1,299.44 | 0.00 | 1,299.44 | 3,614.64 | 1,807.32 | 6,265.24 | 3,137.28 | 13.17 | -1.87 | 0.421 |
| 75.00 | -23.11 | -25.57 | 0.00 | -1,247.82 | 0.00 | 1,247.82 | 3,582.60 | 1,791.30 | 6,131.68 | 3,070.40 | 13.96 | -1.93 | 0.413 |
| 78.50 | -21.92 | -25.33 | 0.00 | -1,158.33 | 0.00 | 1,158.33 | 2,803.82 | 1,401.91 | 4,778.86 | 2,392.98 | 15.42 | -2.04 | 0.492 |
| 80.00 | -21.61 | -25.06 | 0.00 | -1,120.34 | 0.00 | 1,120.34 | 2,786.75 | 1,393.37 | 4,704.23 | 2,355.61 | 16.07 | -2.09 | 0.484 |
| 85.00 | -20.68 | -24.79 | 0.00 | -995.04 | 0.00 | 995.04 | 2,728.49 | 1,364.25 | 4,457.31 | 2,231.97 | 18.36 | -2.27 | 0.454 |
| 86.00 | -20.43 | -24.19 | 0.00 | -968.93 | 0.00 | 968.93 | 2,716.60 | 1,358.30 | 4,408.29 | 2,207.42 | 18.84 | -2.30 | 0.447 |
| 89.00 | -19.41 | -23.63 | 0.00 | -896.37 | 0.00 | 896.37 | 2,680.41 | 1,340.21 | 4,262.00 | 2,134.17 | 20.32 | -2.40 | 0.428 |
| 90.00 | -19.21 | -23.39 | 0.00 | -872.74 | 0.00 | 872.74 | 2,668.19 | 1,334.09 | 4,213.50 | 2,109.88 | 20.83 | -2.44 | 0.421 |
| 95.00 | -18.35 | -23.07 | 0.00 | -755.77 | 0.00 | 755.77 | 2,605.84 | 1,302.92 | 3,973.13 | 1,989.52 | 23.47 | -2.60 | 0.387 |
| 97.50 | -17.16 | -21.34 | 0.00 | -692.94 | 0.00 | 692.94 | 2,573.89 | 1,286.95 | 3,854.35 | 1,930.04 | 24.85 | -2.68 | 0.366 |
| 100.00 | -16.76 | -21.19 | 0.00 | -639.58 | 0.00 | 639.58 | 2,541.44 | 1,270.72 | 3,736.55 | 1,871.05 | 26.28 | -2.76 | 0.349 |
| 101.00 | -14.88 | -19.07 | 0.00 | -618.39 | 0.00 | 618.39 | 2,528.31 | 1,264.16 | 3,689.71 | 1,847.60 | 26.86 | -2.79 | 0.341 |
| 105.00 | -14.24 | -18.74 | 0.00 | -542.11 | 0.00 | 542.11 | 2,474.99 | 1,237.49 | 3,504.07 | 1,754.64 | 29.25 | -2.91 | 0.315 |
| 108.75 | -13.66 | -18.52 | 0.00 | -471.82 | 0.00 | 471.82 | 2,423.81 | 1,211.90 | 3,332.62 | 1,668.79 | 31.58 | -3.01 | 0.289 |
| 110.00 | -13.37 | -18.38 | 0.00 | -448.66 | 0.00 | 448.66 | 2,406.49 | 1,203.24 | 3,276.05 | 1,640.46 | 32.37 | -3.05 | 0.279 |
| 112.00 | -12.54 | -17.43 | 0.00 | -411.89 | 0.00 | 411.89 | 2,378.52 | 1,189.26 | 3,186.16 | 1,595.45 | 33.66 | -3.10 | 0.264 |
| 113.00 | -12.31 | -17.30 | 0.00 | -394.47 | 0.00 | 394.47 | 1,786.91 | 893.46 | 2,420.38 | 1,211.99 | 34.31 | -3.13 | 0.333 |
| 115.00 | -12.05 | -17.03 | 0.00 | -359.86 | 0.00 | 359.86 | 1,768.50 | 884.25 | 2,356.91 | 1,180.21 | 35.63 | -3.18 | 0.312 |
| 120.00 | -10.86 | -15.46 | 0.00 | -273.45 | 0.00 | 273.45 | 1,721.02 | 860.51 | 2,199.92 | 1,101.60 | 39.03 | -3.31 | 0.255 |
| 121.00 | -9.01 | -14.10 | 0.00 | -257.99 | 0.00 | 257.99 | 1,711.28 | 855.64 | 2,168.83 | 1,086.03 | 39.73 | -3.34 | 0.243 |
| 125.00 | -8.58 | -13.75 | 0.00 | -201.59 | 0.00 | 201.59 | 1,671.50 | 835.75 | 2,045.59 | 1,024.32 | 42.56 | -3.42 | 0.202 |
| 130.00 | -8.06 | -13.46 | 0.00 | -132.86 | 0.00 | 132.86 | 1,619.92 | 809.96 | 1,894.26 | 948.54 | 46.20 | -3.51 | 0.145 |
| 132.00 | -5.42 | -9.13 | 0.00 | -103.28 | 0.00 | 103.28 | 1,598.72 | 799.36 | 1,834.65 | 918.69 | 47.68 | -3.54 | 0.116 |
| 135.00 | -5.17 | -8.90 | 0.00 | -75.89 | 0.00 | 75.89 | 1,566.30 | 783.15 | 1,746.27 | 874.43 | 49.91 | -3.58 | 0.090 |
| 138.00 | -4.32 | -8.03 | 0.00 | -49.19 | 0.00 | 49.19 | 1,533.15 | 766.57 | 1,659.21 | 830.84 | 52.17 | -3.60 | 0.062 |
| 140.00 | -2.03 | -3.57 | 0.00 | -33.12 | 0.00 | 33.12 | 1,510.63 | 755.32 | 1,601.94 | 802.16 | 53.68 | -3.62 | 0.043 |
| 145.00 | -1.66 | -3.29 | 0.00 | -15.25 | 0.00 | 15.25 | 1,446.60 | 723.30 | 1,455.26 | 728.71 | 57.48 | -3.64 | 0.022 |

Load Case: 0.9D + 1.6W — 101 mph with No Ice (Reduced DL) — 22 Iterations

Gust Response Factor :1.10
Dead Load Factor :0.90
Wind Load Factor :1.60
Wind Importance Factor 1.00

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 148.00 | 0.00 | -3.18 | 0.00 | -5.38 | 0.00 | 5.38 | 1,400.09 | 700.04 | 1,362.73 | 682.38 | 59.77 | -3.64 | 0.008 |

**Load Case:** 1.2D + 1.0Di + 1.0Wi — 50 mph with 0.75 in Radial Ice — 21 Iterations

Gust Response Factor :1.10 — Ice Dead Load Factor :1.00 — Wind Importance Factor :1.00
Dead Load Factor :1.20 — Ice Importance Factor :1.00
Wind Load Factor :1.00

## Applied Segment Forces Summary

| Seg Elev (ft) | Description | Shaft Forces Wind FX (lb) | Shaft Forces Dead Load (lb) | Discrete Forces Wind FX (lb) | Discrete Forces Torsion MY (lb-ft) | Discrete Forces Moment MZ (lb-ft) | Discrete Forces Dead Load (lb) | Linear Forces Wind FX (lb) | Linear Forces Dead Load (lb) | Sum of Forces Wind FX (lb) | Sum of Forces Dead Load (lb) | Sum of Forces Torsion MY (lb-ft) | Sum of Forces Moment MZ (lb) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | | 74.5 | 0.0 | | | | | 0.0 | 0.0 | 74.5 | 0.0 | 0.0 | 0.0 |
| 5.00 | | 147.7 | 2,382.6 | | | | | 22.2 | 446.8 | 169.9 | 2,829.5 | 0.0 | 0.0 |
| 10.00 | | 145.1 | 2,381.8 | | | | | 23.3 | 454.7 | 168.4 | 2,836.4 | 0.0 | 0.0 |
| 15.00 | | 142.2 | 2,353.9 | | | | | 23.9 | 458.7 | 166.2 | 2,812.6 | 0.0 | 0.0 |
| 20.00 | | 139.3 | 2,317.1 | | | | | 24.4 | 461.6 | 163.7 | 2,778.7 | 0.0 | 0.0 |
| 25.00 | | 136.3 | 2,275.8 | | | | | 24.7 | 463.7 | 161.0 | 2,739.5 | 0.0 | 0.0 |
| 30.00 | | 134.9 | 2,231.5 | | | | | 25.0 | 465.5 | 159.9 | 2,697.1 | 0.0 | 0.0 |
| 35.00 | | 115.5 | 2,185.3 | | | | | 25.9 | 467.1 | 141.3 | 2,652.4 | 0.0 | 0.0 |
| 38.50 | Bot - Section 2 | 69.0 | 1,502.7 | | | | | 18.9 | 327.8 | 87.9 | 1,830.5 | 0.0 | 0.0 |
| 40.00 | | 91.5 | 1,012.2 | | | | | 8.3 | 140.7 | 99.8 | 1,152.8 | 0.0 | 0.0 |
| 45.00 | Top - Section 1 | 141.5 | 3,317.0 | | | | | 28.4 | 469.6 | 170.0 | 3,786.6 | 0.0 | 0.0 |
| 50.00 | | 142.3 | 1,678.3 | | | | | 29.5 | 470.7 | 171.9 | 2,149.0 | 0.0 | 0.0 |
| 55.00 | | 142.6 | 1,638.4 | | | | | 30.6 | 471.7 | 173.2 | 2,110.1 | 0.0 | 0.0 |
| 60.00 | | 142.5 | 1,597.9 | | | | | 31.6 | 472.6 | 174.1 | 2,070.5 | 0.0 | 0.0 |
| 65.00 | | 142.0 | 1,556.9 | | | | | 32.6 | 473.4 | 174.6 | 2,030.3 | 0.0 | 0.0 |
| 70.00 | | 113.1 | 1,515.4 | | | | | 33.5 | 474.2 | 146.6 | 1,989.6 | 0.0 | 0.0 |
| 73.00 | Bot - Section 3 | 70.7 | 890.7 | 9.1 | 0.0 | 18.2 | 30.7 | 20.5 | 284.9 | 100.3 | 1,206.3 | 0.0 | 0.0 |
| 75.00 | | 77.9 | 933.9 | | | | | 13.9 | 186.8 | 91.8 | 1,120.8 | 0.0 | 0.0 |
| 78.50 | Top - Section 2 | 70.6 | 1,606.4 | | | | | 24.6 | 327.2 | 95.2 | 1,933.6 | 0.0 | 0.0 |
| 80.00 | | 90.9 | 383.1 | | | | | 10.6 | 140.3 | 101.6 | 523.4 | 0.0 | 0.0 |
| 85.00 | | 83.7 | 1,247.9 | | | | | 36.0 | 468.1 | 119.7 | 1,716.0 | 0.0 | 0.0 |
| 86.00 | Appurtenance(s) | 55.2 | 246.2 | 96.5 | 0.0 | 289.5 | 278.2 | 7.3 | 93.7 | 159.0 | 618.0 | 0.0 | 0.0 |
| 89.00 | Appurtenance(s) | 55.0 | 727.8 | 97.5 | 0.0 | 0.0 | 1,004.5 | 22.1 | 263.5 | 174.6 | 1,995.8 | 0.0 | 0.0 |
| 90.00 | | 81.6 | 240.1 | | | | | 7.4 | 87.9 | 89.0 | 328.0 | 0.0 | 0.0 |
| 95.00 | | 101.4 | 1,172.3 | | | | | 37.6 | 439.7 | 139.0 | 1,612.0 | 0.0 | 0.0 |
| 97.50 | Appurtenance(s) | 66.7 | 573.6 | 305.2 | 0.0 | 1,068.3 | 2,233.9 | 19.1 | 220.0 | 391.0 | 3,027.6 | 0.0 | 0.0 |
| 100.00 | | 46.4 | 564.0 | | | | | 19.2 | 208.2 | 65.7 | 772.2 | 0.0 | 0.0 |
| 101.00 | Appurtenance(s) | 65.5 | 223.3 | 414.9 | 0.0 | 0.0 | 3,368.2 | 7.8 | 83.3 | 488.1 | 3,674.8 | 0.0 | 0.0 |
| 105.00 | | 100.6 | 874.6 | | | | | 31.3 | 333.4 | 131.9 | 1,208.0 | 0.0 | 0.0 |
| 108.75 | Bot - Section 4 | 64.4 | 797.8 | | | | | 29.7 | 312.8 | 94.1 | 1,110.6 | 0.0 | 0.0 |
| 110.00 | | 41.8 | 400.6 | | | | | 10.0 | 104.3 | 51.8 | 504.9 | 0.0 | 0.0 |
| 112.00 | Appurtenance(s) | 38.4 | 632.7 | 178.2 | 0.0 | 0.0 | 878.9 | 16.1 | 167.0 | 232.6 | 1,678.6 | 0.0 | 0.0 |
| 113.00 | Top - Section 3 | 38.0 | 313.0 | | | | | 8.1 | 83.5 | 46.1 | 396.6 | 0.0 | 0.0 |
| 115.00 | | 87.4 | 358.1 | | | | | 16.2 | 167.1 | 103.7 | 525.1 | 0.0 | 0.0 |
| 120.00 | Appurtenance(s) | 74.4 | 867.3 | 266.1 | 0.0 | 266.1 | 1,676.8 | 41.1 | 418.0 | 381.6 | 2,962.1 | 0.0 | 0.0 |
| 121.00 | Appurtenance(s) | 60.6 | 170.5 | 306.3 | 0.0 | 0.0 | 2,846.9 | 1.9 | 50.6 | 368.7 | 3,068.0 | 0.0 | 0.0 |
| 125.00 | | 107.3 | 665.2 | | | | | 0.0 | 179.6 | 107.3 | 844.8 | 0.0 | 0.0 |
| 130.00 | | 82.0 | 799.5 | | | | | 0.0 | 224.5 | 82.0 | 1,024.0 | 0.0 | 0.0 |
| 132.00 | Appurtenance(s) | 57.2 | 311.9 | 923.0 | 0.0 | 587.8 | 5,681.7 | 0.0 | 89.8 | 980.2 | 6,083.4 | 0.0 | 0.0 |
| 135.00 | | 67.6 | 456.8 | | | | | 0.0 | 77.2 | 67.6 | 534.0 | 0.0 | 0.0 |
| 138.00 | Appurtenance(s) | 55.4 | 444.4 | 164.4 | 0.0 | 0.0 | 1,365.1 | 0.0 | 77.2 | 219.9 | 1,886.8 | 0.0 | 0.0 |
| 140.00 | Appurtenance(s) | 75.5 | 290.0 | 912.4 | 0.0 | 0.0 | 5,343.7 | 0.0 | 51.5 | 987.9 | 5,685.2 | 0.0 | 0.0 |
| 145.00 | | 84.8 | 696.5 | | | | | 0.0 | 109.4 | 84.8 | 805.9 | 0.0 | 0.0 |
| 148.00 | Appurtenance(s) | 31.2 | 403.0 | 845.0 | 0.0 | 1,885.8 | 3,593.9 | 0.0 | 33.2 | 876.3 | 4,030.1 | 0.0 | 0.0 |
| | | | | | | | | Totals: | | 9,234.31 | 87,342.0 | 0.00 | 0.00 |

Load Case: 1.2D + 1.0Di + 1.0Wi 50 mph with 0.75 in Radial Ice 21 Iterations

Gust Response Factor :1.10 Ice Dead Load Factor :1.00 Wind Importance Factor :1.00
Dead Load Factor :1.20 Ice Importance Factor :1.00
Wind Load Factor :1.00

## Calculated Forces

| Seg Elev (ft) | Pu FY (-) (kips) | Vu FX (-) (kips) | Tu MY (ft-kips) | Mu MZ (ft-kips) | Mu MX (ft-kips) | Resultant Moment (ft-kips) | phi Pn (kips) | phi Vn (kips) | phi Tn (ft-kips) | phi Mn (ft-kips) | Total Deflect (in) | Rotation (deg) | Ratio |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | -87.34 | -9.18 | 0.00 | -959.15 | 0.00 | 959.15 | 6,758.61 | 3,379.30 | 16,808.8 | 8,416.91 | 0.00 | 0.00 | 0.127 |
| 5.00 | -84.51 | -9.06 | 0.00 | -913.24 | 0.00 | 913.24 | 6,657.97 | 3,328.99 | 16,195.9 | 8,110.02 | 0.02 | -0.03 | 0.125 |
| 10.00 | -81.66 | -8.93 | 0.00 | -867.96 | 0.00 | 867.96 | 6,555.28 | 3,277.64 | 15,589.2 | 7,806.19 | 0.06 | -0.06 | 0.124 |
| 15.00 | -78.85 | -8.80 | 0.00 | -823.31 | 0.00 | 823.31 | 6,450.55 | 3,225.27 | 14,988.8 | 7,505.57 | 0.14 | -0.09 | 0.122 |
| 20.00 | -76.06 | -8.68 | 0.00 | -779.30 | 0.00 | 779.30 | 6,343.76 | 3,171.88 | 14,395.2 | 7,208.34 | 0.26 | -0.12 | 0.120 |
| 25.00 | -73.32 | -8.55 | 0.00 | -735.92 | 0.00 | 735.92 | 6,234.93 | 3,117.46 | 13,808.7 | 6,914.66 | 0.40 | -0.15 | 0.118 |
| 30.00 | -70.62 | -8.42 | 0.00 | -693.18 | 0.00 | 693.18 | 6,124.04 | 3,062.02 | 13,229.7 | 6,624.69 | 0.58 | -0.19 | 0.116 |
| 35.00 | -67.96 | -8.30 | 0.00 | -651.08 | 0.00 | 651.08 | 6,011.11 | 3,005.56 | 12,658.4 | 6,338.62 | 0.79 | -0.22 | 0.114 |
| 38.50 | -66.13 | -8.23 | 0.00 | -622.02 | 0.00 | 622.02 | 5,930.84 | 2,965.42 | 12,263.3 | 6,140.77 | 0.96 | -0.24 | 0.112 |
| 40.00 | -64.97 | -8.15 | 0.00 | -609.68 | 0.00 | 609.68 | 5,896.13 | 2,948.06 | 12,095.2 | 6,056.60 | 1.04 | -0.25 | 0.112 |
| 45.00 | -61.18 | -8.00 | 0.00 | -568.94 | 0.00 | 568.94 | 4,028.70 | 2,014.35 | 8,211.50 | 4,111.85 | 1.32 | -0.29 | 0.154 |
| 50.00 | -59.03 | -7.85 | 0.00 | -528.96 | 0.00 | 528.96 | 3,959.47 | 1,979.74 | 7,854.78 | 3,933.23 | 1.64 | -0.32 | 0.149 |
| 55.00 | -56.92 | -7.71 | 0.00 | -489.71 | 0.00 | 489.71 | 3,888.20 | 1,944.10 | 7,501.64 | 3,756.40 | 2.00 | -0.36 | 0.145 |
| 60.00 | -54.84 | -7.56 | 0.00 | -451.16 | 0.00 | 451.16 | 3,814.87 | 1,907.44 | 7,152.43 | 3,581.53 | 2.40 | -0.41 | 0.140 |
| 65.00 | -52.81 | -7.41 | 0.00 | -413.36 | 0.00 | 413.36 | 3,739.50 | 1,869.75 | 6,807.48 | 3,408.80 | 2.85 | -0.45 | 0.135 |
| 70.00 | -50.81 | -7.28 | 0.00 | -376.30 | 0.00 | 376.30 | 3,662.08 | 1,831.04 | 6,467.12 | 3,238.36 | 3.35 | -0.49 | 0.130 |
| 73.00 | -49.61 | -7.19 | 0.00 | -354.44 | 0.00 | 354.44 | 3,614.64 | 1,807.32 | 6,265.24 | 3,137.28 | 3.66 | -0.52 | 0.127 |
| 75.00 | -48.48 | -7.11 | 0.00 | -340.07 | 0.00 | 340.07 | 3,582.60 | 1,791.30 | 6,131.68 | 3,070.40 | 3.88 | -0.54 | 0.124 |
| 78.50 | -46.55 | -7.01 | 0.00 | -315.20 | 0.00 | 315.20 | 2,803.82 | 1,401.91 | 4,778.86 | 2,392.98 | 4.29 | -0.57 | 0.148 |
| 80.00 | -46.02 | -6.93 | 0.00 | -304.69 | 0.00 | 304.69 | 2,786.75 | 1,393.37 | 4,704.23 | 2,355.61 | 4.47 | -0.58 | 0.146 |
| 85.00 | -44.30 | -6.81 | 0.00 | -270.06 | 0.00 | 270.06 | 2,728.49 | 1,364.25 | 4,457.31 | 2,231.97 | 5.10 | -0.63 | 0.137 |
| 86.00 | -43.69 | -6.66 | 0.00 | -262.96 | 0.00 | 262.96 | 2,716.60 | 1,358.30 | 4,408.29 | 2,207.42 | 5.23 | -0.63 | 0.135 |
| 89.00 | -41.69 | -6.48 | 0.00 | -242.98 | 0.00 | 242.98 | 2,680.41 | 1,340.21 | 4,262.00 | 2,134.17 | 5.64 | -0.66 | 0.129 |
| 90.00 | -41.36 | -6.40 | 0.00 | -236.51 | 0.00 | 236.51 | 2,668.19 | 1,334.09 | 4,213.50 | 2,109.88 | 5.78 | -0.67 | 0.128 |
| 95.00 | -39.75 | -6.27 | 0.00 | -204.50 | 0.00 | 204.50 | 2,605.84 | 1,302.92 | 3,973.13 | 1,989.52 | 6.51 | -0.72 | 0.118 |
| 97.50 | -36.72 | -5.85 | 0.00 | -187.77 | 0.00 | 187.77 | 2,573.89 | 1,286.95 | 3,854.35 | 1,930.04 | 6.89 | -0.74 | 0.112 |
| 100.00 | -35.95 | -5.78 | 0.00 | -173.14 | 0.00 | 173.14 | 2,541.44 | 1,270.72 | 3,736.55 | 1,871.05 | 7.28 | -0.76 | 0.107 |
| 101.00 | -32.28 | -5.26 | 0.00 | -167.36 | 0.00 | 167.36 | 2,528.31 | 1,264.16 | 3,689.71 | 1,847.60 | 7.44 | -0.77 | 0.103 |
| 105.00 | -31.07 | -5.13 | 0.00 | -146.32 | 0.00 | 146.32 | 2,474.99 | 1,237.49 | 3,504.07 | 1,754.64 | 8.10 | -0.80 | 0.096 |
| 108.75 | -29.96 | -5.03 | 0.00 | -127.10 | 0.00 | 127.10 | 2,423.81 | 1,211.90 | 3,332.62 | 1,668.79 | 8.74 | -0.83 | 0.089 |
| 110.00 | -29.45 | -4.97 | 0.00 | -120.82 | 0.00 | 120.82 | 2,406.49 | 1,203.24 | 3,276.05 | 1,640.46 | 8.95 | -0.84 | 0.086 |
| 112.00 | -27.78 | -4.72 | 0.00 | -110.87 | 0.00 | 110.87 | 2,378.52 | 1,189.26 | 3,186.16 | 1,595.45 | 9.31 | -0.85 | 0.081 |
| 113.00 | -27.38 | -4.67 | 0.00 | -106.15 | 0.00 | 106.15 | 1,786.91 | 893.46 | 2,420.38 | 1,211.99 | 9.49 | -0.86 | 0.103 |
| 115.00 | -26.86 | -4.57 | 0.00 | -96.81 | 0.00 | 96.81 | 1,768.50 | 884.25 | 2,356.91 | 1,180.21 | 9.85 | -0.87 | 0.097 |
| 120.00 | -23.90 | -4.16 | 0.00 | -73.67 | 0.00 | 73.67 | 1,721.02 | 860.51 | 2,199.92 | 1,101.60 | 10.78 | -0.91 | 0.081 |
| 121.00 | -20.84 | -3.74 | 0.00 | -69.51 | 0.00 | 69.51 | 1,711.28 | 855.64 | 2,168.83 | 1,086.03 | 10.97 | -0.91 | 0.076 |
| 125.00 | -19.99 | -3.63 | 0.00 | -54.54 | 0.00 | 54.54 | 1,671.50 | 835.75 | 2,045.59 | 1,024.32 | 11.75 | -0.94 | 0.065 |
| 130.00 | -18.97 | -3.54 | 0.00 | -36.39 | 0.00 | 36.39 | 1,619.92 | 809.96 | 1,894.26 | 948.54 | 12.75 | -0.96 | 0.050 |
| 132.00 | -12.90 | -2.46 | 0.00 | -28.72 | 0.00 | 28.72 | 1,598.72 | 799.36 | 1,834.65 | 918.69 | 13.15 | -0.97 | 0.039 |
| 135.00 | -12.37 | -2.38 | 0.00 | -21.35 | 0.00 | 21.35 | 1,566.30 | 783.15 | 1,746.27 | 874.43 | 13.77 | -0.98 | 0.032 |
| 138.00 | -10.49 | -2.13 | 0.00 | -14.21 | 0.00 | 14.21 | 1,533.15 | 766.57 | 1,659.21 | 830.84 | 14.38 | -0.99 | 0.024 |
| 140.00 | -4.82 | -1.04 | 0.00 | -9.95 | 0.00 | 9.95 | 1,510.63 | 755.32 | 1,601.94 | 802.16 | 14.80 | -0.99 | 0.016 |
| 145.00 | -4.01 | -0.95 | 0.00 | -4.72 | 0.00 | 4.72 | 1,446.60 | 723.30 | 1,455.26 | 728.71 | 15.84 | -1.00 | 0.009 |

Site Number: 302540 Code: ANSI/TIA-222-G 

Site Name: Madison CT 6, CT Engineering Number:12995792_C3_03 11/20/2019 1:40:41 PM

Customer: VERIZON WIRELESS

Load Case: 1.2D + 1.0Di + 1.0Wi 50 mph with 0.75 in Radial Ice 21 Iterations

Gust Response Factor :1.10 Ice Dead Load Factor :1.00 Wind Importance Factor :1.00

Dead Load Factor :1.20 Ice Importance Factor :1.00

Wind Load Factor :1.00

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 148.00 | 0.00 | -0.88 | 0.00 | -1.89 | 0.00 | 1.89 | 1,400.09 | 700.04 | 1,362.73 | 682.38 | 16.47 | -1.00 | 0.003 |

Load Case: 1.0D + 1.0W Serviceability 60 mph 21 Iterations

Gust Response Factor :1.10 Wind Importance Factor 1.00
Dead Load Factor :1.00
Wind Load Factor :1.00

## Applied Segment Forces Summary

| Seg Elev (ft) | Description | Shaft Forces Wind FX (lb) | Shaft Forces Dead Load (lb) | Discrete Forces Wind FX (lb) | Discrete Forces Torsion MY (lb-ft) | Discrete Forces Moment MZ (lb-ft) | Discrete Forces Dead Load (lb) | Linear Forces Wind FX (lb) | Linear Forces Dead Load (lb) | Sum of Forces Wind FX (lb) | Sum of Forces Dead Load (lb) | Sum of Forces Torsion MY (lb-ft) | Sum of Forces Moment MZ (lb) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | | 50.1 | 0.0 | | | | | 0.0 | 0.0 | 50.1 | 0.0 | 0.0 | 0.0 |
| 5.00 | | 99.1 | 1,617.1 | | | | | 0.0 | 311.1 | 99.1 | 1,928.2 | 0.0 | 0.0 |
| 10.00 | | 96.9 | 1,581.6 | | | | | 0.0 | 311.1 | 96.9 | 1,892.7 | 0.0 | 0.0 |
| 15.00 | | 94.7 | 1,546.1 | | | | | 0.0 | 311.1 | 94.7 | 1,857.2 | 0.0 | 0.0 |
| 20.00 | | 92.5 | 1,510.6 | | | | | 0.0 | 311.1 | 92.5 | 1,821.7 | 0.0 | 0.0 |
| 25.00 | | 90.4 | 1,475.1 | | | | | 0.0 | 311.1 | 90.4 | 1,786.2 | 0.0 | 0.0 |
| 30.00 | | 89.2 | 1,439.6 | | | | | 0.0 | 311.1 | 89.2 | 1,750.7 | 0.0 | 0.0 |
| 35.00 | | 76.2 | 1,404.1 | | | | | 0.0 | 311.1 | 76.2 | 1,715.2 | 0.0 | 0.0 |
| 38.50 | Bot - Section 2 | 45.5 | 961.7 | | | | | 0.0 | 217.8 | 45.5 | 1,179.5 | 0.0 | 0.0 |
| 40.00 | | 60.3 | 717.3 | | | | | 0.0 | 93.3 | 60.3 | 810.6 | 0.0 | 0.0 |
| 45.00 | Top - Section 1 | 93.1 | 2,350.6 | | | | | 0.0 | 311.1 | 93.1 | 2,661.7 | 0.0 | 0.0 |
| 50.00 | | 93.4 | 990.9 | | | | | 0.0 | 311.1 | 93.4 | 1,302.0 | 0.0 | 0.0 |
| 55.00 | | 93.4 | 964.2 | | | | | 0.0 | 311.1 | 93.4 | 1,275.3 | 0.0 | 0.0 |
| 60.00 | | 93.1 | 937.6 | | | | | 0.0 | 311.1 | 93.1 | 1,248.7 | 0.0 | 0.0 |
| 65.00 | | 92.5 | 911.0 | | | | | 0.0 | 311.1 | 92.5 | 1,222.1 | 0.0 | 0.0 |
| 70.00 | | 73.5 | 884.4 | | | | | 0.0 | 311.1 | 73.5 | 1,195.5 | 0.0 | 0.0 |
| 73.00 | Bot - Section 3 | 45.9 | 517.8 | 7.1 | 0.0 | 14.1 | 10.0 | 0.0 | 186.7 | 53.0 | 714.5 | 0.0 | 0.0 |
| 75.00 | | 50.6 | 627.8 | | | | | 0.0 | 124.1 | 50.6 | 751.9 | 0.0 | 0.0 |
| 78.50 | Top - Section 2 | 45.8 | 1,079.8 | | | | | 0.0 | 217.2 | 45.8 | 1,297.1 | 0.0 | 0.0 |
| 80.00 | | 58.8 | 208.9 | | | | | 0.0 | 93.1 | 58.8 | 302.0 | 0.0 | 0.0 |
| 85.00 | | 54.1 | 682.0 | | | | | 0.0 | 310.3 | 54.1 | 992.3 | 0.0 | 0.0 |
| 86.00 | Appurtenance(s) | 35.6 | 133.7 | 86.7 | 0.0 | 260.1 | 79.2 | 0.0 | 62.1 | 122.3 | 275.0 | 0.0 | 0.0 |
| 89.00 | Appurtenance(s) | 35.5 | 395.9 | 70.0 | 0.0 | 0.0 | 560.0 | 0.0 | 171.5 | 105.5 | 1,127.3 | 0.0 | 0.0 |
| 90.00 | | 52.4 | 130.2 | | | | | 0.0 | 57.1 | 52.4 | 187.3 | 0.0 | 0.0 |
| 95.00 | | 65.1 | 637.6 | | | | | 0.0 | 285.7 | 65.1 | 923.4 | 0.0 | 0.0 |
| 97.50 | Appurtenance(s) | 42.8 | 310.5 | 291.1 | 0.0 | 1,018.8 | 918.3 | 0.0 | 142.9 | 333.9 | 1,371.7 | 0.0 | 0.0 |
| 100.00 | | 29.7 | 304.9 | | | | | 0.0 | 132.9 | 29.7 | 437.8 | 0.0 | 0.0 |
| 101.00 | Appurtenance(s) | 41.8 | 120.4 | 362.1 | 0.0 | 0.0 | 2,000.0 | 0.0 | 53.1 | 403.9 | 2,173.6 | 0.0 | 0.0 |
| 105.00 | | 64.1 | 472.8 | | | | | 0.0 | 212.6 | 64.1 | 685.4 | 0.0 | 0.0 |
| 108.75 | Bot - Section 4 | 41.0 | 430.4 | | | | | 0.0 | 199.3 | 41.0 | 629.7 | 0.0 | 0.0 |
| 110.00 | | 26.5 | 255.1 | | | | | 0.0 | 66.4 | 26.5 | 321.6 | 0.0 | 0.0 |
| 112.00 | Appurtenance(s) | 24.4 | 403.0 | 157.2 | 0.0 | 0.0 | 449.4 | 0.0 | 106.3 | 181.5 | 958.7 | 0.0 | 0.0 |
| 113.00 | Top - Section 3 | 24.1 | 199.1 | | | | | 0.0 | 53.1 | 24.1 | 252.3 | 0.0 | 0.0 |
| 115.00 | | 55.3 | 176.5 | | | | | 0.0 | 106.3 | 55.3 | 282.8 | 0.0 | 0.0 |
| 120.00 | Appurtenance(s) | 47.0 | 428.9 | 251.3 | 0.0 | 251.3 | 702.0 | 0.0 | 265.7 | 298.3 | 1,396.7 | 0.0 | 0.0 |
| 121.00 | Appurtenance(s) | 38.1 | 83.7 | 211.3 | 0.0 | 0.0 | 2,000.0 | 0.0 | 40.1 | 249.4 | 2,123.7 | 0.0 | 0.0 |
| 125.00 | | 67.3 | 327.5 | | | | | 0.0 | 149.7 | 67.3 | 477.2 | 0.0 | 0.0 |
| 130.00 | | 51.3 | 393.4 | | | | | 0.0 | 187.1 | 51.3 | 580.5 | 0.0 | 0.0 |
| 132.00 | Appurtenance(s) | 35.6 | 152.4 | 787.1 | 0.0 | 523.1 | 2,988.3 | 0.0 | 74.8 | 822.7 | 3,215.5 | 0.0 | 0.0 |
| 135.00 | | 42.0 | 223.3 | | | | | 0.0 | 64.3 | 42.0 | 287.6 | 0.0 | 0.0 |
| 138.00 | Appurtenance(s) | 34.3 | 216.9 | 126.6 | 0.0 | 0.0 | 725.0 | 0.0 | 64.3 | 161.0 | 1,006.2 | 0.0 | 0.0 |
| 140.00 | Appurtenance(s) | 46.5 | 141.0 | 803.2 | 0.0 | 0.0 | 2,664.0 | 0.0 | 42.9 | 849.7 | 2,847.9 | 0.0 | 0.0 |
| 145.00 | | 52.1 | 340.2 | | | | | 0.0 | 91.1 | 52.1 | 431.3 | 0.0 | 0.0 |
| 148.00 | Appurtenance(s) | 19.1 | 195.6 | 607.6 | 0.0 | 1,062.6 | 1,845.0 | 0.0 | 27.6 | 626.7 | 2,068.2 | 0.0 | 0.0 |
| | | | | | | | | Totals: | | 6,321.98 | 51,766.4 | 0.00 | 0.00 |

Load Case: 1.0D + 1.0W Serviceability 60 mph 21 Iterations

Gust Response Factor :1.10 Wind Importance Factor 1.00
Dead Load Factor :1.00
Wind Load Factor :1.00

## Calculated Forces

| Seg Elev (ft) | Pu FY (-) (kips) | Vu FX (-) (kips) | Tu MY (ft-kips) | Mu MZ (ft-kips) | Mu MX (ft-kips) | Resultant Moment (ft-kips) | phi Pn (kips) | phi Vn (kips) | phi Tn (ft-kips) | phi Mn (ft-kips) | Total Deflect (in) | Rotation (deg) | Ratio |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | -51.77 | -6.28 | 0.00 | -676.76 | 0.00 | 676.76 | 6,758.61 | 3,379.30 | 16,808.8 | 8,416.91 | 0.00 | 0.00 | 0.088 |
| 5.00 | -49.83 | -6.20 | 0.00 | -645.36 | 0.00 | 645.36 | 6,657.97 | 3,328.99 | 16,195.9 | 8,110.02 | 0.01 | -0.02 | 0.087 |
| 10.00 | -47.94 | -6.12 | 0.00 | -614.36 | 0.00 | 614.36 | 6,555.28 | 3,277.64 | 15,589.2 | 7,806.19 | 0.05 | -0.04 | 0.086 |
| 15.00 | -46.08 | -6.04 | 0.00 | -583.75 | 0.00 | 583.75 | 6,450.55 | 3,225.27 | 14,988.8 | 7,505.57 | 0.10 | -0.06 | 0.085 |
| 20.00 | -44.26 | -5.96 | 0.00 | -553.55 | 0.00 | 553.55 | 6,343.76 | 3,171.88 | 14,395.2 | 7,208.34 | 0.18 | -0.09 | 0.084 |
| 25.00 | -42.47 | -5.89 | 0.00 | -523.73 | 0.00 | 523.73 | 6,234.93 | 3,117.46 | 13,808.7 | 6,914.66 | 0.28 | -0.11 | 0.083 |
| 30.00 | -40.72 | -5.81 | 0.00 | -494.29 | 0.00 | 494.29 | 6,124.04 | 3,062.02 | 13,229.7 | 6,624.69 | 0.41 | -0.13 | 0.081 |
| 35.00 | -39.00 | -5.74 | 0.00 | -465.23 | 0.00 | 465.23 | 6,011.11 | 3,005.56 | 12,658.4 | 6,338.62 | 0.56 | -0.16 | 0.080 |
| 38.50 | -37.82 | -5.70 | 0.00 | -445.13 | 0.00 | 445.13 | 5,930.84 | 2,965.42 | 12,263.3 | 6,140.77 | 0.68 | -0.17 | 0.079 |
| 40.00 | -37.01 | -5.65 | 0.00 | -436.57 | 0.00 | 436.57 | 5,896.13 | 2,948.06 | 12,095.2 | 6,056.60 | 0.74 | -0.18 | 0.078 |
| 45.00 | -34.34 | -5.56 | 0.00 | -408.32 | 0.00 | 408.32 | 4,028.70 | 2,014.35 | 8,211.50 | 4,111.85 | 0.94 | -0.20 | 0.108 |
| 50.00 | -33.04 | -5.48 | 0.00 | -380.51 | 0.00 | 380.51 | 3,959.47 | 1,979.74 | 7,854.78 | 3,933.23 | 1.17 | -0.23 | 0.105 |
| 55.00 | -31.76 | -5.40 | 0.00 | -353.10 | 0.00 | 353.10 | 3,888.20 | 1,944.10 | 7,501.64 | 3,756.40 | 1.42 | -0.26 | 0.102 |
| 60.00 | -30.51 | -5.32 | 0.00 | -326.11 | 0.00 | 326.11 | 3,814.87 | 1,907.44 | 7,152.43 | 3,581.53 | 1.71 | -0.29 | 0.099 |
| 65.00 | -29.28 | -5.23 | 0.00 | -299.53 | 0.00 | 299.53 | 3,739.50 | 1,869.75 | 6,807.48 | 3,408.80 | 2.03 | -0.32 | 0.096 |
| 70.00 | -28.09 | -5.17 | 0.00 | -273.36 | 0.00 | 273.36 | 3,662.08 | 1,831.04 | 6,467.12 | 3,238.36 | 2.38 | -0.35 | 0.092 |
| 73.00 | -27.37 | -5.12 | 0.00 | -257.85 | 0.00 | 257.85 | 3,614.64 | 1,807.32 | 6,265.24 | 3,137.28 | 2.61 | -0.37 | 0.090 |
| 75.00 | -26.62 | -5.07 | 0.00 | -247.62 | 0.00 | 247.62 | 3,582.60 | 1,791.30 | 6,131.68 | 3,070.40 | 2.77 | -0.38 | 0.088 |
| 78.50 | -25.32 | -5.02 | 0.00 | -229.88 | 0.00 | 229.88 | 2,803.82 | 1,401.91 | 4,778.86 | 2,392.98 | 3.06 | -0.41 | 0.105 |
| 80.00 | -25.02 | -4.97 | 0.00 | -222.36 | 0.00 | 222.36 | 2,786.75 | 1,393.37 | 4,704.23 | 2,355.61 | 3.19 | -0.41 | 0.103 |
| 85.00 | -24.02 | -4.92 | 0.00 | -197.51 | 0.00 | 197.51 | 2,728.49 | 1,364.25 | 4,457.31 | 2,231.97 | 3.64 | -0.45 | 0.097 |
| 86.00 | -23.75 | -4.80 | 0.00 | -192.34 | 0.00 | 192.34 | 2,716.60 | 1,358.30 | 4,408.29 | 2,207.42 | 3.73 | -0.46 | 0.096 |
| 89.00 | -22.62 | -4.69 | 0.00 | -177.95 | 0.00 | 177.95 | 2,680.41 | 1,340.21 | 4,262.00 | 2,134.17 | 4.03 | -0.48 | 0.092 |
| 90.00 | -22.43 | -4.64 | 0.00 | -173.26 | 0.00 | 173.26 | 2,668.19 | 1,334.09 | 4,213.50 | 2,109.88 | 4.13 | -0.48 | 0.091 |
| 95.00 | -21.51 | -4.58 | 0.00 | -150.05 | 0.00 | 150.05 | 2,605.84 | 1,302.92 | 3,973.13 | 1,989.52 | 4.65 | -0.52 | 0.084 |
| 97.50 | -20.14 | -4.24 | 0.00 | -137.59 | 0.00 | 137.59 | 2,573.89 | 1,286.95 | 3,854.35 | 1,930.04 | 4.93 | -0.53 | 0.079 |
| 100.00 | -19.70 | -4.21 | 0.00 | -127.00 | 0.00 | 127.00 | 2,541.44 | 1,270.72 | 3,736.55 | 1,871.05 | 5.21 | -0.55 | 0.076 |
| 101.00 | -17.53 | -3.79 | 0.00 | -122.80 | 0.00 | 122.80 | 2,528.31 | 1,264.16 | 3,689.71 | 1,847.60 | 5.33 | -0.55 | 0.073 |
| 105.00 | -16.84 | -3.72 | 0.00 | -107.65 | 0.00 | 107.65 | 2,474.99 | 1,237.49 | 3,504.07 | 1,754.64 | 5.80 | -0.58 | 0.068 |
| 108.75 | -16.21 | -3.68 | 0.00 | -93.70 | 0.00 | 93.70 | 2,423.81 | 1,211.90 | 3,332.62 | 1,668.79 | 6.26 | -0.60 | 0.063 |
| 110.00 | -15.89 | -3.65 | 0.00 | -89.10 | 0.00 | 89.10 | 2,406.49 | 1,203.24 | 3,276.05 | 1,640.46 | 6.42 | -0.60 | 0.061 |
| 112.00 | -14.93 | -3.46 | 0.00 | -81.80 | 0.00 | 81.80 | 2,378.52 | 1,189.26 | 3,186.16 | 1,595.45 | 6.67 | -0.62 | 0.058 |
| 113.00 | -14.68 | -3.44 | 0.00 | -78.34 | 0.00 | 78.34 | 1,786.91 | 893.46 | 2,420.38 | 1,211.99 | 6.80 | -0.62 | 0.073 |
| 115.00 | -14.40 | -3.38 | 0.00 | -71.47 | 0.00 | 71.47 | 1,768.50 | 884.25 | 2,356.91 | 1,180.21 | 7.07 | -0.63 | 0.069 |
| 120.00 | -13.00 | -3.07 | 0.00 | -54.30 | 0.00 | 54.30 | 1,721.02 | 860.51 | 2,199.92 | 1,101.60 | 7.74 | -0.66 | 0.057 |
| 121.00 | -10.88 | -2.80 | 0.00 | -51.23 | 0.00 | 51.23 | 1,711.28 | 855.64 | 2,168.83 | 1,086.03 | 7.88 | -0.66 | 0.054 |
| 125.00 | -10.41 | -2.73 | 0.00 | -40.03 | 0.00 | 40.03 | 1,671.50 | 835.75 | 2,045.59 | 1,024.32 | 8.44 | -0.68 | 0.045 |
| 130.00 | -9.82 | -2.67 | 0.00 | -26.38 | 0.00 | 26.38 | 1,619.92 | 809.96 | 1,894.26 | 948.54 | 9.16 | -0.70 | 0.034 |
| 132.00 | -6.62 | -1.81 | 0.00 | -20.51 | 0.00 | 20.51 | 1,598.72 | 799.36 | 1,834.65 | 918.69 | 9.46 | -0.70 | 0.026 |
| 135.00 | -6.33 | -1.77 | 0.00 | -15.07 | 0.00 | 15.07 | 1,566.30 | 783.15 | 1,746.27 | 874.43 | 9.90 | -0.71 | 0.021 |
| 138.00 | -5.33 | -1.60 | 0.00 | -9.76 | 0.00 | 9.76 | 1,533.15 | 766.57 | 1,659.21 | 830.84 | 10.35 | -0.72 | 0.015 |
| 140.00 | -2.49 | -0.71 | 0.00 | -6.57 | 0.00 | 6.57 | 1,510.63 | 755.32 | 1,601.94 | 802.16 | 10.65 | -0.72 | 0.010 |
| 145.00 | -2.06 | -0.65 | 0.00 | -3.02 | 0.00 | 3.02 | 1,446.60 | 723.30 | 1,455.26 | 728.71 | 11.40 | -0.72 | 0.006 |

Code: ANSI/TIA-222-G
Engineering Number:12995792_C3_03



Load Case: 1.0D + 1.0W
Serviceability 60 mph
21 Iterations

Gust Response Factor :1.10
Dead Load Factor :1.00
Wind Load Factor :1.00
Wind Importance Factor 1.00

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 148.00 | 0.00 | -0.63 | 0.00 | -1.06 | 0.00 | 1.06 | 1,400.09 | 700.04 | 1,362.73 | 682.38 | 11.86 | -0.72 | 0.002 |

## Equivalent Lateral Forces Method Analysis

(Based on ASCE7-10 Chapters 11, 12, 15)

| | | |
|---|---|---|
| Spectral Response Acceleration for Short Period ($S_s$): | 0.17 | |
| Spectral Response Acceleration at 1.0 Second Period ($S_1$): | 0.06 | |
| Long-Period Transition Period ($T_L$): | 6 | |
| Importance Factor ($I_E$): | 1.00 | |
| Site Coefficient $F_a$: | 1.60 | |
| Site Coeffiecient $F_v$: | 2.40 | |
| Response Modification Coefficient (R): | 1.50 | |
| Design Spectral Response Acceleration at Short Period ($S_{ds}$): | 0.18 | |
| Design Spectral Response Acceleration at 1.0 Second Period ($S_{d1}$): | 0.10 | |
| Seismic Response Coefficient ($C_s$): | 0.03 | |
| Upper Limit $C_s$ | 0.03 | |
| Lower Limit $C_s$ | 0.03 | |
| Period based on Rayleigh Method (sec): | 1.99 | |
| Redundancy Factor (p): | 1.00 | |
| Seismic Force Distribution Exponent (k): | 1.75 | |
| Total Unfactored Dead Load: | 51.77 | k |
| Seismic Base Shear (E): | 1.66 | k |

Load Case (1.2 + 0.2Sds) * DL + E ELFM Seismic Equivalent Lateral Forces Method

| Segment | Height Above Base (ft) | Weight (lb) | $W_z$ (lb-ft) | $C_{vx}$ | Horizontal Force (lb) | Vertical Force (lb) |
|---|---|---|---|---|---|---|
| 43 | 146.50 | 223 | 1,343 | 0.011 | 18 | 276 |
| 42 | 142.50 | 431 | 2,474 | 0.020 | 33 | 533 |
| 41 | 139.00 | 184 | 1,010 | 0.008 | 14 | 227 |
| 40 | 136.50 | 281 | 1,496 | 0.012 | 20 | 348 |
| 39 | 133.50 | 288 | 1,472 | 0.012 | 20 | 356 |
| 38 | 131.00 | 227 | 1,125 | 0.009 | 15 | 281 |
| 37 | 127.50 | 581 | 2,742 | 0.022 | 37 | 718 |
| 36 | 123.00 | 477 | 2,117 | 0.017 | 28 | 590 |
| 35 | 120.50 | 124 | 530 | 0.004 | 7 | 153 |
| 34 | 117.50 | 695 | 2,845 | 0.023 | 38 | 859 |
| 33 | 114.00 | 283 | 1,099 | 0.009 | 15 | 350 |
| 32 | 112.50 | 252 | 958 | 0.008 | 13 | 312 |
| 31 | 111.00 | 509 | 1,889 | 0.015 | 25 | 630 |
| 30 | 109.38 | 322 | 1,162 | 0.009 | 16 | 398 |
| 29 | 106.88 | 630 | 2,186 | 0.018 | 29 | 779 |
| 28 | 103.00 | 685 | 2,231 | 0.018 | 30 | 847 |
| 27 | 100.50 | 174 | 541 | 0.004 | 7 | 215 |
| 26 | 98.75 | 438 | 1,324 | 0.011 | 18 | 541 |
| 25 | 96.25 | 453 | 1,311 | 0.011 | 18 | 561 |
| 24 | 92.50 | 923 | 2,491 | 0.020 | 33 | 1,142 |
| 23 | 89.50 | 187 | 477 | 0.004 | 6 | 232 |
| 22 | 87.50 | 567 | 1,389 | 0.011 | 19 | 701 |
| 21 | 85.50 | 196 | 461 | 0.004 | 6 | 242 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 20 | 82.50 | 992 | 2,193 | 0.018 | 29 | 1,227 |
| 19 | 79.25 | 302 | 622 | 0.005 | 8 | 373 |
| 18 | 76.75 | 1,297 | 2,527 | 0.020 | 34 | 1,604 |
| 17 | 74.00 | 752 | 1,374 | 0.011 | 18 | 930 |
| 16 | 71.50 | 704 | 1,213 | 0.010 | 16 | 871 |
| 15 | 67.50 | 1,195 | 1,861 | 0.015 | 25 | 1,478 |
| 14 | 62.50 | 1,222 | 1,664 | 0.013 | 22 | 1,511 |
| 13 | 57.50 | 1,249 | 1,470 | 0.012 | 20 | 1,544 |
| 12 | 52.50 | 1,275 | 1,281 | 0.010 | 17 | 1,577 |
| 11 | 47.50 | 1,302 | 1,098 | 0.009 | 15 | 1,610 |
| 10 | 42.50 | 2,662 | 1,848 | 0.015 | 25 | 3,291 |
| 9 | 39.25 | 811 | 490 | 0.004 | 7 | 1,002 |
| 8 | 36.75 | 1,179 | 636 | 0.005 | 9 | 1,458 |
| 7 | 32.50 | 1,715 | 746 | 0.006 | 10 | 2,121 |
| 6 | 27.50 | 1,751 | 569 | 0.005 | 8 | 2,165 |
| 5 | 22.50 | 1,786 | 409 | 0.003 | 5 | 2,209 |
| 4 | 17.50 | 1,822 | 269 | 0.002 | 4 | 2,252 |
| 3 | 12.50 | 1,857 | 152 | 0.001 | 2 | 2,296 |
| 2 | 7.50 | 1,893 | 64 | 0.001 | 1 | 2,340 |
| 1 | 2.50 | 1,928 | 10 | 0.000 | 0 | 2,384 |
| Generic 8' Omni | 148.00 | 25 | 153 | 0.001 | 2 | 31 |
| Generic 8' Dipole | 148.00 | 25 | 153 | 0.001 | 2 | 31 |
| Generic 48" x 8" Pan | 148.00 | 240 | 1,471 | 0.012 | 20 | 297 |
| Generic 18' Dipole | 148.00 | 55 | 337 | 0.003 | 5 | 68 |
| Flat Low Profile Pla | 148.00 | 1,500 | 9,191 | 0.074 | 123 | 1,855 |
| Commscope CBC78T-DS- | 140.00 | 62 | 345 | 0.003 | 5 | 77 |
| Samsung Outdoor CBRS | 140.00 | 56 | 310 | 0.002 | 4 | 69 |
| Samsung Outdoor CBRS | 140.00 | 13 | 73 | 0.001 | 1 | 16 |
| Samsung B2/B66A RRH- | 140.00 | 253 | 1,408 | 0.011 | 19 | 313 |
| Samsung B5/B13 RRH-B | 140.00 | 211 | 1,173 | 0.009 | 16 | 261 |
| RFS DB-T1-6Z-8AB-0Z | 140.00 | 88 | 489 | 0.004 | 7 | 109 |
| Commscope LNX-6514DS | 140.00 | 39 | 216 | 0.002 | 3 | 48 |
| Andrew LNX-8513DS-A1 | 140.00 | 78 | 436 | 0.004 | 6 | 97 |
| Commscope JAHH-65B-R | 140.00 | 364 | 2,022 | 0.016 | 27 | 450 |
| Flat Low Profile Pla | 140.00 | 1,500 | 8,341 | 0.067 | 112 | 1,855 |
| Ericsson RRUS 11 (Ba | 138.00 | 165 | 895 | 0.007 | 12 | 204 |
| Collar | 138.00 | 560 | 3,037 | 0.024 | 41 | 692 |
| Powerwave Allgon LGP | 132.00 | 32 | 160 | 0.001 | 2 | 39 |
| Powerwave Allgon TT1 | 132.00 | 96 | 482 | 0.004 | 6 | 119 |
| Raycap DC6-48-60-18- | 132.00 | 64 | 319 | 0.003 | 4 | 79 |
| Ericsson Radio 4449 | 132.00 | 212 | 1,063 | 0.009 | 14 | 262 |
| Ericsson RRUS A2 B2 | 132.00 | 66 | 331 | 0.003 | 4 | 82 |
| Ericsson RRUS 32 B30 | 132.00 | 159 | 798 | 0.006 | 11 | 197 |
| Ericsson RRUS-12 B2 | 132.00 | 174 | 873 | 0.007 | 12 | 215 |
| KMW AM-X-CD-14-65-00 | 132.00 | 109 | 548 | 0.004 | 7 | 135 |
| Commscope SBNHH-1D65 | 132.00 | 101 | 504 | 0.004 | 7 | 124 |
| Kathrein Scala 80010 | 132.00 | 251 | 1,262 | 0.010 | 17 | 311 |
| Flat Low Profile Pla | 132.00 | 1,725 | 8,656 | 0.070 | 116 | 2,133 |
| Round Low Profile Pl | 121.00 | 2,000 | 8,623 | 0.069 | 116 | 2,473 |
| Ericsson KRY 112 144 | 120.00 | 44 | 187 | 0.002 | 3 | 54 |
| Ericsson AIR 21, 1.3 | 120.00 | 332 | 1,411 | 0.011 | 19 | 411 |
| Ericsson AIR 21, 1.3 | 120.00 | 326 | 1,385 | 0.011 | 19 | 403 |
| Generic 6.7" x 10.7" | 112.00 | 59 | 224 | 0.002 | 3 | 73 |
| 6.7" x 10.7" TTA | 112.00 | 300 | 1,130 | 0.009 | 15 | 371 |
| Generic 48" x 12" Pa | 112.00 | 90 | 339 | 0.003 | 5 | 111 |
| Flat Platform w/ Han | 101.00 | 2,000 | 6,291 | 0.051 | 84 | 2,473 |
| Alcatel-Lucent 800 M | 97.50 | 192 | 568 | 0.005 | 8 | 237 |
| Alcatel-Lucent 1900 | 97.50 | 180 | 532 | 0.004 | 7 | 223 |
| Alcatel-Lucent TD-RR | 97.50 | 210 | 621 | 0.005 | 8 | 260 |
| RFS APXV9TM14-ALU-I2 | 97.50 | 165 | 489 | 0.004 | 7 | 204 |
| RFS APXVSPP18-C-A20 | 97.50 | 171 | 506 | 0.004 | 7 | 211 |
| Collar | 89.00 | 560 | 1,413 | 0.011 | 19 | 692 |
| RFS APXV18-206517S-C | 86.00 | 79 | 188 | 0.002 | 3 | 98 |
| Generic GPS | 73.00 | 10 | 18 | 0.000 | 0 | 12 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | 51,766 | 124,138 | 1.000 | 1,665 | 64,008 |

Load Case (0.9 - 0.2Sds) * DL + E ELFM Seismic (Reduced DL) Equivalent Lateral Forces Method

| Segment | Height Above Base (ft) | Weight (lb) | $W_z$ (lb-ft) | $C_{vx}$ | Horizontal Force (lb) | Vertical Force (lb) |
|---|---|---|---|---|---|---|
| 43 | 146.50 | 223 | 1,343 | 0.011 | 18 | 193 |
| 42 | 142.50 | 431 | 2,474 | 0.020 | 33 | 372 |
| 41 | 139.00 | 184 | 1,010 | 0.008 | 14 | 159 |
| 40 | 136.50 | 281 | 1,496 | 0.012 | 20 | 243 |
| 39 | 133.50 | 288 | 1,472 | 0.012 | 20 | 248 |
| 38 | 131.00 | 227 | 1,125 | 0.009 | 15 | 196 |
| 37 | 127.50 | 581 | 2,742 | 0.022 | 37 | 501 |
| 36 | 123.00 | 477 | 2,117 | 0.017 | 28 | 412 |
| 35 | 120.50 | 124 | 530 | 0.004 | 7 | 107 |
| 34 | 117.50 | 695 | 2,845 | 0.023 | 38 | 600 |
| 33 | 114.00 | 283 | 1,099 | 0.009 | 15 | 244 |
| 32 | 112.50 | 252 | 958 | 0.008 | 13 | 218 |
| 31 | 111.00 | 509 | 1,889 | 0.015 | 25 | 440 |
| 30 | 109.38 | 322 | 1,162 | 0.009 | 16 | 278 |
| 29 | 106.88 | 630 | 2,186 | 0.018 | 29 | 544 |
| 28 | 103.00 | 685 | 2,231 | 0.018 | 30 | 592 |
| 27 | 100.50 | 174 | 541 | 0.004 | 7 | 150 |
| 26 | 98.75 | 438 | 1,324 | 0.011 | 18 | 378 |
| 25 | 96.25 | 453 | 1,311 | 0.011 | 18 | 391 |
| 24 | 92.50 | 923 | 2,491 | 0.020 | 33 | 797 |
| 23 | 89.50 | 187 | 477 | 0.004 | 6 | 162 |
| 22 | 87.50 | 567 | 1,389 | 0.011 | 19 | 490 |
| 21 | 85.50 | 196 | 461 | 0.004 | 6 | 169 |
| 20 | 82.50 | 992 | 2,193 | 0.018 | 29 | 857 |
| 19 | 79.25 | 302 | 622 | 0.005 | 8 | 261 |
| 18 | 76.75 | 1,297 | 2,527 | 0.020 | 34 | 1,120 |
| 17 | 74.00 | 752 | 1,374 | 0.011 | 18 | 649 |
| 16 | 71.50 | 704 | 1,213 | 0.010 | 16 | 608 |
| 15 | 67.50 | 1,195 | 1,861 | 0.015 | 25 | 1,032 |
| 14 | 62.50 | 1,222 | 1,664 | 0.013 | 22 | 1,055 |
| 13 | 57.50 | 1,249 | 1,470 | 0.012 | 20 | 1,078 |
| 12 | 52.50 | 1,275 | 1,281 | 0.010 | 17 | 1,101 |
| 11 | 47.50 | 1,302 | 1,098 | 0.009 | 15 | 1,124 |
| 10 | 42.50 | 2,662 | 1,848 | 0.015 | 25 | 2,298 |
| 9 | 39.25 | 811 | 490 | 0.004 | 7 | 700 |
| 8 | 36.75 | 1,179 | 636 | 0.005 | 9 | 1,019 |
| 7 | 32.50 | 1,715 | 746 | 0.006 | 10 | 1,481 |
| 6 | 27.50 | 1,751 | 569 | 0.005 | 8 | 1,512 |
| 5 | 22.50 | 1,786 | 409 | 0.003 | 5 | 1,542 |
| 4 | 17.50 | 1,822 | 269 | 0.002 | 4 | 1,573 |
| 3 | 12.50 | 1,857 | 152 | 0.001 | 2 | 1,604 |
| 2 | 7.50 | 1,893 | 64 | 0.001 | 1 | 1,634 |
| 1 | 2.50 | 1,928 | 10 | 0.000 | 0 | 1,665 |
| Generic 8' Omni | 148.00 | 25 | 153 | 0.001 | 2 | 22 |
| Generic 8' Dipole | 148.00 | 25 | 153 | 0.001 | 2 | 22 |
| Generic 48" x 8" Pan | 148.00 | 240 | 1,471 | 0.012 | 20 | 207 |
| Generic 18' Dipole | 148.00 | 55 | 337 | 0.003 | 5 | 47 |
| Flat Low Profile Pla | 148.00 | 1,500 | 9,191 | 0.074 | 123 | 1,295 |
| Commscope CBC78T-DS- | 140.00 | 62 | 345 | 0.003 | 5 | 54 |
| Samsung Outdoor CBRS | 140.00 | 56 | 310 | 0.002 | 4 | 48 |
| Samsung Outdoor CBRS | 140.00 | 13 | 73 | 0.001 | 1 | 11 |
| Samsung B2/B66A RRH- | 140.00 | 253 | 1,408 | 0.011 | 19 | 219 |
| Samsung B5/B13 RRH-B | 140.00 | 211 | 1,173 | 0.009 | 16 | 182 |
| RFS DB-T1-6Z-8AB-0Z | 140.00 | 88 | 489 | 0.004 | 7 | 76 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Commscope LNX-6514DS | 140.00 | 39 | 216 | 0.002 | 3 | 34 |
| Andrew LNX-8513DS-A1 | 140.00 | 78 | 436 | 0.004 | 6 | 68 |
| Commscope JAHH-65B-R | 140.00 | 364 | 2,022 | 0.016 | 27 | 314 |
| Flat Low Profile Pla | 140.00 | 1,500 | 8,341 | 0.067 | 112 | 1,295 |
| Ericsson RRUS 11 (Ba | 138.00 | 165 | 895 | 0.007 | 12 | 142 |
| Collar | 138.00 | 560 | 3,037 | 0.024 | 41 | 484 |
| Powerwave Allgon LGP | 132.00 | 32 | 160 | 0.001 | 2 | 27 |
| Powerwave Allgon TT1 | 132.00 | 96 | 482 | 0.004 | 6 | 83 |
| Raycap DC6-48-60-18- | 132.00 | 64 | 319 | 0.003 | 4 | 55 |
| Ericsson Radio 4449 | 132.00 | 212 | 1,063 | 0.009 | 14 | 183 |
| Ericsson RRUS A2 B2 | 132.00 | 66 | 331 | 0.003 | 4 | 57 |
| Ericsson RRUS 32 B30 | 132.00 | 159 | 798 | 0.006 | 11 | 137 |
| Ericsson RRUS-12 B2 | 132.00 | 174 | 873 | 0.007 | 12 | 150 |
| KMW AM-X-CD-14-65-00 | 132.00 | 109 | 548 | 0.004 | 7 | 94 |
| Commscope SBNHH-1D65 | 132.00 | 101 | 504 | 0.004 | 7 | 87 |
| Kathrein Scala 80010 | 132.00 | 251 | 1,262 | 0.010 | 17 | 217 |
| Flat Low Profile Pla | 132.00 | 1,725 | 8,656 | 0.070 | 116 | 1,490 |
| Round Low Profile Pl | 121.00 | 2,000 | 8,623 | 0.069 | 116 | 1,727 |
| Ericsson KRY 112 144 | 120.00 | 44 | 187 | 0.002 | 3 | 38 |
| Ericsson AIR 21, 1.3 | 120.00 | 332 | 1,411 | 0.011 | 19 | 287 |
| Ericsson AIR 21, 1.3 | 120.00 | 326 | 1,385 | 0.011 | 19 | 282 |
| Generic 6.7" x 10.7" | 112.00 | 59 | 224 | 0.002 | 3 | 51 |
| 6.7" x 10.7" TTA | 112.00 | 300 | 1,130 | 0.009 | 15 | 259 |
| Generic 48" x 12" Pa | 112.00 | 90 | 339 | 0.003 | 5 | 78 |
| Flat Platform w/ Han | 101.00 | 2,000 | 6,291 | 0.051 | 84 | 1,727 |
| Alcatel-Lucent 800 M | 97.50 | 192 | 568 | 0.005 | 8 | 166 |
| Alcatel-Lucent 1900 | 97.50 | 180 | 532 | 0.004 | 7 | 155 |
| Alcatel-Lucent TD-RR | 97.50 | 210 | 621 | 0.005 | 8 | 181 |
| RFS APXV9TM14-ALU-I2 | 97.50 | 165 | 489 | 0.004 | 7 | 143 |
| RFS APXVSPP18-C-A20 | 97.50 | 171 | 506 | 0.004 | 7 | 148 |
| Collar | 89.00 | 560 | 1,413 | 0.011 | 19 | 484 |
| RFS APXV18-206517S-C | 86.00 | 79 | 188 | 0.002 | 3 | 68 |
| Generic GPS | 73.00 | 10 | 18 | 0.000 | 0 | 9 |
| | | 51,766 | 124,138 | 1.000 | 1,665 | 44,701 |

Load Case (1.2 + 0.2Sds) * DL + E ELFM Seismic Equivalent Lateral Forces Method

Calculated Forces

| Seg Elev (ft) | Pu FY (-) (kips) | Vu FX (-) (kips) | Tu MY (ft-kips) | Mu MZ (ft-kips) | Mu MX (ft-kips) | Resultant Moment (ft-kips) | phi Pn (kips) | phi Vn (kips) | phi Tn (ft-kips) | phi Mn (ft-kips) | Total Deflect (in) | Rotation (deg) | Ratio |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | -61.62 | -1.67 | 0.00 | -194.73 | 0.00 | 194.73 | 6,758.61 | 3,379.30 | 16,808.8 | 8,416.91 | 0.00 | 0.00 | 0.032 |
| 5.00 | -59.28 | -1.67 | 0.00 | -186.40 | 0.00 | 186.40 | 6,657.97 | 3,328.99 | 16,195.9 | 8,110.02 | 0.00 | -0.01 | 0.032 |
| 10.00 | -56.99 | -1.68 | 0.00 | -178.03 | 0.00 | 178.03 | 6,555.28 | 3,277.64 | 15,589.2 | 7,806.19 | 0.01 | -0.01 | 0.032 |
| 15.00 | -54.73 | -1.68 | 0.00 | -169.65 | 0.00 | 169.65 | 6,450.55 | 3,225.27 | 14,988.8 | 7,505.57 | 0.03 | -0.02 | 0.031 |
| 20.00 | -52.53 | -1.68 | 0.00 | -161.26 | 0.00 | 161.26 | 6,343.76 | 3,171.88 | 14,395.2 | 7,208.34 | 0.05 | -0.03 | 0.031 |
| 25.00 | -50.36 | -1.68 | 0.00 | -152.87 | 0.00 | 152.87 | 6,234.93 | 3,117.46 | 13,808.7 | 6,914.66 | 0.08 | -0.03 | 0.030 |
| 30.00 | -48.24 | -1.67 | 0.00 | -144.49 | 0.00 | 144.49 | 6,124.04 | 3,062.02 | 13,229.7 | 6,624.69 | 0.12 | -0.04 | 0.030 |
| 35.00 | -46.78 | -1.66 | 0.00 | -136.14 | 0.00 | 136.14 | 6,011.11 | 3,005.56 | 12,658.4 | 6,338.62 | 0.16 | -0.05 | 0.029 |
| 38.50 | -45.78 | -1.66 | 0.00 | -130.31 | 0.00 | 130.31 | 5,930.84 | 2,965.42 | 12,263.3 | 6,140.77 | 0.20 | -0.05 | 0.029 |
| 40.00 | -42.49 | -1.64 | 0.00 | -127.82 | 0.00 | 127.82 | 5,896.13 | 2,948.06 | 12,095.2 | 6,056.60 | 0.21 | -0.05 | 0.028 |
| 45.00 | -40.88 | -1.62 | 0.00 | -119.64 | 0.00 | 119.64 | 4,028.70 | 2,014.35 | 8,211.50 | 4,111.85 | 0.27 | -0.06 | 0.039 |
| 50.00 | -39.30 | -1.61 | 0.00 | -111.52 | 0.00 | 111.52 | 3,959.47 | 1,979.74 | 7,854.78 | 3,933.23 | 0.34 | -0.07 | 0.038 |
| 55.00 | -37.76 | -1.60 | 0.00 | -103.46 | 0.00 | 103.46 | 3,888.20 | 1,944.10 | 7,501.64 | 3,756.40 | 0.41 | -0.08 | 0.037 |
| 60.00 | -36.24 | -1.58 | 0.00 | -95.48 | 0.00 | 95.48 | 3,814.87 | 1,907.44 | 7,152.43 | 3,581.53 | 0.50 | -0.08 | 0.036 |
| 65.00 | -34.77 | -1.56 | 0.00 | -87.60 | 0.00 | 87.60 | 3,739.50 | 1,869.75 | 6,807.48 | 3,408.80 | 0.59 | -0.09 | 0.035 |
| 70.00 | -33.90 | -1.54 | 0.00 | -79.82 | 0.00 | 79.82 | 3,662.08 | 1,831.04 | 6,467.12 | 3,238.36 | 0.69 | -0.10 | 0.034 |
| 73.00 | -32.95 | -1.52 | 0.00 | -75.19 | 0.00 | 75.19 | 3,614.64 | 1,807.32 | 6,265.24 | 3,137.28 | 0.76 | -0.11 | 0.033 |
| 75.00 | -31.35 | -1.49 | 0.00 | -72.15 | 0.00 | 72.15 | 3,582.60 | 1,791.30 | 6,131.68 | 3,070.40 | 0.81 | -0.11 | 0.032 |
| 78.50 | -30.98 | -1.48 | 0.00 | -66.93 | 0.00 | 66.93 | 2,803.82 | 1,401.91 | 4,778.86 | 2,392.98 | 0.89 | -0.12 | 0.039 |
| 80.00 | -29.75 | -1.45 | 0.00 | -64.71 | 0.00 | 64.71 | 2,786.75 | 1,393.37 | 4,704.23 | 2,355.61 | 0.93 | -0.12 | 0.038 |
| 85.00 | -29.51 | -1.45 | 0.00 | -57.43 | 0.00 | 57.43 | 2,728.49 | 1,364.25 | 4,457.31 | 2,231.97 | 1.06 | -0.13 | 0.037 |
| 86.00 | -28.71 | -1.43 | 0.00 | -55.98 | 0.00 | 55.98 | 2,716.60 | 1,358.30 | 4,408.29 | 2,207.42 | 1.09 | -0.13 | 0.036 |
| 89.00 | -27.78 | -1.40 | 0.00 | -51.69 | 0.00 | 51.69 | 2,680.41 | 1,340.21 | 4,262.00 | 2,134.17 | 1.17 | -0.14 | 0.035 |
| 90.00 | -26.64 | -1.37 | 0.00 | -50.29 | 0.00 | 50.29 | 2,668.19 | 1,334.09 | 4,213.50 | 2,109.88 | 1.20 | -0.14 | 0.034 |
| 95.00 | -26.08 | -1.36 | 0.00 | -43.43 | 0.00 | 43.43 | 2,605.84 | 1,302.92 | 3,973.13 | 1,989.52 | 1.36 | -0.15 | 0.032 |
| 97.50 | -24.40 | -1.30 | 0.00 | -40.04 | 0.00 | 40.04 | 2,573.89 | 1,286.95 | 3,854.35 | 1,930.04 | 1.44 | -0.16 | 0.030 |
| 100.00 | -24.19 | -1.29 | 0.00 | -36.80 | 0.00 | 36.80 | 2,541.44 | 1,270.72 | 3,736.55 | 1,871.05 | 1.52 | -0.16 | 0.029 |
| 101.00 | -20.87 | -1.17 | 0.00 | -35.50 | 0.00 | 35.50 | 2,528.31 | 1,264.16 | 3,689.71 | 1,847.60 | 1.55 | -0.16 | 0.027 |
| 105.00 | -20.09 | -1.14 | 0.00 | -30.82 | 0.00 | 30.82 | 2,474.99 | 1,237.49 | 3,504.07 | 1,754.64 | 1.69 | -0.17 | 0.026 |
| 108.75 | -19.69 | -1.13 | 0.00 | -26.55 | 0.00 | 26.55 | 2,423.81 | 1,211.90 | 3,332.62 | 1,668.79 | 1.82 | -0.17 | 0.024 |
| 110.00 | -19.06 | -1.10 | 0.00 | -25.14 | 0.00 | 25.14 | 2,406.49 | 1,203.24 | 3,276.05 | 1,640.46 | 1.87 | -0.18 | 0.023 |
| 112.00 | -18.19 | -1.06 | 0.00 | -22.94 | 0.00 | 22.94 | 2,378.52 | 1,189.26 | 3,186.16 | 1,595.45 | 1.94 | -0.18 | 0.022 |
| 113.00 | -17.85 | -1.05 | 0.00 | -21.88 | 0.00 | 21.88 | 1,786.91 | 893.46 | 2,420.38 | 1,211.99 | 1.98 | -0.18 | 0.028 |
| 115.00 | -16.99 | -1.01 | 0.00 | -19.79 | 0.00 | 19.79 | 1,768.50 | 884.25 | 2,356.91 | 1,180.21 | 2.06 | -0.18 | 0.026 |
| 120.00 | -15.97 | -0.96 | 0.00 | -14.76 | 0.00 | 14.76 | 1,721.02 | 860.51 | 2,199.92 | 1,101.60 | 2.25 | -0.19 | 0.023 |
| 121.00 | -12.90 | -0.80 | 0.00 | -13.80 | 0.00 | 13.80 | 1,711.28 | 855.64 | 2,168.83 | 1,086.03 | 2.29 | -0.19 | 0.020 |
| 125.00 | -12.19 | -0.77 | 0.00 | -10.58 | 0.00 | 10.58 | 1,671.50 | 835.75 | 2,045.59 | 1,024.32 | 2.46 | -0.20 | 0.018 |
| 130.00 | -11.90 | -0.75 | 0.00 | -6.75 | 0.00 | 6.75 | 1,619.92 | 809.96 | 1,894.26 | 948.54 | 2.67 | -0.20 | 0.014 |
| 132.00 | -7.85 | -0.52 | 0.00 | -5.25 | 0.00 | 5.25 | 1,598.72 | 799.36 | 1,834.65 | 918.69 | 2.75 | -0.20 | 0.011 |
| 135.00 | -7.51 | -0.49 | 0.00 | -3.71 | 0.00 | 3.71 | 1,566.30 | 783.15 | 1,746.27 | 874.43 | 2.88 | -0.20 | 0.009 |
| 138.00 | -6.38 | -0.42 | 0.00 | -2.22 | 0.00 | 2.22 | 1,533.15 | 766.57 | 1,659.21 | 830.84 | 3.01 | -0.21 | 0.007 |
| 140.00 | -2.56 | -0.18 | 0.00 | -1.37 | 0.00 | 1.37 | 1,510.63 | 755.32 | 1,601.94 | 802.16 | 3.09 | -0.21 | 0.003 |
| 145.00 | -2.28 | -0.16 | 0.00 | -0.48 | 0.00 | 0.48 | 1,446.60 | 723.30 | 1,455.26 | 728.71 | 3.31 | -0.21 | 0.002 |
| 148.00 | 0.00 | -0.15 | 0.00 | 0.00 | 0.00 | 0.00 | 1,400.09 | 700.04 | 1,362.73 | 682.38 | 3.44 | -0.21 | 0.000 |

Load Case (0.9 - 0.2Sds) * DL + E ELFM Seismic (Reduced DL) Equivalent Lateral Forces Method

Calculated Forces

| Seg Elev (ft) | Pu FY (-) (kips) | Vu FX (-) (kips) | Tu MY (ft-kips) | Mu MZ (ft-kips) | Mu MX (ft-kips) | Resultant Moment (ft-kips) | phi Pn (kips) | phi Vn (kips) | phi Tn (ft-kips) | phi Mn (ft-kips) | Total Deflect (in) | Rotation (deg) | Ratio |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | -43.04 | -1.67 | 0.00 | -192.62 | 0.00 | 192.62 | 6,758.61 | 3,379.30 | 16,808.8 | 8,416.91 | 0.00 | 0.00 | 0.029 |
| 5.00 | -41.40 | -1.67 | 0.00 | -184.29 | 0.00 | 184.29 | 6,657.97 | 3,328.99 | 16,195.9 | 8,110.02 | 0.00 | -0.01 | 0.029 |
| 10.00 | -39.80 | -1.67 | 0.00 | -175.95 | 0.00 | 175.95 | 6,555.28 | 3,277.64 | 15,589.2 | 7,806.19 | 0.01 | -0.01 | 0.029 |
| 15.00 | -38.22 | -1.67 | 0.00 | -167.59 | 0.00 | 167.59 | 6,450.55 | 3,225.27 | 14,988.8 | 7,505.57 | 0.03 | -0.02 | 0.028 |
| 20.00 | -36.68 | -1.67 | 0.00 | -159.24 | 0.00 | 159.24 | 6,343.76 | 3,171.88 | 14,395.2 | 7,208.34 | 0.05 | -0.02 | 0.028 |
| 25.00 | -35.17 | -1.66 | 0.00 | -150.89 | 0.00 | 150.89 | 6,234.93 | 3,117.46 | 13,808.7 | 6,914.66 | 0.08 | -0.03 | 0.027 |
| 30.00 | -33.69 | -1.66 | 0.00 | -142.57 | 0.00 | 142.57 | 6,124.04 | 3,062.02 | 13,229.7 | 6,624.69 | 0.12 | -0.04 | 0.027 |
| 35.00 | -32.67 | -1.65 | 0.00 | -134.28 | 0.00 | 134.28 | 6,011.11 | 3,005.56 | 12,658.4 | 6,338.62 | 0.16 | -0.04 | 0.027 |
| 38.50 | -31.97 | -1.65 | 0.00 | -128.50 | 0.00 | 128.50 | 5,930.84 | 2,965.42 | 12,263.3 | 6,140.77 | 0.20 | -0.05 | 0.026 |
| 40.00 | -29.67 | -1.62 | 0.00 | -126.03 | 0.00 | 126.03 | 5,896.13 | 2,948.06 | 12,095.2 | 6,056.60 | 0.21 | -0.05 | 0.026 |
| 45.00 | -28.55 | -1.61 | 0.00 | -117.92 | 0.00 | 117.92 | 4,028.70 | 2,014.35 | 8,211.50 | 4,111.85 | 0.27 | -0.06 | 0.036 |
| 50.00 | -27.45 | -1.60 | 0.00 | -109.87 | 0.00 | 109.87 | 3,959.47 | 1,979.74 | 7,854.78 | 3,933.23 | 0.33 | -0.07 | 0.035 |
| 55.00 | -26.37 | -1.58 | 0.00 | -101.90 | 0.00 | 101.90 | 3,888.20 | 1,944.10 | 7,501.64 | 3,756.40 | 0.41 | -0.07 | 0.034 |
| 60.00 | -25.31 | -1.56 | 0.00 | -94.01 | 0.00 | 94.01 | 3,814.87 | 1,907.44 | 7,152.43 | 3,581.53 | 0.49 | -0.08 | 0.033 |
| 65.00 | -24.28 | -1.54 | 0.00 | -86.21 | 0.00 | 86.21 | 3,739.50 | 1,869.75 | 6,807.48 | 3,408.80 | 0.58 | -0.09 | 0.032 |
| 70.00 | -23.67 | -1.52 | 0.00 | -78.53 | 0.00 | 78.53 | 3,662.08 | 1,831.04 | 6,467.12 | 3,238.36 | 0.68 | -0.10 | 0.031 |
| 73.00 | -23.01 | -1.50 | 0.00 | -73.97 | 0.00 | 73.97 | 3,614.64 | 1,807.32 | 6,265.24 | 3,137.28 | 0.75 | -0.11 | 0.030 |
| 75.00 | -21.89 | -1.47 | 0.00 | -70.96 | 0.00 | 70.96 | 3,582.60 | 1,791.30 | 6,131.68 | 3,070.40 | 0.80 | -0.11 | 0.029 |
| 78.50 | -21.63 | -1.46 | 0.00 | -65.82 | 0.00 | 65.82 | 2,803.82 | 1,401.91 | 4,778.86 | 2,392.98 | 0.88 | -0.12 | 0.035 |
| 80.00 | -20.77 | -1.43 | 0.00 | -63.63 | 0.00 | 63.63 | 2,786.75 | 1,393.37 | 4,704.23 | 2,355.61 | 0.92 | -0.12 | 0.034 |
| 85.00 | -20.61 | -1.43 | 0.00 | -56.46 | 0.00 | 56.46 | 2,728.49 | 1,364.25 | 4,457.31 | 2,231.97 | 1.05 | -0.13 | 0.033 |
| 86.00 | -20.05 | -1.41 | 0.00 | -55.03 | 0.00 | 55.03 | 2,716.60 | 1,358.30 | 4,408.29 | 2,207.42 | 1.07 | -0.13 | 0.032 |
| 89.00 | -19.40 | -1.38 | 0.00 | -50.81 | 0.00 | 50.81 | 2,680.41 | 1,340.21 | 4,262.00 | 2,134.17 | 1.16 | -0.14 | 0.031 |
| 90.00 | -18.60 | -1.35 | 0.00 | -49.43 | 0.00 | 49.43 | 2,668.19 | 1,334.09 | 4,213.50 | 2,109.88 | 1.19 | -0.14 | 0.030 |
| 95.00 | -18.21 | -1.33 | 0.00 | -42.68 | 0.00 | 42.68 | 2,605.84 | 1,302.92 | 3,973.13 | 1,989.52 | 1.34 | -0.15 | 0.028 |
| 97.50 | -17.04 | -1.28 | 0.00 | -39.35 | 0.00 | 39.35 | 2,573.89 | 1,286.95 | 3,854.35 | 1,930.04 | 1.42 | -0.15 | 0.027 |
| 100.00 | -16.89 | -1.27 | 0.00 | -36.16 | 0.00 | 36.16 | 2,541.44 | 1,270.72 | 3,736.55 | 1,871.05 | 1.50 | -0.16 | 0.026 |
| 101.00 | -14.57 | -1.15 | 0.00 | -34.89 | 0.00 | 34.89 | 2,528.31 | 1,264.16 | 3,689.71 | 1,847.60 | 1.53 | -0.16 | 0.025 |
| 105.00 | -14.03 | -1.12 | 0.00 | -30.29 | 0.00 | 30.29 | 2,474.99 | 1,237.49 | 3,504.07 | 1,754.64 | 1.67 | -0.17 | 0.023 |
| 108.75 | -13.75 | -1.11 | 0.00 | -26.08 | 0.00 | 26.08 | 2,423.81 | 1,211.90 | 3,332.62 | 1,668.79 | 1.80 | -0.17 | 0.021 |
| 110.00 | -13.31 | -1.08 | 0.00 | -24.70 | 0.00 | 24.70 | 2,406.49 | 1,203.24 | 3,276.05 | 1,640.46 | 1.84 | -0.17 | 0.021 |
| 112.00 | -12.71 | -1.04 | 0.00 | -22.54 | 0.00 | 22.54 | 2,378.52 | 1,189.26 | 3,186.16 | 1,595.45 | 1.92 | -0.18 | 0.019 |
| 113.00 | -12.46 | -1.03 | 0.00 | -21.50 | 0.00 | 21.50 | 1,786.91 | 893.46 | 2,420.38 | 1,211.99 | 1.95 | -0.18 | 0.025 |
| 115.00 | -11.86 | -0.99 | 0.00 | -19.44 | 0.00 | 19.44 | 1,768.50 | 884.25 | 2,356.91 | 1,180.21 | 2.03 | -0.18 | 0.023 |
| 120.00 | -11.15 | -0.94 | 0.00 | -14.50 | 0.00 | 14.50 | 1,721.02 | 860.51 | 2,199.92 | 1,101.60 | 2.22 | -0.19 | 0.020 |
| 121.00 | -9.01 | -0.79 | 0.00 | -13.56 | 0.00 | 13.56 | 1,711.28 | 855.64 | 2,168.83 | 1,086.03 | 2.26 | -0.19 | 0.018 |
| 125.00 | -8.51 | -0.75 | 0.00 | -10.40 | 0.00 | 10.40 | 1,671.50 | 835.75 | 2,045.59 | 1,024.32 | 2.42 | -0.19 | 0.015 |
| 130.00 | -8.31 | -0.74 | 0.00 | -6.64 | 0.00 | 6.64 | 1,619.92 | 809.96 | 1,894.26 | 948.54 | 2.63 | -0.20 | 0.012 |
| 132.00 | -5.48 | -0.51 | 0.00 | -5.16 | 0.00 | 5.16 | 1,598.72 | 799.36 | 1,834.65 | 918.69 | 2.71 | -0.20 | 0.009 |
| 135.00 | -5.24 | -0.49 | 0.00 | -3.64 | 0.00 | 3.64 | 1,566.30 | 783.15 | 1,746.27 | 874.43 | 2.84 | -0.20 | 0.008 |
| 138.00 | -4.46 | -0.42 | 0.00 | -2.18 | 0.00 | 2.18 | 1,533.15 | 766.57 | 1,659.21 | 830.84 | 2.96 | -0.20 | 0.006 |
| 140.00 | -1.79 | -0.18 | 0.00 | -1.35 | 0.00 | 1.35 | 1,510.63 | 755.32 | 1,601.94 | 802.16 | 3.05 | -0.20 | 0.003 |
| 145.00 | -1.59 | -0.16 | 0.00 | -0.47 | 0.00 | 0.47 | 1,446.60 | 723.30 | 1,455.26 | 728.71 | 3.26 | -0.20 | 0.002 |
| 148.00 | 0.00 | -0.15 | 0.00 | 0.00 | 0.00 | 0.00 | 1,400.09 | 700.04 | 1,362.73 | 682.38 | 3.39 | -0.20 | 0.000 |

## Equivalent Modal Analysis Method

(Based on ASCE7-10 Chapters 11, 12 & 15 and ANSI/TIA-G, section 2.7)

| | |
|---|---|
| Spectral Response Acceleration for Short Period ($S_s$): | 0.17 |
| Spectral Response Acceleration at 1.0 Second Period ($S_1$): | 0.06 |
| Importance Factor ($I_E$): | 1.00 |
| Site Coefficient $F_a$: | 1.60 |
| Site Coefficient $F_v$ | 2.40 |
| Response Modification Coefficient (R): | 1.50 |
| Design Spectral Response Acceleration at Short Period ($S_{ds}$): | 0.18 |
| Desing Spectral Response Acceleration at 1.0 Second Period ($S_{d1}$): | 0.10 |
| Period Based on Rayleigh Method (sec): | 1.99 |
| Redundancy Factor (p): | 1.00 |

### Load Case (1.2 + 0.2Sds) * DL + E EMAM Seismic Equivalent Modal Analysis Method

| Segment | Height Above Base (ft) | Weight (lb) | a | b | c | Saz | Horizontal Force (lb) | Vertical Force (lb) |
|---|---|---|---|---|---|---|---|---|
| 43 | 146.50 | 223 | 1.852 | 1.785 | 1.069 | 0.327 | 49 | 276 |
| 42 | 142.50 | 431 | 1.752 | 1.330 | 0.897 | 0.269 | 77 | 533 |
| 41 | 139.00 | 184 | 1.667 | 1.002 | 0.765 | 0.223 | 27 | 227 |
| 40 | 136.50 | 281 | 1.608 | 0.803 | 0.681 | 0.193 | 36 | 348 |
| 39 | 133.50 | 288 | 1.538 | 0.599 | 0.589 | 0.159 | 30 | 356 |
| 38 | 131.00 | 227 | 1.481 | 0.455 | 0.520 | 0.133 | 20 | 281 |
| 37 | 127.50 | 581 | 1.403 | 0.289 | 0.435 | 0.099 | 38 | 718 |
| 36 | 123.00 | 477 | 1.305 | 0.128 | 0.341 | 0.062 | 20 | 590 |
| 35 | 120.50 | 124 | 1.253 | 0.060 | 0.296 | 0.045 | 4 | 153 |
| 34 | 117.50 | 695 | 1.191 | -0.003 | 0.248 | 0.026 | 12 | 859 |
| 33 | 114.00 | 283 | 1.121 | -0.057 | 0.200 | 0.007 | 1 | 350 |
| 32 | 112.50 | 252 | 1.092 | -0.074 | 0.182 | 0.001 | 0 | 312 |
| 31 | 111.00 | 509 | 1.063 | -0.088 | 0.165 | -0.005 | -2 | 630 |
| 30 | 109.38 | 322 | 1.032 | -0.100 | 0.148 | -0.011 | -2 | 398 |
| 29 | 106.88 | 630 | 0.986 | -0.113 | 0.124 | -0.018 | -8 | 779 |
| 28 | 103.00 | 685 | 0.915 | -0.121 | 0.093 | -0.026 | -12 | 847 |
| 27 | 100.50 | 174 | 0.872 | -0.121 | 0.077 | -0.029 | -3 | 215 |
| 26 | 98.75 | 438 | 0.841 | -0.118 | 0.066 | -0.029 | -9 | 541 |
| 25 | 96.25 | 453 | 0.799 | -0.112 | 0.054 | -0.029 | -9 | 561 |
| 24 | 92.50 | 923 | 0.738 | -0.098 | 0.038 | -0.026 | -16 | 1,142 |
| 23 | 89.50 | 187 | 0.691 | -0.084 | 0.028 | -0.021 | -3 | 232 |
| 22 | 87.50 | 567 | 0.661 | -0.074 | 0.023 | -0.017 | -6 | 701 |
| 21 | 85.50 | 196 | 0.631 | -0.064 | 0.018 | -0.012 | -2 | 242 |
| 20 | 82.50 | 992 | 0.587 | -0.048 | 0.013 | -0.005 | -3 | 1,227 |
| 19 | 79.25 | 302 | 0.542 | -0.032 | 0.009 | 0.004 | 1 | 373 |
| 18 | 76.75 | 1,297 | 0.508 | -0.019 | 0.007 | 0.011 | 9 | 1,604 |
| 17 | 74.00 | 752 | 0.472 | -0.006 | 0.006 | 0.018 | 9 | 930 |
| 16 | 71.50 | 704 | 0.441 | 0.005 | 0.006 | 0.024 | 11 | 871 |
| 15 | 67.50 | 1,195 | 0.393 | 0.020 | 0.007 | 0.031 | 25 | 1,478 |
| 14 | 62.50 | 1,222 | 0.337 | 0.036 | 0.009 | 0.039 | 32 | 1,511 |
| 13 | 57.50 | 1,249 | 0.285 | 0.048 | 0.014 | 0.043 | 36 | 1,544 |
| 12 | 52.50 | 1,275 | 0.238 | 0.057 | 0.018 | 0.045 | 39 | 1,577 |
| 11 | 47.50 | 1,302 | 0.195 | 0.063 | 0.024 | 0.046 | 40 | 1,610 |
| 10 | 42.50 | 2,662 | 0.156 | 0.067 | 0.029 | 0.045 | 80 | 3,291 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 9 | 39.25 | 811 | 0.133 | 0.069 | 0.033 | 0.045 | 24 | 1,002 |
| 8 | 36.75 | 1,179 | 0.117 | 0.070 | 0.035 | 0.044 | 35 | 1,458 |
| 7 | 32.50 | 1,715 | 0.091 | 0.071 | 0.038 | 0.043 | 49 | 2,121 |
| 6 | 27.50 | 1,751 | 0.065 | 0.072 | 0.041 | 0.042 | 49 | 2,165 |
| 5 | 22.50 | 1,786 | 0.044 | 0.071 | 0.042 | 0.040 | 48 | 2,209 |
| 4 | 17.50 | 1,822 | 0.026 | 0.067 | 0.040 | 0.038 | 46 | 2,252 |
| 3 | 12.50 | 1,857 | 0.013 | 0.059 | 0.035 | 0.034 | 42 | 2,296 |
| 2 | 7.50 | 1,893 | 0.005 | 0.044 | 0.025 | 0.026 | 33 | 2,340 |
| 1 | 2.50 | 1,928 | 0.001 | 0.018 | 0.010 | 0.012 | 15 | 2,384 |
| Generic 8' Omni | 148.00 | 25 | 1.890 | 1.980 | 1.140 | 0.350 | 6 | 31 |
| Generic 8' Dipole | 148.00 | 25 | 1.890 | 1.980 | 1.140 | 0.350 | 6 | 31 |
| Generic 48" x 8" Pan | 148.00 | 240 | 1.890 | 1.980 | 1.140 | 0.350 | 56 | 297 |
| Generic 18' Dipole | 148.00 | 55 | 1.890 | 1.980 | 1.140 | 0.350 | 13 | 68 |
| Flat Low Profile Pla | 148.00 | 1,500 | 1.890 | 1.980 | 1.140 | 0.350 | 350 | 1,855 |
| Commscope CBC78T- | 140.00 | 62 | 1.691 | 1.089 | 0.801 | 0.236 | 10 | 77 |
| Samsung Outdoor | 140.00 | 56 | 1.691 | 1.089 | 0.801 | 0.236 | 9 | 69 |
| Samsung Outdoor | 140.00 | 13 | 1.691 | 1.089 | 0.801 | 0.236 | 2 | 16 |
| Samsung B2/B66A RRH- | 140.00 | 253 | 1.691 | 1.089 | 0.801 | 0.236 | 40 | 313 |
| Samsung B5/B13 RRH-B | 140.00 | 211 | 1.691 | 1.089 | 0.801 | 0.236 | 33 | 261 |
| RFS DB-T1-6Z-8AB-0Z | 140.00 | 88 | 1.691 | 1.089 | 0.801 | 0.236 | 14 | 109 |
| Commscope LNX- | 140.00 | 39 | 1.691 | 1.089 | 0.801 | 0.236 | 6 | 48 |
| Andrew LNX-8513DS-A1 | 140.00 | 78 | 1.691 | 1.089 | 0.801 | 0.236 | 12 | 97 |
| Commscope JAHH-65B- | 140.00 | 364 | 1.691 | 1.089 | 0.801 | 0.236 | 57 | 450 |
| Flat Low Profile Pla | 140.00 | 1,500 | 1.691 | 1.089 | 0.801 | 0.236 | 236 | 1,855 |
| Ericsson RRUS 11 (Ba | 138.00 | 165 | 1.643 | 0.919 | 0.730 | 0.211 | 23 | 204 |
| Collar | 138.00 | 560 | 1.643 | 0.919 | 0.730 | 0.211 | 79 | 692 |
| Powerwave Allgon LGP | 132.00 | 32 | 1.503 | 0.510 | 0.547 | 0.143 | 3 | 39 |
| Powerwave Allgon TT1 | 132.00 | 96 | 1.503 | 0.510 | 0.547 | 0.143 | 9 | 119 |
| Raycap DC6-48-60-18- | 132.00 | 64 | 1.503 | 0.510 | 0.547 | 0.143 | 6 | 79 |
| Ericsson Radio 4449 | 132.00 | 212 | 1.503 | 0.510 | 0.547 | 0.143 | 20 | 262 |
| Ericsson RRUS A2 B2 | 132.00 | 66 | 1.503 | 0.510 | 0.547 | 0.143 | 6 | 82 |
| Ericsson RRUS 32 B30 | 132.00 | 159 | 1.503 | 0.510 | 0.547 | 0.143 | 15 | 197 |
| Ericsson RRUS-12 B2 | 132.00 | 174 | 1.503 | 0.510 | 0.547 | 0.143 | 17 | 215 |
| KMW AM-X-CD-14-65-00 | 132.00 | 109 | 1.503 | 0.510 | 0.547 | 0.143 | 10 | 135 |
| Commscope SBNHH- | 132.00 | 101 | 1.503 | 0.510 | 0.547 | 0.143 | 10 | 124 |
| Kathrein Scala 80010 | 132.00 | 251 | 1.503 | 0.510 | 0.547 | 0.143 | 24 | 311 |
| Flat Low Profile Pla | 132.00 | 1,725 | 1.503 | 0.510 | 0.547 | 0.143 | 164 | 2,133 |
| Round Low Profile Pl | 121.00 | 2,000 | 1.263 | 0.073 | 0.305 | 0.048 | 64 | 2,473 |
| Ericsson KRY 112 144 | 120.00 | 44 | 1.243 | 0.049 | 0.288 | 0.041 | 1 | 54 |
| Ericsson AIR 21, 1.3 | 120.00 | 332 | 1.243 | 0.049 | 0.288 | 0.041 | 9 | 411 |
| Ericsson AIR 21, 1.3 | 120.00 | 326 | 1.243 | 0.049 | 0.288 | 0.041 | 9 | 403 |
| Generic 6.7" x 10.7" | 112.00 | 59 | 1.082 | -0.079 | 0.176 | -0.001 | 0 | 73 |
| 6.7" x 10.7" TTA | 112.00 | 300 | 1.082 | -0.079 | 0.176 | -0.001 | 0 | 371 |
| Generic 48" x 12" Pa | 112.00 | 90 | 1.082 | -0.079 | 0.176 | -0.001 | 0 | 111 |
| Flat Platform w/ Han | 101.00 | 2,000 | 0.880 | -0.121 | 0.080 | -0.028 | -38 | 2,473 |
| Alcatel-Lucent 800 M | 97.50 | 192 | 0.820 | -0.115 | 0.060 | -0.029 | -4 | 237 |
| Alcatel-Lucent 1900 | 97.50 | 180 | 0.820 | -0.115 | 0.060 | -0.029 | -4 | 223 |
| Alcatel-Lucent TD-RR | 97.50 | 210 | 0.820 | -0.115 | 0.060 | -0.029 | -4 | 260 |
| RFS APXV9TM14-ALU-I2 | 97.50 | 165 | 0.820 | -0.115 | 0.060 | -0.029 | -3 | 204 |
| RFS APXVSPP18-C-A20 | 97.50 | 171 | 0.820 | -0.115 | 0.060 | -0.029 | -3 | 211 |
| Collar | 89.00 | 560 | 0.683 | -0.082 | 0.027 | -0.020 | -7 | 692 |
| RFS APXV18-206517S-C | 86.00 | 79 | 0.638 | -0.067 | 0.019 | -0.013 | -1 | 98 |
| Generic GPS | 73.00 | 10 | 0.460 | -0.002 | 0.006 | 0.020 | 0 | 12 |
| | | 51,766 | 92.329 | 33.321 | 30.814 | 8.030 | 2,120 | 64,008 |

Load Case (0.9 - 0.2Sds) * DL + E EMAM Seismic (Reduced DL) Equivalent Modal Analysis Method

| Segment | Height Above Base (ft) | Weight (lb) | a | b | c | Saz | Horizontal Force (lb) | Vertical Force (lb) |
|---|---|---|---|---|---|---|---|---|

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 43 | 146.50 | 223 | 1.852 | 1.785 | 1.069 | 0.327 | 49 | 193 |
| 42 | 142.50 | 431 | 1.752 | 1.330 | 0.897 | 0.269 | 77 | 372 |
| 41 | 139.00 | 184 | 1.667 | 1.002 | 0.765 | 0.223 | 27 | 159 |
| 40 | 136.50 | 281 | 1.608 | 0.803 | 0.681 | 0.193 | 36 | 243 |
| 39 | 133.50 | 288 | 1.538 | 0.599 | 0.589 | 0.159 | 30 | 248 |
| 38 | 131.00 | 227 | 1.481 | 0.455 | 0.520 | 0.133 | 20 | 196 |
| 37 | 127.50 | 581 | 1.403 | 0.289 | 0.435 | 0.099 | 38 | 501 |
| 36 | 123.00 | 477 | 1.305 | 0.128 | 0.341 | 0.062 | 20 | 412 |
| 35 | 120.50 | 124 | 1.253 | 0.060 | 0.296 | 0.045 | 4 | 107 |
| 34 | 117.50 | 695 | 1.191 | -0.003 | 0.248 | 0.026 | 12 | 600 |
| 33 | 114.00 | 283 | 1.121 | -0.057 | 0.200 | 0.007 | 1 | 244 |
| 32 | 112.50 | 252 | 1.092 | -0.074 | 0.182 | 0.001 | 0 | 218 |
| 31 | 111.00 | 509 | 1.063 | -0.088 | 0.165 | -0.005 | -2 | 440 |
| 30 | 109.38 | 322 | 1.032 | -0.100 | 0.148 | -0.011 | -2 | 278 |
| 29 | 106.88 | 630 | 0.986 | -0.113 | 0.124 | -0.018 | -8 | 544 |
| 28 | 103.00 | 685 | 0.915 | -0.121 | 0.093 | -0.026 | -12 | 592 |
| 27 | 100.50 | 174 | 0.872 | -0.121 | 0.077 | -0.029 | -3 | 150 |
| 26 | 98.75 | 438 | 0.841 | -0.118 | 0.066 | -0.029 | -9 | 378 |
| 25 | 96.25 | 453 | 0.799 | -0.112 | 0.054 | -0.029 | -9 | 391 |
| 24 | 92.50 | 923 | 0.738 | -0.098 | 0.038 | -0.026 | -16 | 797 |
| 23 | 89.50 | 187 | 0.691 | -0.084 | 0.028 | -0.021 | -3 | 162 |
| 22 | 87.50 | 567 | 0.661 | -0.074 | 0.023 | -0.017 | -6 | 490 |
| 21 | 85.50 | 196 | 0.631 | -0.064 | 0.018 | -0.012 | -2 | 169 |
| 20 | 82.50 | 992 | 0.587 | -0.048 | 0.013 | -0.005 | -3 | 857 |
| 19 | 79.25 | 302 | 0.542 | -0.032 | 0.009 | 0.004 | 1 | 261 |
| 18 | 76.75 | 1,297 | 0.508 | -0.019 | 0.007 | 0.011 | 9 | 1,120 |
| 17 | 74.00 | 752 | 0.472 | -0.006 | 0.006 | 0.018 | 9 | 649 |
| 16 | 71.50 | 704 | 0.441 | 0.005 | 0.006 | 0.024 | 11 | 608 |
| 15 | 67.50 | 1,195 | 0.393 | 0.020 | 0.007 | 0.031 | 25 | 1,032 |
| 14 | 62.50 | 1,222 | 0.337 | 0.036 | 0.009 | 0.039 | 32 | 1,055 |
| 13 | 57.50 | 1,249 | 0.285 | 0.048 | 0.014 | 0.043 | 36 | 1,078 |
| 12 | 52.50 | 1,275 | 0.238 | 0.057 | 0.018 | 0.045 | 39 | 1,101 |
| 11 | 47.50 | 1,302 | 0.195 | 0.063 | 0.024 | 0.046 | 40 | 1,124 |
| 10 | 42.50 | 2,662 | 0.156 | 0.067 | 0.029 | 0.045 | 80 | 2,298 |
| 9 | 39.25 | 811 | 0.133 | 0.069 | 0.033 | 0.045 | 24 | 700 |
| 8 | 36.75 | 1,179 | 0.117 | 0.070 | 0.035 | 0.044 | 35 | 1,019 |
| 7 | 32.50 | 1,715 | 0.091 | 0.071 | 0.038 | 0.043 | 49 | 1,481 |
| 6 | 27.50 | 1,751 | 0.065 | 0.072 | 0.041 | 0.042 | 49 | 1,512 |
| 5 | 22.50 | 1,786 | 0.044 | 0.071 | 0.042 | 0.040 | 48 | 1,542 |
| 4 | 17.50 | 1,822 | 0.026 | 0.067 | 0.040 | 0.038 | 46 | 1,573 |
| 3 | 12.50 | 1,857 | 0.013 | 0.059 | 0.035 | 0.034 | 42 | 1,604 |
| 2 | 7.50 | 1,893 | 0.005 | 0.044 | 0.025 | 0.026 | 33 | 1,634 |
| 1 | 2.50 | 1,928 | 0.001 | 0.018 | 0.010 | 0.012 | 15 | 1,665 |
| Generic 8' Omni | 148.00 | 25 | 1.890 | 1.980 | 1.140 | 0.350 | 6 | 22 |
| Generic 8' Dipole | 148.00 | 25 | 1.890 | 1.980 | 1.140 | 0.350 | 6 | 22 |
| Generic 48" x 8" Pan | 148.00 | 240 | 1.890 | 1.980 | 1.140 | 0.350 | 56 | 207 |
| Generic 18' Dipole | 148.00 | 55 | 1.890 | 1.980 | 1.140 | 0.350 | 13 | 47 |
| Flat Low Profile Pla | 148.00 | 1,500 | 1.890 | 1.980 | 1.140 | 0.350 | 350 | 1,295 |
| Commscope CBC78T- | 140.00 | 62 | 1.691 | 1.089 | 0.801 | 0.236 | 10 | 54 |
| Samsung Outdoor | 140.00 | 56 | 1.691 | 1.089 | 0.801 | 0.236 | 9 | 48 |
| Samsung Outdoor | 140.00 | 13 | 1.691 | 1.089 | 0.801 | 0.236 | 2 | 11 |
| Samsung B2/B66A RRH- | 140.00 | 253 | 1.691 | 1.089 | 0.801 | 0.236 | 40 | 219 |
| Samsung B5/B13 RRH-B | 140.00 | 211 | 1.691 | 1.089 | 0.801 | 0.236 | 33 | 182 |
| RFS DB-T1-6Z-8AB-0Z | 140.00 | 88 | 1.691 | 1.089 | 0.801 | 0.236 | 14 | 76 |
| Commscope LNX- | 140.00 | 39 | 1.691 | 1.089 | 0.801 | 0.236 | 6 | 34 |
| Andrew LNX-8513DS-A1 | 140.00 | 78 | 1.691 | 1.089 | 0.801 | 0.236 | 12 | 68 |
| Commscope JAHH-65B- | 140.00 | 364 | 1.691 | 1.089 | 0.801 | 0.236 | 57 | 314 |
| Flat Low Profile Pla | 140.00 | 1,500 | 1.691 | 1.089 | 0.801 | 0.236 | 236 | 1,295 |
| Ericsson RRUS 11 (Ba | 138.00 | 165 | 1.643 | 0.919 | 0.730 | 0.211 | 23 | 142 |
| Collar | 138.00 | 560 | 1.643 | 0.919 | 0.730 | 0.211 | 79 | 484 |
| Powerwave Allgon LGP | 132.00 | 32 | 1.503 | 0.510 | 0.547 | 0.143 | 3 | 27 |
| Powerwave Allgon TT1 | 132.00 | 96 | 1.503 | 0.510 | 0.547 | 0.143 | 9 | 83 |
| Raycap DC6-48-60-18- | 132.00 | 64 | 1.503 | 0.510 | 0.547 | 0.143 | 6 | 55 |
| Ericsson Radio 4449 | 132.00 | 212 | 1.503 | 0.510 | 0.547 | 0.143 | 20 | 183 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Ericsson RRUS A2 B2 | 132.00 | 66 | 1.503 | 0.510 | 0.547 | 0.143 | 6 | 57 |
| Ericsson RRUS 32 B30 | 132.00 | 159 | 1.503 | 0.510 | 0.547 | 0.143 | 15 | 137 |
| Ericsson RRUS-12 B2 | 132.00 | 174 | 1.503 | 0.510 | 0.547 | 0.143 | 17 | 150 |
| KMW AM-X-CD-14-65-00 | 132.00 | 109 | 1.503 | 0.510 | 0.547 | 0.143 | 10 | 94 |
| Commscope SBNHH- | 132.00 | 101 | 1.503 | 0.510 | 0.547 | 0.143 | 10 | 87 |
| Kathrein Scala 80010 | 132.00 | 251 | 1.503 | 0.510 | 0.547 | 0.143 | 24 | 217 |
| Flat Low Profile Pla | 132.00 | 1,725 | 1.503 | 0.510 | 0.547 | 0.143 | 164 | 1,490 |
| Round Low Profile Pl | 121.00 | 2,000 | 1.263 | 0.073 | 0.305 | 0.048 | 64 | 1,727 |
| Ericsson KRY 112 144 | 120.00 | 44 | 1.243 | 0.049 | 0.288 | 0.041 | 1 | 38 |
| Ericsson AIR 21, 1.3 | 120.00 | 332 | 1.243 | 0.049 | 0.288 | 0.041 | 9 | 287 |
| Ericsson AIR 21, 1.3 | 120.00 | 326 | 1.243 | 0.049 | 0.288 | 0.041 | 9 | 282 |
| Generic 6.7" x 10.7" | 112.00 | 59 | 1.082 | -0.079 | 0.176 | -0.001 | 0 | 51 |
| 6.7" x 10.7" TTA | 112.00 | 300 | 1.082 | -0.079 | 0.176 | -0.001 | 0 | 259 |
| Generic 48" x 12" Pa | 112.00 | 90 | 1.082 | -0.079 | 0.176 | -0.001 | 0 | 78 |
| Flat Platform w/ Han | 101.00 | 2,000 | 0.880 | -0.121 | 0.080 | -0.028 | -38 | 1,727 |
| Alcatel-Lucent 800 M | 97.50 | 192 | 0.820 | -0.115 | 0.060 | -0.029 | -4 | 166 |
| Alcatel-Lucent 1900 | 97.50 | 180 | 0.820 | -0.115 | 0.060 | -0.029 | -4 | 155 |
| Alcatel-Lucent TD-RR | 97.50 | 210 | 0.820 | -0.115 | 0.060 | -0.029 | -4 | 181 |
| RFS APXV9TM14-ALU-I2 | 97.50 | 165 | 0.820 | -0.115 | 0.060 | -0.029 | -3 | 143 |
| RFS APXVSPP18-C-A20 | 97.50 | 171 | 0.820 | -0.115 | 0.060 | -0.029 | -3 | 148 |
| Collar | 89.00 | 560 | 0.683 | -0.082 | 0.027 | -0.020 | -7 | 484 |
| RFS APXV18-206517S-C | 86.00 | 79 | 0.638 | -0.067 | 0.019 | -0.013 | -1 | 68 |
| Generic GPS | 73.00 | 10 | 0.460 | -0.002 | 0.006 | 0.020 | 0 | 9 |
| | | 51,766 | 92.329 | 33.321 | 30.814 | 8.030 | 2,120 | 44,701 |

Load Case (1.2 + 0.2Sds) * DL + E EMAM Seismic Equivalent Modal Analysis Method

Calculated Forces

| Seg Elev (ft) | Pu FY (-) (kips) | Vu FX (-) (kips) | Tu MY (ft-kips) | Mu MZ (ft-kips) | Mu MX (ft-kips) | Resultant Moment (ft-kips) | phi Pn (kips) | phi Vn (kips) | phi Tn (ft-kips) | phi Mn (ft-kips) | Total Deflect (in) | Rotation (deg) | Ratio |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | -61.62 | -2.11 | 0.00 | -243.44 | 0.00 | 243.44 | 6,758.61 | 3,379.30 | 16,808.83 | 8,416.91 | 0.00 | 0.00 | 0.038 |
| 5.00 | -59.28 | -2.08 | 0.00 | -232.90 | 0.00 | 232.90 | 6,657.97 | 3,328.99 | 16,195.98 | 8,110.02 | 0.00 | -0.01 | 0.038 |
| 10.00 | -56.99 | -2.05 | 0.00 | -222.48 | 0.00 | 222.48 | 6,555.28 | 3,277.64 | 15,589.21 | 7,806.19 | 0.02 | -0.02 | 0.037 |
| 15.00 | -54.73 | -2.01 | 0.00 | -212.24 | 0.00 | 212.24 | 6,450.55 | 3,225.27 | 14,988.86 | 7,505.57 | 0.04 | -0.02 | 0.037 |
| 20.00 | -52.52 | -1.97 | 0.00 | -202.19 | 0.00 | 202.19 | 6,343.76 | 3,171.88 | 14,395.28 | 7,208.34 | 0.07 | -0.03 | 0.036 |
| 25.00 | -50.36 | -1.93 | 0.00 | -192.35 | 0.00 | 192.35 | 6,234.93 | 3,117.46 | 13,808.79 | 6,914.66 | 0.10 | -0.04 | 0.036 |
| 30.00 | -48.24 | -1.88 | 0.00 | -182.73 | 0.00 | 182.73 | 6,124.04 | 3,062.02 | 13,229.73 | 6,624.69 | 0.15 | -0.05 | 0.035 |
| 35.00 | -46.78 | -1.85 | 0.00 | -173.32 | 0.00 | 173.32 | 6,011.11 | 3,005.56 | 12,658.42 | 6,338.62 | 0.20 | -0.06 | 0.035 |
| 38.50 | -45.78 | -1.83 | 0.00 | -166.84 | 0.00 | 166.84 | 5,930.84 | 2,965.42 | 12,263.31 | 6,140.77 | 0.25 | -0.06 | 0.035 |
| 40.00 | -42.49 | -1.75 | 0.00 | -164.10 | 0.00 | 164.10 | 5,896.13 | 2,948.06 | 12,095.22 | 6,056.60 | 0.27 | -0.07 | 0.034 |
| 45.00 | -40.88 | -1.71 | 0.00 | -155.34 | 0.00 | 155.34 | 4,028.70 | 2,014.35 | 8,211.50 | 4,111.85 | 0.34 | -0.07 | 0.048 |
| 50.00 | -39.30 | -1.68 | 0.00 | -146.77 | 0.00 | 146.77 | 3,959.47 | 1,979.74 | 7,854.78 | 3,933.23 | 0.43 | -0.08 | 0.047 |
| 55.00 | -37.76 | -1.65 | 0.00 | -138.36 | 0.00 | 138.36 | 3,888.20 | 1,944.10 | 7,501.64 | 3,756.40 | 0.52 | -0.10 | 0.047 |
| 60.00 | -36.24 | -1.62 | 0.00 | -130.11 | 0.00 | 130.11 | 3,814.87 | 1,907.44 | 7,152.43 | 3,581.53 | 0.63 | -0.11 | 0.046 |
| 65.00 | -34.77 | -1.60 | 0.00 | -121.98 | 0.00 | 121.98 | 3,739.50 | 1,869.75 | 6,807.48 | 3,408.80 | 0.75 | -0.12 | 0.045 |
| 70.00 | -33.89 | -1.60 | 0.00 | -113.96 | 0.00 | 113.96 | 3,662.08 | 1,831.04 | 6,467.12 | 3,238.36 | 0.88 | -0.13 | 0.044 |
| 73.00 | -32.95 | -1.59 | 0.00 | -109.17 | 0.00 | 109.17 | 3,614.64 | 1,807.32 | 6,265.24 | 3,137.28 | 0.97 | -0.14 | 0.044 |
| 75.00 | -31.35 | -1.58 | 0.00 | -105.99 | 0.00 | 105.99 | 3,582.60 | 1,791.30 | 6,131.68 | 3,070.40 | 1.03 | -0.15 | 0.043 |
| 78.50 | -30.97 | -1.58 | 0.00 | -100.46 | 0.00 | 100.46 | 2,803.82 | 1,401.91 | 4,778.86 | 2,392.98 | 1.14 | -0.16 | 0.053 |
| 80.00 | -29.75 | -1.59 | 0.00 | -98.08 | 0.00 | 98.08 | 2,786.75 | 1,393.37 | 4,704.23 | 2,355.61 | 1.19 | -0.16 | 0.052 |
| 85.00 | -29.50 | -1.59 | 0.00 | -90.15 | 0.00 | 90.15 | 2,728.49 | 1,364.25 | 4,457.31 | 2,231.97 | 1.37 | -0.18 | 0.051 |
| 86.00 | -28.70 | -1.60 | 0.00 | -88.55 | 0.00 | 88.55 | 2,716.60 | 1,358.30 | 4,408.29 | 2,207.42 | 1.40 | -0.18 | 0.051 |
| 89.00 | -27.78 | -1.61 | 0.00 | -83.75 | 0.00 | 83.75 | 2,680.41 | 1,340.21 | 4,262.00 | 2,134.17 | 1.52 | -0.19 | 0.050 |
| 90.00 | -26.64 | -1.63 | 0.00 | -82.14 | 0.00 | 82.14 | 2,668.19 | 1,334.09 | 4,213.50 | 2,109.88 | 1.56 | -0.19 | 0.049 |
| 95.00 | -26.08 | -1.64 | 0.00 | -74.00 | 0.00 | 74.00 | 2,605.84 | 1,302.92 | 3,973.13 | 1,989.52 | 1.77 | -0.21 | 0.047 |
| 97.50 | -24.40 | -1.66 | 0.00 | -69.90 | 0.00 | 69.90 | 2,573.89 | 1,286.95 | 3,854.35 | 1,930.04 | 1.88 | -0.22 | 0.046 |
| 100.00 | -24.19 | -1.67 | 0.00 | -65.74 | 0.00 | 65.74 | 2,541.44 | 1,270.72 | 3,736.55 | 1,871.05 | 1.99 | -0.22 | 0.045 |
| 101.00 | -20.86 | -1.71 | 0.00 | -64.07 | 0.00 | 64.07 | 2,528.31 | 1,264.16 | 3,689.71 | 1,847.60 | 2.04 | -0.23 | 0.043 |
| 105.00 | -20.09 | -1.72 | 0.00 | -57.25 | 0.00 | 57.25 | 2,474.99 | 1,237.49 | 3,504.07 | 1,754.64 | 2.24 | -0.24 | 0.041 |
| 108.75 | -19.69 | -1.72 | 0.00 | -50.81 | 0.00 | 50.81 | 2,423.81 | 1,211.90 | 3,332.62 | 1,668.79 | 2.43 | -0.25 | 0.039 |
| 110.00 | -19.06 | -1.72 | 0.00 | -48.66 | 0.00 | 48.66 | 2,406.49 | 1,203.24 | 3,276.05 | 1,640.46 | 2.50 | -0.25 | 0.038 |
| 112.00 | -18.19 | -1.72 | 0.00 | -45.22 | 0.00 | 45.22 | 2,378.52 | 1,189.26 | 3,186.16 | 1,595.45 | 2.60 | -0.26 | 0.036 |
| 113.00 | -17.84 | -1.72 | 0.00 | -43.50 | 0.00 | 43.50 | 1,786.91 | 893.46 | 2,420.38 | 1,211.99 | 2.66 | -0.26 | 0.046 |
| 115.00 | -16.98 | -1.70 | 0.00 | -40.07 | 0.00 | 40.07 | 1,768.50 | 884.25 | 2,356.91 | 1,180.21 | 2.77 | -0.27 | 0.044 |
| 120.00 | -15.96 | -1.68 | 0.00 | -31.55 | 0.00 | 31.55 | 1,721.02 | 860.51 | 2,199.92 | 1,101.60 | 3.06 | -0.28 | 0.038 |
| 121.00 | -12.90 | -1.58 | 0.00 | -29.88 | 0.00 | 29.88 | 1,711.28 | 855.64 | 2,168.83 | 1,086.03 | 3.12 | -0.29 | 0.035 |
| 125.00 | -12.18 | -1.54 | 0.00 | -23.56 | 0.00 | 23.56 | 1,671.50 | 835.75 | 2,045.59 | 1,024.32 | 3.36 | -0.30 | 0.030 |
| 130.00 | -11.90 | -1.52 | 0.00 | -15.85 | 0.00 | 15.85 | 1,619.92 | 809.96 | 1,894.26 | 948.54 | 3.68 | -0.31 | 0.024 |
| 132.00 | -7.85 | -1.18 | 0.00 | -12.81 | 0.00 | 12.81 | 1,598.72 | 799.36 | 1,834.65 | 918.69 | 3.81 | -0.31 | 0.019 |
| 135.00 | -7.50 | -1.15 | 0.00 | -9.26 | 0.00 | 9.26 | 1,566.30 | 783.15 | 1,746.27 | 874.43 | 4.01 | -0.31 | 0.015 |
| 138.00 | -6.38 | -1.01 | 0.00 | -5.82 | 0.00 | 5.82 | 1,533.15 | 766.57 | 1,659.21 | 830.84 | 4.21 | -0.32 | 0.011 |
| 140.00 | -2.55 | -0.49 | 0.00 | -3.80 | 0.00 | 3.80 | 1,510.63 | 755.32 | 1,601.94 | 802.16 | 4.34 | -0.32 | 0.006 |
| 145.00 | -2.28 | -0.44 | 0.00 | -1.33 | 0.00 | 1.33 | 1,446.60 | 723.30 | 1,455.26 | 728.71 | 4.67 | -0.32 | 0.003 |
| 148.00 | 0.00 | -0.43 | 0.00 | 0.00 | 0.00 | 0.00 | 1,400.09 | 700.04 | 1,362.73 | 682.38 | 4.88 | -0.32 | 0.000 |

Load Case (0.9 - 0.2Sds) * DL + E EMAM Seismic (Reduced DL) Equivalent Modal Analysis Method

Calculated Forces

| Seg Elev (ft) | Pu FY (-) (kips) | Vu FX (-) (kips) | Tu MY (ft-kips) | Mu MZ (ft-kips) | Mu MX (ft-kips) | Resultant Moment (ft-kips) | phi Pn (kips) | phi Vn (kips) | phi Tn (ft-kips) | phi Mn (ft-kips) | Total Deflect (in) | Rotation (deg) | Ratio |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | -43.04 | -2.11 | 0.00 | -240.75 | 0.00 | 240.75 | 6,758.61 | 3,379.30 | 16,808.83 | 8,416.91 | 0.00 | 0.00 | 0.035 |
| 5.00 | -41.40 | -2.08 | 0.00 | -230.21 | 0.00 | 230.21 | 6,657.97 | 3,328.99 | 16,195.98 | 8,110.02 | 0.00 | -0.01 | 0.035 |
| 10.00 | -39.80 | -2.04 | 0.00 | -219.82 | 0.00 | 219.82 | 6,555.28 | 3,277.64 | 15,589.21 | 7,806.19 | 0.02 | -0.02 | 0.034 |
| 15.00 | -38.22 | -2.00 | 0.00 | -209.60 | 0.00 | 209.60 | 6,450.55 | 3,225.27 | 14,988.86 | 7,505.57 | 0.04 | -0.02 | 0.034 |
| 20.00 | -36.68 | -1.96 | 0.00 | -199.60 | 0.00 | 199.60 | 6,343.76 | 3,171.88 | 14,395.28 | 7,208.34 | 0.06 | -0.03 | 0.033 |
| 25.00 | -35.17 | -1.91 | 0.00 | -189.81 | 0.00 | 189.81 | 6,234.93 | 3,117.46 | 13,808.79 | 6,914.66 | 0.10 | -0.04 | 0.033 |
| 30.00 | -33.69 | -1.87 | 0.00 | -180.24 | 0.00 | 180.24 | 6,124.04 | 3,062.02 | 13,229.73 | 6,624.69 | 0.15 | -0.05 | 0.033 |
| 35.00 | -32.67 | -1.84 | 0.00 | -170.90 | 0.00 | 170.90 | 6,011.11 | 3,005.56 | 12,658.42 | 6,338.62 | 0.20 | -0.06 | 0.032 |
| 38.50 | -31.97 | -1.81 | 0.00 | -164.48 | 0.00 | 164.48 | 5,930.84 | 2,965.42 | 12,263.31 | 6,140.77 | 0.25 | -0.06 | 0.032 |
| 40.00 | -29.67 | -1.73 | 0.00 | -161.75 | 0.00 | 161.75 | 5,896.13 | 2,948.06 | 12,095.22 | 6,056.60 | 0.27 | -0.06 | 0.032 |
| 45.00 | -28.55 | -1.70 | 0.00 | -153.08 | 0.00 | 153.08 | 4,028.70 | 2,014.35 | 8,211.50 | 4,111.85 | 0.34 | -0.07 | 0.044 |
| 50.00 | -27.44 | -1.66 | 0.00 | -144.60 | 0.00 | 144.60 | 3,959.47 | 1,979.74 | 7,854.78 | 3,933.23 | 0.42 | -0.08 | 0.044 |
| 55.00 | -26.37 | -1.63 | 0.00 | -136.29 | 0.00 | 136.29 | 3,888.20 | 1,944.10 | 7,501.64 | 3,756.40 | 0.51 | -0.09 | 0.043 |
| 60.00 | -25.31 | -1.60 | 0.00 | -128.14 | 0.00 | 128.14 | 3,814.87 | 1,907.44 | 7,152.43 | 3,581.53 | 0.62 | -0.11 | 0.042 |
| 65.00 | -24.28 | -1.58 | 0.00 | -120.12 | 0.00 | 120.12 | 3,739.50 | 1,869.75 | 6,807.48 | 3,408.80 | 0.74 | -0.12 | 0.042 |
| 70.00 | -23.67 | -1.57 | 0.00 | -112.22 | 0.00 | 112.22 | 3,662.08 | 1,831.04 | 6,467.12 | 3,238.36 | 0.87 | -0.13 | 0.041 |
| 73.00 | -23.01 | -1.56 | 0.00 | -107.51 | 0.00 | 107.51 | 3,614.64 | 1,807.32 | 6,265.24 | 3,137.28 | 0.95 | -0.14 | 0.041 |
| 75.00 | -21.89 | -1.56 | 0.00 | -104.38 | 0.00 | 104.38 | 3,582.60 | 1,791.30 | 6,131.68 | 3,070.40 | 1.01 | -0.15 | 0.040 |
| 78.50 | -21.63 | -1.56 | 0.00 | -98.94 | 0.00 | 98.94 | 2,803.82 | 1,401.91 | 4,778.86 | 2,392.98 | 1.12 | -0.15 | 0.049 |
| 80.00 | -20.77 | -1.56 | 0.00 | -96.60 | 0.00 | 96.60 | 2,786.75 | 1,393.37 | 4,704.23 | 2,355.61 | 1.17 | -0.16 | 0.048 |
| 85.00 | -20.60 | -1.56 | 0.00 | -88.80 | 0.00 | 88.80 | 2,728.49 | 1,364.25 | 4,457.31 | 2,231.97 | 1.35 | -0.17 | 0.047 |
| 86.00 | -20.05 | -1.57 | 0.00 | -87.24 | 0.00 | 87.24 | 2,716.60 | 1,358.30 | 4,408.29 | 2,207.42 | 1.38 | -0.18 | 0.047 |
| 89.00 | -19.40 | -1.58 | 0.00 | -82.52 | 0.00 | 82.52 | 2,680.41 | 1,340.21 | 4,262.00 | 2,134.17 | 1.50 | -0.19 | 0.046 |
| 90.00 | -18.60 | -1.60 | 0.00 | -80.94 | 0.00 | 80.94 | 2,668.19 | 1,334.09 | 4,213.50 | 2,109.88 | 1.54 | -0.19 | 0.045 |
| 95.00 | -18.21 | -1.61 | 0.00 | -72.94 | 0.00 | 72.94 | 2,605.84 | 1,302.92 | 3,973.13 | 1,989.52 | 1.74 | -0.20 | 0.044 |
| 97.50 | -17.04 | -1.63 | 0.00 | -68.92 | 0.00 | 68.92 | 2,573.89 | 1,286.95 | 3,854.35 | 1,930.04 | 1.85 | -0.21 | 0.042 |
| 100.00 | -16.89 | -1.64 | 0.00 | -64.83 | 0.00 | 64.83 | 2,541.44 | 1,270.72 | 3,736.55 | 1,871.05 | 1.97 | -0.22 | 0.041 |
| 101.00 | -14.57 | -1.68 | 0.00 | -63.20 | 0.00 | 63.20 | 2,528.31 | 1,264.16 | 3,689.71 | 1,847.60 | 2.01 | -0.22 | 0.040 |
| 105.00 | -14.03 | -1.69 | 0.00 | -56.47 | 0.00 | 56.47 | 2,474.99 | 1,237.49 | 3,504.07 | 1,754.64 | 2.21 | -0.24 | 0.038 |
| 108.75 | -13.75 | -1.69 | 0.00 | -50.14 | 0.00 | 50.14 | 2,423.81 | 1,211.90 | 3,332.62 | 1,668.79 | 2.40 | -0.25 | 0.036 |
| 110.00 | -13.31 | -1.69 | 0.00 | -48.02 | 0.00 | 48.02 | 2,406.49 | 1,203.24 | 3,276.05 | 1,640.46 | 2.46 | -0.25 | 0.035 |
| 112.00 | -12.70 | -1.69 | 0.00 | -44.63 | 0.00 | 44.63 | 2,378.52 | 1,189.26 | 3,186.16 | 1,595.45 | 2.57 | -0.26 | 0.033 |
| 113.00 | -12.46 | -1.69 | 0.00 | -42.94 | 0.00 | 42.94 | 1,786.91 | 893.46 | 2,420.38 | 1,211.99 | 2.62 | -0.26 | 0.042 |
| 115.00 | -11.86 | -1.68 | 0.00 | -39.56 | 0.00 | 39.56 | 1,768.50 | 884.25 | 2,356.91 | 1,180.21 | 2.73 | -0.26 | 0.040 |
| 120.00 | -11.14 | -1.65 | 0.00 | -31.17 | 0.00 | 31.17 | 1,721.02 | 860.51 | 2,199.92 | 1,101.60 | 3.02 | -0.28 | 0.035 |
| 121.00 | -9.01 | -1.56 | 0.00 | -29.52 | 0.00 | 29.52 | 1,711.28 | 855.64 | 2,168.83 | 1,086.03 | 3.08 | -0.28 | 0.032 |
| 125.00 | -8.50 | -1.52 | 0.00 | -23.28 | 0.00 | 23.28 | 1,671.50 | 835.75 | 2,045.59 | 1,024.32 | 3.32 | -0.29 | 0.028 |
| 130.00 | -8.31 | -1.50 | 0.00 | -15.68 | 0.00 | 15.68 | 1,619.92 | 809.96 | 1,894.26 | 948.54 | 3.63 | -0.30 | 0.022 |
| 132.00 | -5.48 | -1.17 | 0.00 | -12.68 | 0.00 | 12.68 | 1,598.72 | 799.36 | 1,834.65 | 918.69 | 3.76 | -0.31 | 0.017 |
| 135.00 | -5.24 | -1.13 | 0.00 | -9.17 | 0.00 | 9.17 | 1,566.30 | 783.15 | 1,746.27 | 874.43 | 3.95 | -0.31 | 0.014 |
| 138.00 | -4.45 | -1.00 | 0.00 | -5.77 | 0.00 | 5.77 | 1,533.15 | 766.57 | 1,659.21 | 830.84 | 4.15 | -0.31 | 0.010 |
| 140.00 | -1.78 | -0.49 | 0.00 | -3.77 | 0.00 | 3.77 | 1,510.63 | 755.32 | 1,601.94 | 802.16 | 4.28 | -0.32 | 0.006 |
| 145.00 | -1.59 | -0.44 | 0.00 | -1.32 | 0.00 | 1.32 | 1,446.60 | 723.30 | 1,455.26 | 728.71 | 4.61 | -0.32 | 0.003 |
| 148.00 | 0.00 | -0.43 | 0.00 | 0.00 | 0.00 | 0.00 | 1,400.09 | 700.04 | 1,362.73 | 682.38 | 4.81 | -0.32 | 0.000 |

## Analysis Summary

| | Reactions | | | | | | Max Usage | |
|---|---|---|---|---|---|---|---|---|
| Load Case | Shear FX (kips) | Shear FZ (kips) | Axial FY (kips) | Moment MX (ft-kips) | Moment MY (ft-kips) | Moment MZ (ft-kips) | Elev (ft) | Interaction Ratio |
| 1.2D + 1.6W | 31.93 | 0.00 | 62.09 | 0.00 | 0.00 | 3457.25 | 45.00 | 0.52 |
| 0.9D + 1.6W | 31.82 | 0.00 | 46.56 | 0.00 | 0.00 | 3418.00 | 45.00 | 0.51 |
| 1.2D + 1.0Di + 1.0Wi | 9.18 | 0.00 | 87.34 | 0.00 | 0.00 | 959.15 | 45.00 | 0.15 |
| (1.2 + 0.2Sds) * DL + E ELFM | 1.67 | 0.00 | 61.62 | 0.00 | 0.00 | 194.73 | 45.00 | 0.04 |
| (1.2 + 0.2Sds) * DL + E EMAM | 2.11 | 0.00 | 61.62 | 0.00 | 0.00 | 243.44 | 78.50 | 0.05 |
| (0.9 - 0.2Sds) * DL + E ELFM | 1.67 | 0.00 | 43.04 | 0.00 | 0.00 | 192.62 | 45.00 | 0.04 |
| (0.9 - 0.2Sds) * DL + E EMAM | 2.11 | 0.00 | 43.04 | 0.00 | 0.00 | 240.75 | 78.50 | 0.05 |
| 1.0D + 1.0W | 6.28 | 0.00 | 51.77 | 0.00 | 0.00 | 676.76 | 45.00 | 0.11 |

# Base Plate & Anchor Rod Analysis

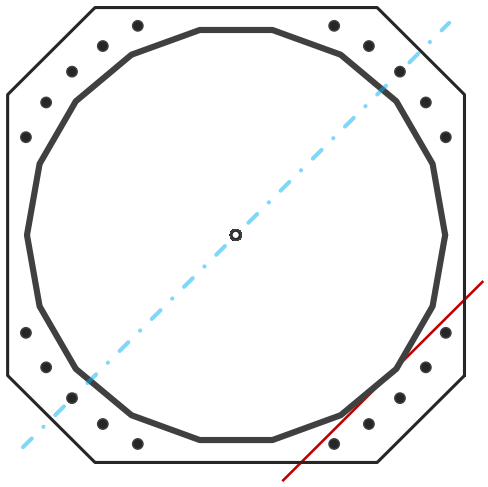
| Pole Dimensions | | |
|---|---|---|
| Number of Sides | 18 | - |
| Diameter | 61.05 | in |
| Thickness | 0.5 | in |
| Orientation Offset | 0 | ° |

| Base Reactions | | |
|---|---|---|
| Moment, Mu | 3457.3 | k-ft |
| Axial, Pu | 62.1 | k |
| Shear, Vu | 31.9 | k |
| Neutral Axis | 225 | ° |

| Report Capacities | | |
|---|---|---|
| Component | Capacity | Result |
| Base Plate | 41% | Pass |
| Anchor Rods | 48% | Pass |
| Dwyidag | - | - |

| Base Plate | | |
|---|---|---|
| Shape | Square | - |
| Width | 68 | in |
| Thickness | 3 1/4 | in |
| Grade | A572-50 | |
| Yield Strength, Fy | 50 | ksi |
| Tensile Strength, Fu | 65 | ksi |
| Clip | 13 | in |
| Orientation Offset | 0 | ° |
| Anchor Rod Detail | d | η=0.5 |
| Clear Distance | 3 | in |
| Applied Moment, Mu | 1698.0 | k |
| Bending Stress, ϕMn | 4143.1 | k |

| Original Anchor Rods | | |
|---|---|---|
| Arrangement | Cluster | - |
| Quantity | 20 | - |
| Diameter, ø | 2 1/4 | in |
| Bolt Circle | 69 | in |
| Grade | A615-75 | |
| Yield Strength, Fy | 75 | ksi |
| Tensile Strength, Fu | 100 | ksi |
| Spacing | 6.0 | in |
| Orientation Offset | 0 | ° |
| Applied Force, Pu | 123.3 | k |
| Anchor Rods, ϕPn | 259.8 | k |



# Calculations for Monopole Base Plate & Anchor Rod Analysis

**Reaction Distribution**

| Reaction | Shear Vu | Moment Mu | Factor |
|---|---|---|---|
| - | k | k-ft | - |
| Base Forces | 31.9 | 3457.3 | 1.00 |
| Anchor Rod Forces | 31.9 | 3457.3 | 1.00 |
| Additional Bolt (Grp1) Forces | 0.0 | 0.0 | 0.00 |
| Additional Bolt (Grp2) Forces | 0.0 | 0.0 | 0.00 |
| Dywidag Forces | 0.0 | 0.0 | 0.00 |
| Stiffener Forces | 0.0 | 0.0 | 0.00 |

**Geometric Properties**

| Section | Gross Area | Net Area | Individual Inertia | Threads per Inch | Moment of Inertia |
|---|---|---|---|---|---|
| - | $in^2$ | $in^2$ | $in^4$ | # | $in^4$ |
| Pole | 94.6296 | 5.2572 | 0.4399 | | 43375.50 |
| Bolt | 3.9761 | 3.2477 | 0.8393 | 4.5 | 38672.41 |
| Bolt1 | 0.0000 | 0.0000 | 0.0000 | 0 | 0.00 |
| Bolt2 | 0.0000 | 0.0000 | 0.0000 | 0 | 0.00 |
| Dywidag | 0.0000 | 0.0000 | 0.0000 | | 0.00 |
| Stiffener | 0.0000 | 0.0000 | 0.0000 | | 0.00 |

| Base Plate | | |
|---|---|---|
| Shape | Square | - |
| Width, W | 68 | in |
| Thickness, t | 3.25 | in |
| Yield Strength, Fy | 50 | ksi |
| Tensile Strength, Fu | 65 | ksi |
| Base Plate Chord | 29.948 | in |
| Detail Type | d | - |
| Detail Factor | 0.50 | - |
| Clear Distance | 3 | - |

| Anchor Rods | | |
|---|---|---|
| Anchor Rod Quantity, N | 20 | - |
| Rod Diameter, d | 2.25 | in |
| Bolt Circle, BC | 69 | in |
| Yield Strength, Fy | 75 | ksi |
| Tensile Strength, Fu | 100 | ksi |
| Applied Axial, Pu | 123.3 | k |
| Applied Shear, Vu | 0.5 | k |
| Compressive Capacity, ϕPn | 259.8 | k |
| Tensile Capacity, ϕRnt | 0.475 | OK |
| Interaction Capacity | 0.478 | OK |

| External Base Plate | | |
|---|---|---|
| Chord Length AA | 34.867 | in |
| Additional AA | 0.000 | in |
| Section Modulus, Z | 92.069 | $in^3$ |
| Applied Moment, Mu | 1698.0 | k-ft |
| Bending Capacity, ϕMn | 4143.1 | k-ft |
| Capacity, Mu/ϕMn | 0.410 | OK |
| | | |
| Chord Length AB | 33.921 | in |
| Additional AB | 0.000 | in |
| Section Modulus, Z | 89.572 | $in^3$ |
| Applied Moment, Mu | 1415.0 | k-ft |
| Bending Capacity, ϕMn | 4030.8 | k-ft |
| Capacity, Mu/ϕMn | 0.351 | OK |
| | | |
| Bend Line Length | 0.000 | in |
| Additional Bend Line | 0.000 | in |
| Section Modulus, Z | 0.000 | $in^3$ |
| Applied Moment, Mu | 0.0 | k-ft |
| Bending Capacity, ϕMn | 0.0 | k-ft |
| Capacity, Mu/ϕMn | | |

| Internal Base Plate | | |
|---|---|---|
| Arc Length | 0.000 | in |
| Section Modulus, Z | 0.000 | $in^3$ |
| Moment Arm | 0.000 | in |
| Applied Moment, Mu | 0.0 | k-ft |
| Bending Capacity, ϕMn | 0.0 | k-ft |
| Capacity, Mu/ϕMn | | |

AMERICAN TOWER®
CORPORATION

# Antenna Mount Analysis Report

| | | |
|---|---|---|
| **ATC Site Name** | : | **Madison CT 6, CT** |
| **ATC Site Number** | : | **302540** |
| **Engineering Number** | : | **12995792_C8_01** |
| **Mount Elevation** | : | **139.5 ft** |
| **Carrier** | : | **Verizon Wireless** |
| **Carrier Site Name** | : | **MADISON 2 CT** |
| **Carrier Site Number** | : | **468845** |
| **Site Location** | : | **8 Old 79**<br>**Madison, CT 06443-2685**<br>**41.28553333 , -72.60134167** |
| **County** | : | **New Haven** |
| **Date** | : | **January 22, 2020** |
| **Max Usage** | : | **68%** |
| **Result** | : | **Contingent Pass** |

Prepared By:
Mitchell Chen
Structural Engineer

Reviewed By:

STATE OF CONNECTICUT
ESHA KAUSHAL MODI
32593
LICENSED
PROFESSIONAL ENGINEER

Authorized by "EOR"
22 Jan 2020 01:14:36 cosign

**COA: PEC.0001553**

**Table of Contents**

## Introduction

The purpose of this report is to summarize results of the antenna mount analysis performed for Verizon Wireless at 139.5 ft.

## Supporting Documents

| | |
|---|---|
| **Mount Mapping** | Infinigy Project #1009-Z0003-H/317-505, dated January 8, 2020 |
| **Spec. Sheet** | Spec Sheet for Perfect Vision PV-VSK-B |
| **RFDS** | RFDS dated October 30, 2019 |
| **Photos** | Site photos from 2018 |

## Analysis

This antenna mount was analyzed using American Tower Corporation's Mount Analysis Program and RISA-3D v17

| | |
|---|---|
| **Basic Wind Speed:** | 101 mph (3-Second Gust, Vasd) / 130 mph (3-Second Gust, Vult) |
| **Basic Wind Speed w/ Ice:** | 50 mph (3-Second Gust) w/ 3/4" radial ice concurrent |
| **Codes:** | ANSI/TIA-222-G / 2015 IBC / 2018 Connecticut State Building Code |
| **Structure Class:** | II |
| **Exposure Category:** | B |
| **Topographic Category:** | 1 |
| **Crest Height:** | 0 ft |
| **Spectral Response:** | Ss = 0.171, $S_1$ = 0.06 |
| **Site Class:** | D - Stiff Soil |
| **Live Loads:** | Lm = 450 lbs, Lv = 250 lbs |

## Conclusion

Based on the analysis results, the antenna mount meets the requirements per the applicable codes listed above. The mount can support the equipment as described in this report.

- Install Perfect Vision PV-VSK-M v-stabilizer kit on the tower approximately 32" below the existing connection with Perfect Vision PV-XP-2020 crossover plates and Perfect Vision Pipe-238x150 (2-3/8"x150") approximately 10" below the existing face horizontal

If you have any questions or require additional information, please contact American Tower via email at Engineering@americantower.com. Please include the American Tower site name, site number, and engineering number in the subject line for any questions.

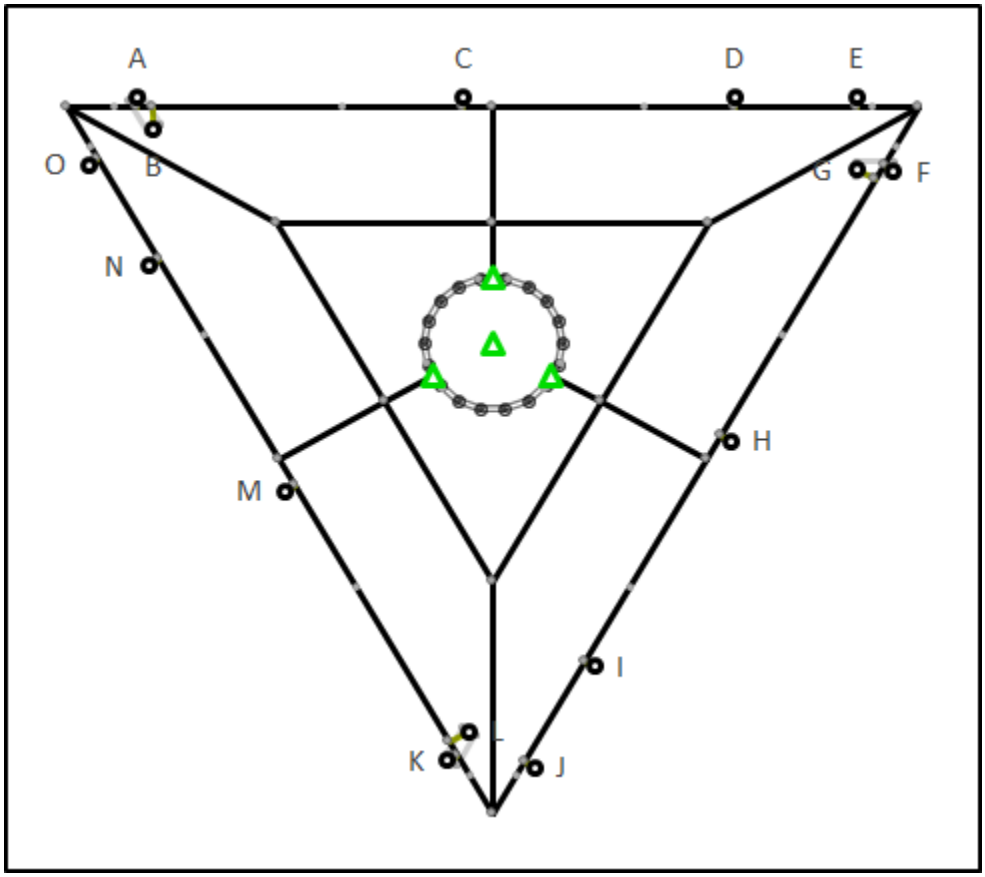
## Application Loading

| Mount Centerline (ft) | Antenna Centerline (ft) | Qty | Antenna Model |
|---|---|---|---|
| 139.5 | 140.0 | 3 | Samsung Outdoor CBRS 20W RRH –Clip-on Antenna |
| | | 6 | Commscope JAHH-65B-R3B |
| | | 2 | Andrew LNX-8513DS-A1M |
| | | 1 | Commscope LNX-6514DS-A1M |
| | | 3 | Commscope CBC78T-DS-43-2X |
| | | 2 | RFS DB-T1-6Z-8AB-0Z |
| | | 3 | Samsung B5/B13 RRH-BR04C |
| | | 3 | Samsung Outdoor CBRS 20W RRH |
| | | 3 | Samsung B2/B66A RRH-BR049 |

## Structure Usages

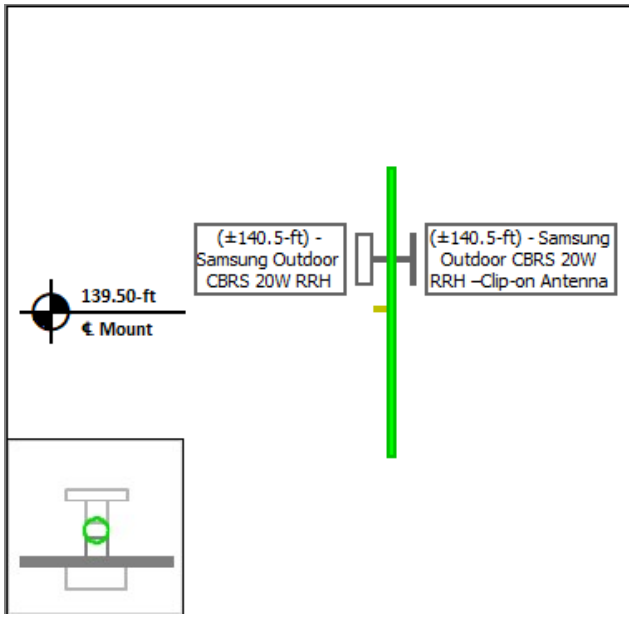
| Structural Component | Controlling Usage | Pass/Fail |
|---|---|---|
| Horizontals | 67% | Pass |
| Mount Pipes | 68% | Pass |
| Mod-Kits | 5% | Pass |

**Mount Layout**

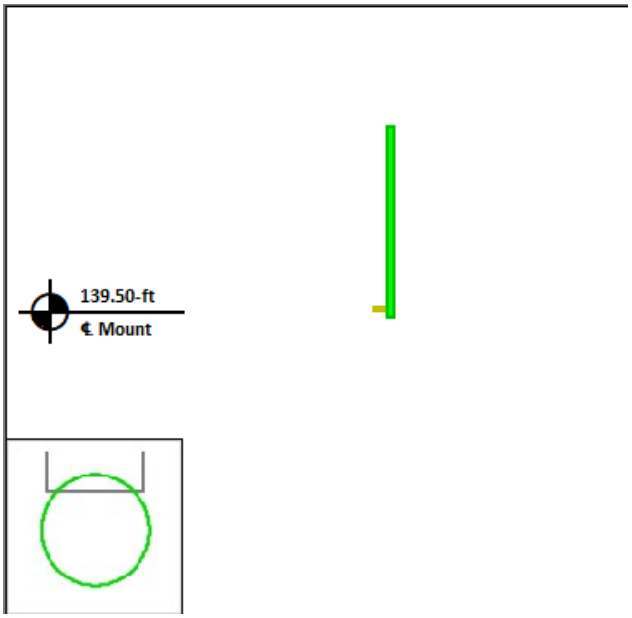


## Equipment Layout

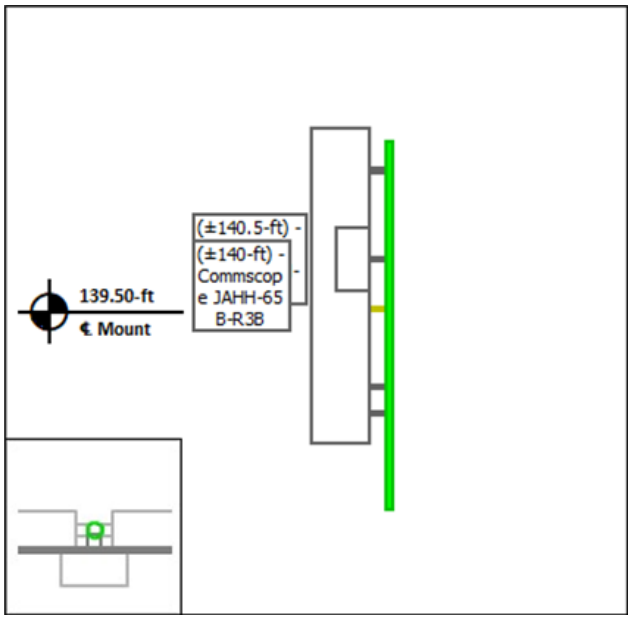
### Mount Pipe A



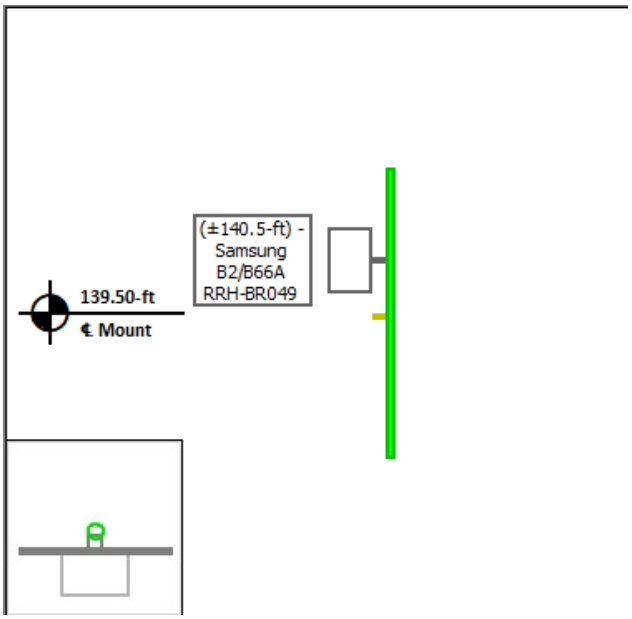

### Mount Pipe B




### Mount Pipe C

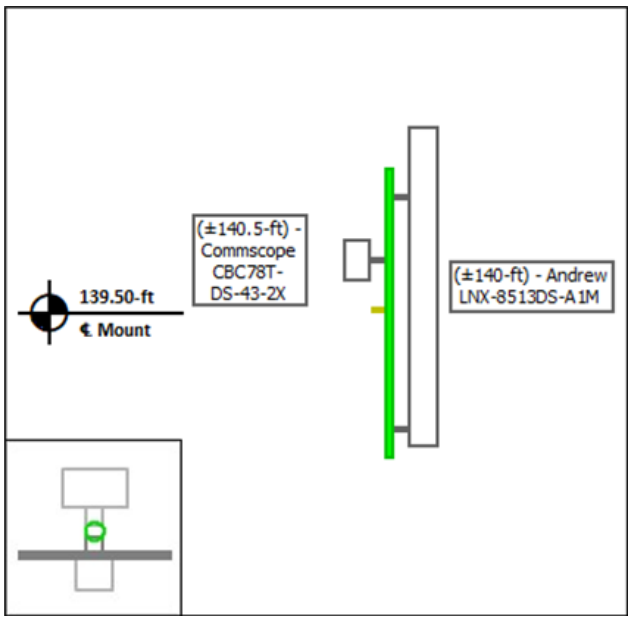



### Mount Pipe D

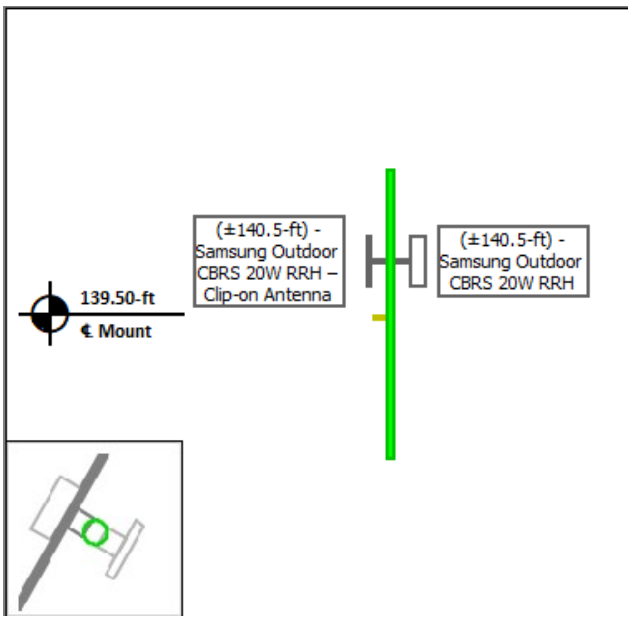


## Equipment Layout Cont'd.

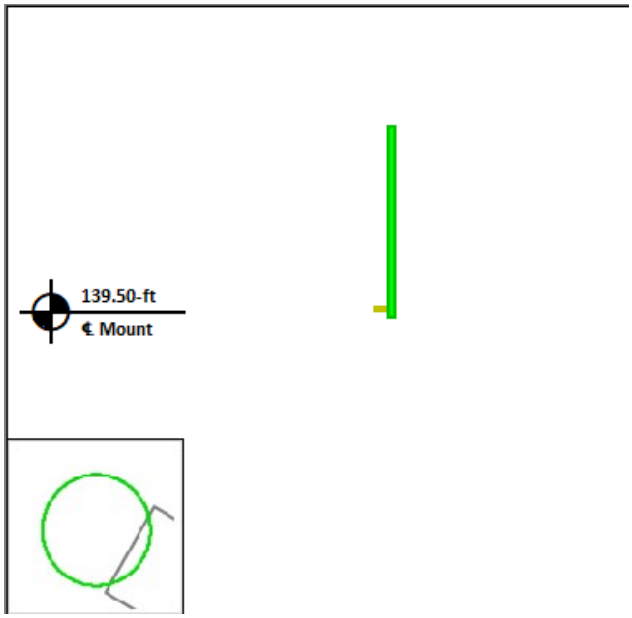
**Mount Pipe E**



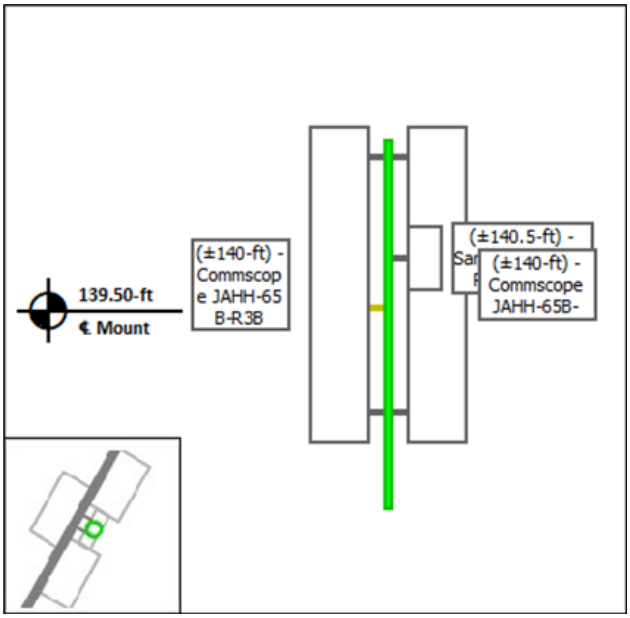

**Mount Pipe F**




**Mount Pipe G**

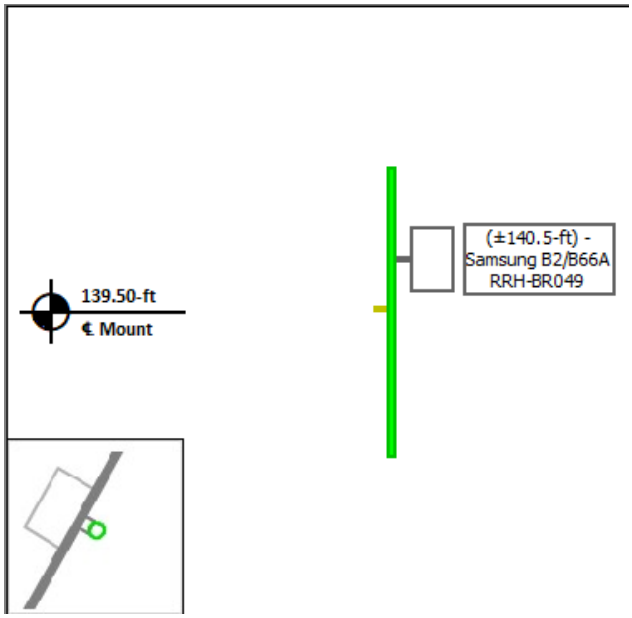



**Mount Pipe H**

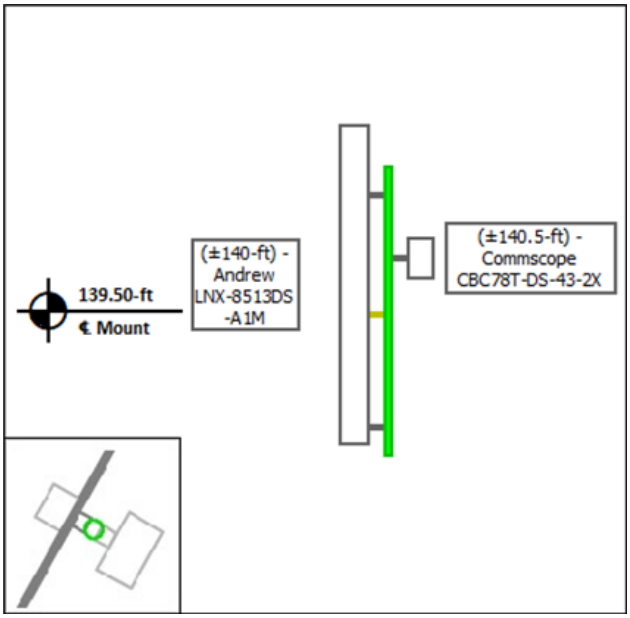


## Equipment Layout Cont'd.

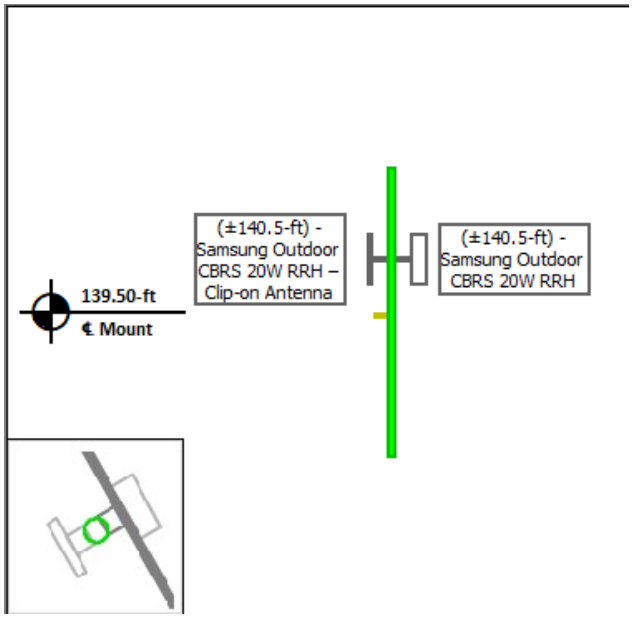
**Mount Pipe I**



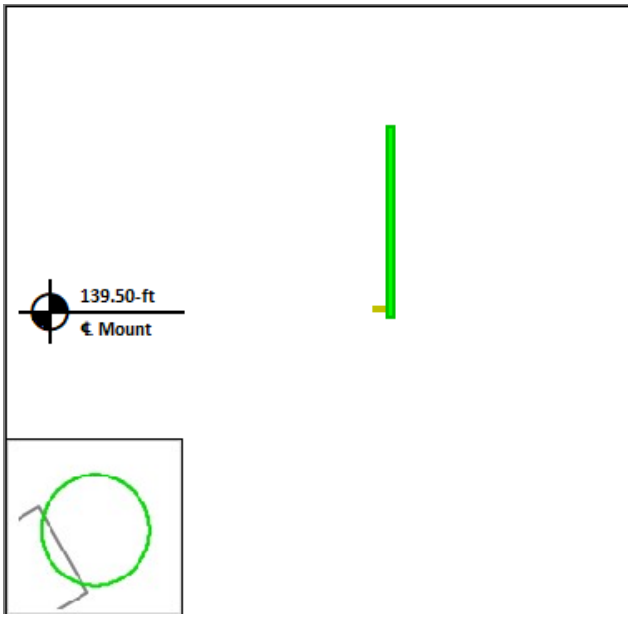

**Mount Pipe J**




**Mount Pipe K**

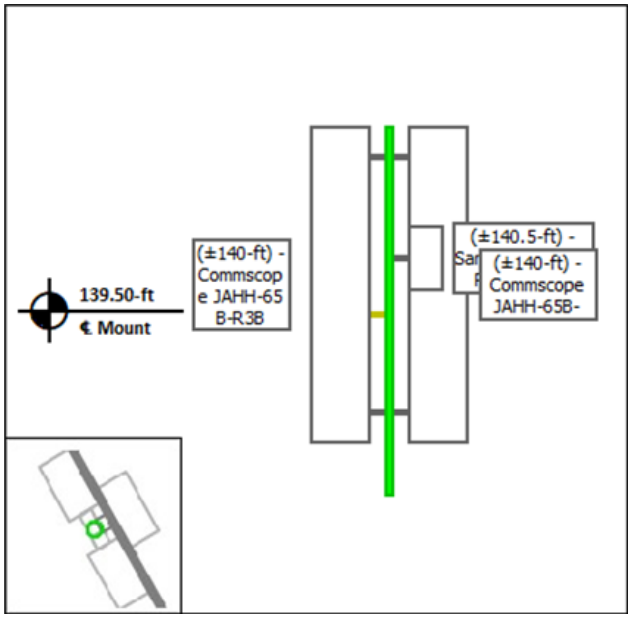



**Mount Pipe L**

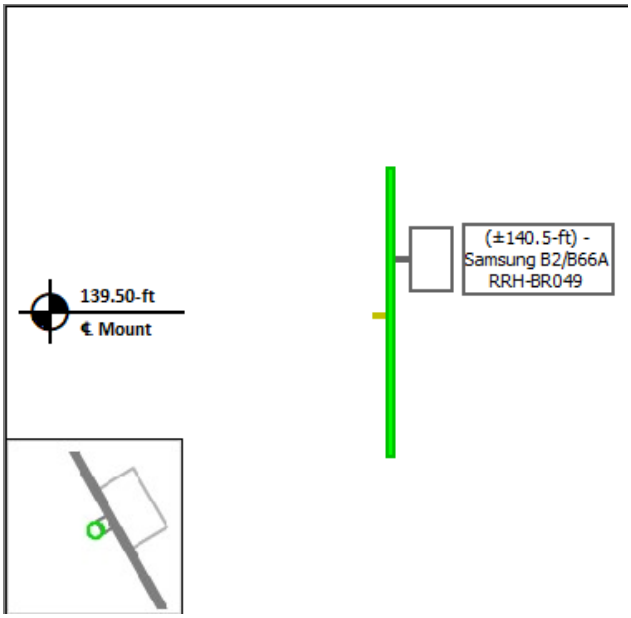


## Equipment Layout Cont'd.

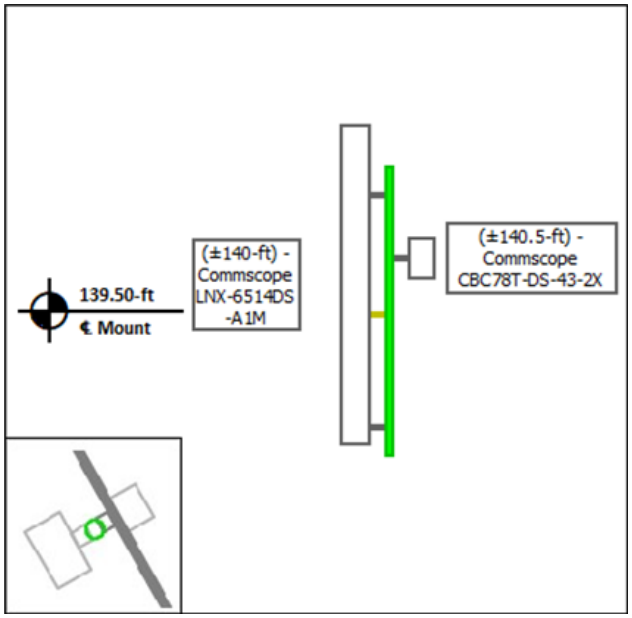
**Mount Pipe M**




**Mount Pipe N**




**Mount Pipe O**



**Standard Conditions**

All engineering services performed by A.T. Engineering Service, PLLC are prepared on the basis that the information used is current and correct. This information may consist of, but is not limited to the following:

- Information supplied by the client regarding antenna, mounts and feed line loading
- Information from drawings, design and analysis documents, and field notes in the possession of A.T. Engineering Service, PLLC

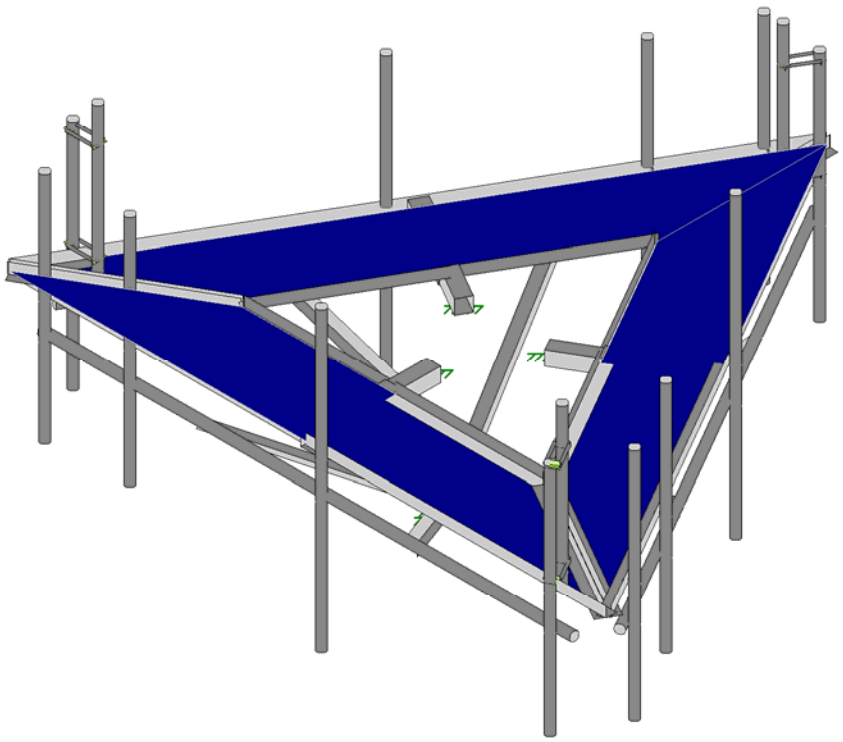
It is the responsibility of the client to ensure that the information provided to A.T. Engineering Service, PLLC and used in the performance of our engineering services is correct and complete.

All assets of American Tower Corporation, its affiliates and subsidiaries (collectively "American Tower") are inspected at regular intervals. Based upon these inspections and in the absence of information to the contrary, American Tower assumes that all structures were constructed in accordance with the drawings and specifications.

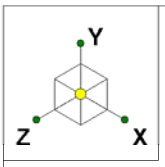
All connections are to be verified for condition and tightness by the installation contractor preceding any changes to the appurtenance mounting system and/or equipment attached to it.

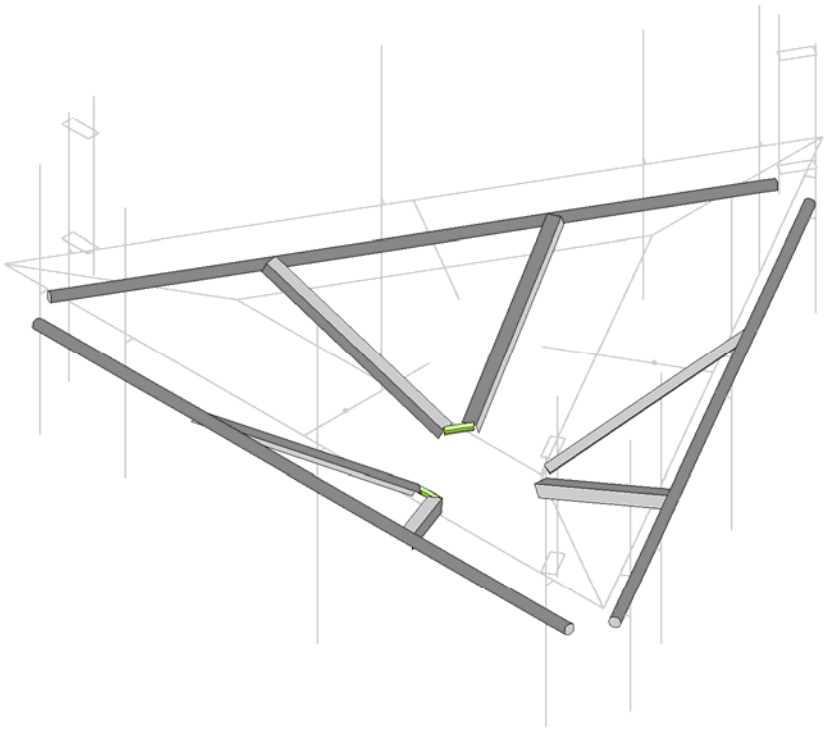
Unless explicitly agreed by both the client and A.T. Engineering Service, PLLC, all services will be performed in accordance with the current revision of ANSI/TIA-222.

All services are performed, results obtained, and recommendations made in accordance with generally accepted engineering principles and practices. A.T. Engineering Service, PLLC is not responsible for the conclusions, opinions and recommendations made by others based on the information supplied herein.




| | | |
|---|---|---|
| American Tower Corp. | | SK - 1 |
| Mitchell.Chen | 302540, Madison CT 6 | Jan 22, 2020 at 12:17 PM |
| 12995792_C8_01 | 3D Rendering (Final Configuration) | R3D. VERIZON WIRELESS @ 302... |



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|---|---|---|
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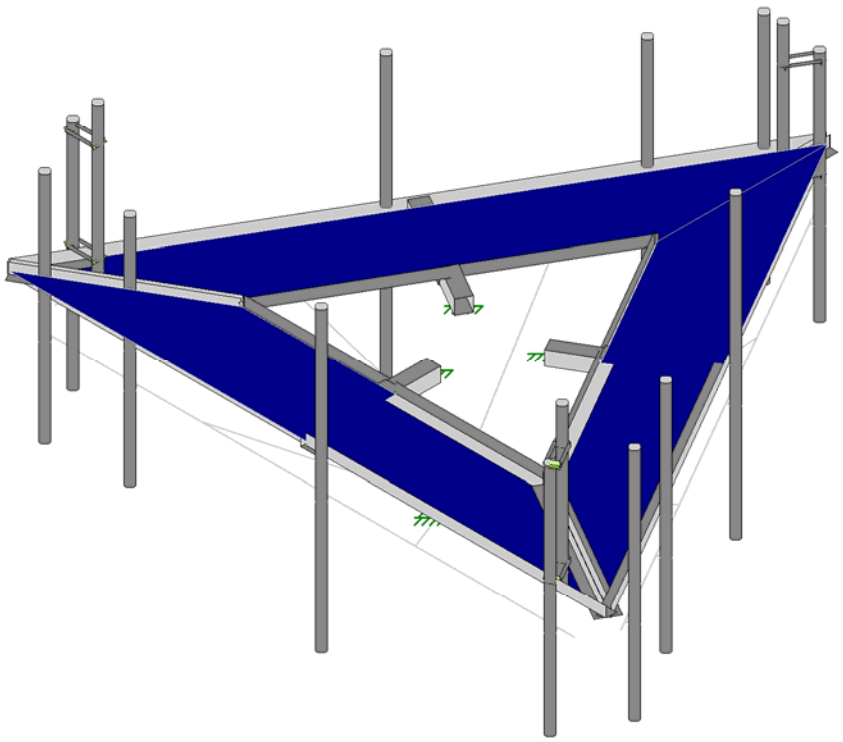


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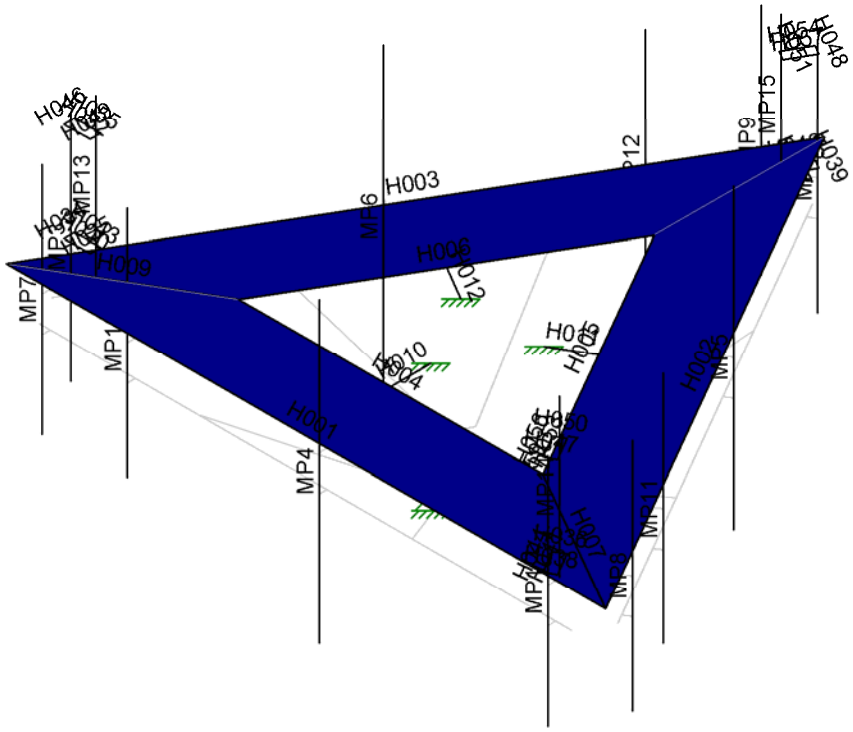


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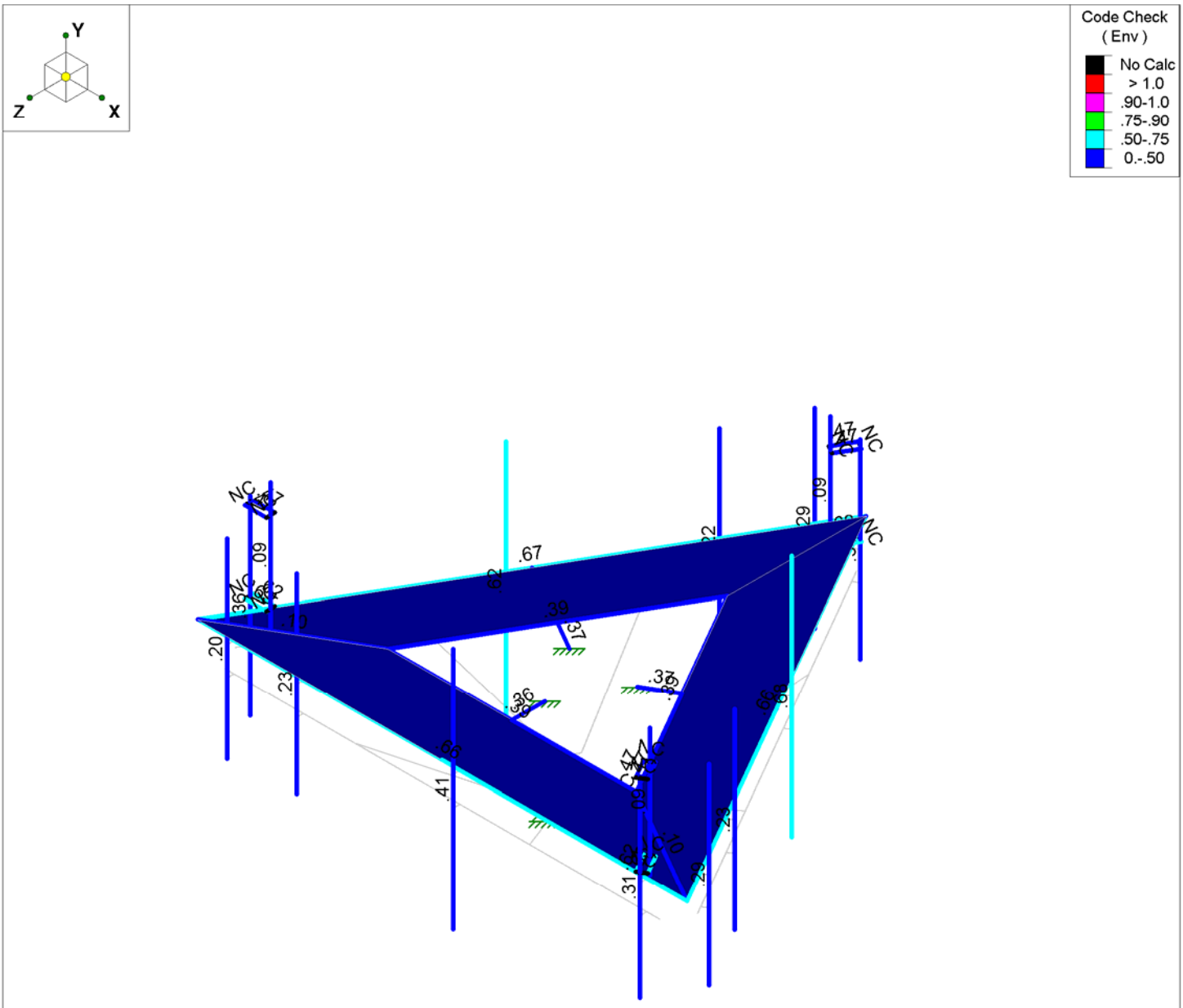
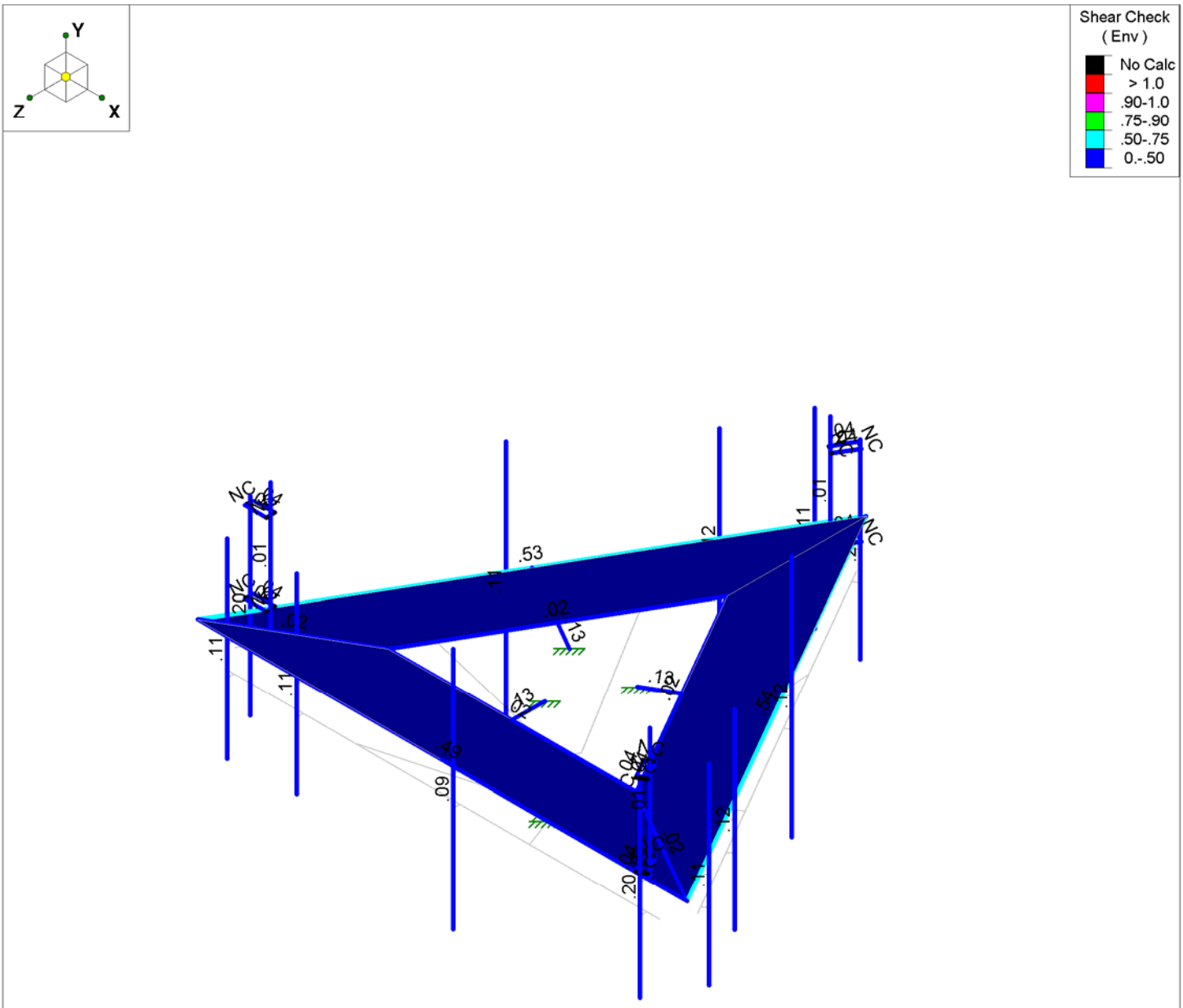



Member Code Checks Displayed (Enveloped)
Results for LC 1, 1.4D

| | | |
|---|---|---|
| American Tower Corp. | | SK - 5 |
| Mitchell.Chen | 302540, Madison CT 6 | Jan 22, 2020 at 12:23 PM |
| 12995792_C8_01 | Unity Bending Checks | R3D. VERIZON WIRELESS @ 302... |




Member Shear Checks Displayed (Enveloped)
Results for LC 1, 1.4D

| | | |
|---|---|---|
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| Mitchell.Chen | 302540, Madison CT 6 | Jan 22, 2020 at 12:23 PM |
| 12995792_C8_01 | Shear Checks | R3D. VERIZON WIRELESS @ 302... |

## Hot Rolled Steel Properties

| | Label | E [psi] | G [psi] | Nu | Therm (/1E..Density[lb/f... | | Yield[psi] | Ry | Fu[psi] | Rt |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | A36 | 2.9e+7 | 1.115e+7 | .3 | .65 | 490 | 36000 | 1.5 | 58000 | 1.2 |
| 2 | A572-50 | 2.9e+7 | 1.115e+7 | .3 | .65 | 490 | 50000 | 1.1 | 65000 | 1.1 |
| 3 | A500 Gr. B [RND] | 2.9e+7 | 1.115e+7 | .3 | .65 | 527 | 42000 | 1.4 | 58000 | 1.3 |
| 4 | A500 Gr. B [SQR] | 2.9e+7 | 1.115e+7 | .3 | .65 | 527 | 46000 | 1.4 | 58000 | 1.3 |
| 5 | A1085 | 2.9e+7 | 1.115e+7 | .3 | .65 | 490 | 50000 | 1.1 | 65000 | 1.1 |
| 6 | A53 Gr. B | 2.9e+7 | 1.115e+7 | .3 | .65 | 490 | 35000 | 1.6 | 60000 | 1.2 |
| 7 | A992 | 2.9e+7 | 1.115e+7 | .3 | .65 | 490 | 50000 | 1.1 | 65000 | 1.1 |
| 8 | SAE J429 Gr. 2 | 2.9e+7 | 1.115e+7 | .3 | .65 | 490 | 57000 | 1.1 | 74000 | 1.1 |

## Member Primary Data

| | Label | I Joint | J Joint | K Joint | Rotate(deg) | Section/Shape | Type | Design List | Material | Design Rules |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | H001 | N004 | N003 | | | L3x3x5 | Beam | None | A36 | Typical |
| 2 | H002 | N002 | N004 | | | L3x3x5 | Beam | None | A36 | Typical |
| 3 | H003 | N003 | N002 | | | L3x3x5 | Beam | None | A36 | Typical |
| 4 | H004 | N013 | N012 | | 270 | L3x3x5 | Beam | None | A36 | Typical |
| 5 | H005 | N011 | N013 | | 270 | L3x3x5 | Beam | None | A36 | Typical |
| 6 | H006 | N012 | N011 | | 270 | L3x3x5 | Beam | None | A36 | Typical |
| 7 | H007 | N013 | N004 | | 180 | LL3x3x5x0 | Beam | None | A36 | Typical |
| 8 | H008 | N011 | N002 | | 180 | LL3x3x5x0 | Beam | None | A36 | Typical |
| 9 | H009 | N012 | N003 | | 180 | LL3x3x5x0 | Beam | None | A36 | Typical |
| 10 | H010 | N005 | N014 | | | HSS4x4x4 | Beam | None | A500 Gr. ... | Typical |
| 11 | H011 | N006 | N015 | | | HSS4x4x4 | Beam | None | A500 Gr. ... | Typical |
| 12 | H012 | N007 | N016 | | | HSS4x4x4 | Beam | None | A500 Gr. ... | Typical |
| 13 | H013 | N014 | N008 | | | HSS4.5x4.5x4 | Beam | None | A500 Gr. ... | Typical |
| 14 | H014 | N015 | N010 | | | HSS4.5x4.5x4 | Beam | None | A500 Gr. ... | Typical |
| 15 | H015 | N016 | N009 | | | HSS4.5x4.5x4 | Beam | None | A500 Gr. ... | Typical |
| 16 | U016 | N017 | N032 | | | (2) 1/2 U-Bolts | Beam | None | A36 | Typical |
| 17 | U017 | N020 | N033 | | | (2) 1/2 U-Bolts | Beam | None | A36 | Typical |
| 18 | U018 | N026 | N034 | | | (2) 1/2 U-Bolts | Beam | None | A36 | Typical |
| 19 | U019 | N023 | N035 | | | (2) 1/2 U-Bolts | Beam | None | A36 | Typical |
| 20 | U020 | N019 | N036 | | | (2) 1/2 U-Bolts | Beam | None | A36 | Typical |
| 21 | U021 | N022 | N037 | | | (2) 1/2 U-Bolts | Beam | None | A36 | Typical |
| 22 | U022 | N028 | N038 | | | (2) 1/2 U-Bolts | Beam | None | A36 | Typical |
| 23 | U023 | N025 | N039 | | | (2) 1/2 U-Bolts | Beam | None | A36 | Typical |
| 24 | U024 | N018 | N040 | | | (2) 1/2 U-Bolts | Beam | None | A36 | Typical |
| 25 | U025 | N021 | N041 | | | (2) 1/2 U-Bolts | Beam | None | A36 | Typical |
| 26 | U026 | N027 | N042 | | | (2) 1/2 U-Bolts | Beam | None | A36 | Typical |
| 27 | U027 | N024 | N043 | | | (2) 1/2 U-Bolts | Beam | None | A36 | Typical |
| 28 | H031 | N065 | N066 | | | PIPE_2.0 | Beam | None | A53 Gr. B | Typical |
| 29 | H032 | N067 | N069 | | | PIPE_2.0 | Beam | None | A53 Gr. B | Typical |
| 30 | H033 | N068 | N070 | | | PIPE_2.0 | Beam | None | A53 Gr. B | Typical |
| 31 | H034 | N073 | N074 | | | RIGID | None | None | RIGID | Typical |
| 32 | H035 | N071 | N072 | | | RIGID | None | None | RIGID | Typical |
| 33 | H036 | N075 | N081 | | | RIGID | None | None | RIGID | Typical |
| 34 | H037 | N076 | N082 | | | RIGID | None | None | RIGID | Typical |
| 35 | H038 | N077 | N079 | | | RIGID | None | None | RIGID | Typical |
| 36 | H039 | N078 | N080 | | | RIGID | None | None | RIGID | Typical |
| 37 | H040 | N071 | N073 | | | SR_0.5 | Beam | None | A572-50 | Typical |

## Member Primary Data (Continued)

| | Label | I Joint | J Joint | K Joint | Rotate(deg) | Section/Shape | Type | Design List | Material | Design Rules |
|---|---|---|---|---|---|---|---|---|---|---|
| 38 | H041 | N075 | N077 | | | SR_0.5 | Beam | None | A572-50 | Typical |
| 39 | H042 | N076 | N078 | | | SR_0.5 | Beam | None | A572-50 | Typical |
| 40 | H043 | N072 | N074 | | | SR_0.5 | Beam | None | A572-50 | Typical |
| 41 | H044 | N081 | N079 | | | SR_0.5 | Beam | None | A572-50 | Typical |
| 42 | H045 | N082 | N080 | | | SR_0.5 | Beam | None | A572-50 | Typical |
| 43 | H046 | N089 | N090 | | | RIGID | None | None | RIGID | Typical |
| 44 | H047 | N091 | N093 | | | RIGID | None | None | RIGID | Typical |
| 45 | H048 | N092 | N094 | | | RIGID | None | None | RIGID | Typical |
| 46 | H049 | N083 | N086 | | | RIGID | None | None | RIGID | Typical |
| 47 | H050 | N084 | N087 | | | RIGID | None | None | RIGID | Typical |
| 48 | H051 | N085 | N088 | | | RIGID | None | None | RIGID | Typical |
| 49 | H052 | N083 | N089 | | | SR_0.625 | Beam | None | A572-50 | Typical |
| 50 | H053 | N084 | N091 | | | SR_0.625 | Beam | None | A572-50 | Typical |
| 51 | H054 | N085 | N092 | | | SR_0.625 | Beam | None | A572-50 | Typical |
| 52 | H055 | N086 | N090 | | | SR_0.625 | Beam | None | A572-50 | Typical |
| 53 | H056 | N087 | N093 | | | SR_0.625 | Beam | None | A572-50 | Typical |
| 54 | H057 | N088 | N094 | | | SR_0.625 | Beam | None | A572-50 | Typical |
| 55 | H058 | N095 | N098 | | | RIGID | None | None | RIGID | Typical |
| 56 | H059 | N096 | N099 | | | RIGID | None | None | RIGID | Typical |
| 57 | H060 | N097 | N100 | | | RIGID | None | None | RIGID | Typical |
| 58 | D061 | N095 | N060 | | 90 | L3x3x3 | Column | None | A36 | Typical |
| 59 | D062 | N096 | N061 | | 90 | L3x3x3 | Column | None | A36 | Typical |
| 60 | D063 | N097 | N062 | | 90 | L3x3x3 | Column | None | A36 | Typical |
| 61 | D064 | N098 | N059 | | 180 | L3x3x3 | Column | None | A36 | Typical |
| 62 | D065 | N099 | N063 | | 180 | L3x3x3 | Column | None | A36 | Typical |
| 63 | D066 | N100 | N064 | | 180 | L3x3x3 | Column | None | A36 | Typical |
| 64 | MP1 | MP1t | MP1b | | | PIPE_2.0 | Column | None | A53 Gr. B | Typical |
| 65 | MP2 | MP2t | MP2b | | | PIPE_2.0 | Column | None | A53 Gr. B | Typical |
| 66 | MP3 | MP3t | MP3b | | | PIPE_2.0 | Column | None | A53 Gr. B | Typical |
| 67 | MP4 | MP4t | MP4b | | | PIPE_2.0 | Column | None | A53 Gr. B | Typical |
| 68 | MP5 | MP5t | MP5b | | | PIPE_2.0 | Column | None | A53 Gr. B | Typical |
| 69 | MP6 | MP6t | MP6b | | | PIPE_2.0 | Column | None | A53 Gr. B | Typical |
| 70 | MP7 | MP7t | MP7b | | | PIPE_2.0 | Column | None | A53 Gr. B | Typical |
| 71 | MP8 | MP8t | MP8b | | | PIPE_2.0 | Column | None | A53 Gr. B | Typical |
| 72 | MP9 | MP9t | MP9b | | | PIPE_2.0 | Column | None | A53 Gr. B | Typical |
| 73 | MP10 | MP10t | MP10b | | | PIPE_2.0 | Column | None | A53 Gr. B | Typical |
| 74 | MP11 | MP11t | MP11b | | | PIPE_2.0 | Column | None | A53 Gr. B | Typical |
| 75 | MP12 | MP12t | MP12b | | | PIPE_2.0 | Column | None | A53 Gr. B | Typical |
| 76 | MP13 | MP13t | MP13b | | | PIPE_2.0 | Column | None | A53 Gr. B | Typical |
| 77 | MP14 | MP14t | MP14b | | | PIPE_2.0 | Column | None | A53 Gr. B | Typical |
| 78 | MP15 | MP15t | MP15b | | | PIPE_2.0 | Column | None | A53 Gr. B | Typical |
| 79 | M79 | N139 | N151 | | | (2) 1/2 U-Bolts | Beam | None | A36 | Typical |
| 80 | M80 | N142 | N152 | | | (2) 1/2 U-Bolts | Beam | None | A36 | Typical |
| 81 | M81 | N148 | N153 | | | (2) 1/2 U-Bolts | Beam | None | A36 | Typical |
| 82 | M82 | N145 | N154 | | | (2) 1/2 U-Bolts | Beam | None | A36 | Typical |
| 83 | M83 | N141 | N155 | | | (2) 1/2 U-Bolts | Beam | None | A36 | Typical |
| 84 | M84 | N144 | N156 | | | (2) 1/2 U-Bolts | Beam | None | A36 | Typical |
| 85 | M85 | N150 | N157 | | | (2) 1/2 U-Bolts | Beam | None | A36 | Typical |
| 86 | M86 | N147 | N158 | | | (2) 1/2 U-Bolts | Beam | None | A36 | Typical |
| 87 | M87 | N140 | N159 | | | (2) 1/2 U-Bolts | Beam | None | A36 | Typical |
| 88 | M88 | N143 | N160 | | | (2) 1/2 U-Bolts | Beam | None | A36 | Typical |
| 89 | M89 | N149 | N161 | | | (2) 1/2 U-Bolts | Beam | None | A36 | Typical |
| 90 | M90 | N146 | N162 | | | (2) 1/2 U-Bolts | Beam | None | A36 | Typical |

## Basic Load Cases

| | BLC Description | Category | X Gravity | Y Gravity | Z Gravity | Joint | Point | Distributed | Area(Me... | Surface(P... |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Dead | DL | | -1 | | | 33 | | | |
| 2 | Ice | IL | | | | | 33 | 66 | | 3 |
| 3 | Wind -Z | WLZ | | | | | 33 | | 1 | |
| 4 | Wind -X | WLX | | | | | 33 | | 1 | |
| 5 | Wind -Z (Ice) | WL-Z | | | | | 33 | 66 | 1 | |
| 6 | Wind -X (Ice) | WL-X | | | | | 33 | 66 | 1 | |
| 7 | Wind -Z (Working) | WLZP1 | | | | | 33 | | 1 | |
| 8 | Wind -X (Working) | WLXP1 | | | | | 33 | | 1 | |
| 9 | Ev -Y (Seismic) | ELY | | | | | | 66 | | |
| 10 | Eh -Z (Seismic) | ELZ | | | | | | 66 | | |
| 11 | Eh -X (Seismic) | ELX | | | | | | 66 | | |
| 12 | Lm (1) | LL | | | | 1 | | | | |
| 13 | Lm (2) | LL | | | | 1 | | | | |
| 14 | Lm (3) | LL | | | | 1 | | | | |
| 15 | Lm (4) | LL | | | | 1 | | | | |
| 16 | Lm (5) | LL | | | | 1 | | | | |
| 17 | Lm (6) | LL | | | | 1 | | | | |
| 18 | Lm (7) | LL | | | | 1 | | | | |
| 19 | Lm (8) | LL | | | | 1 | | | | |
| 20 | Lm (9) | LL | | | | 1 | | | | |
| 21 | Lm (10) | LL | | | | 1 | | | | |
| 22 | Lm (11) | LL | | | | 1 | | | | |
| 23 | Lm (12) | LL | | | | 1 | | | | |
| 24 | Lm (13) | LL | | | | 1 | | | | |
| 25 | Lm (14) | LL | | | | 1 | | | | |
| 26 | Lm (15) | LL | | | | 1 | | | | |
| 27 | BLC 3 Transient Area... | None | | | | | | 75 | | |
| 28 | BLC 4 Transient Area... | None | | | | | | 82 | | |
| 29 | BLC 5 Transient Area... | None | | | | | | 75 | | |
| 30 | BLC 6 Transient Area... | None | | | | | | 82 | | |
| 31 | BLC 7 Transient Area... | None | | | | | | 75 | | |
| 32 | BLC 8 Transient Area... | None | | | | | | 82 | | |

## Load Combinations

| | Description | So.. | P... | S... | BLC | Fac.. | BLC | Fac.. | BLC | Fac.. | BLC | Fac.. | BLC | Fac.. | BLC | Fac.. | BLC | Fac.. | BLC | Fac.. | BLC | Fac.. | BLC | Fac.. | BLC | Fac.. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.4D | Yes | Y | | DL | 1.4 | | | | | | | | | | | | | | | | | | | | |
| 2 | 1.2D + 1.6Wo [0°] | Yes | Y | | DL | 1.2 | W... | .001 | W... | 1.6 | | | | | | | | | | | | | | | | |
| 3 | 1.2D + 1.6Wo [30°] | Yes | Y | | DL | 1.2 | W... | .8 | W... | 1.3... | | | | | | | | | | | | | | | | |
| 4 | 1.2D + 1.6Wo [60°] | Yes | Y | | DL | 1.2 | W... | 1.3... | W... | .8 | | | | | | | | | | | | | | | | |
| 5 | 1.2D + 1.6Wo [90°] | Yes | Y | | DL | 1.2 | W... | 1.6 | W... | .001 | | | | | | | | | | | | | | | | |
| 6 | 1.2D + 1.6Wo [120°] | Yes | Y | | DL | 1.2 | W... | 1.3... | W... | -.8 | | | | | | | | | | | | | | | | |
| 7 | 1.2D + 1.6Wo [150°] | Yes | Y | | DL | 1.2 | W... | .8 | W... | -1.3... | | | | | | | | | | | | | | | | |
| 8 | 1.2D + 1.6Wo [180°] | Yes | Y | | DL | 1.2 | W... | .001 | W... | -1.6 | | | | | | | | | | | | | | | | |
| 9 | 1.2D + 1.6Wo [210°] | Yes | Y | | DL | 1.2 | W... | -.8 | W... | -1.3... | | | | | | | | | | | | | | | | |
| 10 | 1.2D + 1.6Wo [240°] | Yes | Y | | DL | 1.2 | W... | -1.3... | W... | -.8 | | | | | | | | | | | | | | | | |
| 11 | 1.2D + 1.6Wo [270°] | Yes | Y | | DL | 1.2 | W... | -1.6 | W... | .001 | | | | | | | | | | | | | | | | |
| 12 | 1.2D + 1.6Wo [300°] | Yes | Y | | DL | 1.2 | W... | -1.3... | W... | .8 | | | | | | | | | | | | | | | | |
| 13 | 1.2D + 1.6Wo [330°] | Yes | Y | | DL | 1.2 | W... | -.8 | W... | 1.3... | | | | | | | | | | | | | | | | |
| 14 | 0.9D + 1.6Wo [0°] | Yes | Y | | DL | .9 | W... | .001 | W... | 1.6 | | | | | | | | | | | | | | | | |
| 15 | 0.9D + 1.6Wo [30°] | Yes | Y | | DL | .9 | W... | .8 | W... | 1.3... | | | | | | | | | | | | | | | | |
| 16 | 0.9D + 1.6Wo [60°] | Yes | Y | | DL | .9 | W... | 1.3... | W... | .8 | | | | | | | | | | | | | | | | |
| 17 | 0.9D + 1.6Wo [90°] | Yes | Y | | DL | .9 | W... | 1.6 | W... | .001 | | | | | | | | | | | | | | | | |
| 18 | 0.9D + 1.6Wo [120°] | Yes | Y | | DL | .9 | W... | 1.3... | W... | -.8 | | | | | | | | | | | | | | | | |
| 19 | 0.9D + 1.6Wo [150°] | Yes | Y | | DL | .9 | W... | .8 | W... | -1.3... | | | | | | | | | | | | | | | | |

## Load Combinations (Continued)

| | Description | So.. | P... | S... | BLC | Fac.. | BLC | Fac.. | BLC | Fac.. | BLC | Fac.. | BLC | Fac.. | BLC | Fac.. | BLC | Fac.. | BLC | Fac.. | BLC | Fac.. | BLC | Fac.. | BLC | Fac... |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 20 | 0.9D + 1.6Wo [180°] | Yes | Y | | DL | .9 | W... | .001 | W... | -1.6 | | | | | | | | | | | | | | | | |
| 21 | 0.9D + 1.6Wo [210°] | Yes | Y | | DL | .9 | W... | -.8 | W... | -1.3... | | | | | | | | | | | | | | | | |
| 22 | 0.9D + 1.6Wo [240°] | Yes | Y | | DL | .9 | W... | -1.3... | W... | -.8 | | | | | | | | | | | | | | | | |
| 23 | 0.9D + 1.6Wo [270°] | Yes | Y | | DL | .9 | W... | -1.6 | W... | .001 | | | | | | | | | | | | | | | | |
| 24 | 0.9D + 1.6Wo [300°] | Yes | Y | | DL | .9 | W... | -1.3... | W... | .8 | | | | | | | | | | | | | | | | |
| 25 | 0.9D + 1.6Wo [330°] | Yes | Y | | DL | .9 | W... | -.8 | W... | 1.3... | | | | | | | | | | | | | | | | |
| 26 | 1.2D + 1.0Di + 1.0Wi [0... | Yes | Y | | DL | 1.2 | IL | 1 | W... | .001 | W... | 1 | | | | | | | | | | | | | | |
| 27 | 1.2D + 1.0Di + 1.0Wi [3... | Yes | Y | | DL | 1.2 | IL | 1 | W... | .5 | W... | .866 | | | | | | | | | | | | | | |
| 28 | 1.2D + 1.0Di + 1.0Wi [6... | Yes | Y | | DL | 1.2 | IL | 1 | W... | .866 | W... | .5 | | | | | | | | | | | | | | |
| 29 | 1.2D + 1.0Di + 1.0Wi [9... | Yes | Y | | DL | 1.2 | IL | 1 | W... | 1 | W... | .001 | | | | | | | | | | | | | | |
| 30 | 1.2D + 1.0Di + 1.0Wi [1... | Yes | Y | | DL | 1.2 | IL | 1 | W... | .866 | W... | -.5 | | | | | | | | | | | | | | |
| 31 | 1.2D + 1.0Di + 1.0Wi [1... | Yes | Y | | DL | 1.2 | IL | 1 | W... | .5 | W... | -.866 | | | | | | | | | | | | | | |
| 32 | 1.2D + 1.0Di + 1.0Wi [1... | Yes | Y | | DL | 1.2 | IL | 1 | W... | .001 | W... | -1 | | | | | | | | | | | | | | |
| 33 | 1.2D + 1.0Di + 1.0Wi [2... | Yes | Y | | DL | 1.2 | IL | 1 | W... | -.5 | W... | -.866 | | | | | | | | | | | | | | |
| 34 | 1.2D + 1.0Di + 1.0Wi [2... | Yes | Y | | DL | 1.2 | IL | 1 | W... | -.866 | W... | -.5 | | | | | | | | | | | | | | |
| 35 | 1.2D + 1.0Di + 1.0Wi [2... | Yes | Y | | DL | 1.2 | IL | 1 | W... | -1 | W... | .001 | | | | | | | | | | | | | | |
| 36 | 1.2D + 1.0Di + 1.0Wi [3... | Yes | Y | | DL | 1.2 | IL | 1 | W... | -.866 | W... | .5 | | | | | | | | | | | | | | |
| 37 | 1.2D + 1.0Di + 1.0Wi [3... | Yes | Y | | DL | 1.2 | IL | 1 | W... | -.5 | W... | .866 | | | | | | | | | | | | | | |
| 38 | 1.2D + 1.0Ev + 1.0Eh [0°] | Yes | Y | | DL | 1.2 | ELY | 1 | ELZ | 1 | ELX | .001 | | | | | | | | | | | | | | |
| 39 | 1.2D + 1.0Ev + 1.0Eh [3... | Yes | Y | | DL | 1.2 | ELY | 1 | ELZ | .866 | ELX | .5 | | | | | | | | | | | | | | |
| 40 | 1.2D + 1.0Ev + 1.0Eh [6... | Yes | Y | | DL | 1.2 | ELY | 1 | ELZ | .5 | ELX | .866 | | | | | | | | | | | | | | |
| 41 | 1.2D + 1.0Ev + 1.0Eh [9... | Yes | Y | | DL | 1.2 | ELY | 1 | ELZ | .001 | ELX | 1 | | | | | | | | | | | | | | |
| 42 | 1.2D + 1.0Ev + 1.0Eh [1... | Yes | Y | | DL | 1.2 | ELY | 1 | ELZ | -.5 | ELX | .866 | | | | | | | | | | | | | | |
| 43 | 1.2D + 1.0Ev + 1.0Eh [1... | Yes | Y | | DL | 1.2 | ELY | 1 | ELZ | -.866 | ELX | .5 | | | | | | | | | | | | | | |
| 44 | 1.2D + 1.0Ev + 1.0Eh [1... | Yes | Y | | DL | 1.2 | ELY | 1 | ELZ | -1 | ELX | .001 | | | | | | | | | | | | | | |
| 45 | 1.2D + 1.0Ev + 1.0Eh [2... | Yes | Y | | DL | 1.2 | ELY | 1 | ELZ | -.866 | ELX | -.5 | | | | | | | | | | | | | | |
| 46 | 1.2D + 1.0Ev + 1.0Eh [2... | Yes | Y | | DL | 1.2 | ELY | 1 | ELZ | -.5 | ELX | -.866 | | | | | | | | | | | | | | |
| 47 | 1.2D + 1.0Ev + 1.0Eh [2... | Yes | Y | | DL | 1.2 | ELY | 1 | ELZ | .001 | ELX | -1 | | | | | | | | | | | | | | |
| 48 | 1.2D + 1.0Ev + 1.0Eh [3... | Yes | Y | | DL | 1.2 | ELY | 1 | ELZ | .5 | ELX | -.866 | | | | | | | | | | | | | | |
| 49 | 1.2D + 1.0Ev + 1.0Eh [3... | Yes | Y | | DL | 1.2 | ELY | 1 | ELZ | .866 | ELX | -.5 | | | | | | | | | | | | | | |
| 50 | 0.9D + 1.0Ev + 1.0Eh [0°] | Yes | Y | | DL | .9 | ELY | 1 | ELZ | 1 | ELX | .001 | | | | | | | | | | | | | | |
| 51 | 0.9D + 1.0Ev + 1.0Eh [3... | Yes | Y | | DL | .9 | ELY | 1 | ELZ | .866 | ELX | .5 | | | | | | | | | | | | | | |
| 52 | 0.9D + 1.0Ev + 1.0Eh [6... | Yes | Y | | DL | .9 | ELY | 1 | ELZ | .5 | ELX | .866 | | | | | | | | | | | | | | |
| 53 | 0.9D + 1.0Ev + 1.0Eh [9... | Yes | Y | | DL | .9 | ELY | 1 | ELZ | .001 | ELX | 1 | | | | | | | | | | | | | | |
| 54 | 0.9D + 1.0Ev + 1.0Eh [1... | Yes | Y | | DL | .9 | ELY | 1 | ELZ | -.5 | ELX | .866 | | | | | | | | | | | | | | |
| 55 | 0.9D + 1.0Ev + 1.0Eh [1... | Yes | Y | | DL | .9 | ELY | 1 | ELZ | -.866 | ELX | .5 | | | | | | | | | | | | | | |
| 56 | 0.9D + 1.0Ev + 1.0Eh [1... | Yes | Y | | DL | .9 | ELY | 1 | ELZ | -1 | ELX | .001 | | | | | | | | | | | | | | |
| 57 | 0.9D + 1.0Ev + 1.0Eh [2... | Yes | Y | | DL | .9 | ELY | 1 | ELZ | -.866 | ELX | -.5 | | | | | | | | | | | | | | |
| 58 | 0.9D + 1.0Ev + 1.0Eh [2... | Yes | Y | | DL | .9 | ELY | 1 | ELZ | -.5 | ELX | -.866 | | | | | | | | | | | | | | |
| 59 | 0.9D + 1.0Ev + 1.0Eh [2... | Yes | Y | | DL | .9 | ELY | 1 | ELZ | .001 | ELX | -1 | | | | | | | | | | | | | | |
| 60 | 0.9D + 1.0Ev + 1.0Eh [3... | Yes | Y | | DL | .9 | ELY | 1 | ELZ | .5 | ELX | -.866 | | | | | | | | | | | | | | |
| 61 | 0.9D + 1.0Ev + 1.0Eh [3... | Yes | Y | | DL | .9 | ELY | 1 | ELZ | .866 | ELX | -.5 | | | | | | | | | | | | | | |
| 62 | 1.2D + 1.5Lm(1) + 1.0W... | Yes | Y | | DL | 1.2 | 12 | 1.5 | W... | .001 | W... | 1 | | | | | | | | | | | | | | |
| 63 | 1.2D + 1.5Lm(1) + 1.0W... | Yes | Y | | DL | 1.2 | 12 | 1.5 | W... | .5 | W... | .866 | | | | | | | | | | | | | | |
| 64 | 1.2D + 1.5Lm(1) + 1.0W... | Yes | Y | | DL | 1.2 | 12 | 1.5 | W... | .866 | W... | .5 | | | | | | | | | | | | | | |
| 65 | 1.2D + 1.5Lm(1) + 1.0W... | Yes | Y | | DL | 1.2 | 12 | 1.5 | W... | 1 | W... | .001 | | | | | | | | | | | | | | |
| 66 | 1.2D + 1.5Lm(1) + 1.0W... | Yes | Y | | DL | 1.2 | 12 | 1.5 | W... | .866 | W... | -.5 | | | | | | | | | | | | | | |
| 67 | 1.2D + 1.5Lm(1) + 1.0W... | Yes | Y | | DL | 1.2 | 12 | 1.5 | W... | .5 | W... | -.866 | | | | | | | | | | | | | | |
| 68 | 1.2D + 1.5Lm(1) + 1.0W... | Yes | Y | | DL | 1.2 | 12 | 1.5 | W... | .001 | W... | -.5 | | | | | | | | | | | | | | |
| 69 | 1.2D + 1.5Lm(1) + 1.0W... | Yes | Y | | DL | 1.2 | 12 | 1.5 | W... | -.5 | W... | -.866 | | | | | | | | | | | | | | |
| 70 | 1.2D + 1.5Lm(1) + 1.0W... | Yes | Y | | DL | 1.2 | 12 | 1.5 | W... | -.866 | W... | -.5 | | | | | | | | | | | | | | |
| 71 | 1.2D + 1.5Lm(1) + 1.0W... | Yes | Y | | DL | 1.2 | 12 | 1.5 | W... | -1 | W... | .001 | | | | | | | | | | | | | | |
| 72 | 1.2D + 1.5Lm(1) + 1.0W... | Yes | Y | | DL | 1.2 | 12 | 1.5 | W... | -.866 | W... | .5 | | | | | | | | | | | | | | |
| 73 | 1.2D + 1.5Lm(1) + 1.0W... | Yes | Y | | DL | 1.2 | 12 | 1.5 | W... | -.5 | W... | .866 | | | | | | | | | | | | | | |
| 74 | 1.2D + 1.5Lm(2) + 1.0W... | Yes | Y | | DL | 1.2 | 13 | 1.5 | W... | .001 | W... | 1 | | | | | | | | | | | | | | |
| 75 | 1.2D + 1.5Lm(2) + 1.0W... | Yes | Y | | DL | 1.2 | 13 | 1.5 | W... | .5 | W... | .866 | | | | | | | | | | | | | | |
| 76 | 1.2D + 1.5Lm(2) + 1.0W... | Yes | Y | | DL | 1.2 | 13 | 1.5 | W... | .866 | W... | .5 | | | | | | | | | | | | | | |

## Load Combinations (Continued)

| | Description | So.. | P... | S... | BLC | Fac.. | BLC | Fac.. | BLC | Fac.. | BLC | Fac.. | BLC | Fac.. | BLC | Fac.. | BLC | Fac.. | BLC | Fac.. | BLC | Fac.. | BLC | Fac.. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 77 | 1.2D + 1.5Lm(2) + 1.0W.. | Yes | Y | | DL | 1.2 | 13 | 1.5 | W... | 1 | W... | .001 | | | | | | | | | | | | |
| 78 | 1.2D + 1.5Lm(2) + 1.0W.. | Yes | Y | | DL | 1.2 | 13 | 1.5 | W... | .866 | W... | -.5 | | | | | | | | | | | | |
| 79 | 1.2D + 1.5Lm(2) + 1.0W.. | Yes | Y | | DL | 1.2 | 13 | 1.5 | W... | .5 | W... | -.866 | | | | | | | | | | | | |
| 80 | 1.2D + 1.5Lm(2) + 1.0W.. | Yes | Y | | DL | 1.2 | 13 | 1.5 | W... | .001 | W... | -.5 | | | | | | | | | | | | |
| 81 | 1.2D + 1.5Lm(2) + 1.0W.. | Yes | Y | | DL | 1.2 | 13 | 1.5 | W... | -.5 | W... | -.866 | | | | | | | | | | | | |
| 82 | 1.2D + 1.5Lm(2) + 1.0W.. | Yes | Y | | DL | 1.2 | 13 | 1.5 | W... | -.866 | W... | -.5 | | | | | | | | | | | | |
| 83 | 1.2D + 1.5Lm(2) + 1.0W.. | Yes | Y | | DL | 1.2 | 13 | 1.5 | W... | -1 | W... | .001 | | | | | | | | | | | | |
| 84 | 1.2D + 1.5Lm(2) + 1.0W.. | Yes | Y | | DL | 1.2 | 13 | 1.5 | W... | -.866 | W... | .5 | | | | | | | | | | | | |
| 85 | 1.2D + 1.5Lm(2) + 1.0W.. | Yes | Y | | DL | 1.2 | 13 | 1.5 | W... | -.5 | W... | .866 | | | | | | | | | | | | |
| 86 | 1.2D + 1.5Lm(3) + 1.0W.. | Yes | Y | | DL | 1.2 | 14 | 1.5 | W... | .001 | W... | 1 | | | | | | | | | | | | |
| 87 | 1.2D + 1.5Lm(3) + 1.0W.. | Yes | Y | | DL | 1.2 | 14 | 1.5 | W... | .5 | W... | .866 | | | | | | | | | | | | |
| 88 | 1.2D + 1.5Lm(3) + 1.0W.. | Yes | Y | | DL | 1.2 | 14 | 1.5 | W... | .866 | W... | .5 | | | | | | | | | | | | |
| 89 | 1.2D + 1.5Lm(3) + 1.0W.. | Yes | Y | | DL | 1.2 | 14 | 1.5 | W... | 1 | W... | .001 | | | | | | | | | | | | |
| 90 | 1.2D + 1.5Lm(3) + 1.0W.. | Yes | Y | | DL | 1.2 | 14 | 1.5 | W... | .866 | W... | -.5 | | | | | | | | | | | | |
| 91 | 1.2D + 1.5Lm(3) + 1.0W.. | Yes | Y | | DL | 1.2 | 14 | 1.5 | W... | .5 | W... | -.866 | | | | | | | | | | | | |
| 92 | 1.2D + 1.5Lm(3) + 1.0W.. | Yes | Y | | DL | 1.2 | 14 | 1.5 | W... | .001 | W... | -.5 | | | | | | | | | | | | |
| 93 | 1.2D + 1.5Lm(3) + 1.0W.. | Yes | Y | | DL | 1.2 | 14 | 1.5 | W... | -.5 | W... | -.866 | | | | | | | | | | | | |
| 94 | 1.2D + 1.5Lm(3) + 1.0W.. | Yes | Y | | DL | 1.2 | 14 | 1.5 | W... | -.866 | W... | -.5 | | | | | | | | | | | | |
| 95 | 1.2D + 1.5Lm(3) + 1.0W.. | Yes | Y | | DL | 1.2 | 14 | 1.5 | W... | -1 | W... | .001 | | | | | | | | | | | | |
| 96 | 1.2D + 1.5Lm(3) + 1.0W.. | Yes | Y | | DL | 1.2 | 14 | 1.5 | W... | -.866 | W... | .5 | | | | | | | | | | | | |
| 97 | 1.2D + 1.5Lm(3) + 1.0W.. | Yes | Y | | DL | 1.2 | 14 | 1.5 | W... | -.5 | W... | .866 | | | | | | | | | | | | |
| 98 | 1.2D + 1.5Lm(4) + 1.0W.. | Yes | Y | | DL | 1.2 | 15 | 1.5 | W... | .001 | W... | 1 | | | | | | | | | | | | |
| 99 | 1.2D + 1.5Lm(4) + 1.0W.. | Yes | Y | | DL | 1.2 | 15 | 1.5 | W... | .5 | W... | .866 | | | | | | | | | | | | |
| 100 | 1.2D + 1.5Lm(4) + 1.0W.. | Yes | Y | | DL | 1.2 | 15 | 1.5 | W... | .866 | W... | .5 | | | | | | | | | | | | |
| 101 | 1.2D + 1.5Lm(4) + 1.0W.. | Yes | Y | | DL | 1.2 | 15 | 1.5 | W... | 1 | W... | .001 | | | | | | | | | | | | |
| 102 | 1.2D + 1.5Lm(4) + 1.0W.. | Yes | Y | | DL | 1.2 | 15 | 1.5 | W... | .866 | W... | -.5 | | | | | | | | | | | | |
| 103 | 1.2D + 1.5Lm(4) + 1.0W.. | Yes | Y | | DL | 1.2 | 15 | 1.5 | W... | .5 | W... | -.866 | | | | | | | | | | | | |
| 104 | 1.2D + 1.5Lm(4) + 1.0W.. | Yes | Y | | DL | 1.2 | 15 | 1.5 | W... | .001 | W... | -.5 | | | | | | | | | | | | |
| 105 | 1.2D + 1.5Lm(4) + 1.0W.. | Yes | Y | | DL | 1.2 | 15 | 1.5 | W... | -.5 | W... | -.866 | | | | | | | | | | | | |
| 106 | 1.2D + 1.5Lm(4) + 1.0W.. | Yes | Y | | DL | 1.2 | 15 | 1.5 | W... | -.866 | W... | -.5 | | | | | | | | | | | | |
| 107 | 1.2D + 1.5Lm(4) + 1.0W.. | Yes | Y | | DL | 1.2 | 15 | 1.5 | W... | -1 | W... | .001 | | | | | | | | | | | | |
| 108 | 1.2D + 1.5Lm(4) + 1.0W.. | Yes | Y | | DL | 1.2 | 15 | 1.5 | W... | -.866 | W... | .5 | | | | | | | | | | | | |
| 109 | 1.2D + 1.5Lm(4) + 1.0W.. | Yes | Y | | DL | 1.2 | 15 | 1.5 | W... | -.5 | W... | .866 | | | | | | | | | | | | |
| 110 | 1.2D + 1.5Lm(5) + 1.0W.. | Yes | Y | | DL | 1.2 | 16 | 1.5 | W... | .001 | W... | 1 | | | | | | | | | | | | |
| 111 | 1.2D + 1.5Lm(5) + 1.0W.. | Yes | Y | | DL | 1.2 | 16 | 1.5 | W... | .5 | W... | .866 | | | | | | | | | | | | |
| 112 | 1.2D + 1.5Lm(5) + 1.0W.. | Yes | Y | | DL | 1.2 | 16 | 1.5 | W... | .866 | W... | .5 | | | | | | | | | | | | |
| 113 | 1.2D + 1.5Lm(5) + 1.0W.. | Yes | Y | | DL | 1.2 | 16 | 1.5 | W... | 1 | W... | .001 | | | | | | | | | | | | |
| 114 | 1.2D + 1.5Lm(5) + 1.0W.. | Yes | Y | | DL | 1.2 | 16 | 1.5 | W... | .866 | W... | -.5 | | | | | | | | | | | | |
| 115 | 1.2D + 1.5Lm(5) + 1.0W.. | Yes | Y | | DL | 1.2 | 16 | 1.5 | W... | .5 | W... | -.866 | | | | | | | | | | | | |
| 116 | 1.2D + 1.5Lm(5) + 1.0W.. | Yes | Y | | DL | 1.2 | 16 | 1.5 | W... | .001 | W... | -.5 | | | | | | | | | | | | |
| 117 | 1.2D + 1.5Lm(5) + 1.0W.. | Yes | Y | | DL | 1.2 | 16 | 1.5 | W... | -.5 | W... | -.866 | | | | | | | | | | | | |
| 118 | 1.2D + 1.5Lm(5) + 1.0W.. | Yes | Y | | DL | 1.2 | 16 | 1.5 | W... | -.866 | W... | -.5 | | | | | | | | | | | | |
| 119 | 1.2D + 1.5Lm(5) + 1.0W.. | Yes | Y | | DL | 1.2 | 16 | 1.5 | W... | -1 | W... | .001 | | | | | | | | | | | | |
| 120 | 1.2D + 1.5Lm(5) + 1.0W.. | Yes | Y | | DL | 1.2 | 16 | 1.5 | W... | -.866 | W... | .5 | | | | | | | | | | | | |
| 121 | 1.2D + 1.5Lm(5) + 1.0W.. | Yes | Y | | DL | 1.2 | 16 | 1.5 | W... | -.5 | W... | .866 | | | | | | | | | | | | |
| 122 | 1.2D + 1.5Lm(6) + 1.0W.. | Yes | Y | | DL | 1.2 | 17 | 1.5 | W... | .001 | W... | 1 | | | | | | | | | | | | |
| 123 | 1.2D + 1.5Lm(6) + 1.0W.. | Yes | Y | | DL | 1.2 | 17 | 1.5 | W... | .5 | W... | .866 | | | | | | | | | | | | |
| 124 | 1.2D + 1.5Lm(6) + 1.0W.. | Yes | Y | | DL | 1.2 | 17 | 1.5 | W... | .866 | W... | .5 | | | | | | | | | | | | |
| 125 | 1.2D + 1.5Lm(6) + 1.0W.. | Yes | Y | | DL | 1.2 | 17 | 1.5 | W... | 1 | W... | .001 | | | | | | | | | | | | |
| 126 | 1.2D + 1.5Lm(6) + 1.0W.. | Yes | Y | | DL | 1.2 | 17 | 1.5 | W... | .866 | W... | -.5 | | | | | | | | | | | | |
| 127 | 1.2D + 1.5Lm(6) + 1.0W.. | Yes | Y | | DL | 1.2 | 17 | 1.5 | W... | .5 | W... | -.866 | | | | | | | | | | | | |
| 128 | 1.2D + 1.5Lm(6) + 1.0W.. | Yes | Y | | DL | 1.2 | 17 | 1.5 | W... | .001 | W... | -.5 | | | | | | | | | | | | |
| 129 | 1.2D + 1.5Lm(6) + 1.0W.. | Yes | Y | | DL | 1.2 | 17 | 1.5 | W... | -.5 | W... | -.866 | | | | | | | | | | | | |
| 130 | 1.2D + 1.5Lm(6) + 1.0W.. | Yes | Y | | DL | 1.2 | 17 | 1.5 | W... | -.866 | W... | -.5 | | | | | | | | | | | | |
| 131 | 1.2D + 1.5Lm(6) + 1.0W.. | Yes | Y | | DL | 1.2 | 17 | 1.5 | W... | -1 | W... | .001 | | | | | | | | | | | | |
| 132 | 1.2D + 1.5Lm(6) + 1.0W.. | Yes | Y | | DL | 1.2 | 17 | 1.5 | W... | -.866 | W... | .5 | | | | | | | | | | | | |
| 133 | 1.2D + 1.5Lm(6) + 1.0W.. | Yes | Y | | DL | 1.2 | 17 | 1.5 | W... | -.5 | W... | .866 | | | | | | | | | | | | |

## Load Combinations (Continued)

| | Description | So.. | P... | S... | BLC | Fac.. | BLC | Fac.. | BLC | Fac.. | BLC | Fac.. | BLC | Fac.. | BLC | Fac.. | BLC | Fac.. | BLC | Fac.. | BLC | Fac.. | BLC | Fac.. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 134 | 1.2D + 1.5Lm(7) + 1.0W.. | Yes | Y | | DL | 1.2 | 18 | 1.5 | W... | .001 | W... | 1 | | | | | | | | | | | | |
| 135 | 1.2D + 1.5Lm(7) + 1.0W.. | Yes | Y | | DL | 1.2 | 18 | 1.5 | W... | .5 | W... | .866 | | | | | | | | | | | | |
| 136 | 1.2D + 1.5Lm(7) + 1.0W.. | Yes | Y | | DL | 1.2 | 18 | 1.5 | W... | .866 | W... | .5 | | | | | | | | | | | | |
| 137 | 1.2D + 1.5Lm(7) + 1.0W.. | Yes | Y | | DL | 1.2 | 18 | 1.5 | W... | 1 | W... | .001 | | | | | | | | | | | | |
| 138 | 1.2D + 1.5Lm(7) + 1.0W.. | Yes | Y | | DL | 1.2 | 18 | 1.5 | W... | .866 | W... | -.5 | | | | | | | | | | | | |
| 139 | 1.2D + 1.5Lm(7) + 1.0W.. | Yes | Y | | DL | 1.2 | 18 | 1.5 | W... | .5 | W... | -.866 | | | | | | | | | | | | |
| 140 | 1.2D + 1.5Lm(7) + 1.0W.. | Yes | Y | | DL | 1.2 | 18 | 1.5 | W... | .001 | W... | -.5 | | | | | | | | | | | | |
| 141 | 1.2D + 1.5Lm(7) + 1.0W.. | Yes | Y | | DL | 1.2 | 18 | 1.5 | W... | -.5 | W... | -.866 | | | | | | | | | | | | |
| 142 | 1.2D + 1.5Lm(7) + 1.0W.. | Yes | Y | | DL | 1.2 | 18 | 1.5 | W... | -.866 | W... | -.5 | | | | | | | | | | | | |
| 143 | 1.2D + 1.5Lm(7) + 1.0W.. | Yes | Y | | DL | 1.2 | 18 | 1.5 | W... | -1 | W... | .001 | | | | | | | | | | | | |
| 144 | 1.2D + 1.5Lm(7) + 1.0W.. | Yes | Y | | DL | 1.2 | 18 | 1.5 | W... | -.866 | W... | .5 | | | | | | | | | | | | |
| 145 | 1.2D + 1.5Lm(7) + 1.0W.. | Yes | Y | | DL | 1.2 | 18 | 1.5 | W... | -.5 | W... | .866 | | | | | | | | | | | | |
| 146 | 1.2D + 1.5Lm(8) + 1.0W.. | Yes | Y | | DL | 1.2 | 19 | 1.5 | W... | .001 | W... | 1 | | | | | | | | | | | | |
| 147 | 1.2D + 1.5Lm(8) + 1.0W.. | Yes | Y | | DL | 1.2 | 19 | 1.5 | W... | .5 | W... | .866 | | | | | | | | | | | | |
| 148 | 1.2D + 1.5Lm(8) + 1.0W.. | Yes | Y | | DL | 1.2 | 19 | 1.5 | W... | .866 | W... | .5 | | | | | | | | | | | | |
| 149 | 1.2D + 1.5Lm(8) + 1.0W.. | Yes | Y | | DL | 1.2 | 19 | 1.5 | W... | 1 | W... | .001 | | | | | | | | | | | | |
| 150 | 1.2D + 1.5Lm(8) + 1.0W.. | Yes | Y | | DL | 1.2 | 19 | 1.5 | W... | .866 | W... | -.5 | | | | | | | | | | | | |
| 151 | 1.2D + 1.5Lm(8) + 1.0W.. | Yes | Y | | DL | 1.2 | 19 | 1.5 | W... | .5 | W... | -.866 | | | | | | | | | | | | |
| 152 | 1.2D + 1.5Lm(8) + 1.0W.. | Yes | Y | | DL | 1.2 | 19 | 1.5 | W... | .001 | W... | -.5 | | | | | | | | | | | | |
| 153 | 1.2D + 1.5Lm(8) + 1.0W.. | Yes | Y | | DL | 1.2 | 19 | 1.5 | W... | -.5 | W... | -.866 | | | | | | | | | | | | |
| 154 | 1.2D + 1.5Lm(8) + 1.0W.. | Yes | Y | | DL | 1.2 | 19 | 1.5 | W... | -.866 | W... | -.5 | | | | | | | | | | | | |
| 155 | 1.2D + 1.5Lm(8) + 1.0W.. | Yes | Y | | DL | 1.2 | 19 | 1.5 | W... | -1 | W... | .001 | | | | | | | | | | | | |
| 156 | 1.2D + 1.5Lm(8) + 1.0W.. | Yes | Y | | DL | 1.2 | 19 | 1.5 | W... | -.866 | W... | .5 | | | | | | | | | | | | |
| 157 | 1.2D + 1.5Lm(8) + 1.0W.. | Yes | Y | | DL | 1.2 | 19 | 1.5 | W... | -.5 | W... | .866 | | | | | | | | | | | | |
| 158 | 1.2D + 1.5Lm(9) + 1.0W.. | Yes | Y | | DL | 1.2 | 20 | 1.5 | W... | .001 | W... | 1 | | | | | | | | | | | | |
| 159 | 1.2D + 1.5Lm(9) + 1.0W.. | Yes | Y | | DL | 1.2 | 20 | 1.5 | W... | .5 | W... | .866 | | | | | | | | | | | | |
| 160 | 1.2D + 1.5Lm(9) + 1.0W.. | Yes | Y | | DL | 1.2 | 20 | 1.5 | W... | .866 | W... | .5 | | | | | | | | | | | | |
| 161 | 1.2D + 1.5Lm(9) + 1.0W.. | Yes | Y | | DL | 1.2 | 20 | 1.5 | W... | 1 | W... | .001 | | | | | | | | | | | | |
| 162 | 1.2D + 1.5Lm(9) + 1.0W.. | Yes | Y | | DL | 1.2 | 20 | 1.5 | W... | .866 | W... | -.5 | | | | | | | | | | | | |
| 163 | 1.2D + 1.5Lm(9) + 1.0W.. | Yes | Y | | DL | 1.2 | 20 | 1.5 | W... | .5 | W... | -.866 | | | | | | | | | | | | |
| 164 | 1.2D + 1.5Lm(9) + 1.0W.. | Yes | Y | | DL | 1.2 | 20 | 1.5 | W... | .001 | W... | -.5 | | | | | | | | | | | | |
| 165 | 1.2D + 1.5Lm(9) + 1.0W.. | Yes | Y | | DL | 1.2 | 20 | 1.5 | W... | -.5 | W... | -.866 | | | | | | | | | | | | |
| 166 | 1.2D + 1.5Lm(9) + 1.0W.. | Yes | Y | | DL | 1.2 | 20 | 1.5 | W... | -.866 | W... | -.5 | | | | | | | | | | | | |
| 167 | 1.2D + 1.5Lm(9) + 1.0W.. | Yes | Y | | DL | 1.2 | 20 | 1.5 | W... | -1 | W... | .001 | | | | | | | | | | | | |
| 168 | 1.2D + 1.5Lm(9) + 1.0W.. | Yes | Y | | DL | 1.2 | 20 | 1.5 | W... | -.866 | W... | .5 | | | | | | | | | | | | |
| 169 | 1.2D + 1.5Lm(9) + 1.0W.. | Yes | Y | | DL | 1.2 | 20 | 1.5 | W... | -.5 | W... | .866 | | | | | | | | | | | | |
| 170 | 1.2D + 1.5Lm(10) + 1.0... | Yes | Y | | DL | 1.2 | 21 | 1.5 | W... | .001 | W... | 1 | | | | | | | | | | | | |
| 171 | 1.2D + 1.5Lm(10) + 1.0... | Yes | Y | | DL | 1.2 | 21 | 1.5 | W... | .5 | W... | .866 | | | | | | | | | | | | |
| 172 | 1.2D + 1.5Lm(10) + 1.0... | Yes | Y | | DL | 1.2 | 21 | 1.5 | W... | .866 | W... | .5 | | | | | | | | | | | | |
| 173 | 1.2D + 1.5Lm(10) + 1.0... | Yes | Y | | DL | 1.2 | 21 | 1.5 | W... | 1 | W... | .001 | | | | | | | | | | | | |
| 174 | 1.2D + 1.5Lm(10) + 1.0... | Yes | Y | | DL | 1.2 | 21 | 1.5 | W... | .866 | W... | -.5 | | | | | | | | | | | | |
| 175 | 1.2D + 1.5Lm(10) + 1.0... | Yes | Y | | DL | 1.2 | 21 | 1.5 | W... | .5 | W... | -.866 | | | | | | | | | | | | |
| 176 | 1.2D + 1.5Lm(10) + 1.0... | Yes | Y | | DL | 1.2 | 21 | 1.5 | W... | .001 | W... | -.5 | | | | | | | | | | | | |
| 177 | 1.2D + 1.5Lm(10) + 1.0... | Yes | Y | | DL | 1.2 | 21 | 1.5 | W... | -.5 | W... | -.866 | | | | | | | | | | | | |
| 178 | 1.2D + 1.5Lm(10) + 1.0... | Yes | Y | | DL | 1.2 | 21 | 1.5 | W... | -.866 | W... | -.5 | | | | | | | | | | | | |
| 179 | 1.2D + 1.5Lm(10) + 1.0... | Yes | Y | | DL | 1.2 | 21 | 1.5 | W... | -1 | W... | .001 | | | | | | | | | | | | |
| 180 | 1.2D + 1.5Lm(10) + 1.0... | Yes | Y | | DL | 1.2 | 21 | 1.5 | W... | -.866 | W... | .5 | | | | | | | | | | | | |
| 181 | 1.2D + 1.5Lm(10) + 1.0... | Yes | Y | | DL | 1.2 | 21 | 1.5 | W... | -.5 | W... | .866 | | | | | | | | | | | | |
| 182 | 1.2D + 1.5Lm(11) + 1.0... | Yes | Y | | DL | 1.2 | 22 | 1.5 | W... | .001 | W... | 1 | | | | | | | | | | | | |
| 183 | 1.2D + 1.5Lm(11) + 1.0... | Yes | Y | | DL | 1.2 | 22 | 1.5 | W... | .5 | W... | .866 | | | | | | | | | | | | |
| 184 | 1.2D + 1.5Lm(11) + 1.0... | Yes | Y | | DL | 1.2 | 22 | 1.5 | W... | .866 | W... | .5 | | | | | | | | | | | | |
| 185 | 1.2D + 1.5Lm(11) + 1.0... | Yes | Y | | DL | 1.2 | 22 | 1.5 | W... | 1 | W... | .001 | | | | | | | | | | | | |
| 186 | 1.2D + 1.5Lm(11) + 1.0... | Yes | Y | | DL | 1.2 | 22 | 1.5 | W... | .866 | W... | -.5 | | | | | | | | | | | | |
| 187 | 1.2D + 1.5Lm(11) + 1.0... | Yes | Y | | DL | 1.2 | 22 | 1.5 | W... | .5 | W... | -.866 | | | | | | | | | | | | |
| 188 | 1.2D + 1.5Lm(11) + 1.0... | Yes | Y | | DL | 1.2 | 22 | 1.5 | W... | .001 | W... | -.5 | | | | | | | | | | | | |
| 189 | 1.2D + 1.5Lm(11) + 1.0... | Yes | Y | | DL | 1.2 | 22 | 1.5 | W... | -.5 | W... | -.866 | | | | | | | | | | | | |
| 190 | 1.2D + 1.5Lm(11) + 1.0... | Yes | Y | | DL | 1.2 | 22 | 1.5 | W... | -.866 | W... | -.5 | | | | | | | | | | | | |

## Load Combinations (Continued)

| | Description | So.. | P... | S... | BLC | Fac.. | BLC | Fac.. | BLC | Fac.. | BLC | Fac.. | BLC | Fac.. | BLC | Fac.. | BLC | Fac.. | BLC | Fac.. | BLC | Fac.. | BLC | Fac.. | BLC | Fac... |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 191 | 1.2D + 1.5Lm(11) + 1.0... | Yes | Y | | DL | 1.2 | 22 | 1.5 | W... | -1 | W... | .001 | | | | | | | | | | | | | | |
| 192 | 1.2D + 1.5Lm(11) + 1.0... | Yes | Y | | DL | 1.2 | 22 | 1.5 | W... | -.866 | W... | .5 | | | | | | | | | | | | | | |
| 193 | 1.2D + 1.5Lm(11) + 1.0... | Yes | Y | | DL | 1.2 | 22 | 1.5 | W... | -.5 | W... | .866 | | | | | | | | | | | | | | |
| 194 | 1.2D + 1.5Lm(12) + 1.0... | Yes | Y | | DL | 1.2 | 23 | 1.5 | W... | .001 | W... | 1 | | | | | | | | | | | | | | |
| 195 | 1.2D + 1.5Lm(12) + 1.0... | Yes | Y | | DL | 1.2 | 23 | 1.5 | W... | .5 | W... | .866 | | | | | | | | | | | | | | |
| 196 | 1.2D + 1.5Lm(12) + 1.0... | Yes | Y | | DL | 1.2 | 23 | 1.5 | W... | .866 | W... | .5 | | | | | | | | | | | | | | |
| 197 | 1.2D + 1.5Lm(12) + 1.0... | Yes | Y | | DL | 1.2 | 23 | 1.5 | W... | 1 | W... | .001 | | | | | | | | | | | | | | |
| 198 | 1.2D + 1.5Lm(12) + 1.0... | Yes | Y | | DL | 1.2 | 23 | 1.5 | W... | .866 | W... | -.5 | | | | | | | | | | | | | | |
| 199 | 1.2D + 1.5Lm(12) + 1.0... | Yes | Y | | DL | 1.2 | 23 | 1.5 | W... | .5 | W... | -.866 | | | | | | | | | | | | | | |
| 200 | 1.2D + 1.5Lm(12) + 1.0... | Yes | Y | | DL | 1.2 | 23 | 1.5 | W... | .001 | W... | -.5 | | | | | | | | | | | | | | |
| 201 | 1.2D + 1.5Lm(12) + 1.0... | Yes | Y | | DL | 1.2 | 23 | 1.5 | W... | -.5 | W... | -.866 | | | | | | | | | | | | | | |
| 202 | 1.2D + 1.5Lm(12) + 1.0... | Yes | Y | | DL | 1.2 | 23 | 1.5 | W... | -.866 | W... | -.5 | | | | | | | | | | | | | | |
| 203 | 1.2D + 1.5Lm(12) + 1.0... | Yes | Y | | DL | 1.2 | 23 | 1.5 | W... | -1 | W... | .001 | | | | | | | | | | | | | | |
| 204 | 1.2D + 1.5Lm(12) + 1.0... | Yes | Y | | DL | 1.2 | 23 | 1.5 | W... | -.866 | W... | .5 | | | | | | | | | | | | | | |
| 205 | 1.2D + 1.5Lm(12) + 1.0... | Yes | Y | | DL | 1.2 | 23 | 1.5 | W... | -.5 | W... | .866 | | | | | | | | | | | | | | |
| 206 | 1.2D + 1.5Lm(13) + 1.0... | Yes | Y | | DL | 1.2 | 24 | 1.5 | W... | .001 | W... | 1 | | | | | | | | | | | | | | |
| 207 | 1.2D + 1.5Lm(13) + 1.0... | Yes | Y | | DL | 1.2 | 24 | 1.5 | W... | .5 | W... | .866 | | | | | | | | | | | | | | |
| 208 | 1.2D + 1.5Lm(13) + 1.0... | Yes | Y | | DL | 1.2 | 24 | 1.5 | W... | .866 | W... | .5 | | | | | | | | | | | | | | |
| 209 | 1.2D + 1.5Lm(13) + 1.0... | Yes | Y | | DL | 1.2 | 24 | 1.5 | W... | 1 | W... | .001 | | | | | | | | | | | | | | |
| 210 | 1.2D + 1.5Lm(13) + 1.0... | Yes | Y | | DL | 1.2 | 24 | 1.5 | W... | .866 | W... | -.5 | | | | | | | | | | | | | | |
| 211 | 1.2D + 1.5Lm(13) + 1.0... | Yes | Y | | DL | 1.2 | 24 | 1.5 | W... | .5 | W... | -.866 | | | | | | | | | | | | | | |
| 212 | 1.2D + 1.5Lm(13) + 1.0... | Yes | Y | | DL | 1.2 | 24 | 1.5 | W... | .001 | W... | -.5 | | | | | | | | | | | | | | |
| 213 | 1.2D + 1.5Lm(13) + 1.0... | Yes | Y | | DL | 1.2 | 24 | 1.5 | W... | -.5 | W... | -.866 | | | | | | | | | | | | | | |
| 214 | 1.2D + 1.5Lm(13) + 1.0... | Yes | Y | | DL | 1.2 | 24 | 1.5 | W... | -.866 | W... | -.5 | | | | | | | | | | | | | | |
| 215 | 1.2D + 1.5Lm(13) + 1.0... | Yes | Y | | DL | 1.2 | 24 | 1.5 | W... | -1 | W... | .001 | | | | | | | | | | | | | | |
| 216 | 1.2D + 1.5Lm(13) + 1.0... | Yes | Y | | DL | 1.2 | 24 | 1.5 | W... | -.866 | W... | .5 | | | | | | | | | | | | | | |
| 217 | 1.2D + 1.5Lm(13) + 1.0... | Yes | Y | | DL | 1.2 | 24 | 1.5 | W... | -.5 | W... | .866 | | | | | | | | | | | | | | |
| 218 | 1.2D + 1.5Lm(14) + 1.0... | Yes | Y | | DL | 1.2 | 25 | 1.5 | W... | .001 | W... | 1 | | | | | | | | | | | | | | |
| 219 | 1.2D + 1.5Lm(14) + 1.0... | Yes | Y | | DL | 1.2 | 25 | 1.5 | W... | .5 | W... | .866 | | | | | | | | | | | | | | |
| 220 | 1.2D + 1.5Lm(14) + 1.0... | Yes | Y | | DL | 1.2 | 25 | 1.5 | W... | .866 | W... | .5 | | | | | | | | | | | | | | |
| 221 | 1.2D + 1.5Lm(14) + 1.0... | Yes | Y | | DL | 1.2 | 25 | 1.5 | W... | 1 | W... | .001 | | | | | | | | | | | | | | |
| 222 | 1.2D + 1.5Lm(14) + 1.0... | Yes | Y | | DL | 1.2 | 25 | 1.5 | W... | .866 | W... | -.5 | | | | | | | | | | | | | | |
| 223 | 1.2D + 1.5Lm(14) + 1.0... | Yes | Y | | DL | 1.2 | 25 | 1.5 | W... | .5 | W... | -.866 | | | | | | | | | | | | | | |
| 224 | 1.2D + 1.5Lm(14) + 1.0... | Yes | Y | | DL | 1.2 | 25 | 1.5 | W... | .001 | W... | -.5 | | | | | | | | | | | | | | |
| 225 | 1.2D + 1.5Lm(14) + 1.0... | Yes | Y | | DL | 1.2 | 25 | 1.5 | W... | -.5 | W... | -.866 | | | | | | | | | | | | | | |
| 226 | 1.2D + 1.5Lm(14) + 1.0... | Yes | Y | | DL | 1.2 | 25 | 1.5 | W... | -.866 | W... | -.5 | | | | | | | | | | | | | | |
| 227 | 1.2D + 1.5Lm(14) + 1.0... | Yes | Y | | DL | 1.2 | 25 | 1.5 | W... | -1 | W... | .001 | | | | | | | | | | | | | | |
| 228 | 1.2D + 1.5Lm(14) + 1.0... | Yes | Y | | DL | 1.2 | 25 | 1.5 | W... | -.866 | W... | .5 | | | | | | | | | | | | | | |
| 229 | 1.2D + 1.5Lm(14) + 1.0... | Yes | Y | | DL | 1.2 | 25 | 1.5 | W... | -.5 | W... | .866 | | | | | | | | | | | | | | |
| 230 | 1.2D + 1.5Lm(15) + 1.0... | Yes | Y | | DL | 1.2 | 26 | 1.5 | W... | .001 | W... | 1 | | | | | | | | | | | | | | |
| 231 | 1.2D + 1.5Lm(15) + 1.0... | Yes | Y | | DL | 1.2 | 26 | 1.5 | W... | .5 | W... | .866 | | | | | | | | | | | | | | |
| 232 | 1.2D + 1.5Lm(15) + 1.0... | Yes | Y | | DL | 1.2 | 26 | 1.5 | W... | .866 | W... | .5 | | | | | | | | | | | | | | |
| 233 | 1.2D + 1.5Lm(15) + 1.0... | Yes | Y | | DL | 1.2 | 26 | 1.5 | W... | 1 | W... | .001 | | | | | | | | | | | | | | |
| 234 | 1.2D + 1.5Lm(15) + 1.0... | Yes | Y | | DL | 1.2 | 26 | 1.5 | W... | .866 | W... | -.5 | | | | | | | | | | | | | | |
| 235 | 1.2D + 1.5Lm(15) + 1.0... | Yes | Y | | DL | 1.2 | 26 | 1.5 | W... | .5 | W... | -.866 | | | | | | | | | | | | | | |
| 236 | 1.2D + 1.5Lm(15) + 1.0... | Yes | Y | | DL | 1.2 | 26 | 1.5 | W... | .001 | W... | -.5 | | | | | | | | | | | | | | |
| 237 | 1.2D + 1.5Lm(15) + 1.0... | Yes | Y | | DL | 1.2 | 26 | 1.5 | W... | -.5 | W... | -.866 | | | | | | | | | | | | | | |
| 238 | 1.2D + 1.5Lm(15) + 1.0... | Yes | Y | | DL | 1.2 | 26 | 1.5 | W... | -.866 | W... | -.5 | | | | | | | | | | | | | | |
| 239 | 1.2D + 1.5Lm(15) + 1.0... | Yes | Y | | DL | 1.2 | 26 | 1.5 | W... | -1 | W... | .001 | | | | | | | | | | | | | | |
| 240 | 1.2D + 1.5Lm(15) + 1.0... | Yes | Y | | DL | 1.2 | 26 | 1.5 | W... | -.866 | W... | .5 | | | | | | | | | | | | | | |
| 241 | 1.2D + 1.5Lm(15) + 1.0... | Yes | Y | | DL | 1.2 | 26 | 1.5 | W... | -.5 | W... | .866 | | | | | | | | | | | | | | |

## Envelope Joint Reactions

| | Joint | | X [lb] | LC | Y [lb] | LC | Z [lb] | LC | MX [lb-ft] | LC | MY [lb-ft] | LC | MZ [lb-ft] | LC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | N005 | max | 2068.289 | 17 | 2183.538 | 26 | 968.729 | 14 | -1216.725 | 20 | 1117.455 | 5 | 1267.881 | 69 |
| 2 | | min | -2088.141 | 11 | 522.209 | 20 | -1306.909 | 8 | -5326.939 | 26 | -1094.153 | 23 | -1393.104 | 135 |
| 3 | N006 | max | 2045.447 | 17 | 2269.419 | 30 | 2279.007 | 3 | 2753.963 | 29 | 1952.878 | 9 | 4822.889 | 30 |
| 4 | | min | -2327.756 | 11 | 287.1 | 24 | -2092.491 | 21 | 189.111 | 155 | -1929.814 | 16 | 529.215 | 24 |
| 5 | N007 | max | 2254.961 | 5 | 2243.114 | 34 | 2190.932 | 13 | 2758.505 | 35 | 1910.916 | 12 | -713.692 | 16 |
| 6 | | min | -1951.297 | 23 | 373.932 | 16 | -2039.15 | 19 | 292.279 | 89 | -1887.378 | 18 | -4738.67 | 34 |
| 7 | N101 | max | 38.887 | 5 | 510.492 | 32 | 750.512 | 32 | 0 | 241 | 0 | 241 | 0 | 241 |
| 8 | | min | -38.115 | 23 | -74.16 | 14 | -95.093 | 14 | 0 | 1 | 0 | 1 | 0 | 1 |
| 9 | N102 | max | 789.996 | 12 | 612.08 | 12 | 259.281 | 18 | 0 | 241 | 0 | 241 | 0 | 241 |
| 10 | | min | -435.526 | 18 | -324.602 | 18 | -465.751 | 12 | 0 | 1 | 0 | 1 | 0 | 1 |
| 11 | N103 | max | 320.763 | 22 | 576.436 | 28 | 192.49 | 22 | 0 | 241 | 0 | 241 | 0 | 241 |
| 12 | | min | -745.97 | 28 | -242.421 | 22 | -425.499 | 28 | 0 | 1 | 0 | 1 | 0 | 1 |
| 13 | Totals: | max | 5413.003 | 17 | 7865.583 | 28 | 4789.066 | 14 | | | | | | |
| 14 | | min | -5413.075 | 11 | 2170.339 | 21 | -4789.116 | 8 | | | | | | |

## Envelope AISC 15th(360-16): LRFD Steel Code Checks

| | Member | Shape | Code Ch... | Loc[in] | LC | Shear Check | Loc..... | ... | phi*Pn... | phi*Pn... | phi*M... | phi*M... | ... | Eqn |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | H001 | L3x3x5 | .660 | 84.437 | 33 | .485 | 84.... | y | 26 11343... | 57672 | 2014.... | 3604.... | ... | H2-1 |
| 2 | H002 | L3x3x5 | .662 | 84.437 | 37 | .542 | 84.... | y | 30 11343... | 57672 | 2014.... | 3578.... | ... | H2-1 |
| 3 | H003 | L3x3x5 | .670 | 84.437 | 29 | .526 | 84.... | y | 34 11343... | 57672 | 2014.... | 3583.67 | ... | H2-1 |
| 4 | H004 | L3x3x5 | .387 | 42.868 | 30 | .023 | 42.... | z | ... 35649... | 57672 | 2014.... | 4018.... | ... | H2-1 |
| 5 | H005 | L3x3x5 | .392 | 42.868 | 33 | .023 | 42.... | z | ... 35649... | 57672 | 2014.... | 4026.... | ... | H2-1 |
| 6 | H006 | L3x3x5 | .388 | 42.868 | 37 | .023 | 42.... | z | ... 35649... | 57672 | 2014.... | 4024.89 | ... | H2-1 |
| 7 | H007 | LL3x3x5x0 | .104 | 0 | 155 | .018 | 0 | y | ... 99881... | 115344 | 8136 | 5677.57 | ... | H1-1b |
| 8 | H008 | LL3x3x5x0 | .112 | 48 | 5 | .018 | 0 | y | ... 99881... | 115344 | 8136 | 5677.57 | ... | H1-1b |
| 9 | H009 | LL3x3x5x0 | .105 | 0 | 139 | .018 | 0 | y | ... 99881... | 115344 | 8136 | 5677.57 | ... | H1-1b |
| 10 | H010 | HSS4x4x4 | .365 | 0 | 29 | .133 | 0 | y | ... 13900... | 139518 | 16180.5 | 16180.5 | ... | H1-1b |
| 11 | H011 | HSS4x4x4 | .373 | 0 | 28 | .134 | 0 | y | ... 13900... | 139518 | 16180.5 | 16180.5 | ... | H1-1b |
| 12 | H012 | HSS4x4x4 | .373 | 0 | 36 | .133 | 0 | y | ... 13900... | 139518 | 16180.5 | 16180.5 | ... | H1-1b |
| 13 | H013 | HSS4.5x4.5x4 | .171 | 0 | 35 | .074 | 0 | y | ... 15810... | 158976 | 20907 | 20907 | ... | H1-1b |
| 14 | H014 | HSS4.5x4.5x4 | .170 | 0 | 29 | .074 | 0 | y | ... 15810... | 158976 | 20907 | 20907 | ... | H1-1b |
| 15 | H015 | HSS4.5x4.5x4 | .170 | 0 | 33 | .074 | 0 | y | ... 15810... | 158976 | 20907 | 20907 | ... | H1-1b |
| 16 | H031 | PIPE_2.0 | .442 | 70.313 | 32 | .115 | 68.... | | ... 6295.... | 32130 | 1871.... | 1871.... | ... | H1-1a |
| 17 | H032 | PIPE_2.0 | .432 | 70.313 | 26 | .115 | 68.... | | ... 6295.... | 32130 | 1871.... | 1871.... | ... | H1-1a |
| 18 | H033 | PIPE_2.0 | .432 | 70.313 | 30 | .116 | 68.... | | ... 6295.... | 32130 | 1871.... | 1871.... | ... | H1-1a |
| 19 | H040 | SR_0.5 | .628 | 7.417 | 214 | .042 | 7.4... | | ... 7925.... | 8835.... | 73.631 | 73.631 | ... | H1-1b |
| 20 | H041 | SR_0.5 | .628 | 7.417 | 218 | .042 | 7.4... | | ... 7925.... | 8835.... | 73.631 | 73.631 | ... | H1-1b |
| 21 | H042 | SR_0.5 | .628 | 7.417 | 234 | .042 | 7.4... | | ... 7925.... | 8835.... | 73.631 | 73.631 | ... | H1-1b |
| 22 | H043 | SR_0.5 | .616 | 7.417 | 216 | .042 | 7.4... | | ... 7925.... | 8835.... | 73.631 | 73.631 | ... | H1-1b |
| 23 | H044 | SR_0.5 | .616 | 7.417 | 220 | .041 | 7.4... | | ... 7925.... | 8835.... | 73.631 | 73.631 | ... | H1-1b |
| 24 | H045 | SR_0.5 | .616 | 7.417 | 235 | .042 | 7.4... | | ... 7925.... | 8835.... | 73.631 | 73.631 | ... | H1-1b |
| 25 | H052 | SR_0.625 | .468 | 0 | 208 | .036 | 7.4... | | ... 12877... | 13805... | 143.811 | 143.811 | ... | H1-1b |
| 26 | H053 | SR_0.625 | .468 | 0 | 223 | .036 | 7.4... | | ... 12877... | 13805... | 143.811 | 143.811 | ... | H1-1b |
| 27 | H054 | SR_0.625 | .468 | 0 | 240 | .036 | 7.4... | | ... 12877... | 13805... | 143.811 | 143.811 | ... | H1-1b |
| 28 | H055 | SR_0.625 | .472 | 0 | 210 | .036 | 7.4... | | ... 12877... | 13805... | 143.811 | 143.811 | ... | H1-1b |
| 29 | H056 | SR_0.625 | .472 | 0 | 226 | .036 | 7.4... | | ... 12877... | 13805... | 143.811 | 143.811 | ... | H1-1b |
| 30 | H057 | SR_0.625 | .472 | 0 | 241 | .036 | 7.4... | | ... 12877... | 13805... | 143.811 | 143.811 | ... | H1-1b |
| 31 | D061 | L3x3x3 | .041 | 24.777 | 32 | .004 | 49.... | z | 33 23560... | 35316 | 1320.... | 2503.... | ... | H2-1 |
| 32 | D062 | L3x3x3 | .051 | 24.777 | 11 | .018 | 0 | y | 11 23560... | 35316 | 1320.... | 2503.... | ... | H2-1 |
| 33 | D063 | L3x3x3 | .043 | 24.777 | 28 | .011 | 0 | z | 6 23560... | 35316 | 1320.... | 2503.... | ... | H2-1 |
| 34 | D064 | L3x3x3 | .040 | 24.777 | 32 | .004 | 0 | y | 32 23560... | 35316 | 1320.... | 2503.... | ... | H2-1 |
| 35 | D065 | L3x3x3 | .045 | 24.777 | 13 | .017 | 0 | y | 11 23560... | 35316 | 1320.... | 2503.... | ... | H2-1 |
| 36 | D066 | L3x3x3 | .047 | 24.777 | 5 | .012 | 0 | z | 6 23560... | 35316 | 1320.... | 2503.... | ... | H2-1 |
| 37 | MP1 | PIPE_2.0 | .311 | 30.938 | 219 | .203 | 41.... | | ... 7373.... | 32130 | 1871.... | 1871.... | ... | H1-1b |
| 38 | MP2 | PIPE_2.0 | .315 | 33 | 27 | .204 | 33 | | ... 7373.... | 32130 | 1871.... | 1871.... | ... | H1-1b |

## *Envelope AISC 15th(360-16): LRFD Steel Code Checks (Continued)*

| | Member | Shape | Code Ch... | Loc[in] | LC | Shear Check | Loc..... | ... | phi*Pn... | phi*Pn... | phi*M... | phi*M... | ... | Eqn |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 39 | MP3 | PIPE_2.0 | .359 | 33 | 215 | .204 | 33 | ... | 7373.... | 32130 | 1871.... | 1871.... | ... | H1-1b |
| 40 | MP4 | PIPE_2.0 | .412 | 36.75 | 5 | .093 | 37.... | ... | 4552.... | 32130 | 1871.... | 1871.... | ... | H1-1b |
| 41 | MP5 | PIPE_2.0 | .682 | 42 | 11 | .118 | 42 | 12 | 4552.... | 32130 | 1871.... | 1871.... | ... | H1-1b |
| 42 | MP6 | PIPE_2.0 | .617 | 36.75 | 11 | .109 | 37.... | 4 | 4552.... | 32130 | 1871.... | 1871.... | ... | H1-1b |
| 43 | MP7 | PIPE_2.0 | .199 | 31.625 | 30 | .105 | 31.... | 89 | 7373.... | 32130 | 1871.... | 1871.... | ... | H1-1b |
| 44 | MP8 | PIPE_2.0 | .292 | 33 | 5 | .106 | 33 | 67 | 7373.... | 32130 | 1871.... | 1871.... | ... | H1-1b |
| 45 | MP9 | PIPE_2.0 | .294 | 33 | 5 | .106 | 33 | 84 | 7373.... | 32130 | 1871.... | 1871.... | ... | H1-1b |
| 46 | MP10 | PIPE_2.0 | .235 | 33 | 31 | .106 | 42.... | 26 | 7373.... | 32130 | 1871.... | 1871.... | ... | H1-1b |
| 47 | MP11 | PIPE_2.0 | .234 | 33 | 35 | .121 | 33 | 30 | 7373.... | 32130 | 1871.... | 1871.... | ... | H1-1b |
| 48 | MP12 | PIPE_2.0 | .217 | 31.625 | 27 | .119 | 41.... | 34 | 7373.... | 32130 | 1871.... | 1871.... | ... | H1-1b |
| 49 | MP13 | PIPE_2.0 | .087 | 10.083 | 215 | .011 | 10.... | ... | 15782... | 32130 | 1871.... | 1871.... | ... | H1-1b |
| 50 | MP14 | PIPE_2.0 | .087 | 10.083 | 218 | .011 | 10.... | ... | 15782... | 32130 | 1871.... | 1871.... | ... | H1-1b |
| 51 | MP15 | PIPE_2.0 | .087 | 10.083 | 234 | .011 | 10.... | ... | 15782... | 32130 | 1871.... | 1871.... | ... | H1-1b |

AMERICAN TOWER®
CORPORATION

| | |
|---|---|
| **Site Number:** | *302540* |
| **Project Number:** | *12995792_C8_01* |
| **Carrier:** | *Verizon Wireless* |
| **Mount Elevation:** | *139.5 ft* |
| **Date:** | 1/22/2020 |

# Mount Analysis Force Calculations

| Wind & Ice Load Calculations | | | |
|---|---|---|---|
| Shielding Factor | $K_z$ | 1.09 | |
| Topographic Factor | $K_{zt}$ | 1.00 | |
| Rooftop Wind Speed-up Factor | $K_s$ | 1.00 | |
| Shielding Factor | $K_a$ | 0.90 | |
| Ground Elevation Factor | $K_e$ | 1.00 | |
| Wind Direction Probability Factor | $K_d$ | 0.95 | |
| Basic Wind Speed | V | 101 | mph |
| Velocity Pressure | $q_z$ | 27.0 | psf |
| Height Escalation Factor | $K_{iz}$ | 1.16 | |
| Thickness of Radial Glaze Ice | $T_{iz}$ | 1.73 | in |

| Seismic Load Calculations | | | |
|---|---|---|---|
| Short Period DSRAP | $S_{DS}$ | 0.182 | |
| 1 Second DSRAP | $S_{D1}$ | 0.096 | |
| Importance Factor | I | 1.0 | |
| Response Modification Coefficient | R | 2.0 | |
| Seismic Response Coefficient | $C_S$ | 0.091 | |
| Amplification Factor | A | 1.0 | |
| Total Weight | W | 2062.4 | lbs |
| Total Shear Force | $V_S$ | 188.1 | lbs |
| Horizontal Seismic Load | Eh | 188.1 | lbs |
| Vertical Seismic Load | Ev | 75.2 | lbs |

**Antenna Calculations**

| Equipment | Height | Width | Depth | Weight | $EPA_N$ | $EPA_T$ | $EPA_{Ni}$ | $EPA_{Ti}$ |
|---|---|---|---|---|---|---|---|---|
| Model # | in | in | in | lbs | sqft | sqft | sqft | sqft |
| Samsung Outdoor CBRS 20W RRH –Clip-on Antenna | 12.3 | 8.7 | 1.4 | 4.4 | 0.89 | 0.17 | 1.60 | 0.78 |
| Commscope JAHH-65B-R3B | 72.0 | 13.8 | 8.2 | 60.6 | 6.08 | 5.98 | 7.97 | 8.92 |
| Andrew LNX-8513DS-A1M | 72.7 | 11.9 | 7.1 | 39.2 | 5.65 | 5.41 | 7.64 | 8.43 |
| Commscope LNX-6514DS-A1M | 72.7 | 11.9 | 7.1 | 38.8 | 5.65 | 5.41 | 7.64 | 8.43 |
| Commscope CBC78T-DS-43-2X | 9.6 | 6.9 | 6.4 | 20.7 | 0.55 | 0.51 | 1.13 | 1.07 |
| RFS DB-T1-6Z-8AB-0Z | 24.0 | 24.0 | 10.0 | 44.0 | N/A | N/A | | |
| Samsung B5/B13 RRH-BR04C | 15.0 | 15.0 | 8.1 | 70.3 | 1.88 | 1.01 | 2.84 | 1.78 |
| Samsung Outdoor CBRS 20W RRH | 12.1 | 8.5 | 4.1 | 18.6 | 0.86 | 0.42 | 1.55 | 1.00 |
| Samsung B2/B66A RRH-BR049 | 15.0 | 15.0 | 10.0 | 84.4 | 1.88 | 1.25 | 2.84 | 2.07 |

AMERICAN TOWER®
CORPORATION

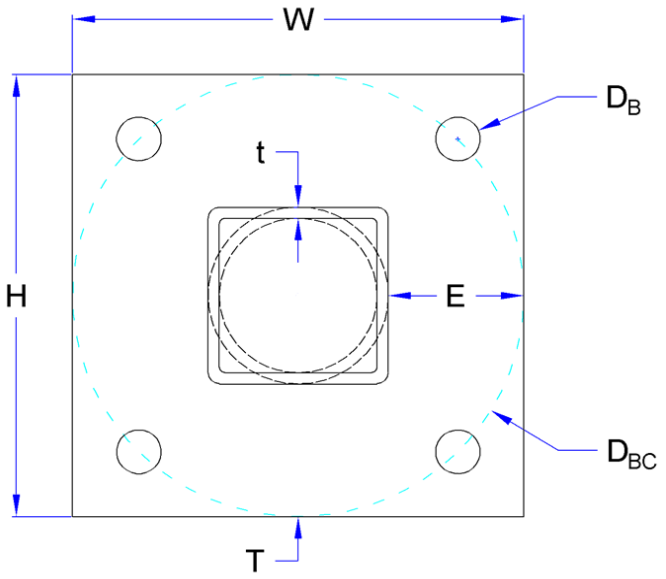
| | |
|---|---|
| **Site Number:** | *302540* |
| **Project Number:** | *12995792_C8_01* |
| **Carrier:** | *Verizon Wireless* |
| **Mount Elevation:** | *139.5 ft* |
| **Date:** | 1/22/2020 |

# Mount-to-Tower Connection Analysis

| Applied Loads from RISA 3D | | | |
|---|---|---|---|
| Controlling Load Combination | | 29 | |
| Node Label | | N005 | |
| Force in X | Fx | 872.3 | lbs |
| Force in Y | Fy | 2165.1 | lbs |
| Force in Z | Fz | -547.0 | lbs |
| Moment about X | Mx | -5267.0 | lb-ft |
| Moment about Y | My | 601.7 | lb-ft |
| Moment about Z | Mz | -38.3 | lb-ft |

| Bolt Shear and Tensile Capacity | | | |
|---|---|---|---|
| Bolt Quantity | n | 3 | |
| Bolt Diameter | $D_B$ | 3/4 | in |
| Bolt Circle | $D_{BC}$ | 8 | in |
| Bolt Grade | | A325 | |
| Bolt Fy | $Fy_B$ | 92 | ksi |
| Bolt Fu | $Fu_B$ | 120 | ksi |
| Applied Shear | Vu | 0.77 | k |
| Applied Tension | Tu | 8.12 | k |
| Tensile Strength | ϕTn | 30.1 | k |
| Interaction Capacity | (Tu+Vu)/ϕTn | 30% | Pass |

| Plate Flexural Capacity | | | |
|---|---|---|---|
| Plate Height | H | 7 | in |
| Plate Width | W | 12 | in |
| Plate Thickness | T | 1/2 | in |
| Plate Grade | | A36 | |
| Plate Fy | $Fy_P$ | 36 | ksi |
| Plate Fu | $Fu_P$ | 58 | ksi |
| Applied Moment | Mu | 4.8 | k-in |
| Flexural Strength | ϕMn | 14.2 | k-in |
| Flexural Capacity | Mu/ϕMn | 34% | Pass |




| Weld and Base Metal Capacity | | | |
|---|---|---|---|
| Standoff Type | | Tube | |
| Standoff Member | | HSS4x4x4 | |
| Member Edge Distance | E | 4 | in |
| Member Width | w | 4 | in |
| Member Thickness | t | 0.250 | in |
| Member Grade | | A53 Gr. B | |
| Member Fy | $Fy_M$ | 35 | ksi |
| Member Fu | $Fu_M$ | 60 | ksi |
| Weld Size | a | 1/4 | in |
| Weld Length | l | 16.0 | in |
| Applied Load | Pu | 12.2 | k |
| Weld Strength | ϕRn | 44.5 | k |
| Weld Capacity | Pu/ϕRn | 27% | Pass |
| Minimum Base Metal Thickness | | 0.206 | in |
| Controlling Base Metal Thickness | | 0.250 | in |
| Base Metal Result | | Acceptable | |

**Site Name: Madison 2 CT**
**Cumulative Power Density**

| Operator | Operating Frequency | Number of Trans. | ERP Per Trans. | Total ERP | Distance to Target | Calculated Power Density | Maximum Permissible Exposure* | Fraction of MPE |
|---|---|---|---|---|---|---|---|---|
| | (MHz) | | (watts) | (watts) | (feet) | (mW/cm^2) | (mW/cm^2) | (%) |
| VZW 700 | 746 | 4 | 628 | 2,511 | 140 | 0.0461 | 0.497333333 | 9.26% |
| VZW Cellular | 869 | 1 | 628 | 628 | 140 | 0.0115 | 0.579333333 | 1.99% |
| VZW Cellular | 880 | 4 | 364 | 1,454 | 140 | 0.0267 | 0.586666667 | 4.55% |
| VZW PCS | 1970 | 4 | 1,525 | 6,100 | 140 | 0.1119 | 1.0 | 11.19% |
| VZW AWS | 2145 | 4 | 1,530 | 6,120 | 140 | 0.1123 | 1.0 | 11.23% |
| VZW CBRS | 3550 | 4 | 42 | 168 | 140 | 0.0031 | 1.0 | 0.31% |
| **Total Percentage of Maximum Permissible Exposure** | | | | | | | | 38.53% |

*Guidelines adopted by the FCC on August 1, 1996, 47 CFR Section 1.13101 based on NCRP Report 86, 1986 and generally on ANSI/IEEE C95.1-1992

MHz = Megahertz
mW/cm^2 = milliwatts per square centimeter
ERP = Effective Radiated Power

Absolute worst case maximum values used, including the following assumptions:
1. closest accessible point is distance from antenna to base of pole;
2. continuous transmission from all available channels at full power for indefinite time period; and,
3. all RF energy is assumed to be directed solely to the base of the pole.

## Description

Google Street View | FEMA Flood Map
Property Card

## Details

Owner Name
CK BUILDERS LLC

Location
8 OLD ROUTE 79

Acres
0

Assessed Value
487500

Appraised Value
696200

Year Built
1974

Year Improved
unavailabl

Land Use
Commercial


Home Layers 8 OLD ROU...

# 8 OLD ROUTE 79

| | | | |
|---|---|---|---|
| **Location** | 8 OLD ROUTE 79 | **Mblu** | 48/ 53/ / / |
| **Acct#** | 00321200 | **Owner** | CK BUILDERS LLC |
| **Assessment** | $299,600 | **Appraisal** | $427,800 |
| **PID** | 3310 | **Building Count** | 1 |

## Current Value

| Appraisal | | | |
|---|---|---|---|
| **Valuation Year** | **Improvements** | **Land** | **Total** |
| 2017 | $22,500 | $405,300 | $427,800 |
| **Assessment** | | | |
| **Valuation Year** | **Improvements** | **Land** | **Total** |
| 2017 | $15,800 | $283,800 | $299,600 |

## Owner of Record

| | | | |
|---|---|---|---|
| **Owner** | CK BUILDERS LLC | **Sale Price** | $0 |
| **Co-Owner** | | **Book & Page** | 1340/ 270 |
| | | **Sale Date** | 12/21/2004 |
| | | **Instrument** | 15 |

## Ownership History

| Ownership History | | | | |
|---|---|---|---|---|
| **Owner** | **Sale Price** | **Book & Page** | **Instrument** | **Sale Date** |
| CK BUILDERS LLC | $0 | 1340/ 270 | 15 | 12/21/2004 |
| TOWN OF MADISON | $0 | 136/ 597 | | |

## Building Information

### Building 1 : Section 1

**Year Built:**
**Living Area:** 0

| Building Attributes | |
|---|---|
| **Field** | **Description** |
| Style | Vacant Land |
| Model | |
| Stories: | |

| | |
|---|---|
| Total Rooms: | |
| Fireplace(s) | |
| Xtra FPL Open | |

### Building Photo

(http://images.vgsi.com/photos/MadisonCTPhotos//\01\00\81/09

### 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** 4310
**Description** TEL REL TW
**Zone** R-1

#### Land Line Valuation

**Size (Acres)** 1.02

### Outbuildings

| Outbuildings | | | | | | Legend |
|---|---|---|---|---|---|---|
| **Code** | **Description** | **Sub Code** | **Sub Description** | **Size** | **Value** | **Bldg #** |
| FND | Foundation | | | 1 UNITS | $22,500 | 1 |

### Valuation History

| Appraisal | | | |
|---|---|---|---|
| **Valuation Year** | **Improvements** | **Land** | **Total** |
| 2017 | $22,500 | $405,300 | $427,800 |

| Assessment | | | |
|---|---|---|---|
| **Valuation Year** | **Improvements** | **Land** | **Total** |
| 2017 | $15,800 | $283,800 | $299,600 |

| | |
|---|---|
| VZW LOCATION CODE: | 468845 |
| VZW SITE NAME: | MADISON 2 CT |
| PROJECT DESCRIPTION: | CBRS ANTENNA RELOCATION /RECONFIGURATION |
| TOWER TYPE: | 148' MONOPOLE |
| SITE ADDRESS: | 8 OLD RT 79<br>MADISON, CT 06443<br>(NEW HAVEN COUNTY) |
| JURISDICTION: | CITY OF MADISON |
| PRESENT OCCUPANCY TYPE: | TELECOMMUNICATIONS FACILITY |
| CURRENT ZONING: | R-1 |
| PID: | 3310 |

## PROJECT INFORMATION

*LATITUDE N 41° 17' 07.92"
*LONGITUDE W 72° 36' 04.83"

*GROUND ELEVATION (AMSL) = 30' ±

*INFORMATION PROVIDED BY ATC

## SITE COORDINATES

verizon

3131 S VAUGHN WAY
AURORA, CO 80014

# VZW LOCATION CODE: 468845
# VZW SITE NAME: MADISON 2 CT

8 OLD RT 79
MADISON, CT 06443
(NEW HAVEN COUNTY)


PLANS PREPARED BY:

TOWER ENGINEERING PROFESSIONALS
326 TRYON ROAD
RALEIGH, NC 27603-3530
OFFICE: (919) 661-6351
www.tepgroup.net

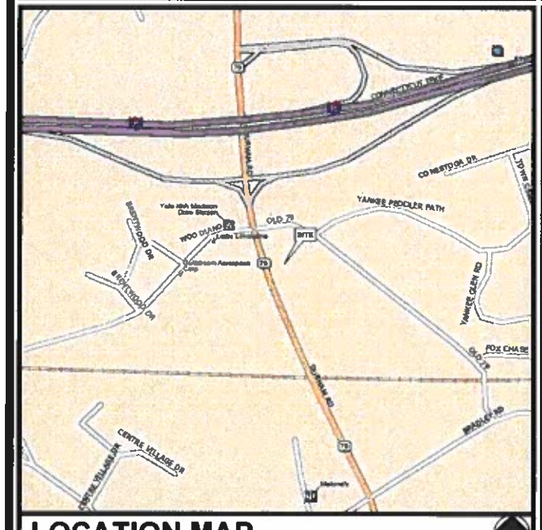

| REV | DATE | ISSUED FOR: |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| 2 | 03-06-20 | 100% CONSTRUCTION |
| 1 | 02-13-20 | 100% CONSTRUCTION |
| 0 | 02-11-20 | 100% CONSTRUCTION |
| A | 11-26-19 | PRELIMINARY |

DRAWN BY: CBM CHECKED BY: DEL

SEAL:

STATE OF CONNECTICUT
GRAHAM M. ANDRES
29538
LICENSED
PROFESSIONAL ENGINEER

March 06, 2020




## LOCATION MAP

FROM NEW LONDON: TAKE I95 SOUTH TO EXIT 61 . TAKE A LEFT AT THE OFF RAMP AND THEN TURN LEFT AT THE FIRST SET OF LIGHTS.

## DRIVING DIRECTIONS

**LESSEE:**
NAME: VERIZON WIRELESS
ADDRESS: 3131 S VAUGHN WAY
CITY, STATE, ZIP: AURORA, CO 80014

**TOWER MANAGER:**
NAME: AMERICAN TOWER CORPORATION
ADDRESS: 19100 VON KARMAN AVE, STE 200
CITY, STATE, ZIP: IRVINE, CA 92612
CONTACT: AARON DIAL
PHONE: (919) 466-5383
SITE NAME: MADISON CT 6
SITE NUMBER: 302540

**CIVIL ENGINEER:**
NAME: TOWER ENGINEERING PROFESSIONALS
ADDRESS: 326 TRYON ROAD
CITY, STATE, ZIP: RALEIGH, NC 27603
CONTACT: GRAHAM M. ANDRES, P.E.
PHONE: (919) 661-6351

**PROPERTY OWNER:**
NAME: CK BUILDERS LLC
ADDRESS: UNKNOWN
CITY, STATE, ZIP: UNKNOWN

## CONTACT INFORMATION

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

1. INTERNATIONAL BUILDING CODE W/CT AMENDMENTS (2015 EDITION)
2. CONNECTICUT CODE COUNCIL
3. ANSI/TIA-222-G-2-2009
4. NATIONAL ELECTRIC CODE W/CT AMENDMENTS (2017 EDITION)
5. LOCAL BUILDING CODE
6. CITY/COUNTY ORDINANCES

## CODE COMPLIANCE

- REMOVE (15) RRHS
- REMOVE (6) DIPLEXERS
- REMOVE (1) 6X12 HYBRIFLEX CABLE
- INSTALL (3) ANTENNAS
- INSTALL (9) RRHS
- INSTALL (3) DIPLEXERS
- INSTALL (2) 1⅝" FIBER CABLES
- INSTALL MOUNT MODIFICATIONS

## SCOPE OF WORK

| SHEET | DESCRIPTION | REV |
|---|---|---|
| T1 | TITLE SHEET | 2 |
| N1 | PROJECT NOTES | 0 |
| C1 | SITE PLAN | 0 |
| C2 | COMPOUND LAYOUT | 1 |
| C3 | TOWER ELEVATION | 2 |
| C4 | ANTENNA LAYOUT | 2 |
| C5 | FINAL ANTENNA SCHEDULE | 2 |
| C6A | EQUIPMENT DETAILS I | 2 |
| C6B | EQUIPMENT DETAILS II | 2 |

## INDEX OF SHEETS

SHEET NUMBER: T-1
REVISION: 2
TEP #: 94025.205897

## PROJECT NOTES:

1. ALL REFERENCES TO THE OWNER IN THESE DOCUMENTS SHALL BE CONSIDERED VERIZON WIRELESS OR ITS DESIGNATED REPRESENTATIVE.
2. ALL WORK PRESENTED ON THESE DRAWINGS MUST BE COMPLETED BY THE CONTRACTOR UNLESS NOTED OTHERWISE. THE CONTRACTOR MUST HAVE CONSIDERABLE EXPERIENCE IN PERFORMANCE OF WORK SIMILAR TO THAT DESCRIBED HEREIN. BY ACCEPTANCE OF THIS ASSIGNMENT, THE CONTRACTOR IS ATTESTING THAT HE DOES HAVE SUFFICIENT EXPERIENCE AND ABILITY, THAT HE IS KNOWLEDGEABLE OF THE WORK TO BE PERFORMED AND THAT HE IS PROPERLY LICENSED AND PROPERLY REGISTERED TO DO THIS WORK IN THE STATE OF CONNECTICUT.
3. WORK SHALL BE COMPLETED IN ACCORDANCE WITH THE 2015 INTERNATIONAL BUILDING CODE W/CT AMENDMENTS.
4. UNLESS SHOWN OR NOTED OTHERWISE ON THE CONTRACT DRAWINGS, OR IN THE SPECIFICATIONS, THE FOLLOWING NOTES SHALL APPLY TO THE MATERIALS LISTED HEREIN, AND TO THE PROCEDURES TO BE USED ON THIS PROJECT.
5. ALL HARDWARE ASSEMBLY MANUFACTURER'S INSTRUCTIONS SHALL BE FOLLOWED EXACTLY AND SHALL SUPERSEDE ANY CONFLICTING NOTES ENCLOSED HEREIN.
6. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO DETERMINE ERECTION PROCEDURE AND SEQUENCE TO INSURE THE SAFETY OF THE STRUCTURE AND IT'S COMPONENT PARTS DURING ERECTION AND/OR FIELD MODIFICATIONS. THIS INCLUDES, BUT IS NOT LIMITED TO, THE ADDITION OF TEMPORARY BRACING, GUYS OR TIE DOWNS THAT MAY BE NECESSARY. SUCH MATERIAL SHALL BE REMOVED AND SHALL REMAIN THE PROPERTY OF THE CONTRACTOR AFTER THE COMPLETION OF THE PROJECT.
7. ALL DIMENSIONS, ELEVATIONS, AND EXISTING CONDITIONS SHOWN ON THE DRAWINGS SHALL BE FIELD VERIFIED BY THE CONTRACTOR PRIOR TO BEGINNING ANY MATERIALS ORDERING, FABRICATION OR CONSTRUCTION WORK ON THIS PROJECT. CONTRACTOR SHALL NOT SCALE CONTRACT DRAWINGS IN LIEU OF FIELD VERIFICATIONS. ANY DISCREPANCIES SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE OWNER AND THE OWNER'S ENGINEER. THE DISCREPANCIES MUST BE RESOLVED BEFORE THE CONTRACTOR IS TO PROCEED WITH THE WORK. THE CONTRACT DOCUMENTS DO NOT INDICATE THE METHOD OF CONSTRUCTION. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES. OBSERVATION VISITS TO THE SITE BY THE OWNER AND/OR THE ENGINEER SHALL NOT INCLUDE INSPECTION OF THE PROTECTIVE MEASURES OR THE PROCEDURES.
8. ALL MATERIALS AND EQUIPMENT FURNISHED SHALL BE NEW AND OF GOOD QUALITY, FREE FROM FAULTS AND DEFECTS AND IN CONFORMANCE WITH THE CONTRACT DOCUMENTS. ANY AND ALL SUBSTITUTIONS MUST BE PROPERLY APPROVED AND AUTHORIZED IN WRITING BY THE OWNER AND ENGINEER PRIOR TO INSTALLATION. THE CONTRACTOR SHALL FURNISH SATISFACTORY EVIDENCE AS TO THE KIND AND QUALITY OF THE MATERIALS AND EQUIPMENT BEING SUBSTITUTED.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INITIATING, MAINTAINING, AND SUPERVISING ALL SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK. THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT THIS PROJECT AND RELATED WORK COMPLIES WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL SAFETY CODES AND REGULATIONS GOVERNING THIS WORK.
10. ACCESS TO THE PROPOSED WORK SITE MAY BE RESTRICTED. THE CONTRACTOR SHALL COORDINATE INTENDED CONSTRUCTION ACTIVITY, INCLUDING WORK SCHEDULE AND MATERIALS ACCESS, WITH THE RESIDENT LEASING AGENT FOR APPROVAL.
11. ALL PERMITS THAT MUST BE OBTAINED ARE THE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE RESPONSIBLE FOR ABIDING BY ALL CONDITIONS AND REQUIREMENTS OF THE PERMITS.
12. IF APPLICABLE, ALL CONCRETE WORK SHALL COMPLY TO LOCAL CODES AND THE ACI 318-11, "BUILDING REQUIREMENTS FOR STRUCTURAL CONCRETE".
13. ALL TOWER DIMENSIONS SHALL BE VERIFIED WITH THE PLANS (LATEST REVISION) PRIOR TO COMMENCING CONSTRUCTION. NOTIFY THE ENGINEER IMMEDIATELY IF ANY DISCREPANCIES ARE DISCOVERED. THE OWNER SHALL HAVE A SET OF APPROVED PLANS AVAILABLE AT THE SITE AT ALL TIMES WHILE WORK IS BEING PERFORMED. A DESIGNATED RESPONSIBLE EMPLOYEE SHALL BE AVAILABLE FOR CONTACT BY GOVERNING AGENCY INSPECTORS.
14. ALL TOWER MODIFICATION WORK SHALL BE IN ACCORDANCE WITH TIA-1019-A STANDARD FOR INSTALLATION, ALTERATION AND MAINTENANCE OF ANTENNA SUPPORTING STRUCTURES AND ANTENNAS.

PLANS PREPARED FOR:

verizon

3131 S VAUGHN WAY
AURORA, CO 80014

PROJECT INFORMATION:

**VZW LOCATION CODE: 468845**
**VZW SITE NAME: MADISON 2 CT**

8 OLD RT 79
MADISON, CT 06443
(NEW HAVEN COUNTY)

PLANS PREPARED BY:


**TOWER ENGINEERING PROFESSIONALS**
326 TRYON ROAD
RALEIGH, NC 27603-3530
OFFICE: (919) 661-6351
www.tepgroup.net


SEAL:


*February 11, 2020*

| REV | DATE | ISSUED FOR: |
|---|---|---|
| | | |
| | | |
| 0 | 02-11-20 | 100% CONSTRUCTION |
| A | 11-26-19 | PRELIMINARY |

DRAWN BY: CBM | CHECKED BY: DEL

SHEET TITLE:

**PROJECT NOTES**

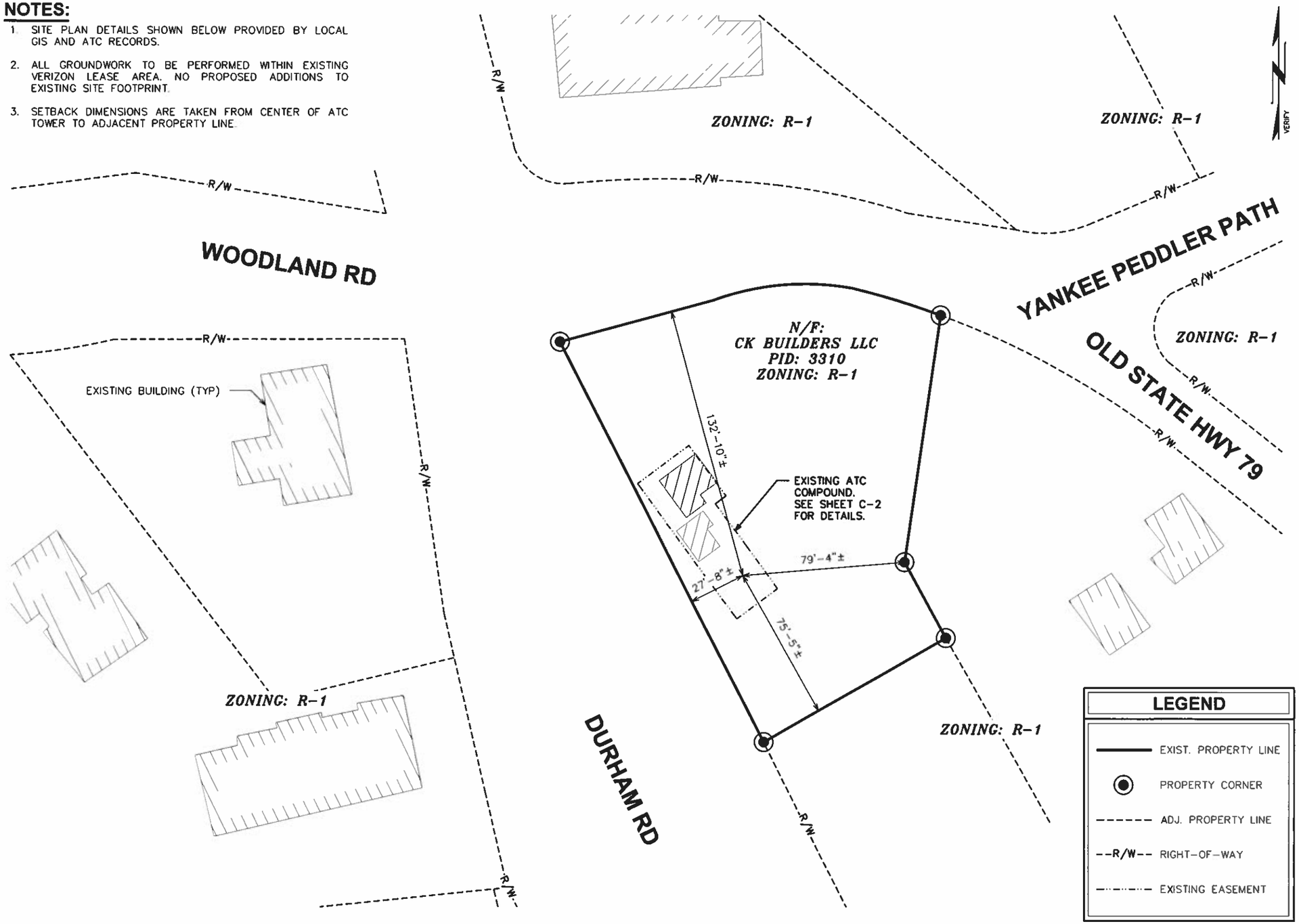
SHEET NUMBER: **N-1**

REVISION: **0**

TEP#: 94025.205897

## NOTES:

1. SITE PLAN DETAILS SHOWN BELOW PROVIDED BY LOCAL GIS AND ATC RECORDS.
2. ALL GROUNDWORK TO BE PERFORMED WITHIN EXISTING VERIZON LEASE AREA. NO PROPOSED ADDITIONS TO EXISTING SITE FOOTPRINT.
3. SETBACK DIMENSIONS ARE TAKEN FROM CENTER OF ATC TOWER TO ADJACENT PROPERTY LINE.




## LEGEND

- EXIST. PROPERTY LINE
- PROPERTY CORNER
- ADJ. PROPERTY LINE
- --R/W-- RIGHT-OF-WAY
- EXISTING EASEMENT

## SITE PLAN

SCALE: 1" = 60'

0 60 120

SCALE IN FEET

PLANS PREPARED FOR:

verizon

3131 S VAUGHN WAY
AURORA, CO 80014

PROJECT INFORMATION:

**VZW LOCATION CODE: 468845**
**VZW SITE NAME: MADISON 2 CT**

8 OLD RT 79
MADISON, CT 06443
(NEW HAVEN COUNTY)

PLANS PREPARED BY: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www.tepgroup.net


SEAL:

STATE OF CONNECTICUT
GRAHAM M. ANDRES
29538
LICENSED
PROFESSIONAL ENGINEER

*February 11, 2020*

| REV | DATE | ISSUED FOR: |
|---|---|---|
| | | |
| | | |
| 0 | 02-11-20 | 100% CONSTRUCTION |
| A | 11-26-19 | PRELIMINARY |

DRAWN BY: CBM | CHECKED BY: DEL

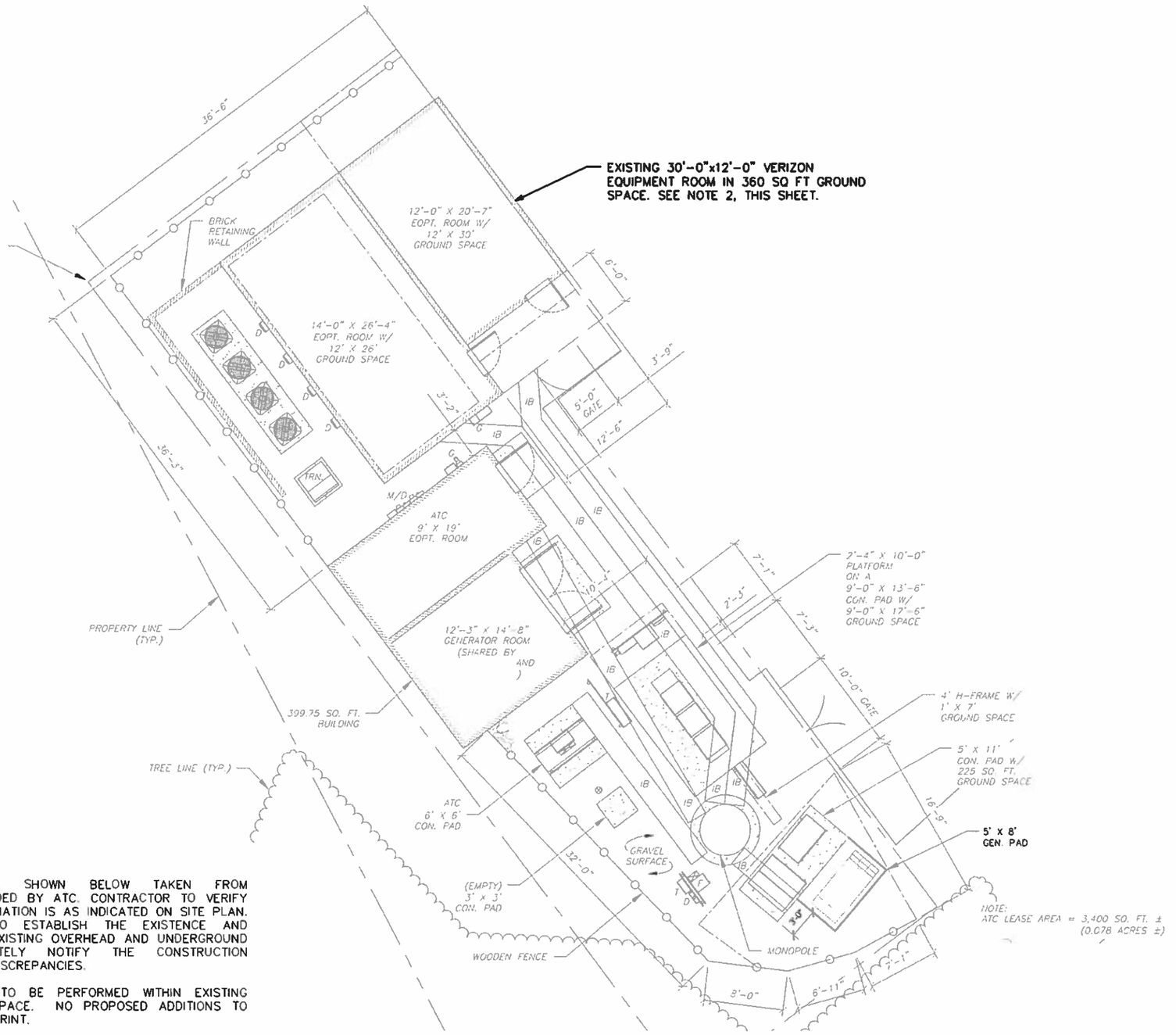
SHEET TITLE:

**SITE PLAN**

SHEET NUMBER: **C-1**

REVISION: 0

TEP#: 94025.205897




## NOTES:

1. COMPOUND DETAIL SHOWN BELOW TAKEN FROM INFORMATION PROVIDED BY ATC. CONTRACTOR TO VERIFY ALL EXISTING INFORMATION IS AS INDICATED ON SITE PLAN. CONTRACTOR IS TO ESTABLISH THE EXISTENCE AND LOCATION OF ALL EXISTING OVERHEAD AND UNDERGROUND UTILITIES. IMMEDIATELY NOTIFY THE CONSTRUCTION MANAGER OF ANY DISCREPANCIES.
2. ALL GROUNDWORK TO BE PERFORMED WITHIN EXISTING VERIZON GROUND SPACE. NO PROPOSED ADDITIONS TO EXISTING SITE FOOTPRINT.

## COMPOUND DETAIL

SCALE: N.T.S.

VERIFY

PLANS PREPARED FOR:

verizon

3131 S VAUGHN WAY
AURORA, CO 80014

PROJECT INFORMATION:

**VZW LOCATION CODE: 468845**
**VZW SITE NAME: MADISON 2 CT**
8 OLD RT 79
MADISON, CT 06443
(NEW HAVEN COUNTY)

PLANS PREPARED BY: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OFFICE: (919) 661-6351
www.tepgroup.net


SEAL:

STATE OF CONNECTICUT · GRAHAM M. ANDRES · 29538 LICENSED · PROFESSIONAL ENGINEER

*February 13, 2020*

| REV | DATE | ISSUED FOR: |
|---|---|---|
| | | |
| 1 | 02-13-20 | 100% CONSTRUCTION |
| 0 | 02-11-20 | 100% CONSTRUCTION |
| A | 11-26-19 | PRELIMINARY |

DRAWN BY: CBM | CHECKED BY: DEL

SHEET TITLE:

**COMPOUND DETAIL**

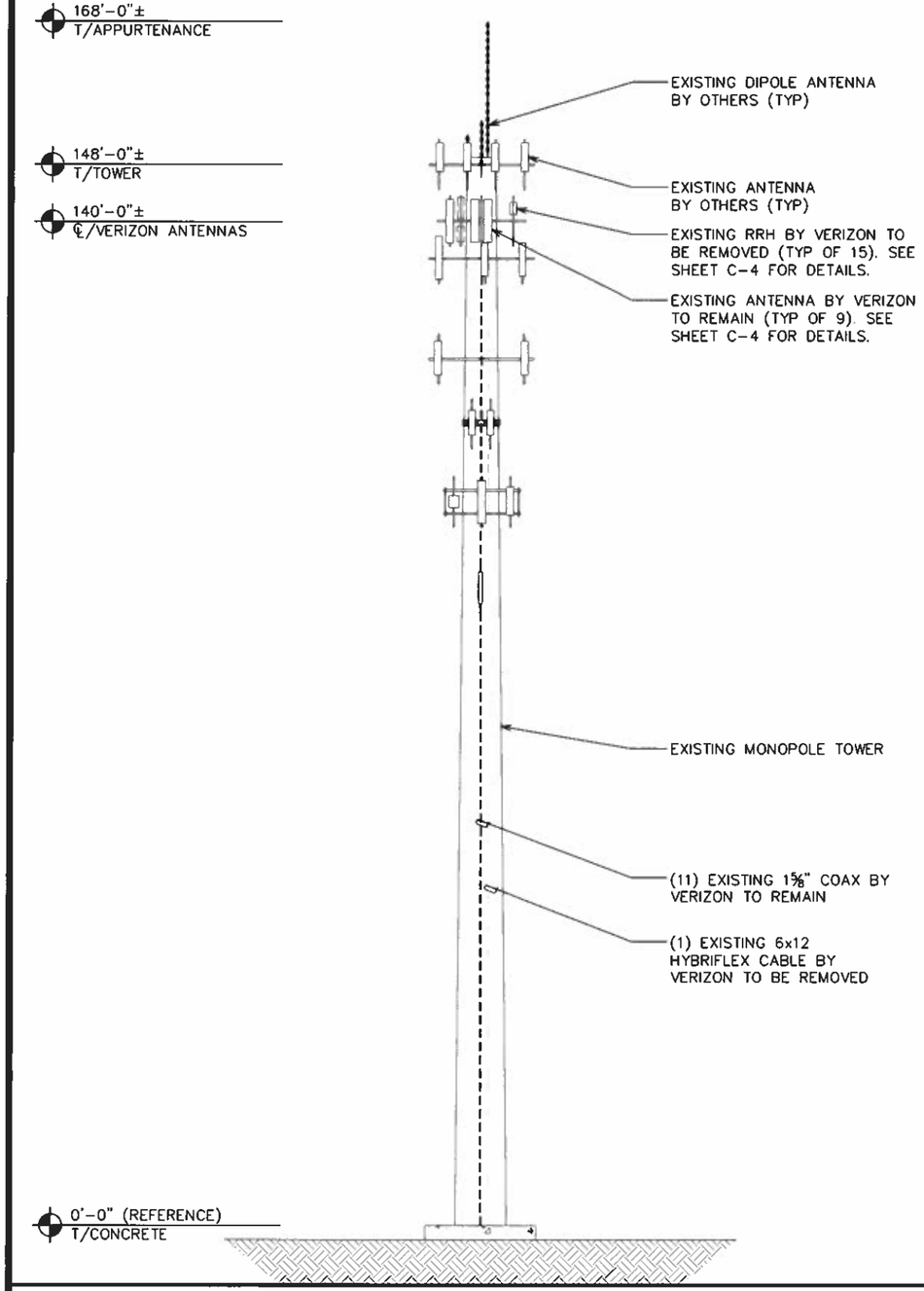
SHEET NUMBER: **C-2**

REVISION: 1

TEP #: 94025.205897

## NOTE:

TOWER ELEVATION IS FOR SCHEMATIC PURPOSES ONLY. TEP DID NOT CONFIRM EXISTING SITE CONDITIONS INCLUDING, BUT NOT LIMITED TO, ANTENNA HEIGHTS, ANTENNA AZIMUTHS, AND MOUNT CONFIGURATIONS.




## EXISTING TOWER ELEVATION

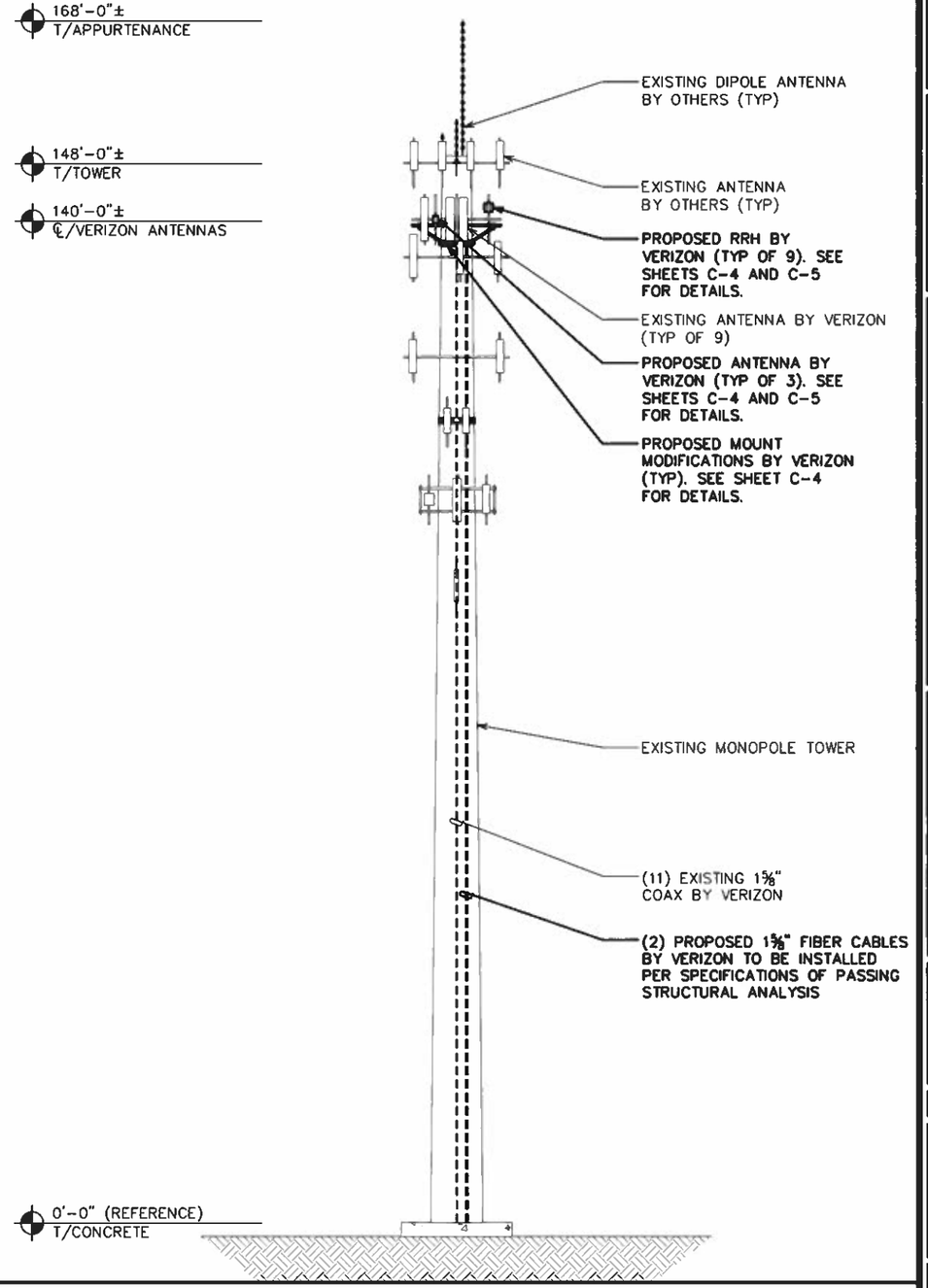
SCALE: 1" = 20'

0 20 40

SCALE IN FEET

## NOTE:

TOWER ELEVATION IS FOR SCHEMATIC PURPOSES ONLY. TEP DID NOT CONFIRM EXISTING SITE CONDITIONS INCLUDING, BUT NOT LIMITED TO, ANTENNA HEIGHTS, ANTENNA AZIMUTHS, AND MOUNT CONFIGURATIONS.




## PROPOSED TOWER ELEVATION

SCALE: 1" = 20'

0 20 40

SCALE IN FEET

PLANS PREPARED FOR:

verizon

3131 S VAUGHN WAY
AURORA, CO 80014

PROJECT INFORMATION:

**VZW LOCATION CODE: 468845**
**VZW SITE NAME: MADISON 2 CT**

8 OLD RT 79
MADISON, CT 06443
(NEW HAVEN COUNTY)

PLANS PREPARED BY:


**TOWER ENGINEERING PROFESSIONALS**
326 TRYON ROAD
RALEIGH, NC 27603-3530
OFFICE (919) 661-6351
www.tepgroup.net


SEAL:


*March 06, 2020*

| REV | DATE | ISSUED FOR: |
|---|---|---|
| 2 | 03-06-20 | 100% CONSTRUCTION |
| 1 | 02-13-20 | 100% CONSTRUCTION |
| 0 | 02-11-20 | 100% CONSTRUCTION |
| A | 11-26-19 | PRELIMINARY |

DRAWN BY: CBM | CHECKED BY: DEL

SHEET TITLE:

**TOWER ELEVATION**

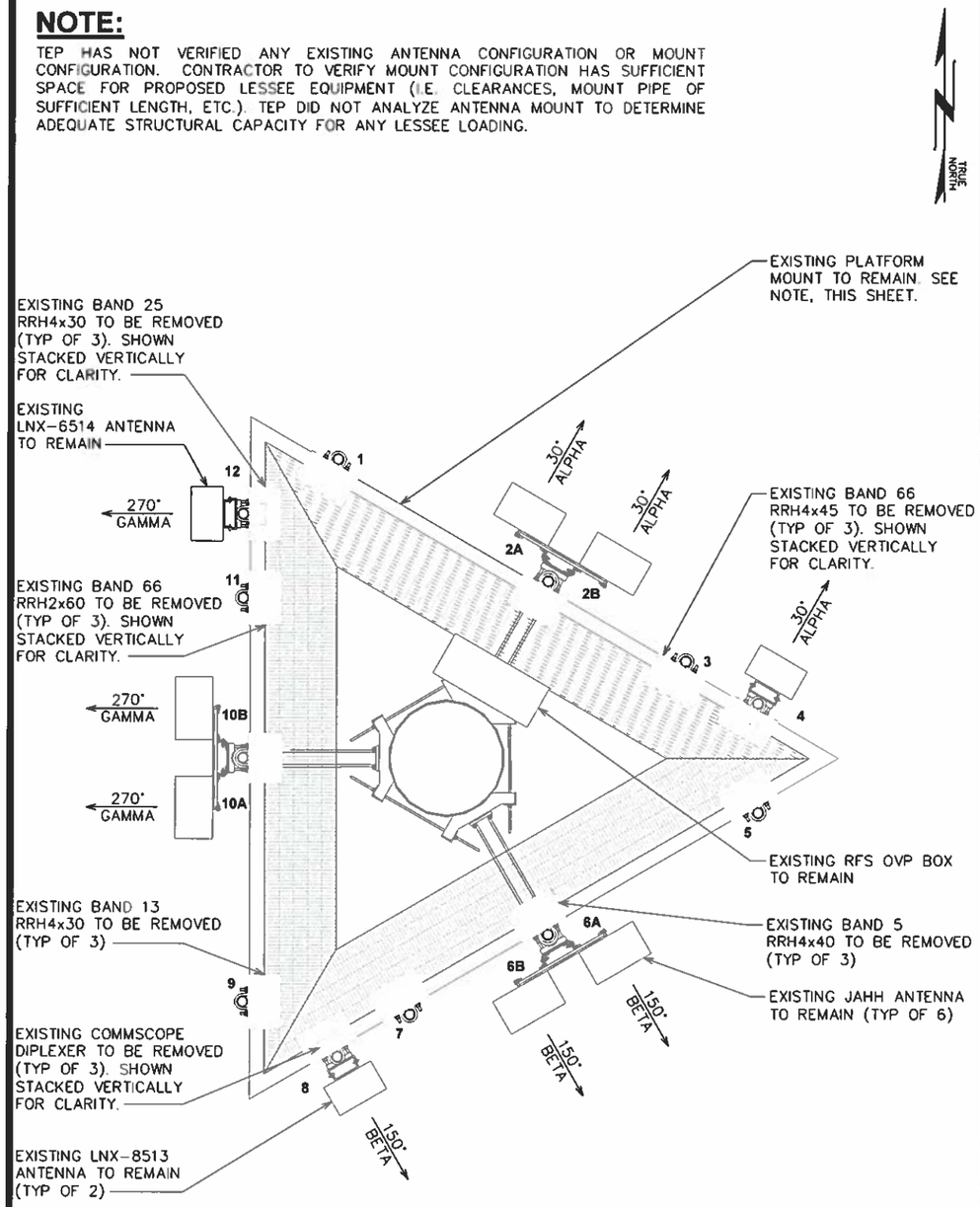
SHEET NUMBER: **C-3**

REVISION: **2**

TEP#: 94025.205897

## NOTE:

TEP HAS NOT VERIFIED ANY EXISTING ANTENNA CONFIGURATION OR MOUNT CONFIGURATION. CONTRACTOR TO VERIFY MOUNT CONFIGURATION HAS SUFFICIENT SPACE FOR PROPOSED LESSEE EQUIPMENT (I.E. CLEARANCES, MOUNT PIPE OF SUFFICIENT LENGTH, ETC.). TEP DID NOT ANALYZE ANTENNA MOUNT TO DETERMINE ADEQUATE STRUCTURAL CAPACITY FOR ANY LESSEE LOADING.




## EXISTING ANTENNA PLAN

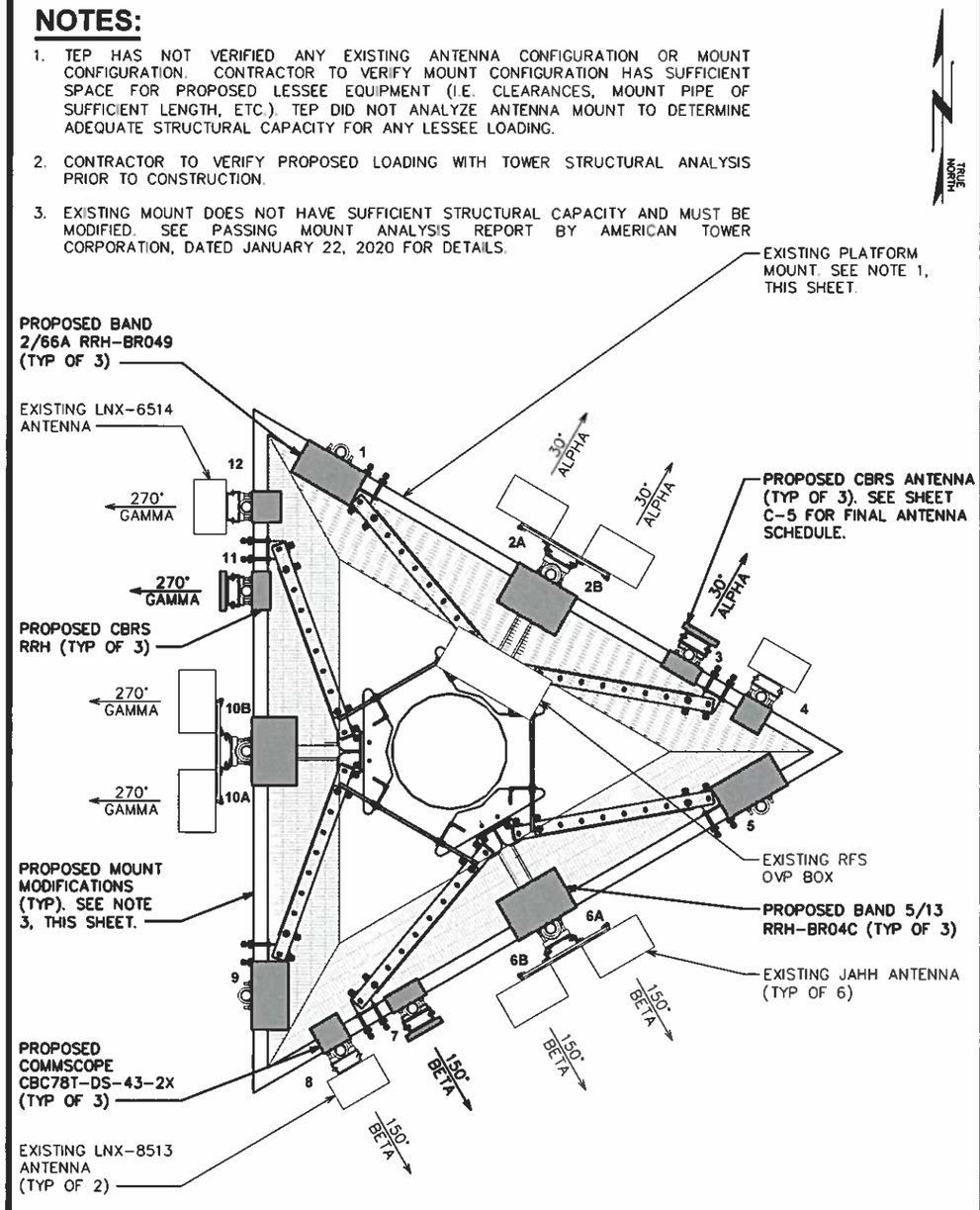
SCALE: 3/8" = 1'-0"

0 2 4

SCALE IN FEET

## NOTES:

1. TEP HAS NOT VERIFIED ANY EXISTING ANTENNA CONFIGURATION OR MOUNT CONFIGURATION. CONTRACTOR TO VERIFY MOUNT CONFIGURATION HAS SUFFICIENT SPACE FOR PROPOSED LESSEE EQUIPMENT (I.E. CLEARANCES, MOUNT PIPE OF SUFFICIENT LENGTH, ETC.). TEP DID NOT ANALYZE ANTENNA MOUNT TO DETERMINE ADEQUATE STRUCTURAL CAPACITY FOR ANY LESSEE LOADING.
2. CONTRACTOR TO VERIFY PROPOSED LOADING WITH TOWER STRUCTURAL ANALYSIS PRIOR TO CONSTRUCTION.
3. EXISTING MOUNT DOES NOT HAVE SUFFICIENT STRUCTURAL CAPACITY AND MUST BE MODIFIED. SEE PASSING MOUNT ANALYSIS REPORT BY AMERICAN TOWER CORPORATION, DATED JANUARY 22, 2020 FOR DETAILS.




## PROPOSED ANTENNA PLAN

SCALE: 3/8" = 1'-0"

0 2 4

SCALE IN FEET

PLANS PREPARED FOR:

verizon

3131 S VAUGHN WAY
AURORA, CO 80014

PROJECT INFORMATION:

**VZW LOCATION CODE: 468845**
**VZW SITE NAME: MADISON 2 CT**

8 OLD RT 79
MADISON, CT 06443
(NEW HAVEN COUNTY)

PLANS PREPARED BY:


**TOWER ENGINEERING PROFESSIONALS**
326 TRYON ROAD
RALEIGH, NC 27603-3530
OFFICE: (919) 661-6351
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SEAL:


*March 06, 2020*

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| A | 11-26-19 | PRELIMINARY |

DRAWN BY: CBM | CHECKED BY: DEL

SHEET TITLE:

**ANTENNA LAYOUT**

SHEET NUMBER: **C-4**

REVISION: 2

TEP#: 94025.205897

## NOTES:

1. CONTRACTOR TO REFERENCE VERIZON ISSUED RFDS AND GIVE PRECEDENCE TO INFORMATION PROVIDED IN RFDS OVER INFORMATION PROVIDED IN THIS TABLE.
2. VERIFY LOADING WITH STRUCTURAL ANALYSIS PRIOR TO CONSTRUCTION.
3. IF STRUCTURAL ANALYSIS AND RFDS DO NOT MATCH CONTRACTOR IS TO CONTACT AMERICAN TOWER CORPORATION IMMEDIATELY.

PROPOSED EQUIPMENT IN BOLD

### FINAL ANTENNA/FEEDLINE SCHEDULE

| SECTOR | POS. | MANUFACTURER MODEL # | MOUNTING HEIGHT | CABLE SIZE | AZIMUTH (TN) | *CABLE LENGTH | OVP/RRH/TMA/DIPLEXER [MODEL #] |
|---|---|---|---|---|---|---|---|
| ALPHA | 1 | - | - | (11) 1⅝" COAX (2) 1⅝" FIBER | - | 242'± | (1) RFS OVP [DB-T1-6Z-8AB-0Z] (1) SAMSUNG RRH [B5/B13 RRH-BR04C] (1) SAMSUNG RRH [B2/B66A RRH-BR049] (1) SAMSUNG RRH [OUTDOOR CBRS 20W RRH] (1) COMMSCOPE CBC78T-DS-43-2X |
| ALPHA | 2A | COMMSCOPE JAHH-65B-R3B | ℄ @ 140'-0"± | | 30° | | |
| ALPHA | 2B | COMMSCOPE JAHH-65B-R3B | ℄ @ 140'-0"± | | 30° | | |
| ALPHA | 3 | **SAMSUNG- OUTDOOR CBRS 20W RRH CLIP-ON ANTENNA** | **℄ @ 140'-0"±** | | **30°** | | |
| ALPHA | 4 | ANDREW LNX-8513DS-A1M | ℄ @ 140'-0"± | | 30° | | |
| BETA | 5 | - | - | | - | | (1) SAMSUNG RRH [B5/B13 RRH-BR04C] (1) SAMSUNG RRH [B2/B66A RRH-BR049] (1) SAMSUNG RRH [OUTDOOR CBRS 20W RRH] (1) COMMSCOPE CBC78T-DS-43-2X |
| BETA | 6A | COMMSCOPE JAHH-65B-R3B | ℄ @ 140'-0"± | | 150° | | |
| BETA | 6B | COMMSCOPE JAHH-65B-R3B | ℄ @ 140'-0"± | | 150° | | |
| BETA | 7 | **SAMSUNG- OUTDOOR CBRS 20W RRH CLIP-ON ANTENNA** | **℄ @ 140'-0"±** | | **150°** | | |
| BETA | 8 | ANDREW LNX-8513DS-A1M | ℄ @ 140'-0"± | | 150° | | |
| GAMMA | 9 | - | - | | - | | (1) SAMSUNG RRH [B5/B13 RRH-BR04C] (1) SAMSUNG RRH [B2/B66A RRH-BR049] (1) SAMSUNG RRH [OUTDOOR CBRS 20W RRH] (1) COMMSCOPE CBC78T-DS-43-2X |
| GAMMA | 10A | COMMSCOPE JAHH-65B-R3B | ℄ @ 140'-0"± | | 270° | | |
| GAMMA | 10B | COMMSCOPE JAHH-65B-R3B | ℄ @ 140'-0"± | | 270° | | |
| GAMMA | 11 | **SAMSUNG- OUTDOOR CBRS 20W RRH CLIP-ON ANTENNA** | **℄ @ 140'-0"±** | | **270°** | | |
| GAMMA | 12 | ANDREW LNX-6514DS-A1M | ℄ @ 140'-0"± | | 270° | | |

*CONTRACTOR TO VERIFY CABLE LENGTH PRIOR TO CONSTRUCTION.
**ANTENNA DESIGN BASED ON INFORMATION PROVIDED BY AMERICAN TOWER CORPORATION IN THE FORM OF AN APPLICATION (ID: 12995792).

## FINAL ANTENNA SCHEDULE

SCALE: N.T.S.

PLANS PREPARED FOR:

verizon

3131 S VAUGHN WAY
AURORA, CO 80014

PROJECT INFORMATION:

**VZW LOCATION CODE: 468845**
**VZW SITE NAME: MADISON 2 CT**
8 OLD RT 79
MADISON, CT 06443
(NEW HAVEN COUNTY)

PLANS PREPARED BY:


**TOWER ENGINEERING PROFESSIONALS**
326 TRYON ROAD
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OFFICE: (919) 661-6351
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SEAL:

STATE OF CONNECTICUT
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*March 06, 2020*

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| A | 11-26-19 | PRELIMINARY |

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SHEET TITLE:

**FINAL ANTENNA SCHEDULE**

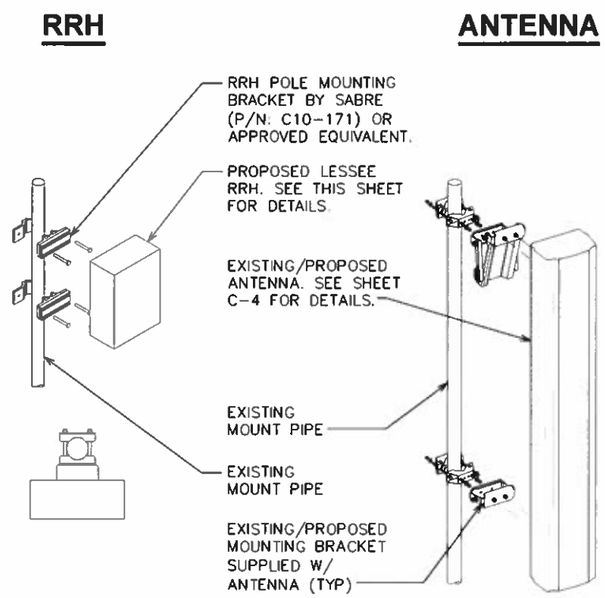
SHEET NUMBER: **C-5**

REVISION: **2**

TEP#: 94025.205897

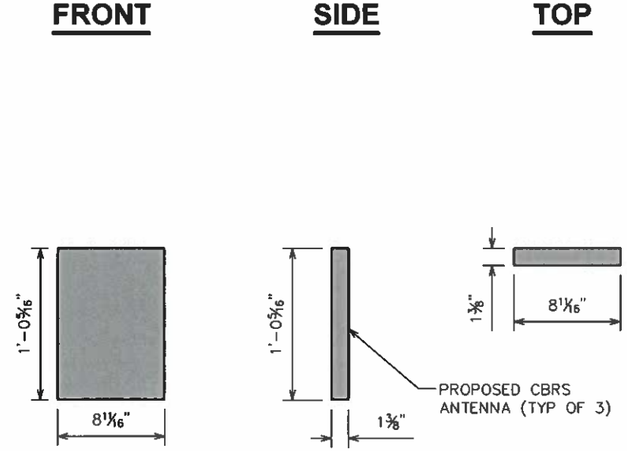
## EQUIPMENT MOUNTING DETAIL

SCALE: N.T.S.



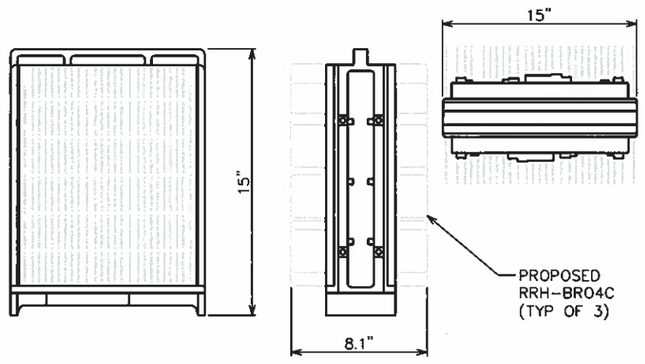

## PROPOSED CBRS ANTENNA DETAIL

SCALE: N.T.S.




## PROPOSED RRH-BR04C DETAIL

SCALE: N.T.S.




PLANS PREPARED FOR:

verizon

3131 S VAUGHN WAY
AURORA, CO 80014

PROJECT INFORMATION:

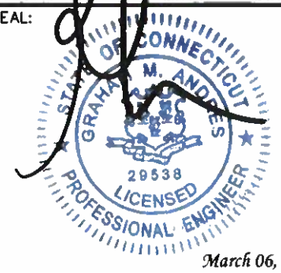
**VZW LOCATION CODE: 468845**
**VZW SITE NAME: MADISON 2 CT**

8 OLD RT 79
MADISON, CT 06443
(NEW HAVEN COUNTY)

PLANS PREPARED BY:


TOWER ENGINEERING PROFESSIONALS
326 TRYON ROAD
RALEIGH, NC 27603-3530
OFFICE (919) 661-6351
www.tepgroup.net


SEAL:




*March 06, 2020*

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| 0 | 02-11-20 | 100% CONSTRUCTION |
| A | 11-26-19 | PRELIMINARY |

DRAWN BY: CBM | CHECKED BY: DEL

SHEET TITLE:

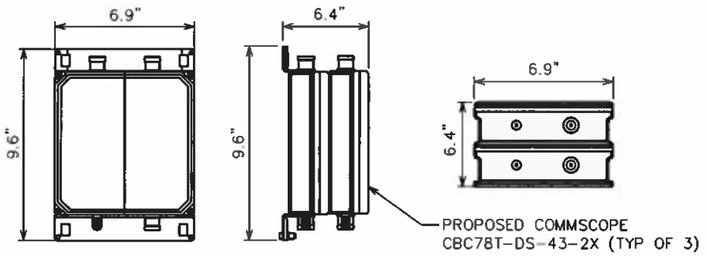
**EQUIPMENT DETAILS I**

SHEET NUMBER: **C-6A**

REVISION: 2

TEP#: 94025.205897

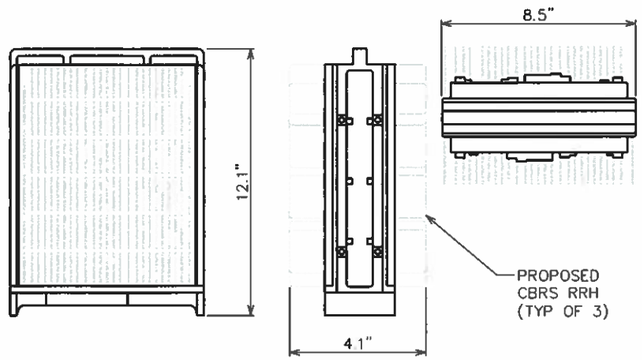
FRONT SIDE TOP




## PROPOSED COMMSCOPE CBC78T-DS-43-2X DETAIL

SCALE: N.T.S.

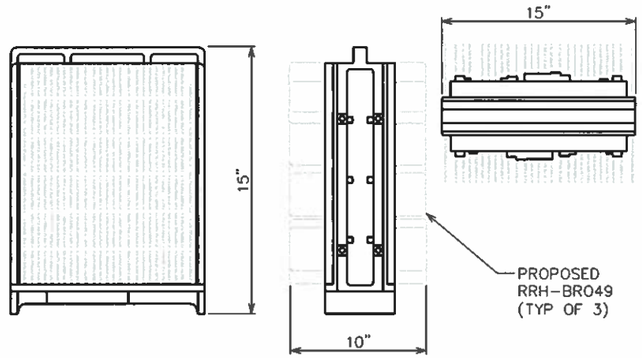
FRONT SIDE TOP




## PROPOSED CBRS RRH DETAIL

SCALE: N.T.S.

FRONT SIDE TOP




## PROPOSED RRH-BR049 DETAIL

SCALE: N.T.S.

PLANS PREPARED FOR:

verizon

3131 S VAUGHN WAY
AURORA, CO 80014

PROJECT INFORMATION:

**VZW LOCATION CODE: 468845**
**VZW SITE NAME: MADISON 2 CT**

8 OLD RT 79
MADISON, CT 06443
(NEW HAVEN COUNTY)

PLANS PREPARED BY: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326 TRYON ROAD
RALEIGH, NC 27603-3530
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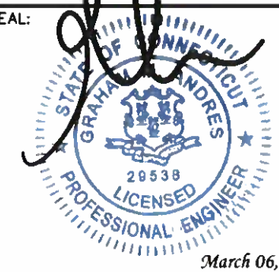
SEAL:




*March 06, 2020*

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| A | 11-26-19 | PRELIMINARY |

DRAWN BY: CBM CHECKED BY: DEL

SHEET TITLE:

**EQUIPMENT DETAILS II**

SHEET NUMBER: **C-6B**

REVISION: 2

TEP #: 94025.205897

AMERICAN TOWER®
CORPORATION

# Antenna Mount Analysis Report

| | | |
|---|---|---|
| **ATC Site Name** | : | **Madison CT 6, CT** |
| **ATC Site Number** | : | **302540** |
| **Engineering Number** | : | **12995792_C8_01** |
| **Mount Elevation** | : | **139.5 ft** |
| **Carrier** | : | **Verizon Wireless** |
| **Carrier Site Name** | : | **MADISON 2 CT** |
| **Carrier Site Number** | : | **468845** |
| **Site Location** | : | **8 Old 79**<br>**Madison, CT 06443-2685**<br>**41.28553333 , -72.60134167** |
| **County** | : | **New Haven** |
| **Date** | : | **January 22, 2020** |
| **Max Usage** | : | **68%** |
| **Result** | : | **Contingent Pass** |

Prepared By:
Mitchell Chen
Structural Engineer

Reviewed By:

STATE OF CONNECTICUT
ESHA KAUSHAL MODI
32593
LICENSED
PROFESSIONAL ENGINEER

Authorized by "EOR"
22 Jan 2020 01:14:36 cosign

**COA: PEC.0001553**

## Introduction

The purpose of this report is to summarize results of the antenna mount analysis performed for Verizon Wireless at 139.5 ft.

## Supporting Documents

| | |
|---|---|
| **Mount Mapping** | Infinigy Project #1009-Z0003-H/317-505, dated January 8, 2020 |
| **Spec. Sheet** | Spec Sheet for Perfect Vision PV-VSK-B |
| **RFDS** | RFDS dated October 30, 2019 |
| **Photos** | Site photos from 2018 |

## Analysis

This antenna mount was analyzed using American Tower Corporation's Mount Analysis Program and RISA-3D v17

| | |
|---|---|
| **Basic Wind Speed:** | 101 mph (3-Second Gust, Vasd) / 130 mph (3-Second Gust, Vult) |
| **Basic Wind Speed w/ Ice:** | 50 mph (3-Second Gust) w/ 3/4" radial ice concurrent |
| **Codes:** | ANSI/TIA-222-G / 2015 IBC / 2018 Connecticut State Building Code |
| **Structure Class:** | II |
| **Exposure Category:** | B |
| **Topographic Category:** | 1 |
| **Crest Height:** | 0 ft |
| **Spectral Response:** | Ss = 0.171, $S_1$ = 0.06 |
| **Site Class:** | D - Stiff Soil |
| **Live Loads:** | Lm = 450 lbs, Lv = 250 lbs |

## Conclusion

Based on the analysis results, the antenna mount meets the requirements per the applicable codes listed above. The mount can support the equipment as described in this report.

- Install Perfect Vision PV-VSK-M v-stabilizer kit on the tower approximately 32" below the existing connection with Perfect Vision PV-XP-2020 crossover plates and Perfect Vision Pipe-238x150 (2-3/8"x150") approximately 10" below the existing face horizontal

If you have any questions or require additional information, please contact American Tower via email at Engineering@americantower.com. Please include the American Tower site name, site number, and engineering number in the subject line for any questions.