



**QC Development**

PO Box 916

Storrs, CT 06268

860-670-9068

Mark.Roberts@QCDevelopment.net

July 26, 2019

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

**Notice of Exempt Modification – New Cingular Wireless PCS, LLC (AT&T) – CT2034**  
**310 Orange Street, New Haven, CT 06510**  
**N 41.30913056**  
**W 72.92178056**

Dear Ms. Bachman:

AT&T currently maintains nine (9) antennas at the rooftop level (206' & 180' AGL) of the Central Office building at 310 Orange Street, Meriden, CT. The property is owned by AT&T (SNET). AT&T now intends to install two (2) Kathrein 800-10964 antennas and (1) Kathrein 800-10966 antenna on upgraded mount frames in the existing locations. AT&T will also remove (3) Ericsson RRUS-32 B2 Remote Radio Units (RRU) and install three (3) Ericsson 4478- B14, three (3) Ericsson 4478-B5, three (3) Ericsson 8843-B2/B66A RRUs and (3) Ericsson RRUS-E2 B29 RRUs. The new antennas and RRUs will also be installed at the 206' and 180' levels of the rooftop.

AT&T's use of this facility was first approved by the Connecticut Siting Council on April 19, 1988. The approval included no conditions that could feasibly be violated by this proposed modification, including total facility height and mounting restrictions. This modification therefore complies with the aforementioned approvals.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to the Honorable Toni N. Harp, Mayor of the City of New Haven, and the New Haven City Plan

Department as well as the property owner.

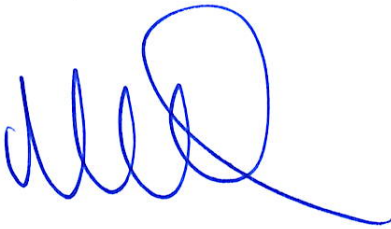
The planned modifications to the facility fall squarely within those activities explicitly provided for in R.C.S.A. § 16-50j-72(b)(2).

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

For the foregoing reasons, AT&T 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).

Please feel free to call me at (860) 670-9068 with any questions regarding this matter. Thank you for your consideration.

Sincerely,



Mark Roberts  
QC Development  
Consultant for AT&T

#### Attachments

cc: Mayor Toni N. Harp - Elected Official  
Aicha S. Woods – Executive Director – City Plan Department  
SNET - Property Owner

## Power Density

### Existing Loading on Tower

| Carrier         | # of Channels | ERP/Ch (W) | Antenna Centerline Height (ft <sup>***</sup> ) | Power Density (mW/cm <sup>2</sup> ) | Freq. Band (MHz <sup>**</sup> ) | Limit S (mW/cm <sup>2</sup> ) | %MPE  |
|-----------------|---------------|------------|------------------------------------------------|-------------------------------------|---------------------------------|-------------------------------|-------|
| Other Carriers* |               |            |                                                |                                     |                                 |                               | 7.22% |
| AT&T UMTS       | 1             | 353        | 180                                            | 0.0042                              | 850                             | 0.5667                        | 0.07% |
| AT&T LTE        | 1             | 1476       | 180                                            | 0.0175                              | 700                             | 0.4667                        | 0.38% |
| AT&T LTE        | 2             | 3664       | 180                                            | 0.0870                              | 1900                            | 1.0000                        | 0.87% |
| AT&T LTE        | 1             | 1285       | 180                                            | 0.0153                              | 2300                            | 1.0000                        | 0.15% |
| Site Total      |               |            |                                                |                                     |                                 |                               | 8.70% |

\*Per CSC Records (available upon request, includes calculation formulas)

\*\* If a range of frequencies are used, such as 880-894, enter the lowest value, i.e. 880

\*\*\* Antenna height for lowest sector (Beta) used for Power Density Calc.

### Proposed Loading on Tower

| Carrier         | # of Channels | ERP/Ch (W) | Antenna Centerline Height (ft <sup>***</sup> ) | Power Density (mW/cm <sup>2</sup> ) | Freq. Band (MHz <sup>**</sup> ) | Limit S (mW/cm <sup>2</sup> ) | %MPE   |
|-----------------|---------------|------------|------------------------------------------------|-------------------------------------|---------------------------------|-------------------------------|--------|
| Other Carriers* |               |            |                                                |                                     |                                 |                               | 7.22%  |
| AT&T UMTS       | 1             | 353        | 180                                            | 0.0042                              | 850                             | 0.5667                        | 0.07%  |
| AT&T LTE        | 2             | 2951       | 180                                            | 0.0701                              | 700                             | 0.4667                        | 1.50%  |
| AT&T LTE        | 1             | 1000       | 180                                            | 0.0119                              | 850                             | 0.5667                        | 0.21%  |
| AT&T 5G         | 1             | 1000       | 180                                            | 0.0119                              | 850                             | 0.5667                        | 0.21%  |
| AT&T LTE        | 2             | 4842       | 180                                            | 0.1150                              | 1900                            | 1.0000                        | 1.15%  |
| AT&T LTE        | 1             | 5070       | 180                                            | 0.0602                              | 2100                            | 1.0000                        | 0.60%  |
| AT&T LTE        | 1             | 3837       | 180                                            | 0.0456                              | 2300                            | 1.0000                        | 0.46%  |
| Site Total      |               |            |                                                |                                     |                                 |                               | 11.43% |

\*Per CSC Records (available upon request, includes calculation formulas)

\*\* If a range of frequencies are used, such as 880-894, enter the lowest value, i.e. 880

\*\*\* Antenna height for lowest sector (Beta) used for Power Density Calc.



|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
| <div>PROJECT INFORMATION</div> <div>SCOPE OF WORK:<div>ITEMS TO BE MOUNTED ON THE EXISTING ROOFTOP:<ul style="list-style-type: none"><li>NEW AT&amp;T ANTENNAS: (800-10966) (TOTAL OF 1 FOR ALPHA SECTOR).</li><li>NEW AT&amp;T ANTENNAS: (800-10964) (TYP. OF 1 PER BETA &amp; GAMMA SECTORS, TOTAL OF 2).</li><li>NEW AT&amp;T RRUS: RRUS-E2 B29 (700) (TYP. OF 1 PER SECTOR, TOTAL OF 3).</li><li>NEW AT&amp;T RRUS: B14 4478 (700) (TYP. OF 1 PER SECTOR, TOTAL OF 3).</li><li>NEW AT&amp;T RRUS: 4478 B5 (850) (TYP. OF 1 PER SECTOR, TOTAL OF 3).</li><li>NEW AT&amp;T RRUS: 8843 B2/B66A (1900/AWS) (TYP. OF 1 PER SECTOR, TOTAL OF 3).</li><li>NEW SURGE ARRESTOR (DC6-48-60-0-8C-EV) (TYP. OF 1 PER SECTOR, TOTAL OF 3) WITH (6) DC POWER CABLES.</li><li>INSTALL (6) LOW BAND COMBINERS (2) PER SECTOR, TOTAL OF (6).</li><li>INSTALL (1) DC12.</li><li>INSTALL (36) TELCO FLEX FOR PROPOSED (6) DC TRUNK</li></ul></div><div>ITEMS TO BE MOUNTED AT EQUIPMENT LOCATION:<ul style="list-style-type: none"><li>PROPOSED NETSURE 7100 POWER PLANT WITH BATTERY TO REPLACE EXISTING POWER PLANT.</li><li>ADD 2ND 5216.</li><li>ADD IDLe.</li><li>ADD RBS 6630 FOR 5G.</li><li>BASEBAND CONFIGURATIONS AS PER PD / SECTION 7</li></ul></div></div> <div>SITE ADDRESS:<div>310 ORANGE STREET DUP 1<br/>NEW HAVEN, CT 06510</div></div> <div>LATITUDE:<div>41.309131° N    41° 18' 32.87" N</div></div> <div>LONGITUDE:<div>72.921748° W    72° 55' 18.29" W</div></div> <div>TYPE OF SITE:<div>ROOFTOP / INDOOR EQUIPMENT</div></div> <div>BUILDING HEIGHT:<div>285'-0"±</div></div> <div>RAD CENTER:<div>180'-0"± (BETA SECTOR) &amp; 206'-0"± (ALPHA &amp; GAMMA SECTORS)</div></div> <div>CURRENT USE:<div>TELECOMMUNICATIONS FACILITY</div></div> <div>PROPOSED USE:<div>TELECOMMUNICATIONS FACILITY</div></div> |  |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|

GROUNDING NOTES

1. THE SUBCONTRACTOR SHALL REVIEW AND INSPECT THE EXISTING FACILITY GROUNDING SYSTEM AND LIGHTNING PROTECTION SYSTEM (AS DESIGNED AND INSTALLED) FOR STRICT COMPLIANCE WITH THE NEC (AS ADOPTED BY THE AHJ), THE SITE-SPECIFIC (UL, LPI, OR NFPA) LIGHTING PROTECTION CODE, AND GENERAL COMPLIANCE WITH TELCORDIA AND TIA GROUNDING STANDARDS. THE SUBCONTRACTOR SHALL REPORT ANY VIOLATIONS OR ADVERSE FINDINGS TO THE CONTRACTOR FOR RESOLUTION.
2. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION, AND AC POWER GES'S) SHALL BE BONDED TOGETHER, AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.
3. THE SUBCONTRACTOR SHALL PERFORM IEEE FALL-OF-POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR NEW GROUND ELECTRODE SYSTEMS. THE SUBCONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS.
4. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO BTS EQUIPMENT.
5. EACH BTS CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, 6 AWG STRANDED COPPER OR LARGER FOR INDOOR BTS 2 AWG STRANDED COPPER FOR OUTDOOR BTS.
6. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.
7. APPROVED ANTIOXIDANT COATINGS (I.E., CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.
8. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO GROUND BAR.
9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.
10. MISCELLANEOUS ELECTRICAL AND NON-ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.
11. METAL CONDUIT SHALL BE MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH 6 AWG COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.
12. ALL NEW STRUCTURES WITH A FOUNDATION AND/OR FOOTING HAVING 20 FT. OR MORE OF 1/2 IN. OR GREATER ELECTRICALLY CONDUCTIVE REINFORCING STEEL MUST HAVE IT BONDED TO THE GROUND RING USING AN EXOTHERMIC WELD CONNECTION USING #2 AWG SOLID BARE TINNED COPPER GROUND WIRE, PER NEC 250.50

GENERAL NOTES

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:  
  
CONTRACTOR – SAI  
SUBCONTRACTOR – GENERAL CONTRACTOR (CONSTRUCTION)  
OWNER – AT&T MOBILITY
2. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING SUBCONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CONTRACTOR.
3. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. SUBCONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS, AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
4. DRAWINGS PROVIDED HERE ARE NOT TO BE SCALED AND ARE INTENDED TO SHOW OUTLINE ONLY.
5. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
6. "KITTING LIST" SUPPLIED WITH THE BID PACKAGE IDENTIFIES ITEMS THAT WILL BE SUPPLIED BY CONTRACTOR. ITEMS NOT INCLUDED IN THE BILL OF MATERIALS AND KITTING LIST SHALL BE SUPPLIED BY THE SUBCONTRACTOR.
7. THE SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
8. IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE SUBCONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION SPACE FOR APPROVAL BY THE CONTRACTOR.
9. SUBCONTRACTOR SHALL DETERMINE ACTUAL ROUTING OF CONDUIT, POWER AND T1 CABLES, GROUNDING CABLES AS SHOWN ON THE POWER, GROUNDING AND TELCO PLAN DRAWING. SUBCONTRACTOR SHALL UTILIZE EXISTING TRAYS AND/OR SHALL ADD NEW TRAYS AS NECESSARY. SUBCONTRACTOR SHALL CONFIRM THE ACTUAL ROUTING WITH THE CONTRACTOR.
10. THE SUBCONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT SUBCONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.
11. SUBCONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
12. SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.
13. ALL CONCRETE REPAIR WORK SHALL BE DONE IN ACCORDANCE WITH AMERICAN CONCRETE INSTITUTE (ACI) 301.

14. ANY NEW CONCRETE NEEDED FOR THE CONSTRUCTION SHALL BE AIR-ENTRAINED AND SHALL HAVE 4000 PSI STRENGTH AT 28 DAYS. ALL CONCRETE WORK SHALL BE DONE IN ACCORDANCE WITH ACI 318 CODE REQUIREMENTS.
15. ALL STRUCTURAL STEEL WORK SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH AISC SPECIFICATIONS. ALL STRUCTURAL STEEL SHALL BE ASTM A36 (Fy = 36 ksi) UNLESS OTHERWISE NOTED. PIPES SHALL BE ASTM A53 TYPE E (Fy = 36 ksi). ALL STEEL EXPOSED TO WEATHER SHALL BE HOT DIPPED GALVANIZED. TOUCHUP ALL SCRATCHES AND OTHER MARKS IN THE FIELD AFTER STEEL IS ERECTED USING A COMPATIBLE ZINC RICH PAINT.
16. CONSTRUCTION SHALL COMPLY WITH SPECIFICATIONS AND "GENERAL CONSTRUCTION SERVICES FOR CONSTRUCTION OF AT&T SITES."
17. SUBCONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS PRIOR TO COMMENCING ANY WORK. ALL DIMENSIONS OF EXISTING CONSTRUCTION SHOWN ON THE DRAWINGS MUST BE VERIFIED. SUBCONTRACTOR SHALL NOTIFY THE CONTRACTOR OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.
18. THE EXISTING CELL SITE IS IN FULL COMMERCIAL OPERATION. ANY CONSTRUCTION WORK BY SUBCONTRACTOR SHALL NOT DISRUPT THE EXISTING NORMAL OPERATION. ANY WORK ON EXISTING EQUIPMENT MUST BE COORDINATED WITH CONTRACTOR. ALSO, WORK SHOULD BE SCHEDULED FOR AN APPROPRIATE MAINTENANCE WINDOW USUALLY IN LOW TRAFFIC PERIODS AFTER MIDNIGHT.
19. SINCE THE CELL SITE IS ACTIVE, ALL SAFETY PRECAUTIONS MUST BE TAKEN WHEN WORKING AROUND HIGH LEVELS OF ELECTROMAGNETIC RADIATION. EQUIPMENT SHOULD BE SHUTDOWN PRIOR TO PERFORMING ANY WORK THAT COULD EXPOSE THE WORKERS TO DANGER. PERSONAL RF EXPOSURE MONITORS ARE ADVISED TO BE WORN TO ALERT OF ANY DANGEROUS EXPOSURE LEVELS.
20. APPLICABLE BUILDING CODES:  
SUBCONTRACTOR'S WORK SHALL COMPLY WITH ALL APPLICABLE NATIONAL, STATE, AND LOCAL CODES AS ADOPTED BY THE LOCAL AUTHORITY HAVING JURISDICTION (AHJ) FOR THE LOCATION. THE EDITION OF THE AHJ ADOPTED CODES AND STANDARDS IN EFFECT ON THE DATE OF CONTRACT AWARD SHALL GOVERN THE DESIGN.

BUILDING CODE: IBC 2015 WITH 2018 CT STATE BUILDING CODE AMENDMENTS  
ELECTRICAL CODE: 2017 NATIONAL ELECTRICAL CODE (NFPA 70-2017)

SUBCONTRACTOR'S WORK SHALL COMPLY WITH THE LATEST EDITION OF THE FOLLOWING STANDARDS:

AMERICAN CONCRETE INSTITUTE (ACI) 318; BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE;

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC) MANUAL OF STEEL CONSTRUCTION, ASD, FOURTEENTH EDITION;

TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA) 222-G, STRUCTURAL STANDARDS FOR STEEL

FOR ANY CONFLICTS BETWEEN SECTIONS OF LISTED CODES AND STANDARDS REGARDING MATERIAL, METHODS OF CONSTRUCTION, OR OTHER REQUIREMENTS, THE MOST RESTRICTIVE REQUIREMENT SHALL GOVERN. WHERE THERE IS CONFLICT BETWEEN A GENERAL REQUIREMENT AND A SPECIFIC REQUIREMENT, THE SPECIFIC REQUIREMENT SHALL GOVERN.

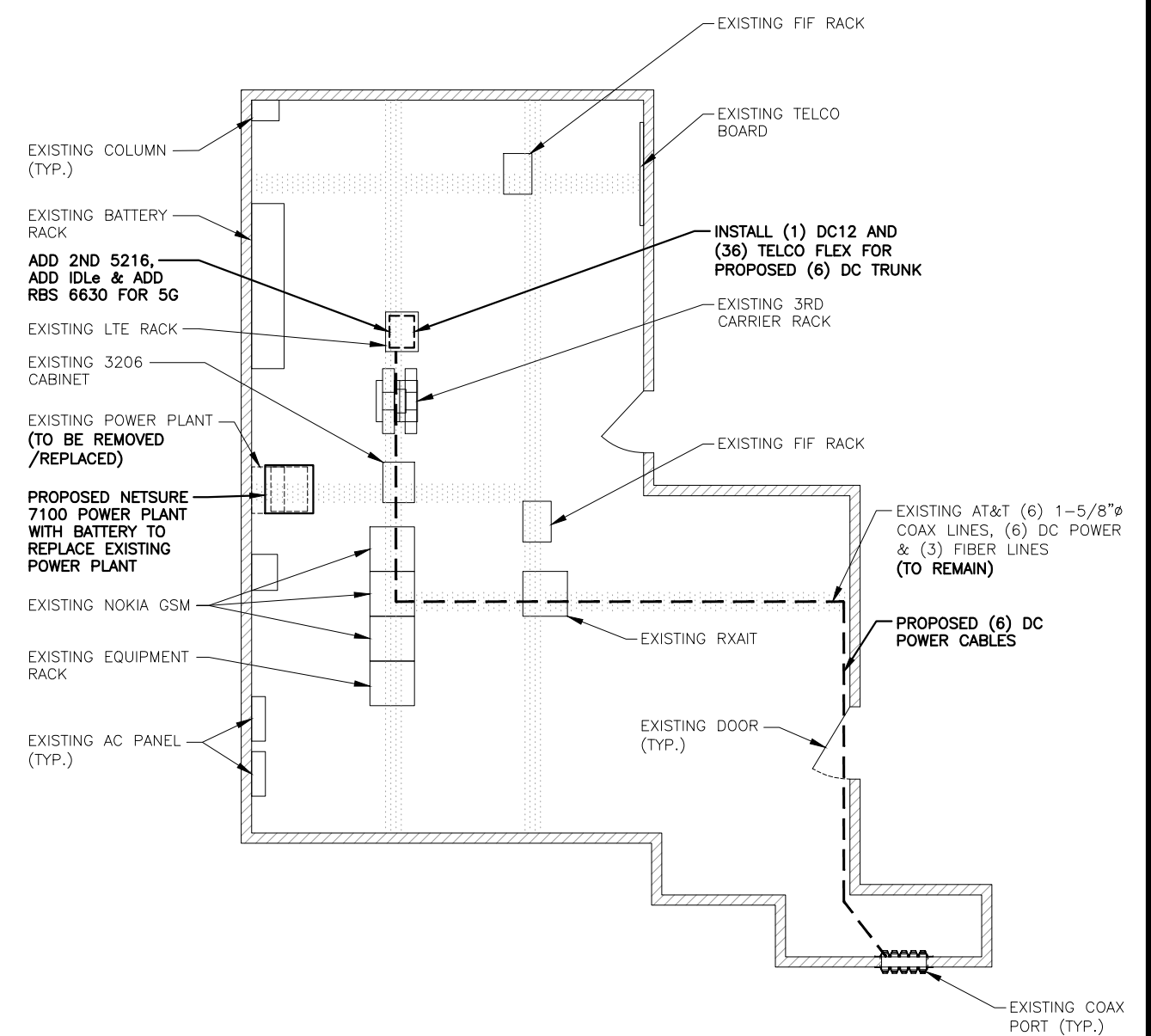
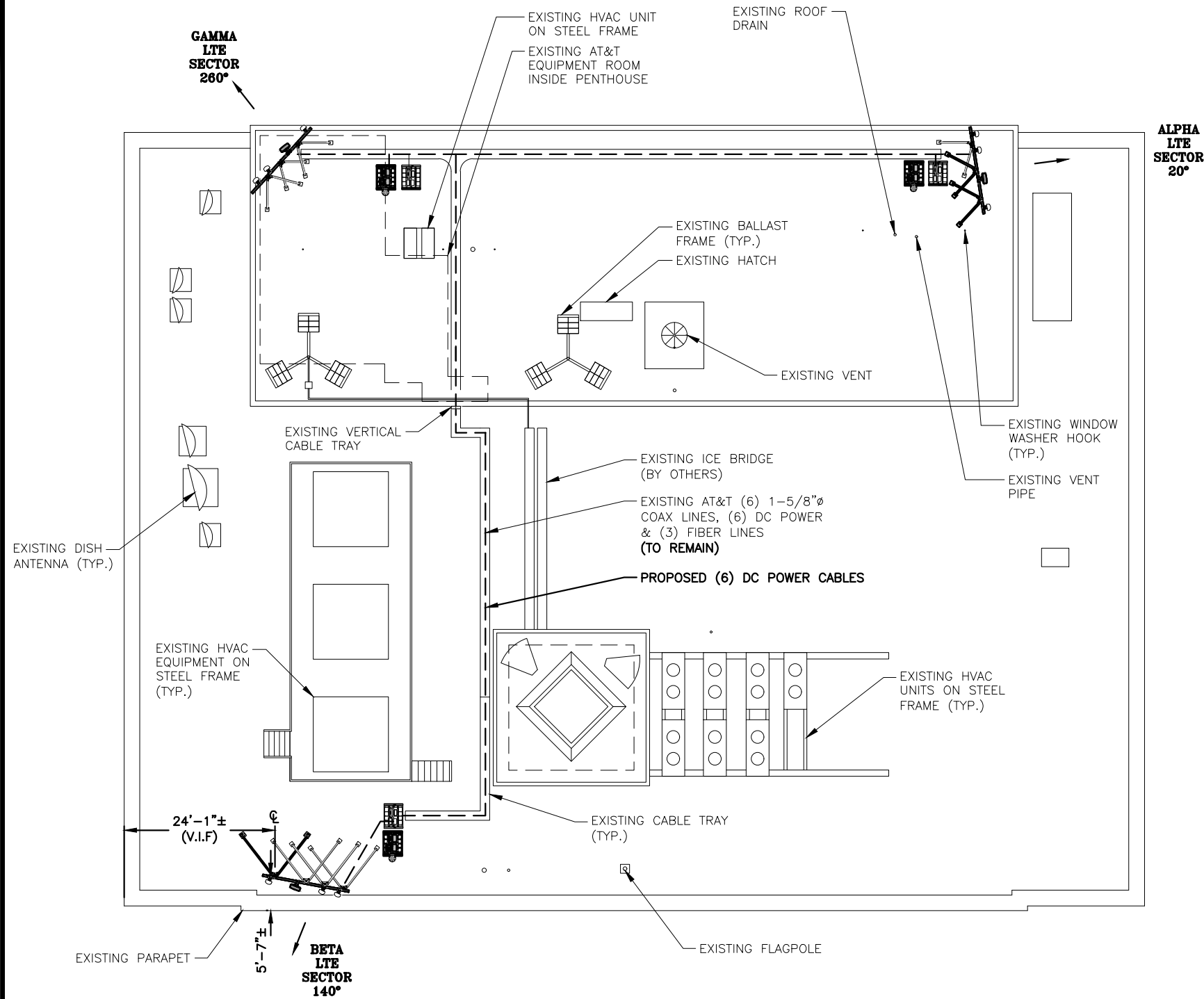
ABBREVIATIONS

|      |                               |     |                                 |      |                            |
|------|-------------------------------|-----|---------------------------------|------|----------------------------|
| AGL  | ABOVE GRADE LEVEL             | EQ  | EQUAL                           | REQ  | REQUIRED                   |
| AWG  | AMERICAN WIRE GAUGE           | GC  | GENERAL CONTRACTOR              | RF   | RADIO FREQUENCY            |
| BBU  | BATTERY BACKUP UNIT           | GRC | GALVANIZED RIGID CONDUIT        | TBD  | TO BE DETERMINED           |
| BTCW | BARE TINNED SOLID COPPER WIRE | MGB | MASTER GROUND BAR               | TBR  | TO BE REMOVED              |
| BGR  | BURIED GROUND RING            | MIN | MINIMUM                         | TBRR | TO BE REMOVED AND REPLACED |
| BTS  | BASE TRANSCEIVER STATION      | P   | PROPOSED                        | TYP  | TYPICAL                    |
| E    | EXISTING                      | NTS | NOT TO SCALE                    | UG   | UNDER GROUND               |
| EGB  | EQUIPMENT GROUND BAR          | RAD | (RADIATION CENTER LINE ANTENNA) | VIF  | VERIFY IN FIELD            |
| EGR  | EQUIPMENT GROUND RING         | REF | REFERENCE                       |      |                            |



NOTE:  
REFER TO THE FINAL RF DATA SHEET  
FOR FINAL ANTENNA SETTINGS.

NOTE:  
REFER TO **STRUCTURAL ANALYSIS**  
BY: HUDSON DESIGN GROUP, LLC,  
DATED: JULY 23, 2019 (REV.2),  
FOR THE CAPACITY OF THE  
EXISTING STRUCTURES TO SUPPORT  
THE PROPOSED EQUIPMENT.



45 BEECHWOOD DRIVE  
NORTH ANDOVER, MA 01845  
TEL: (978) 557-5553  
FAX: (978) 336-5586

12 INDUSTRIAL WAY  
SALEM, NH 03079

SITE NUMBER: CT2034  
SITE NAME: N. HAVEN-310 ORANGE ST-SBC CO

310 ORANGE STREET DUP 1  
NEW HAVEN, CT 06510  
NEW HAVEN COUNTY

500 ENTERPRISE DRIVE, SUITE 3A  
ROCKY HILL, CT 06067

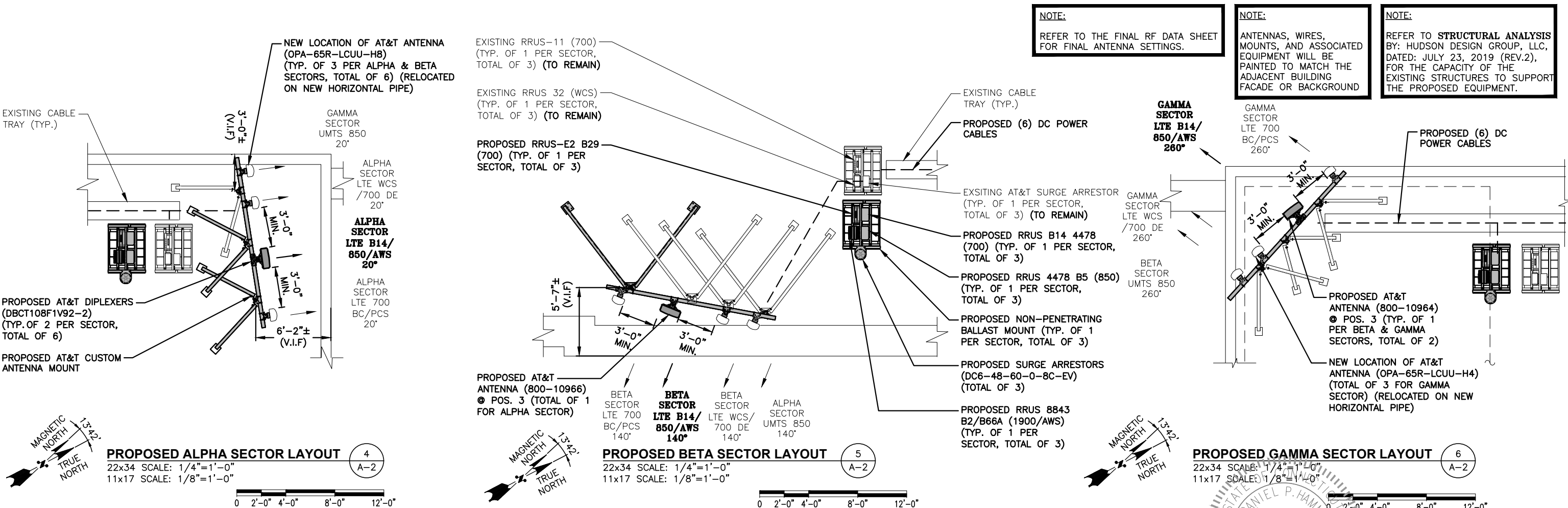
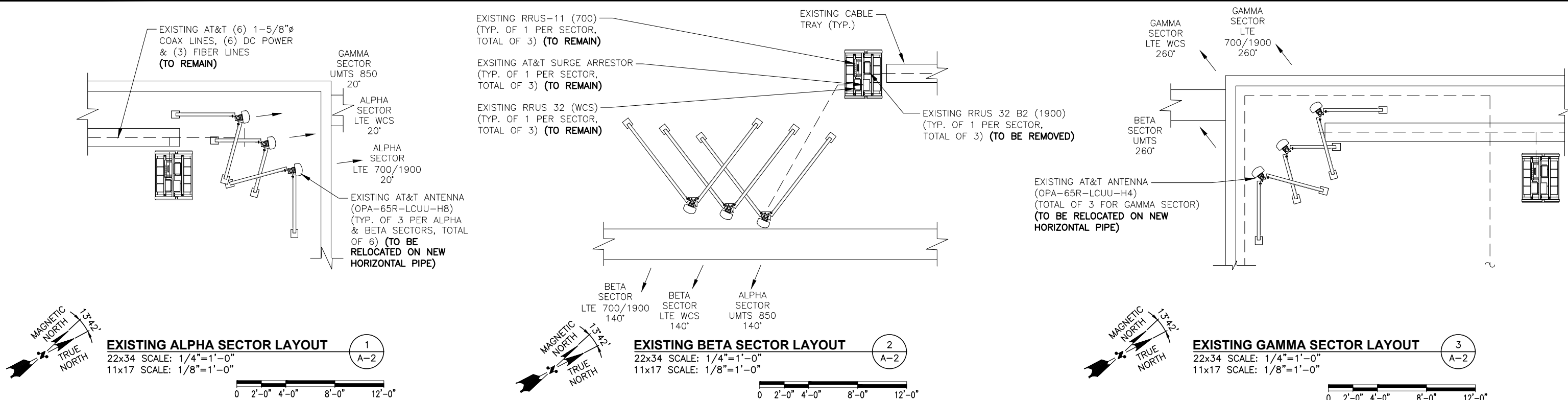
| NO. | DATE     | REVISIONS               | BY | CHK | APP'D |
|-----|----------|-------------------------|----|-----|-------|
| 2   | 07/24/19 | ISSUED FOR CONSTRUCTION | AM | AT  | DJC   |
| 1   | 06/19/19 | ISSUED FOR CONSTRUCTION | EB | AT  | DJC   |
| 0   | 06/04/19 | ISSUED FOR REVIEW       | SG | AT  | DJC   |
| A   | 05/22/19 | ISSUED FOR REVIEW       | AM | AT  | DJC   |

SCALE: AS SHOWN    DESIGNED BY: AT    DRAWN BY: AM

AT&T

ROOF & EQUIPMENT PLANS  
(LTE 4C\_5C\_6C\_7C)

| SITE NUMBER | DRAWING NUMBER | REV |
|-------------|----------------|-----|
| CT2034      | A-1            | 2   |



45 BEECHWOOD DRIVE  
NORTH ANDOVER, MA 01845  
TEL: (978) 557-5553  
FAX: (978) 336-5586

12 INDUSTRIAL WAY  
SALEM, NH 03079

SITE NUMBER: CT2034  
SITE NAME: N. HAVEN-310 ORANGE ST-SBC CO

310 ORANGE STREET DUP 1  
NEW HAVEN, CT 06510  
NEW HAVEN COUNTY

500 ENTERPRISE DRIVE, SUITE 3A  
ROCKY HILL, CT 06067

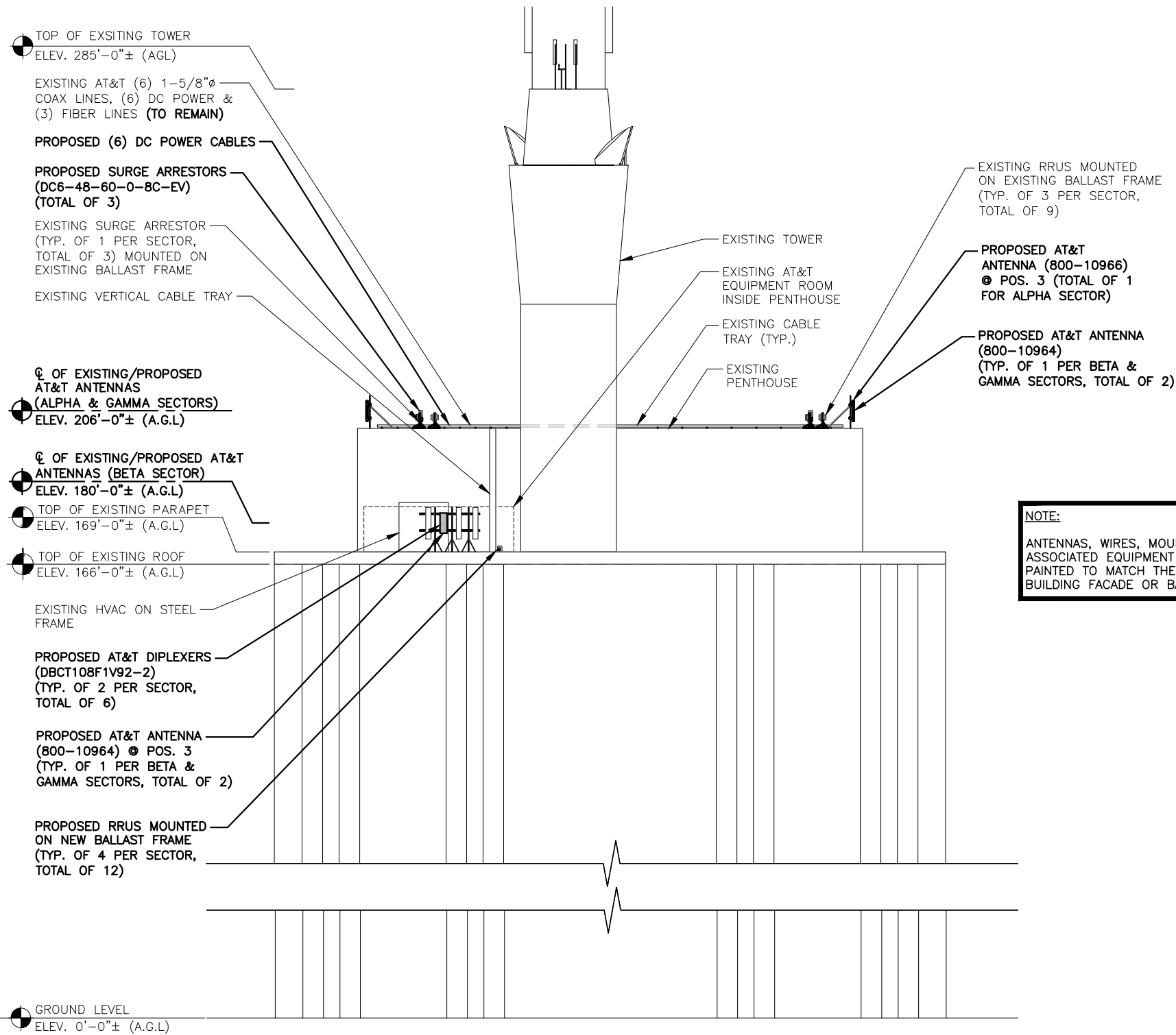
|                 |          |                         |              |     |       |
|-----------------|----------|-------------------------|--------------|-----|-------|
| 2               | 07/24/19 | ISSUED FOR CONSTRUCTION | AM           | AT  | DJC   |
| 1               | 06/19/19 | ISSUED FOR CONSTRUCTION | EB           | AT  | DJC   |
| 0               | 06/04/19 | ISSUED FOR REVIEW       | SG           | AT  | DJC   |
| A               | 05/22/19 | ISSUED FOR REVIEW       | AM           | AT  | DJC   |
| NO.             | DATE     | REVISIONS               | BY           | CHK | APP'D |
| SCALE: AS SHOWN |          | DESIGNED BY: AT         | DRAWN BY: AM |     |       |

AT&T

ANTENNA LAYOUTS  
(LTE 4C\_5C\_6C\_7C)

|             |                |     |
|-------------|----------------|-----|
| SITE NUMBER | DRAWING NUMBER | REV |
| CT2034      | A-2            | 2   |

NOTE:  
ANTENNAS, WIRES, MOUNTS, AND ASSOCIATED EQUIPMENT WILL BE PAINTED TO MATCH THE ADJACENT BUILDING FACADE OR BACKGROUND



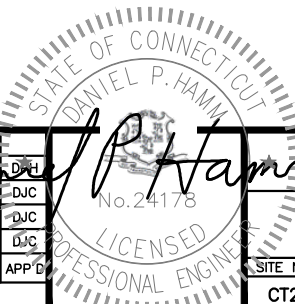
NOTE:  
ANTENNAS, WIRES, MOUNTS, AND ASSOCIATED EQUIPMENT WILL BE PAINTED TO MATCH THE ADJACENT BUILDING FACADE OR BACKGROUND

NOTE:  
REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.

NOTE:  
REFER TO **STRUCTURAL ANALYSIS** BY: HUDSON DESIGN GROUP, LLC, DATED: JULY 23, 2019 (REV.2), FOR THE CAPACITY OF THE EXISTING STRUCTURES TO SUPPORT THE PROPOSED EQUIPMENT.

ELEVATION  
22x34 SCALE: 1/16"=1'-0"  
11x17 SCALE: 1/32"=1'-0"  
0 8'-0" 16'-0" 32'-0" 48'-0"

|                 |          |                         |              |     |       |
|-----------------|----------|-------------------------|--------------|-----|-------|
| 2               | 07/24/19 | ISSUED FOR CONSTRUCTION | AM           | AT  | DJH   |
| 1               | 06/19/19 | ISSUED FOR CONSTRUCTION | EB           | AT  | DJC   |
| 0               | 06/04/19 | ISSUED FOR REVIEW       | SG           | AT  | DJC   |
| A               | 05/22/19 | ISSUED FOR REVIEW       | AM           | AT  | DJC   |
| NO.             | DATE     | REVISIONS               | BY           | CHK | APP'D |
| SCALE: AS SHOWN |          | DESIGNED BY: AT         | DRAWN BY: AM |     |       |



|                                |                |
|--------------------------------|----------------|
| AT&T                           |                |
| ELEVATION<br>(LTE 4C_5C_6C_7C) |                |
| SITE NUMBER                    | DRAWING NUMBER |
| CT2034                         | A-3            |
| REV                            | 2              |



## NOTE:

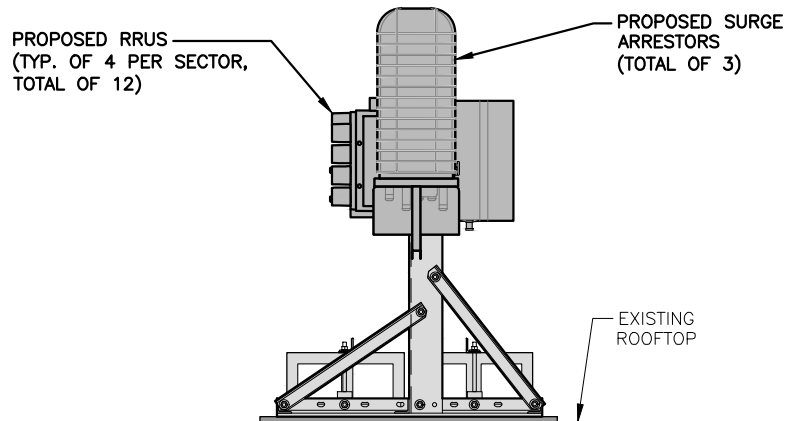
REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.

## NOTE:

REFER TO **STRUCTURAL ANALYSIS** BY: HUDSON DESIGN GROUP, LLC, DATED: JULY 23, 2019 (REV.2), FOR THE CAPACITY OF THE EXISTING STRUCTURES TO SUPPORT THE PROPOSED EQUIPMENT.

## MINIMUM BALLAST REQUIREMENTS

| SIDE                 | A (BACK)        | B (FRONT) |
|----------------------|-----------------|-----------|
| NUMBER OF BLOCKS     | 7               | 7         |
| SIZE OF BLOCKS       | 4"x8"x16" SOLID |           |
| WEIGHT OF BLOCKS     | 38 LBS.         |           |
| TOTAL BALLAST WEIGHT | 532 LBS.        |           |



## PROPOSED RRH BALLAST MOUNT

22x34 SCALE: 1"=1'-0"  
11x17 SCALE: 1/2"=1'-0"

1  
A-4

0 0'-6" 1'-0" 2'-0" 3'-0"



PROPOSED NETSURE 7100  
POWER PLANT W/BATTERY  
TO REPLACE EXISTING  
POWER PLANT

PROPOSED NETSURE 7100  
POWER PLANT DETAIL

SCALE: N.T.S.

2  
A-4

| ANTENNA SCHEDULE |                       |                     |                 |                              |                     |         |                       |                                                                                    |                                                  |                                |                                                                       |
|------------------|-----------------------|---------------------|-----------------|------------------------------|---------------------|---------|-----------------------|------------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------|-----------------------------------------------------------------------|
| SECTOR           | EXISTING/<br>PROPOSED | BAND                | ANTENNA         | SIZE (INCHES)<br>(L x W x D) | ANTENNA<br>Ø HEIGHT | AZIMUTH | TMA/DIPLEXER          | RRU                                                                                | SIZE (INCHES)<br>(L x W x D)                     | FEEDER                         | RAYCAP                                                                |
| A1               | EXISTING              | UMTS 850            | OPA-65R-LCUU-H8 | 92.7X14.4X7                  | ±206'               | 140°    | -                     | -                                                                                  | -                                                | (2) 1-5/8" COAX (±340' LENGTH) | (E) (1) RAYCAP<br>DC6-48-60-18<br>(P) (1) RAYCAP<br>DC6-48-60-0-8C-EV |
| A2               | EXISTING              | LTE WCS/<br>700 DE  | OPA-65R-LCUU-H8 | 92.7X14.4X7                  | ±206'               | 20°     | -                     | (E)(1) RRUS 32 (WCS)<br>(P)(1) RRUS-E2 B29 (700)                                   | -                                                | -                              |                                                                       |
| A3               | PROPOSED              | LTE B14<br>/850/AWS | 800-10966       | 96X20X6.9                    | ±206'               | 20°     | (2)(P) DBCT108F1V92-2 | (P)(1) B14 4478 (700)<br>(P)(1) 4478 B5 (850)<br>(P)(1) 8843 B2/B66A<br>(1900/AWS) | 18.1X13.4X8.3<br>18.1X13.4X8.3<br>14.9X13.2X10.9 | -                              |                                                                       |
| A4               | EXISTING              | LTE 700<br>BC/PCS   | OPA-65R-LCUU-H8 | 92.7X14.4X7                  | ±206'               | 20°     | -                     | (E)(1) RRUS 11 (700)                                                               | -                                                | -                              |                                                                       |
| B1               | EXISTING              | UMTS 850            | OPA-65R-LCUU-H8 | 92.7X14.4X7                  | ±180'               | 260°    | -                     | -                                                                                  | -                                                | (2) 1-5/8" COAX (±340' LENGTH) | (E) (1) RAYCAP<br>DC6-48-60-18<br>(P) (1) RAYCAP<br>DC6-48-60-0-8C-EV |
| B2               | EXISTING              | LTE WCS/<br>700 DE  | OPA-65R-LCUU-H8 | 92.7X14.4X7                  | ±180'               | 140°    | -                     | (E)(1) RRUS 32 (WCS)<br>(P)(1) RRUS-E2 B29 (700)                                   | -                                                | -                              |                                                                       |
| B3               | PROPOSED              | LTE B14<br>/850/AWS | 800-10964       | 59X20X6.9                    | ±180'               | 140°    | (2)(P) DBCT108F1V92-2 | (P)(1) B14 4478 (700)<br>(P)(1) 4478 B5 (850)<br>(P)(1) 8843 B2/B66A<br>(1900/AWS) | 18.1X13.4X8.3<br>18.1X13.4X8.3<br>14.9X13.2X10.9 | -                              |                                                                       |
| B4               | EXISTING              | LTE 700<br>BC/PCS   | OPA-65R-LCUU-H8 | 92.7X14.4X7                  | ±180'               | 140°    | -                     | (E)(1) RRUS 11 (700)                                                               | -                                                | -                              |                                                                       |
| C1               | EXISTING              | UMTS 850            | OPA-65R-LCUU-H4 | 48X14.4X7.3                  | ±206'               | 20°     | -                     | -                                                                                  | -                                                | (2) 1-5/8" COAX (±340' LENGTH) | (E) (1) RAYCAP<br>DC6-48-60-18<br>(P) (1) RAYCAP<br>DC6-48-60-0-8C-EV |
| C2               | EXISTING              | LTE WCS/<br>700 DE  | OPA-65R-LCUU-H4 | 48X14.4X7.3                  | ±206'               | 260°    | -                     | (E)(1) RRUS 32 (WCS)<br>(P)(1) RRUS-E2 B29 (700)                                   | -                                                | -                              |                                                                       |
| C3               | PROPOSED              | LTE B14<br>/850/AWS | 800-10964       | 59X20X6.9                    | ±206'               | 260°    | (2)(P) DBCT108F1V92-2 | (P)(1) B14 4478 (700)<br>(P)(1) 4478 B5 (850)<br>(P)(1) 8843 B2/B66A<br>(1900/AWS) | 18.1X13.4X8.3<br>18.1X13.4X8.3<br>14.9X13.2X10.9 | -                              |                                                                       |
| C4               | EXISTING              | LTE 700<br>BC/PCS   | OPA-65R-LCUU-H4 | 48X14.4X7.3                  | ±206'               | 260°    | -                     | (E)(1) RRUS 11 (700)                                                               | -                                                | -                              |                                                                       |

## FINAL ANTENNA SCHEDULE

SCALE: N.T.S.

5  
A-4

| RRU CHART |                         |       |       |       |
|-----------|-------------------------|-------|-------|-------|
| QUANTITY  | MODEL                   | L     | W     | D     |
| 3(E)      | RRUS-32 (WCS)           | 27.2" | 12.1" | 7.0"  |
| 3(E)      | RRUS 11 (700)           | 19.7" | 17.0" | 7.2"  |
| 3(P)      | RRUS E2 B29 (700)       | 20.4" | 18.5" | 7.5"  |
| 3(P)      | B14 4478 (700)          | 18.1" | 13.4" | 8.3"  |
| 3(P)      | 4478 B5 (850)           | 18.1" | 13.4" | 8.3"  |
| 3(P)      | 8843 B2/B66A (1900/AWS) | 14.9" | 13.2" | 10.9" |

NOTE:  
MOUNT PER MANUFACTURER'S SPECIFICATIONS

## NOTE:

SEE RFDS FOR RRH  
FREQUENCY AND  
MODEL NUMBER

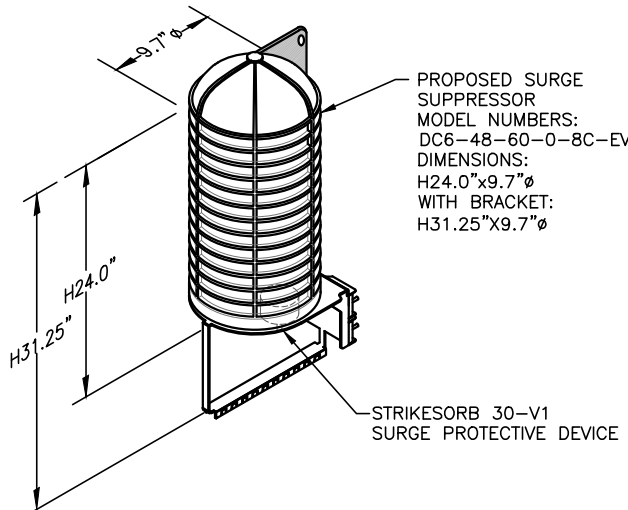
PROPOSED RRU REFER TO THE  
FINAL RFDS AND CHART FOR  
QUANTITY, MODEL AND DIMENSIONS

NOTE:  
MOUNT PER MANUFACTURER'S SPECIFICATIONS.

## PROPOSED RRUS DETAIL

SCALE: N.T.S.

3  
A-4



PROPOSED SURGE  
SUPPRESSOR  
MODEL NUMBERS:  
DC6-48-60-0-8C-EV  
DIMENSIONS:  
H24.0"x9.7"Ø  
WITH BRACKET:  
H31.25"x9.7"Ø

STRIKESORB 30-V1  
SURGE PROTECTIVE DEVICE

NOTE:  
MOUNT PER MANUFACTURER'S SPECIFICATIONS.

## DC SURGE SUPPRESSOR DETAIL

SCALE: N.T.S.

4  
A-4

**HDG** HUDSON  
Design Group LLC

45 BEECHWOOD DRIVE  
NORTH ANDOVER, MA 01845  
TEL: (978) 557-5553  
FAX: (978) 336-5586

**SAI**

12 INDUSTRIAL WAY  
SALEM, NH 03079

SITE NUMBER: CT2034  
SITE NAME: N. HAVEN-310 ORANGE ST-SBC CO

310 ORANGE STREET DUP 1  
NEW HAVEN, CT 06510  
NEW HAVEN COUNTY

**at&t**

500 ENTERPRISE DRIVE, SUITE 3A  
ROCKY HILL, CT 06067

|                 |          |                         |              |     |        |                                          |
|-----------------|----------|-------------------------|--------------|-----|--------|------------------------------------------|
| 2               | 07/24/19 | ISSUED FOR CONSTRUCTION | AM           | AT  | DJC    | AT&T<br><br>DETAILS<br>(LTE 4C_5C_6C_7C) |
| 1               | 06/19/19 | ISSUED FOR CONSTRUCTION | EB           | AT  | DJC    |                                          |
| 0               | 06/04/19 | ISSUED FOR REVIEW       | SG           | AT  | DJC    |                                          |
| A               | 05/22/19 | ISSUED FOR REVIEW       | AM           | AT  | DJC    |                                          |
| NO.             | DATE     | REVISIONS               | BY           | CHK | APP'D  |                                          |
| SCALE: AS SHOWN |          | DESIGNED BY: AT         | DRAWN BY: AM |     | CT2034 |                                          |
|                 |          |                         |              |     | A-4    |                                          |

PACKING MATERIAL: MIN 1-1/2 in. THICKNESS OF MIN 6 pcf MINERAL WOOL BATT INSULATION FIRMLY PACKED INTO OPENING AS A PERMANENT FORM. PACKING MATERIAL TO BE RECESSED FROM TOP SURFACE OF FLOOR OR FROM BOTH SURFACES OF WALL AS REQUIRED TO ACCOMMODATE THE REQUIRED THICKNESS OF FILL MATERIAL.

ONE 2"Ø (OR SMALLER) SCHEDULE 40 PVC PIPE TO BE CENTERED WITHIN FIRESTOP SYSTEM. A NOM. ANNULAR SPACE OF 5/16" IS REQUIRED WITHIN THE FIRESTOP SYSTEM PIPE SHALL BE RIGIDLY SUPPORTED ON BOTH SIDES OF WALL/FLOOR ASSEMBLY

FILL, VOID OR CAVITY MATERIAL - SEALANT: MIN 2 in. THICKNESS OF FILL MATERIAL APPLIED WITHIN ANNULUS, FLUSH WITH THE TOP SURFACE OF FLOOR OR WITH BOTH SURFACES OF WALL.

SPECIFIED TECHNOLOGIES INC. SPECSEAL SERIES SSS SEALANT OR SPECSEAL LCI SEALANT.

UL SYSTEM NUMBER: C-AJ-2057 F RATING - 2 HR.

PVC CONDUIT PENETRATION  
DETAIL IN CONCRETE OR MASONRY

PACKING MATERIAL: MIN. 1 in. THICKNESS OF MIN. 3.5 pcf FIBERGLASS INSULATION SHALL BE WRAPPED AROUND THE THROUGH-PENETRANT AND SECURED TOGETHER BY MEANS OF NO. 24 AWG STEEL TIE WIRE. PACKING MATERIAL SHALL BE CENTERED AT MID-DEPTH OF OPENING AND RECESSED FROM BOTH SURFACES OF WALL ASSEMBLY REQUIRED TO ACCOMMODATE THE REQUIRED THICKNESS OF FILL MATERIAL.

FILL, VOID OR CAVITY MATERIAL - CAULK OR PUTTY: IN 2 HR FIRE RATED ASSEMBLIES MIN 3/4 in. THICKNESS FILL MATERIAL APPLIED WITHIN THE ANNULUS, FLUSH BOTH SURFACES OF WALL. ADDITIONAL FILL MATERIAL TO BE INSTALLED SUCH THAT A MIN 1/4 in. CROWN IS FORMED AROUND THE PENETRATING ITEM. IN 1 HR FIRE RATED ASSEMBLIES, MIN 5/8 in. THICKNESS OF FILL MATERIAL APPLIED WITHIN ANNULUS ON BOTH SURFACES OF WALL. ADDITIONAL FILL MATERIAL TO BE INSTALLED SUCH THAT A MIN 3/8 in. CROWN IS FORMED AROUND THE PENETRATING ITEM AND LAPPING 1 in. BEYOND THE PERIPHERY OF THE OPENING.

SPECIFIED TECHNOLOGIES INC. SPECSEAL SERIES SSS SEALANT, SPECSEAL LCI SEALANT OR SPECSEAL PUTTY.

UL SYSTEM NUMBER: W-L-1029 F RATING - 1 & 2 HR.

PIPE AND CONDUIT PENETRATION  
DETAIL IN GYPSUM WALLBOARD

ONE 4"Ø OR SMALLER METALLIC PIPE OR CONDUIT TO BE CENTERED WITHIN FIRESTOP SYSTEM. PIPE SHALL BE RIGIDLY SUPPORTED ON BOTH SIDES OF WALL/FLOOR ASSEMBLY AND HAVE AN ANNULAR SPACE OF 3/4"

LAYERS OF 5/8" THICK GYPSUM WALL BOARD  
WOOD OR METAL STUDS

NOTE: CORE HOLE 1 1/2" LARGER THAN THE DIAMETER OF THE CONDUIT. CORE DRILLS TO BE SEALED WITH ELASTOMERIC SEALANT

PIPE AND CONDUIT PENETRATION  
DETAIL IN NON-RATED PARTITION

ALL CORES THROUGH ELECTRIC ROOMS TO BE FIRE-STOPPED.

USE FULL CONDUIT RUNS THROUGH PENETRATIONS

| FLOOR OR WALL | MIN FLOOR OR WALL THKNS. (in.) | MAX DIAM OF STEEL PIPE OR CONDUIT (in.) | MIN ANNULAR SPACE (in.) | MAX ANNULAR SPACE (in.) | MIN FILL MTL THKNS (in.) | MIN FORMING MTL THKNS (in.) | F RATING (HOURS) | T RATING (HOURS) |
|---------------|--------------------------------|-----------------------------------------|-------------------------|-------------------------|--------------------------|-----------------------------|------------------|------------------|
| FLOOR         | 3-3/4                          | 1-1/2                                   | 3/8                     | 2-1/8                   | 1                        | 2-3/4                       | 2                | 0                |
| FLOOR         | 3-3/4                          | 6                                       | 3/8                     | 3/4                     | 1                        | 2-3/4                       | 2                | 0                |
| FLOOR         | 3-3/4                          | 6                                       | 3/8                     | 1                       | 2                        | 1-3/4                       | 2                | 0                |
| FLOOR         | 4-1/2                          | 1-1/2                                   | 3/8                     | 2-1/8                   | 1                        | 3-1/2                       | 3                | 3/4              |
| FLOOR         | 4-1/2                          | 6                                       | 3/8                     | 3/4                     | 1                        | 3-1/2                       | 3                | 0                |
| FLOOR         | 4-1/2                          | 6                                       | 3/8                     | 1                       | 2                        | 2-1/2                       | 3                | 0                |
| WALL          | 5-1/2                          | 1-1/2                                   | 3/8                     | 2-1/8                   | 1                        | 3-1/2                       | 3                | 3/4              |
| WALL          | 5-1/2                          | 6                                       | 3/8                     | 3/4                     | 1                        | 3-1/2                       | 3                | 0                |
| WALL          | 6-1/2                          | 1-1/2                                   | 3/8                     | 2-1/8                   | 2                        | 2-1/2                       | 3                | 1                |
| WALL          | 6-1/2                          | 6                                       | 3/8                     | 1                       | 2                        | 2-1/2                       | 3                | 0                |

CONCRETE FLOOR OR WALL ASSEMBLY, MINIMUM 3-3/4 in. THICKNESS FLOOR/ MINIMUM 6-1/2 in. WALL

TYPE AS OR TYPE SS:

MINIMUM THICKNESS OF SEALANT AS SPECIFIED IN THE TABLE ABOVE, APPLIED WITHIN THE OPENING, FLUSH WITH THE TOP SURFACE OF THE FLOOR OR BOTH SURFACES OF THE WALL.

FORMING MATERIAL: MINERAL WOOL BATT INSULATION (MINIMUM 4.0 pcf) FIRMLY PACKED INTO THE OPENING AS A PERMANENT FORM; SEE TABLE FOR MINIMUM REQUIRED THICKNESS

METALLIC PIPE:

STEEL PIPE: 6"Ø (OR SMALLER) SCHEDULE 10 (OR HEAVIER) STEEL PIPE.  
CONDUIT: 4"Ø (OR SMALLER) ELECTRICAL METALLIC TUBING (EMT) OR 6"Ø RIGID STEEL CONDUIT.

UL SYSTEM NUMBER: C-AJ-1020  
F RATING - 3 HR. (FOR PIPES GREATER THAN 4")  
F RATING - 2 HR. (FOR PIPES LESS THAN 4")

PIPE AND CONDUIT PENETRATION  
DETAIL IN CONCRETE OR MASONRY

| WALL HR | MAX DIAM OF THROUGH PENETRANT in. | T RATING HR |
|---------|-----------------------------------|-------------|
| 1       | 2                                 | 1           |
| 1       | 1-1/4                             | 1           |
| 2       | 2                                 | 1           |
| 2       | 1-1/4                             | 1 1/2       |

THE HOURLY F RATING OF THE FIRESTOP SYSTEM IS EQUAL TO THE HOURLY FIRE RATING OF THE WALL ASSEMBLY IN WHICH IT IS INSTALLED.

THROUGH PENETRANTS: ONE 2"Ø NONMETALLIC PIPE, CONDUIT OR RACEWAY TO BE CENTERED WITHIN THE FIRESTOP SYSTEM. A NOM ANNULAR SPACE OF 5/16 in. IS REQUIRED WITHIN THE FIRESTOP SYSTEM. PIPE, CONDUIT OR RACEWAY TO BE RIGIDLY SUPPORTED ON BOTH SIDES OF THE FLOOR OR WALL ASSEMBLY.

FILL, VOID OR CAVITY MATERIAL - SEALANT: MIN 5/8 in. THICKNESS OF FILL MATERIAL APPLIED WITHIN ANNULUS, FLUSH WITH BOTH SURFACES OF WALL. ADDITIONAL FILL MATERIAL TO BE INSTALLED SUCH THAT A MIN 1/4 in. THICK CROWN IS FORMED AROUND THE PENETRATING ITEM AND LAPPING 1 in. BEYOND THE PERIPHERY OF THE OPENING.

SPECIFIED TECHNOLOGIES INC. SPECSEAL SERIES SSS SEALANT, SPECSEAL LCI SEALANT.

UL SYSTEM NUMBER: W-L-2093 F RATING - 1 & 2 HR.

PVC CONDUIT PENETRATION  
DETAIL IN GYPSUM WALLBOARD

NOTE:

CABLES IN VERTICAL RUNS. CABLES INSTALLED IN VERTICAL RUNS AND PENETRATING MORE THAN ONE FLOOR, OR CABLES INSTALLED IN VERTICAL RUNS IN A SHAFT, SHALL BE TYPE CMR. FLOOR PENETRATIONS REQUIRING TYPE CMR SHALL CONTAIN ONLY CABLES SUITABLE FOR RISER OR PLENUM USE. LISTED RISER COMMUNICATIONS RACEWAYS AND LISTED PLENUM COMMUNICATIONS RACEWAYS SHALL BE PERMITTED TO BE INSTALLED IN VERTICAL RISER RUNS IN A SHAFT FROM FLOOR TO FLOOR. ONLY TYPE CMR CABLES SHALL BE PERMITTED TO BE INSTALLED IN THESE RISERS. ONLY CMP CABLES SHALL BE PERMITTED TO BE INSTALLED IN PLENUMS.

METAL RACEWAYS OR FIREPROOF SHAFTS. LISTED COMMUNICATIONS CABLES SHALL BE ENCASED IN A METAL RACEWAY OR LOCATED IN A FIREPROOF SHAFT HAVING FIRESTOPS AT EACH FLOOR.

PENETRATION DETAILS  
22x34 SCALE: N.T.S.

1  
A-5



STRUCTURAL NOTES:

1. DESIGN REQUIREMENTS ARE PER STATE BUILDING CODE AND APPLICABLE SUPPLEMENTS, INTERNATIONAL BUILDING CODE, EIA/TIA-222-G STRUCTURAL STANDARDS FOR STEEL ANTENNA, TOWERS AND ANTENNA SUPPORTING STRUCTURES.
2. CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CONDITIONS IN THE FIELD PRIOR TO FABRICATION AND ERECTION OF ANY MATERIAL. ANY UNUSUAL CONDITIONS SHALL BE REPORTED TO THE ATTENTION OF THE CONSTRUCTION MANAGER AND ENGINEER OF RECORD.
3. DESIGN AND CONSTRUCTION OF STRUCTURAL STEEL SHALL CONFORM TO THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION "SPECIFICATION FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS".
4. STRUCTURAL STEEL SHALL CONFORM TO ASTM A992 (Fy=50 ksi), MISCELLANEOUS STEEL SHALL CONFORM TO ASTM A36 UNLESS OTHERWISE INDICATED.
5. STEEL PIPE SHALL CONFORM TO ASTM A500 "COLD-FORMED WELDED & SEAMLESS CARBON STEEL STRUCTURAL TUBING", GRADE B, OR ASTM A53 PIPE STEEL BLACK AND HOT-DIPPED ZINC-COATED WELDED AND SEAMLESS TYPE E OR S, GRADE B. PIPE SIZES INDICATED ARE NOMINAL. ACTUAL OUTSIDE DIAMETER IS LARGER.
6. STRUCTURAL CONNECTION BOLTS SHALL BE HIGH STRENGTH BOLTS (BEARING TYPE) AND CONFORM TO ASTM A325 TYPE-X "HIGH STRENGTH BOLTS FOR STRUCTURAL JOINTS, INCLUDING SUITABLE NUTS AND PLAIN HARDENED WASHERS". ALL BOLTS SHALL BE 3/4" DIA UON.
7. ALL STEEL MATERIALS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT-DIP GALVANIZED) COATINGS ON IRON AND STEEL PRODUCTS", UNLESS OTHERWISE NOTED.
8. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC-COATING (HOT-DIP) ON IRON AND STEEL HARDWARE", UNLESS OTHERWISE NOTED.
9. FIELD WELDS, DRILL HOLES, SAW CUTS AND ALL DAMAGED GALVANIZED SURFACES SHALL BE REPAIRED WITH AN ORGANIC ZINC REPAIR PAINT COMPLYING WITH REQUIREMENTS OF ASTM A780. GALVANIZING REPAIR PAINT SHALL HAVE 65 PERCENT ZINC BY WEIGHT, ZIRP BY DUNCAN GALVANIZING, GALVA BRIGHT PREMIUM BY CROWN OR EQUAL. THICKNESS OF APPLIED GALVANIZING REPAIR PAINT SHALL BE NOT NOT LESS THAN 4 COATS (ALLOW TIME TO DRY BETWEEN COATS) WITH A RESULTING COATING THICKNESS REQUIRED BY ASTM A123 OR A153 AS APPLICABLE.
10. CONTRACTOR SHALL COMPLY WITH AWS CODE FOR PROCEDURES, APPEARANCE AND QUALITY OF WELDS, AND FOR METHODS USED IN CORRECTING WELDING. ALL WELDERS AND WELDING PROCESSES SHALL BE QUALIFIED IN ACCORDANCE WITH AWS "STANDARD QUALIFICATION PROCEDURES". ALL WELDING SHALL BE DONE USING E70XX ELECTRODES AND WELDING SHALL CONFORM TO AISC AND D.I.I. WHERE FILLET WELD SIZES ARE NOT SHOWN, PROVIDE THE MINIMUM SIZE PER TABLE J2.4 IN THE AISC "STEEL CONSTRUCTION MANUAL". 14TH EDITION.
11. INCORRECTLY FABRICATED, DAMAGED OR OTHERWISE MISFITTING OR NON-CONFORMING MATERIALS OR CONDITIONS SHALL BE REPORTED TO THE CONSTRUCTION MANAGER PRIOR TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE CONSTRUCTION MANAGER APPROVAL.
12. UNISTRUT SHALL BE FORMED STEEL CHANNEL STRUT FRAMING AS MANUFACTURED BY UNISTRUT CORP., WAYNE, MI OR EQUAL. STRUT MEMBERS SHALL BE 1 5/8"x1 5/8"x12GA, UNLESS OTHERWISE NOTED, AND SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION.
13. EPOXY ANCHOR ASSEMBLY SHALL CONSIST OF STAINLESS STEEL ANCHOR ROD WITH NUTS & WASHERS. AN INTERNALLY THREADED INSERT, A SCREEN TUBE AND A EPOXY ADHESIVE. THE ANCHORING SYSTEM SHALL BE THE HILTI-HIT HY-270 AND OR HY-200 SYSTEMS (AS SPECIFIED IN DWG.) OR ENGINEERS APPROVED EQUAL.
14. EXPANSION BOLTS SHALL CONFORM TO FEDERAL SPECIFICATION FF-S-325, GROUP II, TYPE 4, CLASS I, HILTI KWIK BOLT III OR APPROVED EQUAL. INSTALLATION SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
15. LUMBER SHALL COMPLY WITH THE REQUIREMENTS OF THE AMERICAN INSTITUTE OF TIMBER CONSTRUCTION AND THE NATIONAL FOREST PRODUCTS ASSOCIATION'S NATIONAL DESIGN SPECIFICATION FOR WOOD CONSTRUCTION. ALL LUMBER SHALL BE PRESSURE TREATED AND SHALL BE STRUCTURAL GRADE NO. 2 OR BETTER.
16. WHERE ROOF PENETRATIONS ARE REQUIRED, THE CONTRACTOR SHALL CONTACT AND COORDINATE RELATED WORK WITH THE BUILDING OWNER AND THE EXISTING ROOF INSTALLER. WORK SHALL BE PERFORMED IN SUCH A MANNER AS TO NOT VOID THE EXISTING ROOF WARRANTY. ROOF SHALL BE WATERTIGHT.
17. ALL FIBERGLASS MEMBERS USED ARE AS MANUFACTURED BY STRONGWELL COMPANY OF BRISTOL, VA 24203. ALL DESIGN CRITERIA FOR THESE MEMBERS IS BASED ON INFORMATION PROVIDED IN THE DESIGN MANUAL. ALL REQUIREMENTS PUBLISHED IN SAID MANUAL MUST BE STRICTLY ADHERED TO.
18. NO MATERIALS TO BE ORDERED AND NO WORK TO BE COMPLETED UNTIL SHOP DRAWINGS HAVE BEEN REVIEWED AND APPROVED IN WRITING.
19. SUBCONTRACTOR SHALL FIREPROOF ALL STEEL TO PRE-EXISTING CONDITIONS.

SPECIAL INSPECTIONS (REFERENCE IBC CHAPTER 17):

**GENERAL:** WHERE APPLICATION IS MADE FOR CONSTRUCTION, THE OWNER OR THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE ACTING AS THE OWNER'S AGENT SHALL EMPLOY ONE OR MORE APPROVED AGENCIES TO PERFORM INSPECTIONS DURING CONSTRUCTION ON THE TYPES OF WORK LISTED IN THE INSPECTION CHECKLIST ABOVE.

THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE AND ENGINEERS OF RECORD INVOLVED IN THE DESIGN OF THE PROJECT ARE PERMITTED TO ACT AS THE APPROVED AGENCY AND THEIR PERSONNEL ARE PERMITTED TO ACT AS THE SPECIAL INSPECTOR FOR THE WORK DESIGNED BY THEM, PROVIDED THOSE PERSONNEL MEET THE QUALIFICATION REQUIREMENTS.

STATEMENT OF SPECIAL INSPECTIONS: THE APPLICANT SHALL SUBMIT A STATEMENT OF SPECIAL INSPECTIONS PREPARED BY THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE IN ACCORDANCE WITH SECTION 107.1 AS A CONDITION FOR ISSUANCE. THIS STATEMENT SHALL BE IN ACCORDANCE WITH SECTION 1705.

REPORT REQUIREMENT: SPECIAL INSPECTORS SHALL KEEP RECORDS OF INSPECTIONS. THE SPECIAL INSPECTOR SHALL FURNISH INSPECTION REPORTS TO THE BUILDING OFFICIAL, AND TO THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE. REPORTS SHALL INDICATE THAT WORK INSPECTED WAS OR WAS NOT COMPLETED IN CONFORMANCE TO APPROVED CONSTRUCTION DOCUMENTS. DISCREPANCIES SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE CONTRACTOR FOR CORRECTION. IF THEY ARE NOT CORRECTED, THE DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE BUILDING OFFICIAL AND TO THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE. A FINAL REPORT DOCUMENTING REQUIRED SPECIAL INSPECTIONS SHALL BE SUBMITTED.

| SPECIAL INSPECTION CHECKLIST                                                                 |                                                                |
|----------------------------------------------------------------------------------------------|----------------------------------------------------------------|
| BEFORE CONSTRUCTION                                                                          |                                                                |
| CONSTRUCTION/INSTALLATION INSPECTIONS AND TESTING REQUIRED (COMPLETED BY ENGINEER OF RECORD) | REPORT ITEM                                                    |
| REQUIRED                                                                                     | ENGINEER OF RECORD APPROVED SHOP DRAWINGS <sup>1</sup>         |
| N/A                                                                                          | MATERIAL SPECIFICATIONS REPORT <sup>2</sup>                    |
| N/A                                                                                          | FABRICATOR NDE INSPECTION                                      |
| N/A                                                                                          | PACKING SLIPS <sup>3</sup>                                     |
| ADDITIONAL TESTING AND INSPECTIONS:                                                          |                                                                |
| DURING CONSTRUCTION                                                                          |                                                                |
| CONSTRUCTION/INSTALLATION INSPECTIONS AND TESTING REQUIRED (COMPLETED BY ENGINEER OF RECORD) | REPORT ITEM                                                    |
| REQUIRED                                                                                     | STEEL INSPECTIONS                                              |
| N/A                                                                                          | HIGH STRENGTH BOLT INSPECTIONS                                 |
| N/A                                                                                          | HIGH WIND ZONE INSPECTIONS <sup>4</sup>                        |
| N/A                                                                                          | FOUNDATION INSPECTIONS                                         |
| N/A                                                                                          | CONCRETE COMP. STRENGTH, SLUMP TESTS AND PLACEMENT             |
| N/A                                                                                          | POST INSTALLED ANCHOR VERIFICATION <sup>5</sup>                |
| N/A                                                                                          | GROUT VERIFICATION                                             |
| N/A                                                                                          | CERTIFIED WELD INSPECTION                                      |
| N/A                                                                                          | EARTHWORK: LIFT AND DENSITY                                    |
| N/A                                                                                          | ON SITE COLD GALVANIZING VERIFICATION                          |
| N/A                                                                                          | GUY WIRE TENSION REPORT                                        |
| ADDITIONAL TESTING AND INSPECTIONS: STEEL BELOW ROOF                                         |                                                                |
| AFTER CONSTRUCTION                                                                           |                                                                |
| CONSTRUCTION/INSTALLATION INSPECTIONS AND TESTING REQUIRED (COMPLETED BY ENGINEER OF RECORD) | REPORT ITEM                                                    |
| REQUIRED                                                                                     | MODIFICATION INSPECTOR REDLINE OR RECORD DRAWINGS <sup>6</sup> |
| N/A                                                                                          | POST INSTALLED ANCHOR PULL-OUT TESTING                         |
| REQUIRED                                                                                     | PHOTOGRAPHS                                                    |
| ADDITIONAL TESTING AND INSPECTIONS:                                                          |                                                                |
|                                                                                              |                                                                |

NOTES:

1. REQUIRED FOR ANY NEW SHOP FABRICATED FRP OR STEEL.
2. PROVIDED BY MANUFACTURER, REQUIRED IF HIGH STRENGTH BOLTS OR STEEL.
3. PROVIDED BY GENERAL CONTRACTOR; PROOF OF MATERIALS.
4. HIGH WIND ZONE INSPECTION CATB 120MPH OR CAT C,D 110MPH INSPECT FRAMING OF WALLS, ANCHORING, FASTENING SCHEDULE.
5. ADHESIVE FOR REBAR AND ANCHORS SHALL HAVE BEEN TESTED IN ACCORDANCE WITH ACI 355.4 AND ICC-ES AC308 FOR CRACKED CONCRETE AND SEISMIC APPLICATIONS. DESIGN ADHESIVE BOND STRENGTH HAS BEEN BASED ON ACI 355.4 TEMPERATURE CATEGORY B WITH INSTALLATIONS INTO DRY HOLES DRILLED USING A CARBIDE BIT INTO CRACKED CONCRETE THAT HAS CURED FOR AT LEAST 21 DAYS. ADHESIVE ANCHORS REQUIRING CERTIFIED INSTALLATIONS SHALL BE INSTALLED BY A CERTIFIED ADHESIVE ANCHOR INSTALLER PER ACI 318-11 D.9.2.2. INSTALLATIONS REQUIRING CERTIFIED INSTALLERS SHALL BE INSPECTED PER ACI 318-11 D.8.2.4.
6. AS REQUIRED; FOR ANY FIELD CHANGES TO THE ITEMS IN THIS TABLE.

NOTES:

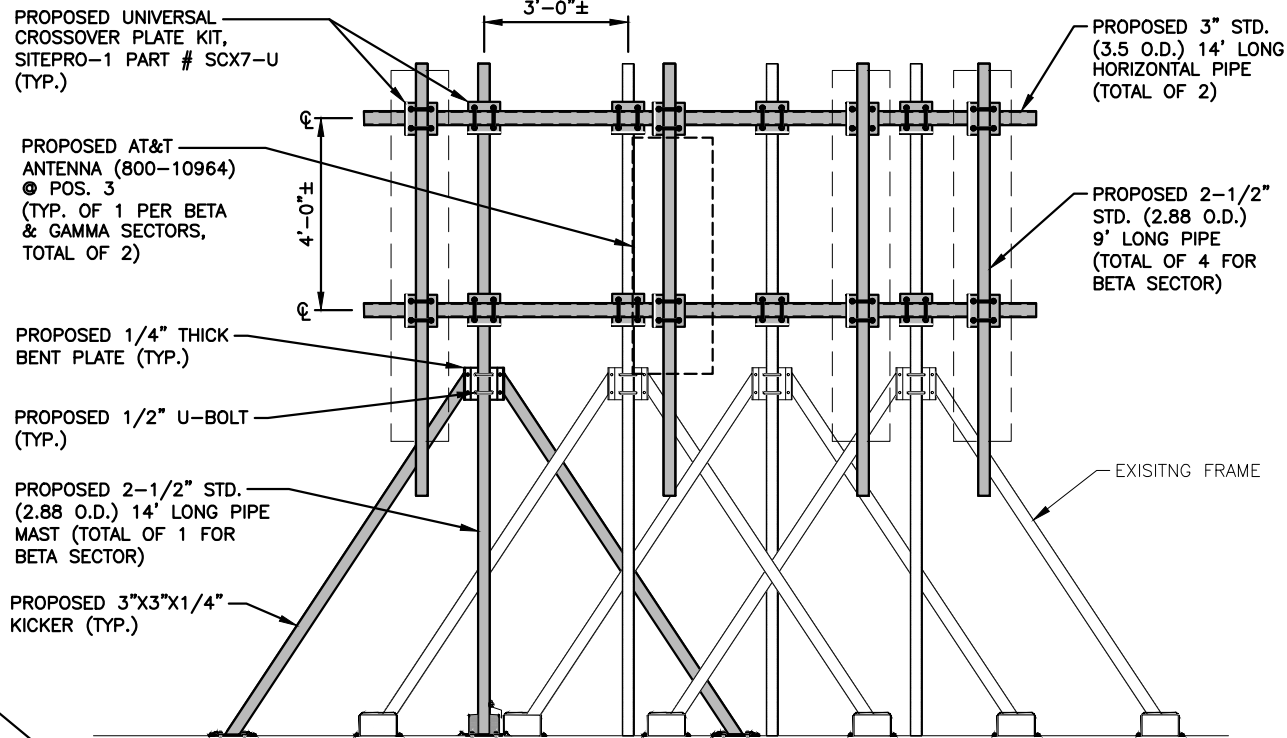
1. ALL CONNECTIONS TO BE SHOP WELDED & FIELD BOLTED USING 3/4"Ø A325-X BOLTS, UNLESS OTHERWISE NOTIFIED.
2. SHOP DRAWING ENGINEER REVIEW & APPROVAL REQUIRED BEFORE ORDERING MATERIAL.
3. SHOP DRAWING ENGINEER REVIEW & APPROVAL REQUIRED PRIOR TO STEEL FABRICATION.
4. VERIFICATION OF EXISTING ROOF CONSTRUCTION IS REQUIRED PRIOR TO THE INSTALLATION OF THE ROOF PLATFORM. ENGINEER OF RECORD IS TO APPROVE EXISTING CONDITIONS IN ORDER TO MOVE FORWARD.
5. CENTERLINE OF PROPOSED STEEL PLATFORM SUPPORT COLUMNS TO BE CENTRALLY LOCATED OVER THE EXISTING BUILDING COLUMNS.
6. EXISTING BRICK MASONRY COLUMNS/BEARING TO BE REPAIRED/REPLACED AT ALL PROPOSED PLATFORM SUPPORT POINTS. ENGINEER OF RECORD TO REVIEW AND APPROVE.



**NOTE:**  
REFER TO **STRUCTURAL ANALYSIS**  
BY: HUDSON DESIGN GROUP, LLC,  
DATED: JULY 23, 2019 (REV.2),  
FOR THE CAPACITY OF THE  
EXISTING STRUCTURES TO SUPPORT  
THE PROPOSED EQUIPMENT.

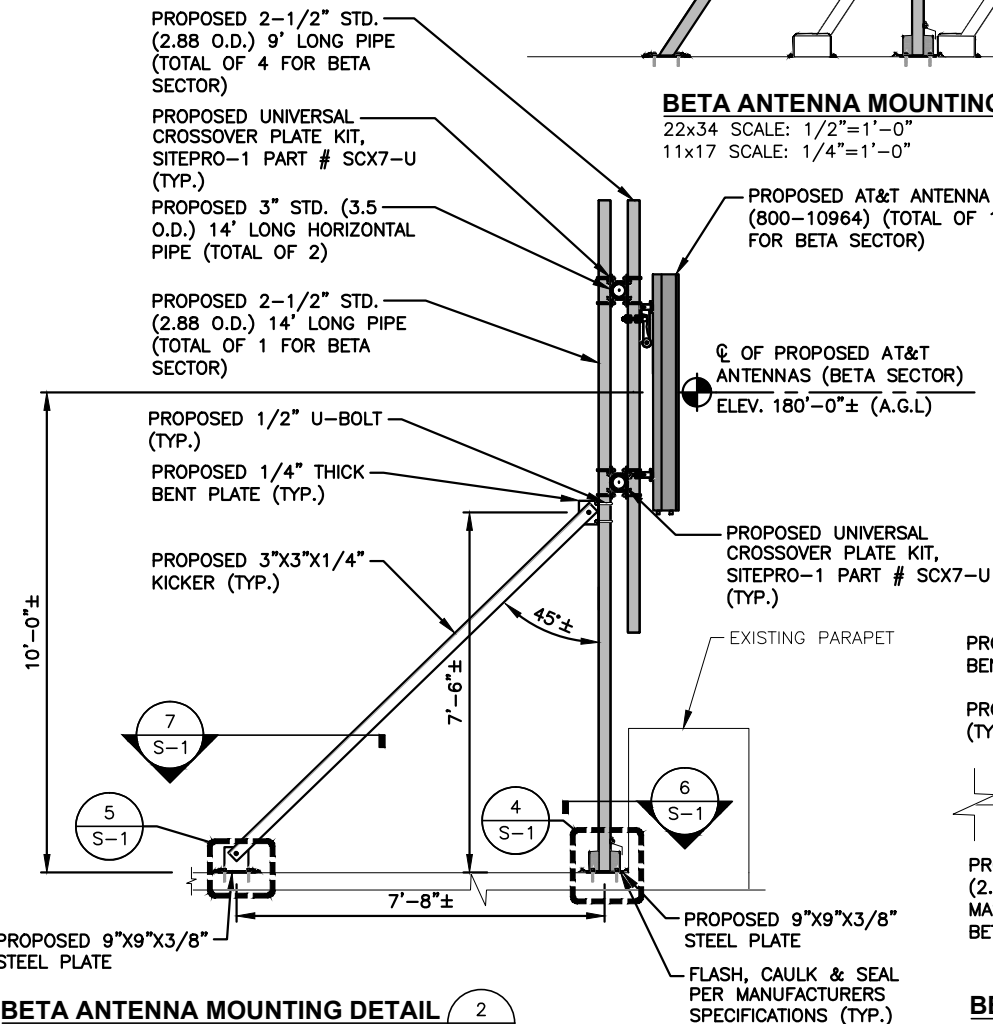
**NOTE:**  
ANTENNAS, WIRES, MOUNTS, AND  
ASSOCIATED EQUIPMENT WILL BE  
PAINTED TO MATCH THE ADJACENT  
BUILDING FACADE OR BACKGROUND

**NOTE:**  
REFER TO THE FINAL RF DATA SHEET  
FOR FINAL ANTENNA SETTINGS.



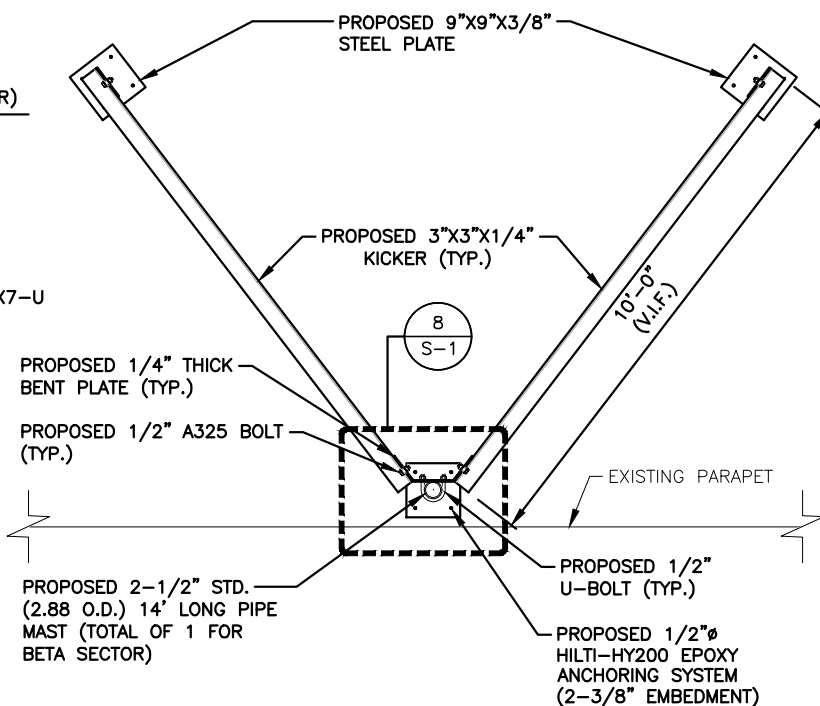
**BETA ANTENNA MOUNTING FACE DETAIL** 1

22x34 SCALE: 1/2"=1'-0"  
11x17 SCALE: 1/4"=1'-0"



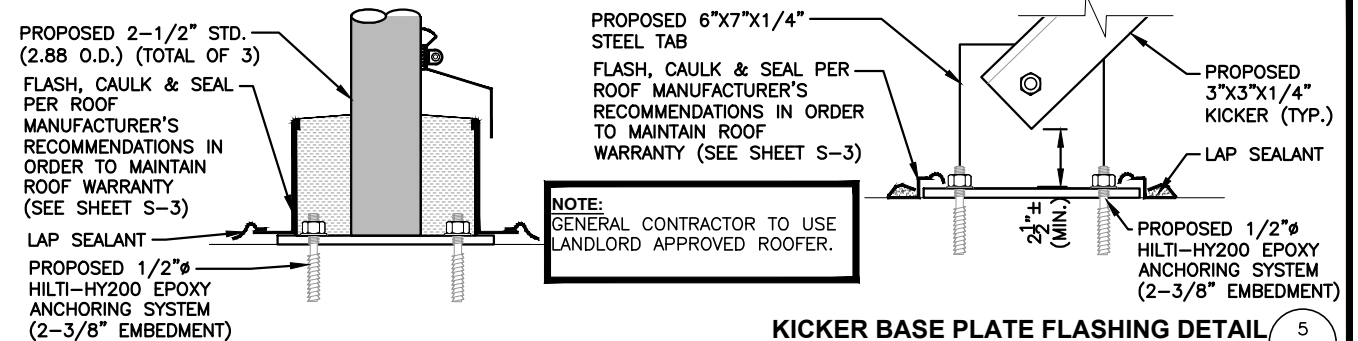
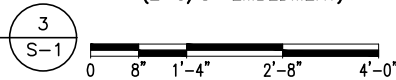
**BETA ANTENNA MOUNTING DETAIL** 2

22x34 SCALE: 1/2"=1'-0"  
11x17 SCALE: 1/4"=1'-0"



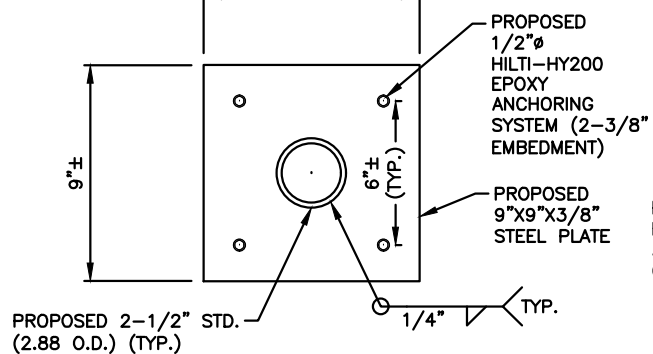
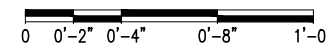
**BETA MOUNT PLAN** 3

22x34 SCALE: 3/4"=1'-0"  
11x17 SCALE: 3/8"=1'-0"



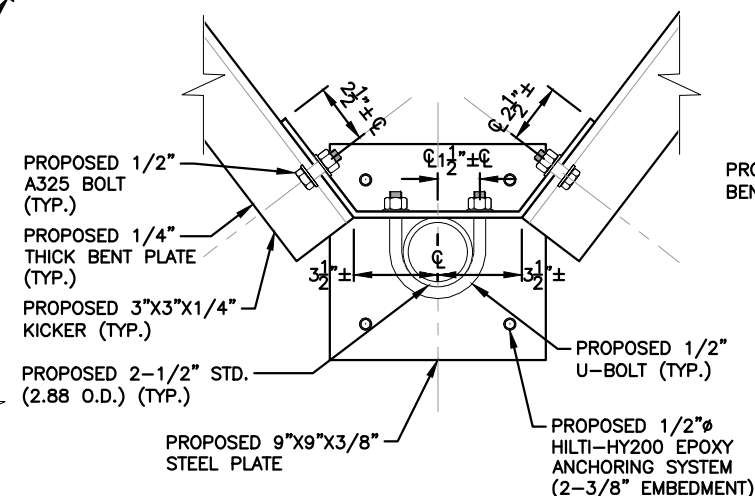
**PIPE BASE PLATE FLASHING DETAIL** 4

22x34 SCALE: 3"=1'-0"  
11x17 SCALE: 1-1/2"=1'-0"



**BASE PLATE DETAIL** 6

22x34 SCALE: 3"=1'-0"  
11x17 SCALE: 1-1/2"=1'-0"



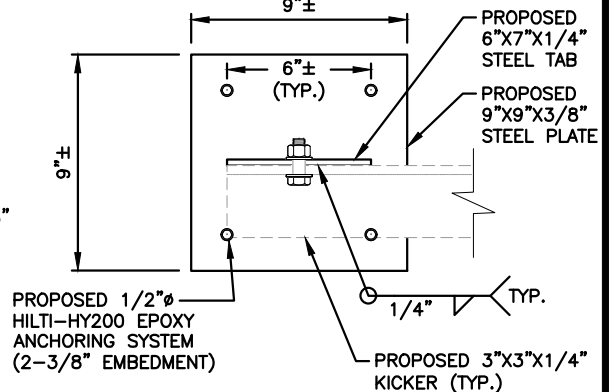
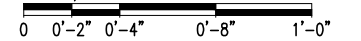
**CONNECTION DETAIL** 8

22x34 SCALE: 3"=1'-0"  
11x17 SCALE: 1-1/2"=1'-0"



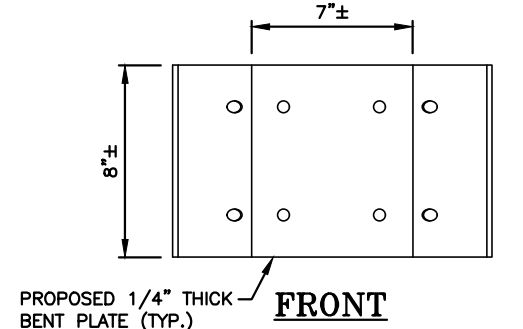
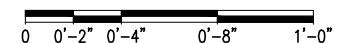
**KICKER BASE PLATE FLASHING DETAIL** 5

22x34 SCALE: 3"=1'-0"  
11x17 SCALE: 1-1/2"=1'-0"

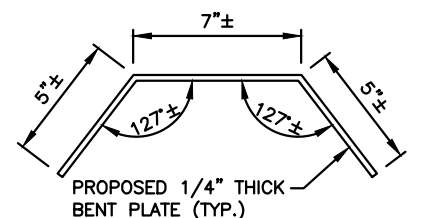


**KICKER BASE PLATE DETAIL** 7

22x34 SCALE: 3"=1'-0"  
11x17 SCALE: 1-1/2"=1'-0"



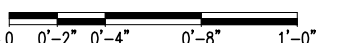
**FRONT**



**TOP**

**BENT PLATE DETAIL** 9

22x34 SCALE: 3"=1'-0"  
11x17 SCALE: 1-1/2"=1'-0"



**HDG** HUDSON  
Design Group LLC

45 BEECHWOOD DRIVE  
NORTH ANDOVER, MA 01845  
TEL: (978) 557-5553  
FAX: (978) 336-5586

**SAI**

12 INDUSTRIAL WAY  
SALEM, NH 03079

SITE NUMBER: CT2034  
SITE NAME: N. HAVEN-310 ORANGE ST-SBC CO

310 ORANGE STREET DUP 1  
NEW HAVEN, CT 06510  
NEW HAVEN COUNTY

**at&t**

500 ENTERPRISE DRIVE, SUITE 3A  
ROCKY HILL, CT 06067

|        |          |                         |    |           |       |
|--------|----------|-------------------------|----|-----------|-------|
| 2      | 07/24/19 | ISSUED FOR CONSTRUCTION | AM | AT        | DJC   |
| 1      | 06/19/19 | ISSUED FOR CONSTRUCTION | EB | AT        | DJC   |
| 0      | 06/04/19 | ISSUED FOR REVIEW       | SG | AT        | DJC   |
| A      | 05/22/19 | ISSUED FOR REVIEW       | AM | AT        | DJC   |
| NO.    | DATE     | REVISIONS               | BY | CHK       | APP'D |
| SCALE: | AS SHOWN | DESIGNED BY:            | AT | DRAWN BY: | AM    |

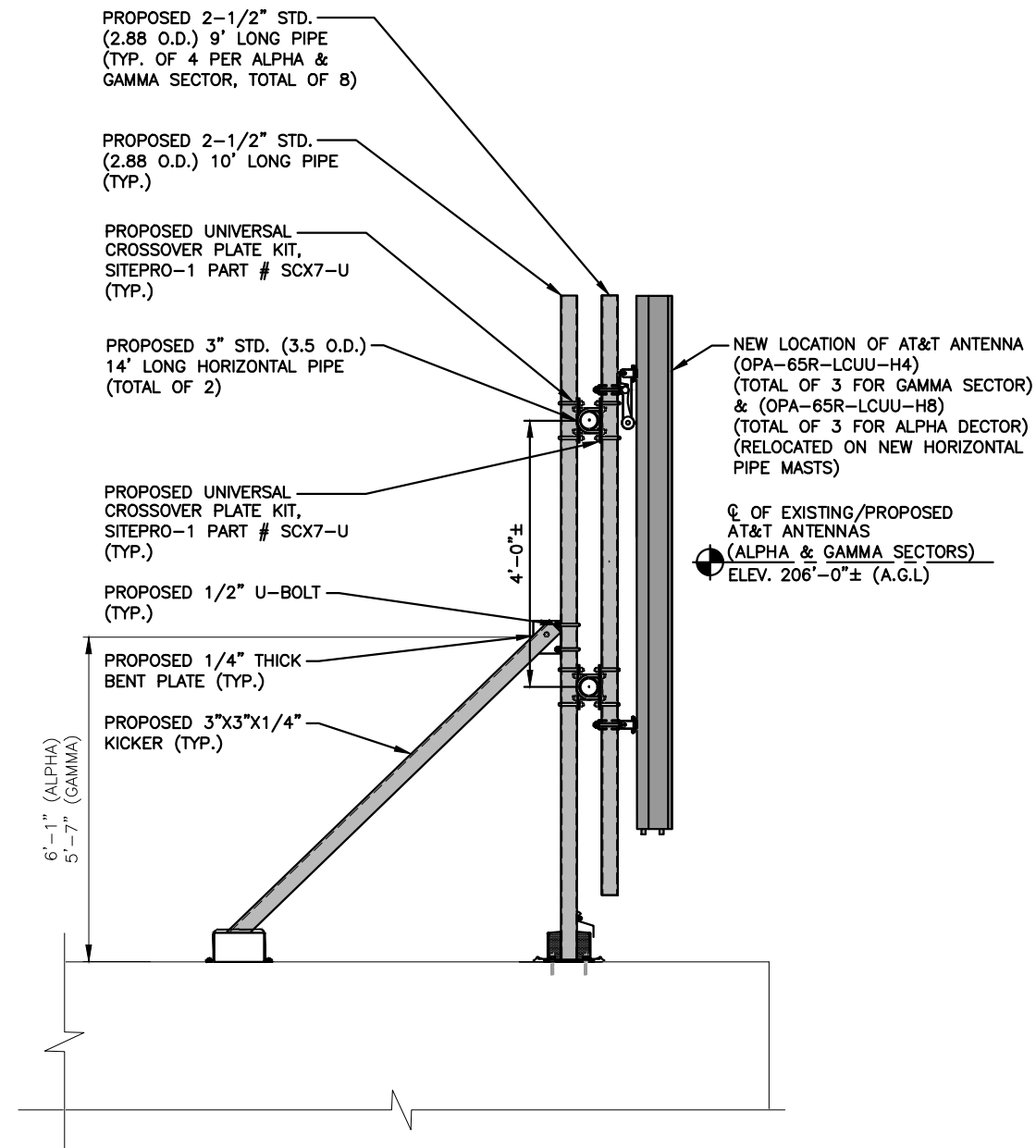
STATE OF CONNECTICUT  
DANIEL P. HAMM  
No. 24178  
LICENSED PROFESSIONAL ENGINEER

|                                         |                |     |
|-----------------------------------------|----------------|-----|
| AT&T                                    |                |     |
| STRUCTURAL DETAILS<br>(LTE 4C_5C_6C_7C) |                |     |
| SITE NUMBER                             | DRAWING NUMBER | REV |
| CT2034                                  | S-1            | 2   |

NOTE:  
REFER TO **STRUCTURAL ANALYSIS**  
BY: HUDSON DESIGN GROUP, LLC,  
DATED: JULY 23, 2019 (REV.2),  
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NOTE:  
ANTENNAS, WIRES, MOUNTS, AND  
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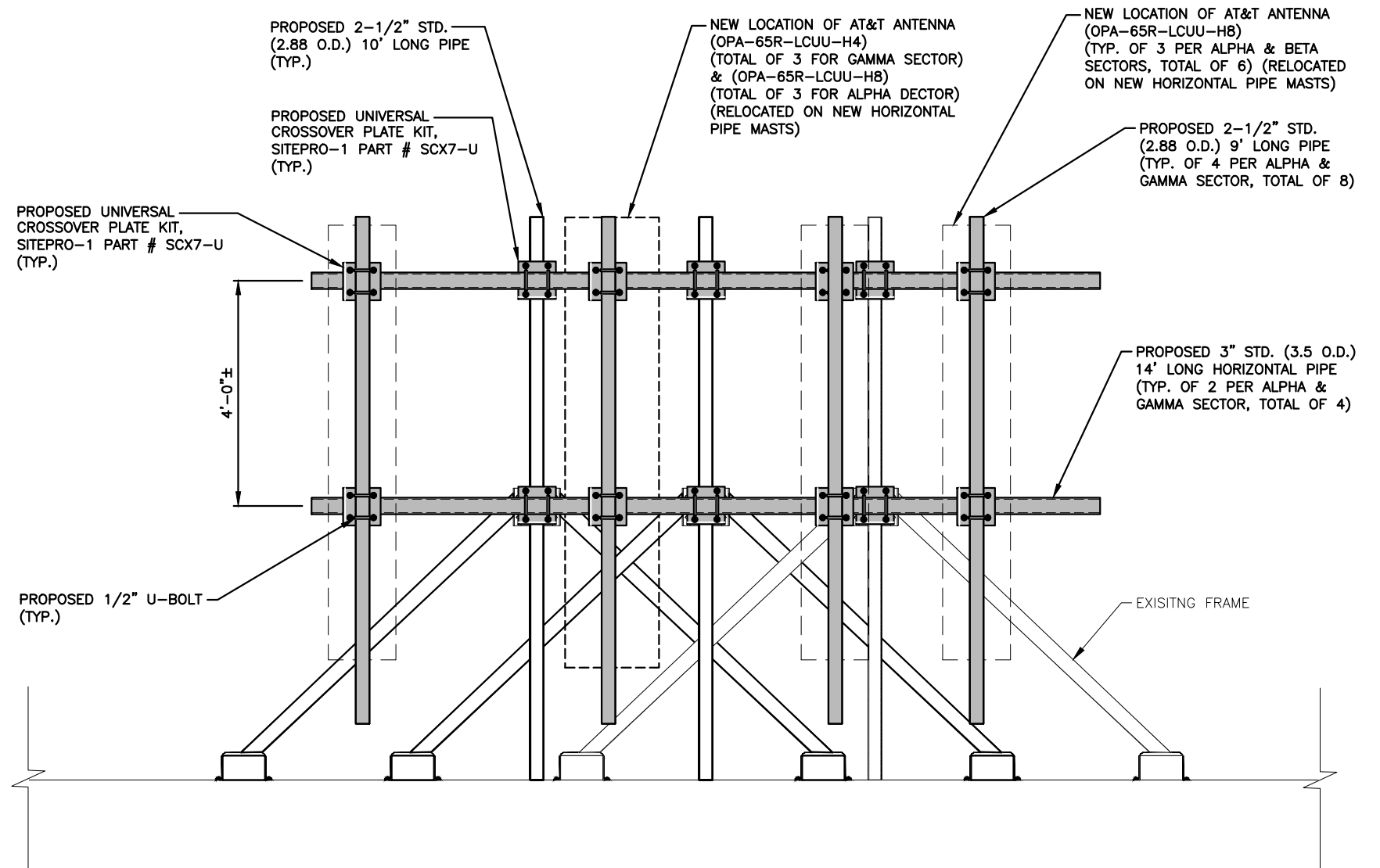
NOTE:  
REFER TO THE FINAL RF DATA SHEET  
FOR FINAL ANTENNA SETTINGS.



**ALPHA & GAMMA SECTORS  
ANTENNA MOUNTING DETAIL**

22x34 SCALE: 3/4"=1'-0"  
11x17 SCALE: 3/8"=1'-0"

1  
S-2

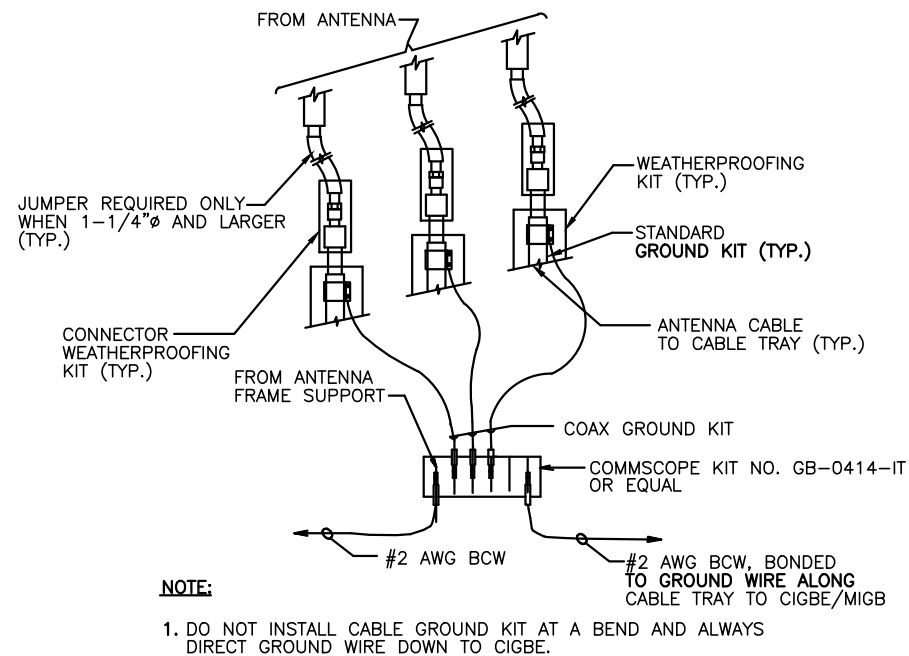


**ALPHA & GAMMA SECTORS  
ANTENNA MOUNTING FACE DETAIL**

22x34 SCALE: 3/4"=1'-0"  
11x17 SCALE: 3/8"=1'-0"

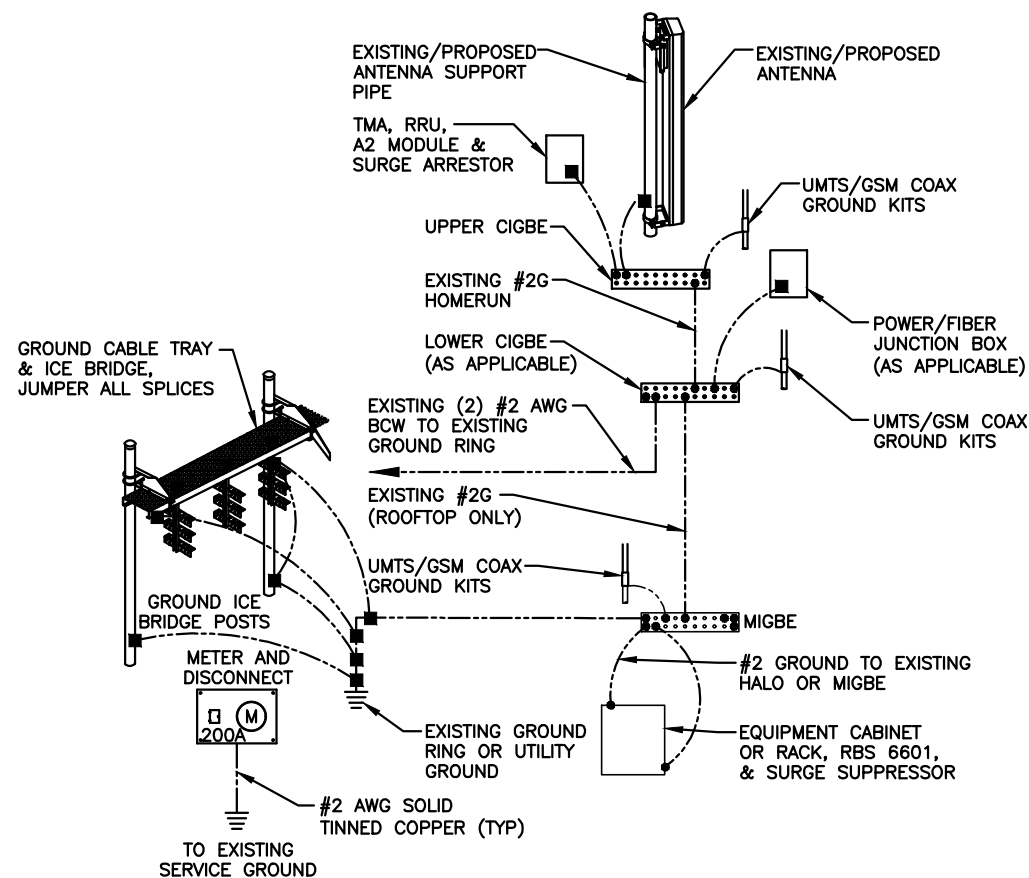
2  
S-2





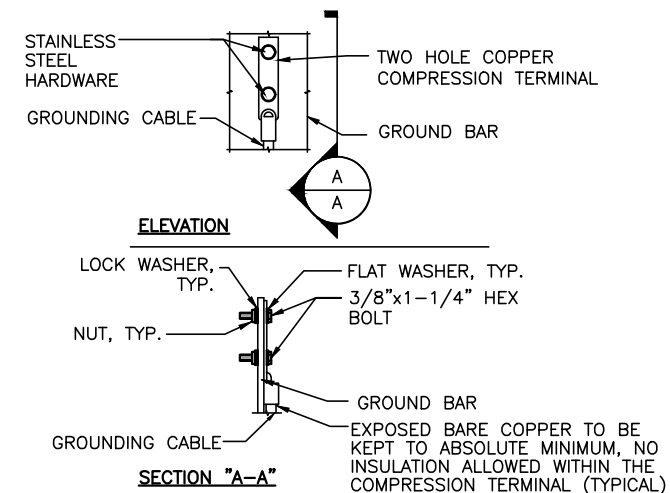
**GROUND WIRE TO GROUND BAR CONNECTION DETAIL**  
SCALE: N.T.S

1  
G-1



**GROUNDING RISER DIAGRAM**  
SCALE: N.T.S

2  
G-1



- NOTES:**  
1. "DOUBLING UP" OR "STACKING" OF CONNECTION IS NOT PERMITTED.  
2. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATION.  
3. CADWELD DOWNLEADS FROM UPPER EGB, LOWER EGB, AND MGB

**TYPICAL GROUND BAR CONNECTION DETAIL**  
SCALE: N.T.S

3  
G-1

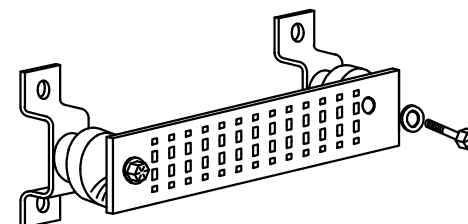
EACH GROUND CONDUCTOR TERMINATING ON ANY GROUND BAR SHALL HAVE AN IDENTIFICATION TAG ATTACHED AT EACH END THAT WILL IDENTIFY ITS ORIGIN AND DESTINATION.

**SECTION "P" - SURGE PRODUCERS**

CABLE ENTRY PORTS (HATCH PLATES) (#2 AWG)  
GENERATOR FRAMEWORK (IF AVAILABLE) (#2 AWG)  
TELCO GROUND BAR  
COMMERCIAL POWER COMMON NEUTRAL/GROUND BOND (#2 AWG)  
+24V POWER SUPPLY RETURN BAR (#2 AWG)  
-48V POWER SUPPLY RETURN BAR (#2 AWG)  
RECTIFIER FRAMES.

**SECTION "A" - SURGE ABSORBERS**

INTERIOR GROUND RING (#2 AWG)  
EXTERNAL EARTH GROUND FIELD (BURIED GROUND RING) (#2 AWG)  
METALLIC COLD WATER PIPE (IF AVAILABLE) (#2 AWG)  
BUILDING STEEL (IF AVAILABLE) (#2 AWG)



**GROUND BAR - DETAIL**  
SCALE: N.T.S

4  
G-1





**(REVISED)**  
**STRUCTURAL ANALYSIS REPORT**

For

**CT2034 (LTE 4C/5C/6C/7C)**  
**N. HAVEN – 310 ORANGE ST – SBC CO.**  
310 Orange Street  
New Haven, CT 06510

**Antennas on Pipes Hard-Mounted to Roof;  
Equipment Room inside Penthouse**



Prepared for:



Dated: July 23, 2019 (Rev.2)

May 23, 2019 (Rev.1)

May 6, 2019

Prepared by:



45 Beechwood Drive  
North Andover, MA 01845  
(P) 978.557.5553 (F) 978.336.5586  
[www.hudsondesigngroupllc.com](http://www.hudsondesigngroupllc.com)



## SCOPE OF WORK:

Hudson Design Group LLC (HDG) has been authorized by AT&T to conduct a structural evaluation of the structure supporting the proposed equipment located in the areas depicted in the latest HDG construction drawings.

This report represents this office's findings, conclusions and recommendations pertaining to the support of AT&T's proposed antennas listed below.

This office conducted an on-site visual survey of the above areas on April 4, 2019. Attendees included Jonathan Schallack (HDG – Lead Designer).

The following documents were used for our reference:

- Previous HDG Structural Analysis Report dated February 3, 2017.
- Construction drawings prepared by HDG dated July 27, 2017.

## CONCLUSION SUMMARY:

Based on our evaluation, we have determined that the existing/proposed connections **ARE CAPABLE** of supporting the proposed equipment loading.

|                             | Member       | Stress Ratio | Pass/Fail |
|-----------------------------|--------------|--------------|-----------|
| Epoxy Anchor (Alpha Sector) | HIT – HY 200 | 19%          | PASS      |
| Epoxy Anchor (Beta Sector)  | HIT – HY 200 | 14%          | PASS      |
| Epoxy Anchor (Gamma Sector) | HIT – HY 200 | 13%          | PASS      |

Based on our evaluation, we have determined that the proposed mounts **ARE CAPABLE** of supporting the proposed equipment loading with the following modification:

- Install new 2-1/2" std. (2.88" O.D.) vertical mounting pipe with (2) L3x3x1/4 steel angle kickers hard mounted to the roof (total of 1 per Beta Sector).

|                                      | Member | Controlling Load Case | Stress Ratio | Pass/Fail |
|--------------------------------------|--------|-----------------------|--------------|-----------|
| Antenna Mount (Alpha Sector)         | 1      | LC3                   | 88%          | PASS      |
| Antenna Mount (Beta Sector)          | 7      | LC3                   | 131%         | FAIL      |
| Modified Antenna Mount (Beta Sector) | 7      | LC3                   | 98%          | PASS      |
| Antenna Mount (Gamma Sector)         | 1      | LC3                   | 51%          | PASS      |

Reference the table below for the RRH minimum ballast requirements:

| RRH MINIMUM BALLAST REQUIREMENTS |                 |
|----------------------------------|-----------------|
| Number of Blocks per Side        | 7               |
| Size of Blocks                   | 4"x8"x16" Solid |
| Weight of Blocks                 | 38 lbs. /each   |
| Total Ballast Weight             | 532 lbs.        |

HDG did not perform a condition assessment of the entire roof but did perform an inspection of the existing roof members and structural bearing walls below the area where the equipment is proposed to be located.

\*Reference documents attached.





**APPURTENANCE CONFIGURATION:**

| Appurtenances                                  | Dimensions        | Weight   | **Elevation | Mount          |
|------------------------------------------------|-------------------|----------|-------------|----------------|
| (3) OPA-65R-LCUU-H4 Antennas                   | 48.0"x14.4"x7.3"  | 57 lbs   | 206'        | Pipe Mast      |
| (6) OPA-65R-LCUU-H8 Antennas                   | 92.7"x14.4"x7.0"  | 88 lbs   | 180', 206'  | Pipe Mast      |
| (3) RRUS-32 RRH's                              | 27.2"x12.1"x7.0"  | 60 lbs   | 180', 206'  | Ballast Mount  |
| (3) RRUS-11 RRH's                              | 19.7"x17.0"x7.2"  | 51 lbs   | 180', 206'  | Ballast Mount  |
| (3) Surge Arrestors                            | 15.2"x17.7"x6.4"  | 38 lbs   | 180', 206'  | Ballast Mount  |
| <b>(1) 800-10966 Antenna</b>                   | 96.0"x20.0"x6.9"  | 115 lbs  | 180'        | Pipe Mast      |
| <b>(2) 800-10964 Antennas</b>                  | 59.0"x20.0"x6.9"  | 84 lbs   | 206'        | Pipe Mast      |
| <b>(3) RRUS-E2 RRH's</b>                       | 20.4"x18.5"x7.5"  | 53 lbs   | 180', 206'  | Ballast Mount  |
| <b>(3) B14 4478 RRH's</b>                      | 18.1"x13.4"x8.3"  | 60 lbs   | 180', 206'  | Ballast Mount  |
| <b>(3) 4478 B5 RRH's</b>                       | 18.1"x13.4"x8.3"  | 60 lbs   | 180', 206'  | Ballast Mount  |
| <b>(3) 8843 B2/B66A RRH's</b>                  | 14.9"x13.2"x10.9" | 72 lbs   | 180', 206'  | Ballast Mount  |
| <b>(6) DBCT108F1V92-2 Diplexers</b>            | 10.7"x6.8"x7.2"   | 29 lbs   | 180', 206'  | Pipe Mast      |
| <b>(3) Squid Surge Arrestors</b>               | 24.0"x9.7" Ø      | 33 lbs   | 180', 206'  | Ballast Mount  |
| <b>(1) Netsure 7100 Power Plant w/ Battery</b> |                   | 2250 lbs |             | Equipment Room |

\* Proposed equipment shown in bold.

\*\* Elevation to antenna centerline (180' → Alpha Sector; 206' → Beta/Gamma Sector).



**DESIGN CRITERIA:**

| <b>International Building Code 2015 with 2018 Connecticut State Building Code, and ASCE 7-10 (Minimum Design Loads for Buildings and Other Structures).</b> |           |                            |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|----------------------------|
| <b>Wind</b>                                                                                                                                                 |           |                            |
| Reference Wind Speed:                                                                                                                                       | 125 mph   | (2018 CTSBC Appendix N)    |
| Exposure Category:                                                                                                                                          | B         | (ASCE 7-10 Chapter 26)     |
| Risk Category:                                                                                                                                              | II        | (ASCE 7-10 Table 1.5-1)    |
| <b>Snow</b>                                                                                                                                                 |           |                            |
| Ground Snow, $P_g$ :                                                                                                                                        | 30        | (2018 CTSBC Appendix N)    |
| Importance Factor ( $I_s$ ):                                                                                                                                | 1.0       | (ASCE 7-10 Table 1.5-2)    |
| Exposure Factor ( $C_e$ ):                                                                                                                                  | 0.9       | (Fully Exposed, Table 7-2) |
| Thermal Factor ( $C_t$ ):                                                                                                                                   | 1.0       | (ASCE 7-10 Table 7-3)      |
| Flat Roof Snow Load:                                                                                                                                        | 18.9 psf  | (ASCE 7-10 Equation 7.3-1) |
| Min. Flat Roof Snow Load:                                                                                                                                   | 30 psf    |                            |
| <b>EIA/TIA-222-H Structural Standards for Steel Antenna Towers and Antenna Supporting Structures</b>                                                        |           |                            |
| <b>Wind</b>                                                                                                                                                 |           |                            |
| City/Town:                                                                                                                                                  | New Haven |                            |
| County:                                                                                                                                                     | New Haven |                            |
| Wind Load:                                                                                                                                                  | 120 mph   | (TIA-222-H Annex B)        |
| <b>Ice</b>                                                                                                                                                  |           |                            |
| Design Ice Thickness ( $t_i$ ):                                                                                                                             | 1.00 in   | (TIA-222-H Annex B)        |
| Structure Class:                                                                                                                                            | II        | (TIA-222-H Table 2-1)      |
| Importance Factor ( $I_i$ ):                                                                                                                                | 1.0       | (TIA-222-H Table 2-3)      |
| Factored Thickness of Radial Ice ( $t_{iz}$ ):                                                                                                              | 1.20 in   | (TIA-222-H Sec. 2.6.10)    |



### **EXISTING ROOF CONSTRUCTION:**

The existing roof construction consists of a roofing membrane over rigid insulation over concrete slab over metal decking supported by steel beams and columns.

### **ANTENNA SUPPORT RECOMMENDATIONS:**

The new antennas are proposed to be mounted on new pipe masts secured to existing vertical mounting pipes secured to the roof structure with epoxy anchors. The pipes are braced back to the roof with angle kickers secured with epoxy anchors.

### **RRH / SURGE ARRESTOR SUPPORT RECOMMENDATIONS:**

The new RRH's and surge arrestors are proposed to be installed on new non-penetrating ballast sleds located on the roof. Reference the table on page 2 for the minimum ballast requirements.

### **EQUIPMENT SUPPORT RECOMMENDATIONS:**

The new equipment cabinet is proposed to be installed within the existing equipment room inside the penthouse.

### Limitations and Assumptions:

1. Reference the latest HDG construction drawings for all the equipment locations.
2. All detail requirements will be designed and furnished in the construction drawings.
3. All structural members and their connections are assumed to be in good condition and are free from defects with no deterioration to its member capacities. Contractor to perform pre-inspection prior to construction.
4. HDG is not responsible for any modifications completed prior to and hereafter which HDG was not directly involved.
5. All antennas, coax cables and waveguide cables are assumed to be properly installed and supported as per the manufacturer requirements.
6. If field conditions differ from what is assumed in this report, then the engineer of record is to be notified as soon as possible.



**FIELD PHOTOS:**

**Photo 1:** Sample photo illustrating the existing alpha sector mount.



**Photo 2:** Sample photo illustrating the existing beta sector mount.

**FIELD PHOTOS (CONT.):**



**Photo 3:** Sample photo illustrating the existing gamma sector mount.



**Photo 4:** Sample photo illustrating the existing RRH non-penetrating ballast mount.



**FIELD PHOTOS (CONT.):**

**Photo 5:** Sample photo illustrating the existing equipment room.





**HUDSON**  
Design Group LLC

## Ice Calculations

Date: 7/23/2019

Project Name: N. HAVEN – 310 ORANGE ST – S&C CO.

Project No.: CT2034

Designed By: BD Checked By: MSC



HUDSON  
Design Group LLC

#### ICE WEIGHT CALCULATIONS

Thickness of ice: 1.20 in.  
Density of ice: 56 pcf

##### OPA-65R-LCUU-H4 Antenna

Weight of ice based on total radial SF area:

Height (in): 48.0  
Width (in): 14.4  
Depth (in): 7.3

Total weight of ice on object: 102 lbs

Weight of object: 57.0 lbs

Combined weight of ice and object: 159 lbs

##### 800-10966 Antenna

Weight of ice based on total radial SF area:

Height (in): 96.0  
Width (in): 20.0  
Depth (in): 6.9

Total weight of ice on object: 262 lbs

Weight of object: 115.0 lbs

Combined weight of ice and object: 377 lbs

##### RRUS-11 RRH

Weight of ice based on total radial SF area:

Height (in): 19.7  
Width (in): 17.0  
Depth (in): 7.2

Total weight of ice on object: 47 lbs

Weight of object: 51.0 lbs

Combined weight of ice and object: 98 lbs

##### B14 4478 RRH

Weight of ice based on total radial SF area:

Height (in): 18.1  
Width (in): 13.4  
Depth (in): 8.3

Total weight of ice on object: 38 lbs

Weight of object: 60.0 lbs

Combined weight of ice and object: 98 lbs

##### 4478 B5 RRH

Weight of ice based on total radial SF area:

Height (in): 18.1  
Width (in): 13.4  
Depth (in): 8.3

Total weight of ice on object: 38 lbs

Weight of object: 60.0 lbs

Combined weight of ice and object: 98 lbs

##### DBCT108F1V92-2 Diplexer

Weight of ice based on total radial SF area:

Height (in): 10.7  
Width (in): 6.8  
Depth (in): 7.2

Total weight of ice on object: 15 lbs

Weight of object: 29.0 lbs

Combined weight of ice and object: 44 lbs

##### Squid Surge Arrestor

Weight of ice based on total radial SF area:

Depth (in): 24.0  
Diameter(in): 9.7

Total weight of ice on object: 32 lbs

Weight of object: 33 lbs

Combined weight of ice and object: 65 lbs

##### L 3x3 Angles

Weight of ice based on total radial SF area:

Height (in): 3  
Width (in): 3

Per foot weight of ice on object: 8 plf

##### OPA-65R-LCUU-H8 Antenna

Weight of ice based on total radial SF area:

Height (in): 92.7  
Width (in): 14.4  
Depth (in): 7.0

Total weight of ice on object: 195 lbs

Weight of object: 88.0 lbs

Combined weight of ice and object: 283 lbs

##### 800-10964 Antenna

Weight of ice based on total radial SF area:

Height (in): 59.0  
Width (in): 20.0  
Depth (in): 6.9

Total weight of ice on object: 161 lbs

Weight of object: 84.0 lbs

Combined weight of ice and object: 245 lbs

##### RRUS-32 RRH

Weight of ice based on total radial SF area:

Height (in): 27.2  
Width (in): 12.1  
Depth (in): 7.0

Total weight of ice on object: 50 lbs

Weight of object: 60.0 lbs

Combined weight of ice and object: 110 lbs

##### RRUS-E2 RRH

Weight of ice based on total radial SF area:

Height (in): 20.4  
Width (in): 18.5  
Depth (in): 7.5

Total weight of ice on object: 53 lbs

Weight of object: 53.0 lbs

Combined weight of ice and object: 106 lbs

##### 8843 B2/B66A RRH

Weight of ice based on total radial SF area:

Height (in): 14.9  
Width (in): 13.2  
Depth (in): 10.9

Total weight of ice on object: 33 lbs

Weight of object: 72.0 lbs

Combined weight of ice and object: 105 lbs

##### Surge Arrestor

Weight of ice based on total radial SF area:

Height (in): 15.2  
Width (in): 17.7  
Depth (in): 6.4

Total weight of ice on object: 37 lbs

Weight of object: 38.0 lbs

Combined weight of ice and object: 75 lbs

##### 2" pipe

Per foot weight of ice:

diameter (in): 2.38

Per foot weight of ice on object: 5 plf

##### 2-1/2" pipe

Per foot weight of ice:

diameter (in): 2.88

Per foot weight of ice on object: 6 plf

##### 3" pipe

Per foot weight of ice:

diameter (in): 3.5

Per foot weight of ice on object: 7 plf



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## **Alpha Sector Wind Calculations**



Date: 7/23/2019  
 Project Name: N. HAVEN – 310 ORANGE ST – SBC CO.  
 Project No.: CT2034  
 Designed By: BD Checked By: MSC



# ALPHA SECTOR

## 2.6.5.2 Velocity Pressure Coeff:

$$K_z = 2.01 (z/z_g)^{2/\alpha}$$

$K_z =$  1.169

$z =$  180 (ft)

$z_g =$  1200 (ft)

$\alpha =$  7.0

$$K_{zmin} \leq K_z \leq 2.01$$

Table 2-4

| Exposure | $Z_g$   | $\alpha$ | $K_{zmin}$ | $K_c$ |
|----------|---------|----------|------------|-------|
| B        | 1200 ft | 7.0      | 0.70       | 0.9   |
| C        | 900 ft  | 9.5      | 0.85       | 1.0   |
| D        | 700 ft  | 11.5     | 1.03       | 1.1   |

## 2.6.6.2 Topographic Factor:

Table 2-5

| Topo. Category | $K_t$ | $f$  |
|----------------|-------|------|
| 2              | 0.43  | 1.25 |
| 3              | 0.53  | 2.0  |
| 4              | 0.72  | 1.5  |

$$K_{zt} = [1 + (K_c K_t / K_h)]^2$$

$$K_h = e^{(f \cdot z / H)}$$

$K_{zt} =$  #DIV/0!

$K_h =$  #DIV/0!

$K_c =$  0.9 (from Table 2-4)

$K_t =$  (from Table 2-5)

$f =$  (from Table 2-5)

$z =$  180

$z_s =$  29 (Mean elevation of base of structure above sea level)

$H =$  0 (Ht. of the crest above surrounding terrain)

$K_{zt} =$  1.00 (from 2.6.6.2.1)

$K_e =$  1.00 (from 2.6.8)

(If Category 1 then  $K_{zt} = 1.0$ )

Category= 1

## 2.6.10 Design Ice Thickness

Max Ice Thickness =

Importance Factor =

$t_i =$  1.00 in

$I =$  1.0 (from Table 2-3)

$K_{iz} =$  1.18 (from Sec. 2.6.10)

$$t_{iz} = t_i * I * K_{iz} * (K_{zt})^{0.35}$$

$t_{iz} =$  1.18 in

Date: 7/23/2019

Project Name: N. HAVEN – 310 ORANGE ST – SBC CO.

Project No.: CT2034

Designed By: BD Checked By: MSC



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## 2.6.9 Gust Effect Factor

### 2.6.9.1 Self Supporting Lattice Structures

$G_h = 1.0$  Latticed Structures > 600 ft

$G_h = 0.85$  Latticed Structures 450 ft or less

$$G_h = 0.85 + 0.15 [h/150 - 3.0]$$

$h$  = ht. of structure

$h =$  166

$G_h =$  0.85

### 2.6.9.2 Guyed Masts

$G_h =$  0.85

### 2.6.9.3 Pole Structures

$G_h =$  1.1

### 2.6.9 Appurtenances

$G_h =$  1.0

### 2.6.9.4 Structures Supported on Other Structures

(Cantilevered tubular or latticed spines, pole, structures on buildings ( $ht. : width$  ratio > 5))

$G_h =$  1.35

$G_h =$  1.00

## 2.6.11.2 Design Wind Force on Appurtenances

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

$$q_z = 0.00256 * K_z * K_{zt} * K_s * K_e * K_d * V_{max}^2$$

$q_z =$  44.37

$q_z (ice) =$  7.10

$q_z (30) =$  2.56

$K_z =$  1.169 (from 2.6.5.2)

$K_{zt} =$  1.0 (from 2.6.6.2.1)

$K_s =$  1.0 (from 2.6.7)

$K_e =$  1.00 (from 2.6.8)

$K_d =$  0.95 (from Table 2-2)

$V_{max} =$  125 mph (Ultimate Wind Speed)

$V_{max (ice)} =$  50 mph

$V_{30} =$  30 mph

Table 2-2

| Structure Type                                                                        | Wind Direction Probability Factor, $K_d$ |
|---------------------------------------------------------------------------------------|------------------------------------------|
| Latticed structures with triangular, square or rectangular cross sections             | 0.85                                     |
| Tubular pole structures, latticed structures with other cross sections, appurtenances | 0.95                                     |
| Tubular pole structures supporting antennas enclosed within a cylindrical shroud      | 1.00                                     |

Date: 7/23/2019  
 Project Name: N. HAVEN – 310 ORANGE ST – SBC CO.  
 Project No.: CT2034  
 Designed By: BD Checked By: MSC



**Determine Ca:**

**Table 2-9**

| Force Coefficients (Ca) for Appurtenances |                                       |                            |                            |                            |
|-------------------------------------------|---------------------------------------|----------------------------|----------------------------|----------------------------|
| Member Type                               |                                       | Aspect Ratio $\leq 2.5$    | Aspect Ratio = 7           | Aspect Ratio $\geq 25$     |
|                                           |                                       | Ca                         | Ca                         | Ca                         |
| Flat                                      |                                       | 1.2                        | 1.4                        | 2.0                        |
| Square/Rectangular HSS                    |                                       | $1.2 - 2.8(r_s) \geq 0.85$ | $1.4 - 4.0(r_s) \geq 0.90$ | $2.0 - 6.0(r_s) \geq 1.25$ |
| Round                                     | C < 39<br>(Subcritical)               | 0.7                        | 0.8                        | 1.2                        |
|                                           | $39 \leq C \leq 78$<br>(Transitional) | $4.14/(C^{0.485})$         | $3.66/(C^{0.415})$         | $46.8/(C^{1.0})$           |
|                                           | C > 78<br>(Supercritical)             | 0.5                        | 0.6                        | 0.6                        |

Aspect Ratio is the overall length/width ratio in the plane normal to the wind direction.  
 (Aspect ratio is independent of the spacing between support points of a linear appurtenance,  
 Note: Linear interpolation may be used for aspect ratios other than those shown.

Ice Thickness = 1.18 in      Angle = 0 (deg)      Equivalent Angle = 180 (deg)

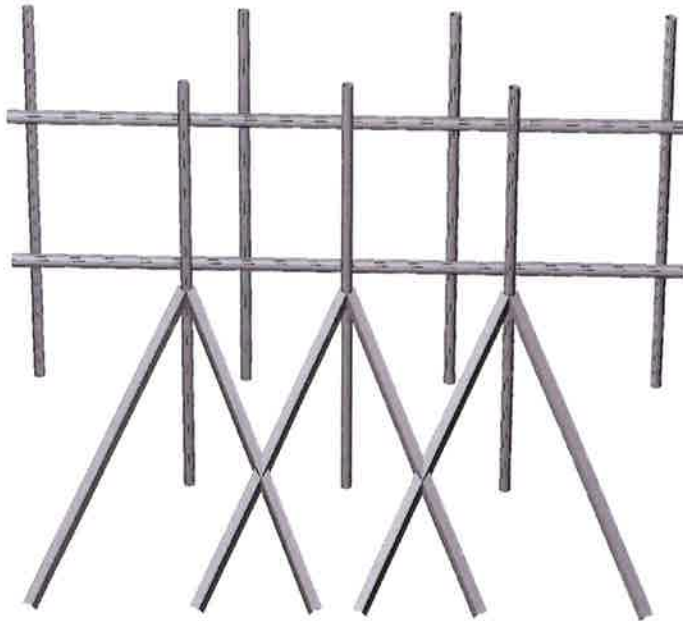
| Appurtenances                  | Height | Width | Depth | Flat Area | Aspect Ratio | Ca   | Force (lbs) | Force (lbs)<br>(w/ Ice) | Force (lbs)<br>(30 mph) |
|--------------------------------|--------|-------|-------|-----------|--------------|------|-------------|-------------------------|-------------------------|
| 800-10966 Antenna              | 96.0   | 20.0  | 6.9   | 13.33     | 4.80         | 1.30 | 770         | 141                     | 44                      |
| 800-10966 Antenna (Side)       | 96.0   | 6.9   | 20.0  | 4.60      | 13.91        | 1.63 | 333         | 73                      | 19                      |
| OPA-65R-LCUU-H8 Antenna        | 92.7   | 14.4  | 7.0   | 9.27      | 6.44         | 1.38 | 566         | 108                     | 33                      |
| OPA-65R-LCUU-H8 Antenna (Side) | 92.7   | 7.0   | 14.4  | 4.51      | 13.24        | 1.61 | 322         | 71                      | 19                      |
| RRUS-11 RRH                    | 19.7   | 17.0  | 7.2   | 2.33      | 1.16         | 1.20 | 124         | 25                      | 7                       |
| RRUS-32 RRH                    | 27.2   | 12.1  | 7.0   | 2.29      | 2.25         | 1.20 | 122         | 25                      | 7                       |
| RRUS-E2 RRH                    | 20.4   | 18.5  | 7.5   | 2.62      | 1.10         | 1.20 | 140         | 28                      | 8                       |
| B14 4478 RRH                   | 18.1   | 13.4  | 8.3   | 1.68      | 1.35         | 1.20 | 90          | 19                      | 5                       |
| 4478 B5 RRH                    | 18.1   | 13.4  | 8.3   | 1.68      | 1.35         | 1.20 | 90          | 19                      | 5                       |
| 8843 B2/B66A RRH               | 14.9   | 13.2  | 10.9  | 1.37      | 1.13         | 1.20 | 73          | 16                      | 4                       |
| DBCT108F1V92-2 Diplexer        | 10.7   | 6.8   | 7.2   | 0.51      | 1.57         | 1.20 | 27          | 7                       | 2                       |
| Surge Arrestor                 | 15.2   | 17.7  | 6.4   | 1.87      | 0.86         | 1.20 | 99          | 21                      | 6                       |
| Squid Surge Arrestor           | 24.0   | 9.7   | 9.7   | 1.62      | 2.47         | 0.70 | 50          | 11                      | 3                       |
| 2" Pipe                        | 2.4    | 12.0  |       | 0.20      | 0.20         | 1.20 | 11          | 4                       | 1                       |
| 2-1/2" Pipe                    | 2.9    | 12.0  |       | 0.24      | 0.24         | 1.20 | 13          | 4                       | 1                       |
| 3" Pipe                        | 3.5    | 12.0  |       | 0.29      | 0.29         | 1.20 | 16          | 5                       | 1                       |
| 3x3 Angle                      | 3.0    | 12.0  |       | 0.25      | 0.25         | 2.00 | 22          | 8                       | 1                       |

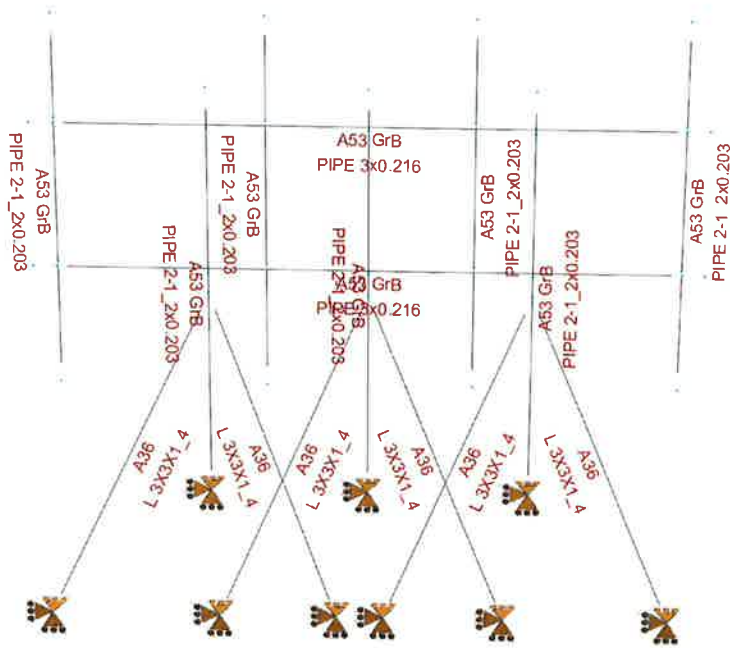




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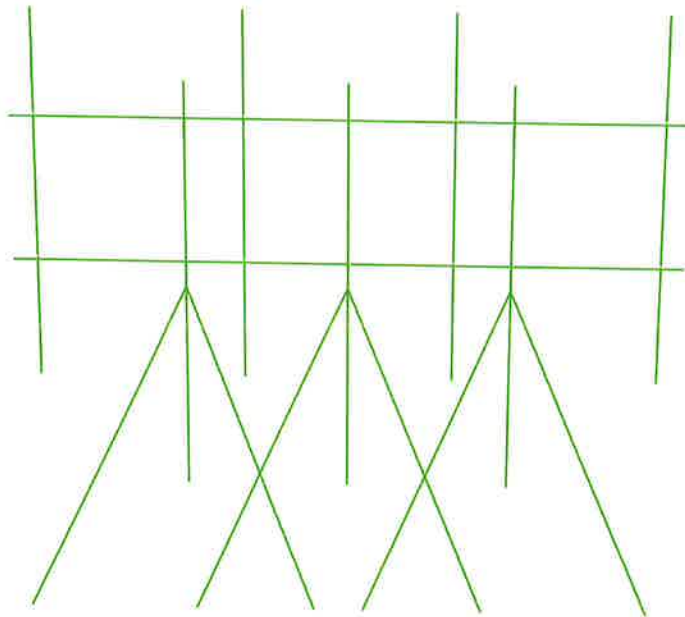
## **Alpha Sector Antenna Mount Calculations**



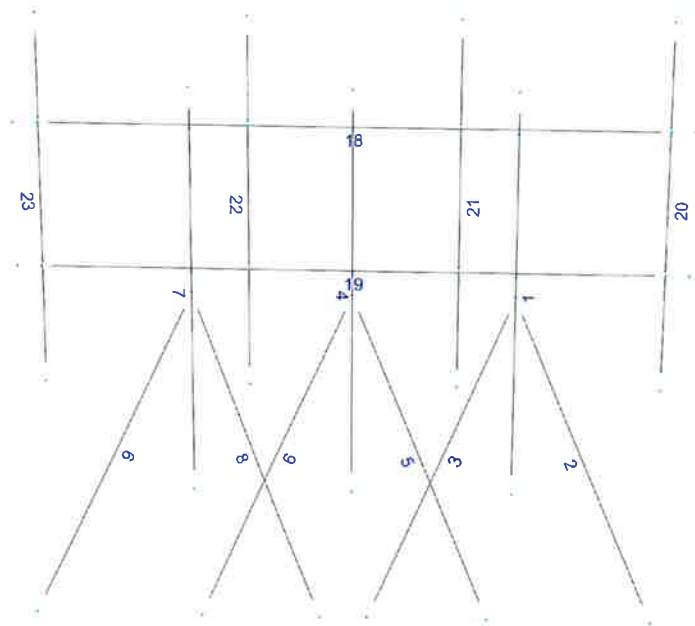


Design status

-  Not designed
-  Error on design
-  Design O.K.
-  With warnings







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## Load data

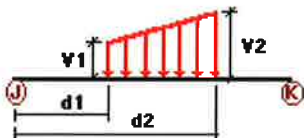
### GLOSSARY

Comb : Indicates if load condition is a load combination

### Load Conditions

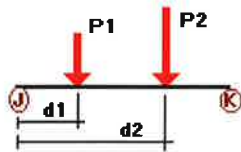
| Condition | Description       | Comb. | Category |
|-----------|-------------------|-------|----------|
| DL        | Dead Load         | No    | DL       |
| Wf        | Wind Load (FRONT) | No    | WIND     |
| Ws        | Wind Load (SIDE)  | No    | WIND     |
| Di        | Ice Load          | No    | LL       |

### Distributed force on members



| Condition | Member | Dir1 | Val1<br>[Kip/ft] | Val2<br>[Kip/ft] | Dist1<br>[ft] | %   | Dist2<br>[ft] | %   |
|-----------|--------|------|------------------|------------------|---------------|-----|---------------|-----|
| Di        | 1      | Y    | -0.006           | -0.006           | 0.00          | Yes | 100.00        | Yes |
|           | 2      | Y    | -0.008           | -0.008           | 0.00          | Yes | 100.00        | Yes |
|           | 3      | Y    | -0.008           | -0.008           | 0.00          | Yes | 100.00        | Yes |
|           | 4      | Y    | -0.006           | -0.006           | 0.00          | Yes | 100.00        | Yes |
|           | 5      | Y    | -0.008           | -0.008           | 0.00          | Yes | 100.00        | Yes |
|           | 6      | Y    | -0.008           | -0.008           | 0.00          | Yes | 100.00        | Yes |
|           | 7      | Y    | -0.006           | -0.006           | 0.00          | Yes | 100.00        | Yes |
|           | 8      | Y    | -0.008           | -0.008           | 0.00          | Yes | 100.00        | Yes |
|           | 9      | Y    | -0.008           | -0.008           | 0.00          | Yes | 100.00        | Yes |
|           | 18     | Y    | -0.007           | -0.007           | 0.00          | Yes | 100.00        | Yes |
|           | 19     | Y    | -0.007           | -0.007           | 0.00          | Yes | 100.00        | Yes |
|           | 20     | Y    | -0.006           | -0.006           | 0.00          | Yes | 100.00        | Yes |
|           | 21     | Y    | -0.006           | -0.006           | 0.00          | Yes | 100.00        | Yes |
|           | 22     | Y    | -0.006           | -0.006           | 0.00          | Yes | 100.00        | Yes |
|           | 23     | Y    | -0.006           | -0.006           | 0.00          | Yes | 100.00        | Yes |

## Concentrated forces on members



| Condition | Member | Dir1 | Value1<br>[Kip] | Dist1<br>[ft] | %  |
|-----------|--------|------|-----------------|---------------|----|
| DL        | 20     | y    | -0.044          | 0.50          | No |
|           |        | y    | -0.044          | 7.50          | No |
|           | 21     | y    | -0.058          | 0.50          | No |
|           |        | y    | -0.058          | 7.50          | No |
|           | 22     | y    | -0.044          | 0.50          | No |
|           |        | y    | -0.044          | 7.50          | No |
|           | 23     | y    | -0.044          | 0.50          | No |
|           |        | y    | -0.044          | 7.50          | No |
| Wf        | 20     | z    | -0.283          | 0.50          | No |
|           |        | z    | -0.283          | 7.50          | No |
|           | 21     | z    | -0.385          | 0.50          | No |
|           |        | z    | -0.385          | 7.50          | No |
|           | 22     | z    | -0.283          | 0.50          | No |
|           |        | z    | -0.283          | 7.50          | No |
|           | 23     | z    | -0.283          | 0.50          | No |
|           |        | z    | -0.283          | 7.50          | No |
| Ws        | 20     | x    | -0.161          | 0.50          | No |
|           |        | x    | -0.161          | 7.50          | No |
|           | 21     | x    | -0.167          | 0.50          | No |
|           |        | x    | -0.167          | 7.50          | No |
|           | 22     | x    | -0.161          | 0.50          | No |
|           |        | x    | -0.161          | 7.50          | No |
|           | 23     | x    | -0.161          | 0.50          | No |
|           |        | x    | -0.161          | 7.50          | No |
| Di        | 20     | y    | -0.098          | 0.50          | No |
|           |        | y    | -0.098          | 7.50          | No |
|           | 21     | y    | -0.131          | 0.50          | No |
|           |        | y    | -0.131          | 7.50          | No |
|           | 22     | y    | -0.098          | 0.50          | No |
|           |        | y    | -0.098          | 7.50          | No |
|           | 23     | y    | -0.098          | 0.50          | No |
|           |        | y    | -0.098          | 7.50          | No |

## Self weight multipliers for load conditions

| Condition | Description       | Self weight multiplier |       |       |       |
|-----------|-------------------|------------------------|-------|-------|-------|
|           |                   | Comb.                  | MultX | MultY | MultZ |
| DL        | Dead Load         | No                     | 0.00  | -1.00 | 0.00  |
| Wf        | Wind Load (FRONT) | No                     | 0.00  | 0.00  | 0.00  |
| Ws        | Wind Load (SIDE)  | No                     | 0.00  | 0.00  | 0.00  |
| Di        | Ice Load          | No                     | 0.00  | 0.00  | 0.00  |

## Earthquake (Dynamic analysis only)

| Condition | a/g  | Ang.<br>[Deg] | Damp.<br>[%] |
|-----------|------|---------------|--------------|
| DL        | 0.00 | 0.00          | 0.00         |
| Wf        | 0.00 | 0.00          | 0.00         |
| Ws        | 0.00 | 0.00          | 0.00         |
| Di        | 0.00 | 0.00          | 0.00         |



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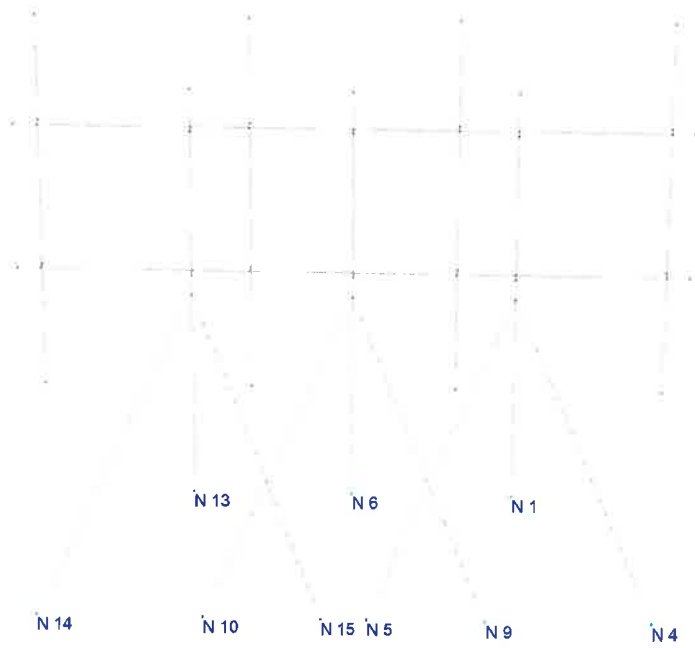
## Steel Code Check

Report: Summary - Group by member

Load conditions to be included in design :

LC1=1.2DL+Wf  
LC2=1.2DL+Ws  
LC3=0.9DL+Wf  
LC4=0.9DL+Ws  
LC5=1.2DL+Wf+Di  
LC6=1.2DL+Ws+Di  
LC7=1.2DL  
LC8=0.9DL

| Description             | Section | Member    | Ctrl Eq.      | Ratio       | Status    | Reference |
|-------------------------|---------|-----------|---------------|-------------|-----------|-----------|
| <b>L 3X3X1_4</b>        |         | <b>2</b>  | LC3 at 0.00%  | 0.51        | OK        | Eq. H2-1  |
|                         |         | <b>3</b>  | LC3 at 0.00%  | <b>0.59</b> | <b>OK</b> | Eq. H2-1  |
|                         |         | <b>5</b>  | LC3 at 0.00%  | 0.30        | OK        | Eq. H2-1  |
|                         |         | <b>6</b>  | LC3 at 0.00%  | 0.30        | OK        | Eq. H2-1  |
|                         |         | <b>8</b>  | LC3 at 0.00%  | 0.55        | OK        | Eq. H2-1  |
|                         |         | <b>9</b>  | LC3 at 0.00%  | 0.48        | OK        | Eq. H2-1  |
| <b>PIPE 2-1_2x0.203</b> |         | <b>1</b>  | LC3 at 48.44% | <b>0.88</b> | <b>OK</b> | Eq. H1-1b |
|                         |         | <b>4</b>  | LC3 at 45.31% | 0.72        | OK        | Eq. H1-1b |
|                         |         | <b>7</b>  | LC3 at 48.44% | 0.84        | OK        | Eq. H1-1b |
|                         |         | <b>20</b> | LC5 at 64.58% | 0.28        | OK        | Eq. H1-1b |
|                         |         | <b>21</b> | LC5 at 27.08% | 0.32        | OK        | Eq. H1-1b |
|                         |         | <b>22</b> | LC5 at 27.08% | 0.23        | OK        | Eq. H1-1b |
| <b>PIPE 3x0.216</b>     |         | <b>18</b> | LC5 at 74.22% | <b>0.44</b> | <b>OK</b> | Eq. H1-1b |
|                         |         | <b>19</b> | LC3 at 74.22% | 0.35        | OK        | Eq. H1-1b |



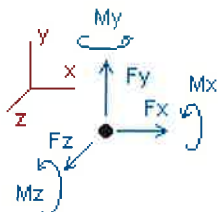
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## Analysis result

### Reactions



Direction of positive forces and moments

| Node                          | Forces [Kip] |          |          | Moments [Kip*ft] |         |         |
|-------------------------------|--------------|----------|----------|------------------|---------|---------|
|                               | FX           | FY       | FZ       | MX               | MY      | MZ      |
| Condition <b>LC1=1.2DL+Wf</b> |              |          |          |                  |         |         |
| 1                             | 0.01316      | -1.12832 | -0.27772 | 0.00000          | 0.00000 | 0.00000 |
| 4                             | 0.34027      | 0.71341  | 0.61845  | 0.00000          | 0.00000 | 0.00000 |
| 5                             | -0.59231     | 1.10253  | 1.02538  | 0.00000          | 0.00000 | 0.00000 |
| 6                             | 0.00108      | -0.22436 | -0.22594 | 0.00000          | 0.00000 | 0.00000 |
| 9                             | 0.00698      | 0.14529  | 0.04743  | 0.00000          | 0.00000 | 0.00000 |
| 10                            | -0.00514     | 0.13822  | 0.04404  | 0.00000          | 0.00000 | 0.00000 |
| 13                            | -0.01253     | -1.00108 | -0.26657 | 0.00000          | 0.00000 | 0.00000 |
| 14                            | -0.30089     | 0.64208  | 0.55032  | 0.00000          | 0.00000 | 0.00000 |
| 15                            | 0.54937      | 1.03044  | 0.95262  | 0.00000          | 0.00000 | 0.00000 |
| SUM                           | 0.00000      | 1.41822  | 2.46800  | 0.00000          | 0.00000 | 0.00000 |
| Condition <b>LC2=1.2DL+Ws</b> |              |          |          |                  |         |         |
| 1                             | -0.02796     | 0.95994  | 0.00437  | 0.00000          | 0.00000 | 0.00000 |
| 4                             | 0.23281      | 0.41923  | 0.39751  | 0.00000          | 0.00000 | 0.00000 |
| 5                             | 0.19467      | -0.28796 | -0.30947 | 0.00000          | 0.00000 | 0.00000 |
| 6                             | -0.02519     | 0.09541  | 0.00630  | 0.00000          | 0.00000 | 0.00000 |
| 9                             | 0.24242      | 0.40519  | 0.39644  | 0.00000          | 0.00000 | 0.00000 |
| 10                            | 0.25975      | -0.39554 | -0.41724 | 0.00000          | 0.00000 | 0.00000 |
| 13                            | -0.02638     | 0.29289  | 0.00974  | 0.00000          | 0.00000 | 0.00000 |
| 14                            | 0.24496      | -0.41203 | -0.42042 | 0.00000          | 0.00000 | 0.00000 |
| 15                            | 0.20493      | 0.34109  | 0.33278  | 0.00000          | 0.00000 | 0.00000 |
| SUM                           | 1.30000      | 1.41822  | 0.00000  | 0.00000          | 0.00000 | 0.00000 |
| Condition <b>LC3=0.9DL+Wf</b> |              |          |          |                  |         |         |
| 1                             | 0.01335      | -1.28773 | -0.27952 | 0.00000          | 0.00000 | 0.00000 |
| 4                             | 0.34176      | 0.71250  | 0.62129  | 0.00000          | 0.00000 | 0.00000 |
| 5                             | -0.59110     | 1.09602  | 1.02259  | 0.00000          | 0.00000 | 0.00000 |
| 6                             | 0.00108      | -0.24815 | -0.22751 | 0.00000          | 0.00000 | 0.00000 |
| 9                             | 0.00922      | 0.14422  | 0.05015  | 0.00000          | 0.00000 | 0.00000 |
| 10                            | -0.00715     | 0.13676  | 0.04639  | 0.00000          | 0.00000 | 0.00000 |
| 13                            | -0.01273     | -1.15494 | -0.26830 | 0.00000          | 0.00000 | 0.00000 |
| 14                            | -0.30248     | 0.64127  | 0.55328  | 0.00000          | 0.00000 | 0.00000 |
| 15                            | 0.54805      | 1.02372  | 0.94963  | 0.00000          | 0.00000 | 0.00000 |
| SUM                           | 0.00000      | 1.06367  | 2.46800  | 0.00000          | 0.00000 | 0.00000 |

Condition **LC4=0.9DL+Ws**

|    |          |          |          |         |         |         |
|----|----------|----------|----------|---------|---------|---------|
| 1  | -0.02777 | 0.80053  | 0.00257  | 0.00000 | 0.00000 | 0.00000 |
| 4  | 0.23430  | 0.41832  | 0.40034  | 0.00000 | 0.00000 | 0.00000 |
| 5  | 0.19588  | -0.29447 | -0.31226 | 0.00000 | 0.00000 | 0.00000 |
| 6  | -0.02519 | 0.07162  | 0.00473  | 0.00000 | 0.00000 | 0.00000 |
| 9  | 0.24466  | 0.40412  | 0.39916  | 0.00000 | 0.00000 | 0.00000 |
| 10 | 0.25773  | -0.39699 | -0.41489 | 0.00000 | 0.00000 | 0.00000 |
| 13 | -0.02659 | 0.13903  | 0.00800  | 0.00000 | 0.00000 | 0.00000 |
| 14 | 0.24337  | -0.41284 | -0.41745 | 0.00000 | 0.00000 | 0.00000 |
| 15 | 0.20361  | 0.33437  | 0.32979  | 0.00000 | 0.00000 | 0.00000 |

---

|     |         |         |         |         |         |         |
|-----|---------|---------|---------|---------|---------|---------|
| SUM | 1.30000 | 1.06367 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
|-----|---------|---------|---------|---------|---------|---------|

---

Condition **LC5=1.2DL+Wf+Di**

|    |          |          |          |         |         |         |
|----|----------|----------|----------|---------|---------|---------|
| 1  | 0.01217  | -0.28792 | -0.26696 | 0.00000 | 0.00000 | 0.00000 |
| 4  | 0.33220  | 0.71803  | 0.60297  | 0.00000 | 0.00000 | 0.00000 |
| 5  | -0.59876 | 1.13730  | 1.04013  | 0.00000 | 0.00000 | 0.00000 |
| 6  | 0.00109  | -0.13479 | -0.21656 | 0.00000 | 0.00000 | 0.00000 |
| 9  | -0.00599 | 0.14951  | 0.03125  | 0.00000 | 0.00000 | 0.00000 |
| 10 | 0.00604  | 0.14541  | 0.03075  | 0.00000 | 0.00000 | 0.00000 |
| 13 | -0.01138 | -0.20430 | -0.25634 | 0.00000 | 0.00000 | 0.00000 |
| 14 | -0.29206 | 0.64583  | 0.53378  | 0.00000 | 0.00000 | 0.00000 |
| 15 | 0.55669  | 1.06685  | 0.96899  | 0.00000 | 0.00000 | 0.00000 |

---

|     |         |         |         |         |         |         |
|-----|---------|---------|---------|---------|---------|---------|
| SUM | 0.00000 | 3.23592 | 2.46800 | 0.00000 | 0.00000 | 0.00000 |
|-----|---------|---------|---------|---------|---------|---------|

---

Condition **LC6=1.2DL+Ws+Di**

|    |          |          |          |         |         |         |
|----|----------|----------|----------|---------|---------|---------|
| 1  | -0.02896 | 1.80034  | 0.01512  | 0.00000 | 0.00000 | 0.00000 |
| 4  | 0.22474  | 0.42384  | 0.38202  | 0.00000 | 0.00000 | 0.00000 |
| 5  | 0.18822  | -0.25318 | -0.29472 | 0.00000 | 0.00000 | 0.00000 |
| 6  | -0.02519 | 0.18498  | 0.01569  | 0.00000 | 0.00000 | 0.00000 |
| 9  | 0.22945  | 0.40940  | 0.38027  | 0.00000 | 0.00000 | 0.00000 |
| 10 | 0.27092  | -0.38834 | -0.43053 | 0.00000 | 0.00000 | 0.00000 |
| 13 | -0.02524 | 1.08967  | 0.01996  | 0.00000 | 0.00000 | 0.00000 |
| 14 | 0.25379  | -0.40828 | -0.43696 | 0.00000 | 0.00000 | 0.00000 |
| 15 | 0.21225  | 0.37749  | 0.34915  | 0.00000 | 0.00000 | 0.00000 |

---

|     |         |         |         |         |         |         |
|-----|---------|---------|---------|---------|---------|---------|
| SUM | 1.30000 | 3.23592 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
|-----|---------|---------|---------|---------|---------|---------|

---

Condition **LC7=1.2DL**

|    |          |         |          |         |         |         |
|----|----------|---------|----------|---------|---------|---------|
| 1  | -0.00075 | 0.63765 | 0.00720  | 0.00000 | 0.00000 | 0.00000 |
| 4  | -0.00596 | 0.00367 | -0.01133 | 0.00000 | 0.00000 | 0.00000 |
| 5  | -0.00484 | 0.02605 | 0.01113  | 0.00000 | 0.00000 | 0.00000 |
| 6  | 0.00000  | 0.09516 | 0.00627  | 0.00000 | 0.00000 | 0.00000 |
| 9  | -0.00897 | 0.00431 | -0.01088 | 0.00000 | 0.00000 | 0.00000 |
| 10 | 0.00806  | 0.00583 | -0.00941 | 0.00000 | 0.00000 | 0.00000 |
| 13 | 0.00083  | 0.61544 | 0.00693  | 0.00000 | 0.00000 | 0.00000 |
| 14 | 0.00635  | 0.00324 | -0.01186 | 0.00000 | 0.00000 | 0.00000 |
| 15 | 0.00529  | 0.02688 | 0.01195  | 0.00000 | 0.00000 | 0.00000 |

---

|     |         |         |         |         |         |         |
|-----|---------|---------|---------|---------|---------|---------|
| SUM | 0.00000 | 1.41822 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
|-----|---------|---------|---------|---------|---------|---------|

---

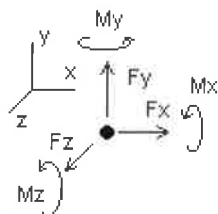


Condition **LC8=0.9DL**

|     |          |         |          |         |         |         |
|-----|----------|---------|----------|---------|---------|---------|
| 1   | -0.00056 | 0.47823 | 0.00540  | 0.00000 | 0.00000 | 0.00000 |
| 4   | -0.00447 | 0.00276 | -0.00849 | 0.00000 | 0.00000 | 0.00000 |
| 5   | -0.00363 | 0.01953 | 0.00835  | 0.00000 | 0.00000 | 0.00000 |
| 6   | 0.00000  | 0.07137 | 0.00471  | 0.00000 | 0.00000 | 0.00000 |
| 9   | -0.00673 | 0.00324 | -0.00816 | 0.00000 | 0.00000 | 0.00000 |
| 10  | 0.00604  | 0.00438 | -0.00706 | 0.00000 | 0.00000 | 0.00000 |
| 13  | 0.00062  | 0.46158 | 0.00520  | 0.00000 | 0.00000 | 0.00000 |
| 14  | 0.00476  | 0.00243 | -0.00890 | 0.00000 | 0.00000 | 0.00000 |
| 15  | 0.00396  | 0.02016 | 0.00896  | 0.00000 | 0.00000 | 0.00000 |
| SUM | 0.00000  | 1.06367 | 0.00000  | 0.00000 | 0.00000 | 0.00000 |

## Envelope for nodal reactions

Note.- **Ic** is the controlling load condition



Direction of positive forces and moments

Envelope of nodal reactions for :

LC1=1.2DL+Wf  
 LC2=1.2DL+Ws  
 LC3=0.9DL+Wf  
 LC4=0.9DL+Ws  
 LC5=1.2DL+Wf+Di  
 LC6=1.2DL+Ws+Di  
 LC7=1.2DL  
 LC8=0.9DL

| Node |     | Forces |     |        |     |        |     | Moments  |     |          |     |          |     |
|------|-----|--------|-----|--------|-----|--------|-----|----------|-----|----------|-----|----------|-----|
|      |     | Fx     | Ic  | Fy     | Ic  | Fz     | Ic  | Mx       | Ic  | My       | Ic  | Mz       | Ic  |
|      |     | [Kip]  |     | [Kip]  |     | [Kip]  |     | [Kip*ft] |     | [Kip*ft] |     | [Kip*ft] |     |
| 1    | Max | 0.013  | LC3 | 1.800  | LC6 | 0.015  | LC6 | 0.00000  | LC1 | 0.00000  | LC1 | 0.00000  | LC1 |
|      | Min | -0.029 | LC6 | -1.288 | LC3 | -0.280 | LC3 | 0.00000  | LC1 | 0.00000  | LC1 | 0.00000  | LC1 |
| 4    | Max | 0.342  | LC3 | 0.718  | LC5 | 0.621  | LC3 | 0.00000  | LC1 | 0.00000  | LC1 | 0.00000  | LC1 |
|      | Min | -0.006 | LC7 | 0.003  | LC8 | -0.011 | LC7 | 0.00000  | LC1 | 0.00000  | LC1 | 0.00000  | LC1 |
| 5    | Max | 0.196  | LC4 | 1.137  | LC5 | 1.040  | LC5 | 0.00000  | LC1 | 0.00000  | LC1 | 0.00000  | LC1 |
|      | Min | -0.599 | LC5 | -0.294 | LC4 | -0.312 | LC4 | 0.00000  | LC1 | 0.00000  | LC1 | 0.00000  | LC1 |
| 6    | Max | 0.001  | LC5 | 0.185  | LC6 | 0.016  | LC6 | 0.00000  | LC1 | 0.00000  | LC1 | 0.00000  | LC1 |
|      | Min | -0.025 | LC4 | -0.248 | LC3 | -0.228 | LC3 | 0.00000  | LC1 | 0.00000  | LC1 | 0.00000  | LC1 |
| 9    | Max | 0.245  | LC4 | 0.409  | LC6 | 0.399  | LC4 | 0.00000  | LC1 | 0.00000  | LC1 | 0.00000  | LC1 |
|      | Min | -0.009 | LC7 | 0.003  | LC8 | -0.011 | LC7 | 0.00000  | LC1 | 0.00000  | LC1 | 0.00000  | LC1 |
| 10   | Max | 0.271  | LC6 | 0.145  | LC5 | 0.046  | LC3 | 0.00000  | LC1 | 0.00000  | LC1 | 0.00000  | LC1 |
|      | Min | -0.007 | LC3 | -0.397 | LC4 | -0.431 | LC6 | 0.00000  | LC1 | 0.00000  | LC1 | 0.00000  | LC1 |

|    |     |        |     |        |     |        |     |         |     |         |     |         |     |
|----|-----|--------|-----|--------|-----|--------|-----|---------|-----|---------|-----|---------|-----|
| 13 | Max | 0.001  | LC7 | 1.090  | LC6 | 0.020  | LC6 | 0.00000 | LC1 | 0.00000 | LC1 | 0.00000 | LC1 |
|    | Min | -0.027 | LC4 | -1.155 | LC3 | -0.268 | LC3 | 0.00000 | LC1 | 0.00000 | LC1 | 0.00000 | LC1 |
| 14 | Max | 0.254  | LC6 | 0.646  | LC5 | 0.553  | LC3 | 0.00000 | LC1 | 0.00000 | LC1 | 0.00000 | LC1 |
|    | Min | -0.302 | LC3 | -0.413 | LC4 | -0.437 | LC6 | 0.00000 | LC1 | 0.00000 | LC1 | 0.00000 | LC1 |
| 15 | Max | 0.557  | LC5 | 1.067  | LC5 | 0.969  | LC5 | 0.00000 | LC1 | 0.00000 | LC1 | 0.00000 | LC1 |
|    | Min | 0.004  | LC8 | 0.020  | LC8 | 0.009  | LC8 | 0.00000 | LC1 | 0.00000 | LC1 | 0.00000 | LC1 |

Date: 5/6/2019  
Project Name: N. HAVEN – 310 ORANGE ST – SBC CO.  
Project No.: CT2034  
Designed By: BD Checked By: MSC



## ALPHA SECTOR

### CHECK EPOXY ANCHOR CONNECTION CAPACITY → PROPOSED ANCHORS

Reference: Hilti Anchor Fastening Technical Guide 2014

Assumed Epoxy Type = HIT-HY 200  
Assumed Anchor Diameter = 3/8 in.  
Assumed Embedment Depth = 2 3/8 in.  
f'c of Concrete = 2500 psi

#### Allowable Tensile Load =

$F_{Tall} = 2855$  lbs.

#### Allowable Shear Load =

$F_{Vall} = 3075$  lbs.

### WIND FORCES

Reaction  $F = 1040$  lbs.  
(Worst Case)

### GRAVITY LOADS

Ice and Equipment 1137 lbs.

No. of Supports = 1  
No. of Anchors / Support = 4

#### Tension Design Load / Anchor =

$f_t = 260.00$  lbs. < 2855 lbs. Therefore, OK !

#### Shear Design Load / Anchor =

$f_v = 284.25$  lbs. < 3075 lbs. Therefore, OK !

### CHECK COMBINED TENSION AND SHEAR

|             |   |             |        |                             |
|-------------|---|-------------|--------|-----------------------------|
| $f_t / F_T$ | + | $f_v / F_V$ | $\leq$ | 1.0                         |
| 0.091       | + | 0.092       | =      | 0.184 < 1.0 Therefore, OK ! |



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## **Beta/Gamma Sector Wind Calculations**

Date: 7/23/2019  
 Project Name: N. HAVEN – 310 ORANGE ST – SBC CO.  
 Project No.: CT2034  
 Designed By: BD Checked By: MSC



# BETA/GAMMA SECTOR

## 2.6.5.2 Velocity Pressure Coeff:

$$K_z = 2.01 (z/z_g)^{2/\alpha}$$

$K_z =$  1.215       $z =$  206 (ft)  
 $z_g =$  1200 (ft)  
 $\alpha =$  7.0

$$K_{zmin} \leq K_z \leq 2.01$$

Table 2-4

| Exposure | $z_g$   | $\alpha$ | $K_{zmin}$ | $K_c$ |
|----------|---------|----------|------------|-------|
| B        | 1200 ft | 7.0      | 0.70       | 0.9   |
| C        | 900 ft  | 9.5      | 0.85       | 1.0   |
| D        | 700 ft  | 11.5     | 1.03       | 1.1   |

## 2.6.6.2 Topographic Factor:

Table 2-5

| Topo. Category | $K_t$ | f    |
|----------------|-------|------|
| 2              | 0.43  | 1.25 |
| 3              | 0.53  | 2.0  |
| 4              | 0.72  | 1.5  |

$$K_{zt} = [1 + (K_c K_t / K_h)]^2$$

$$K_h = e^{(fz/H)}$$

$$K_{zt} = \text{\#DIV/0!}$$

$$K_h = \text{\#DIV/0!}$$

(If Category 1 then  $K_{zt} = 1.0$ )

$$\text{Category} = 1$$

$$K_c = 0.9 \text{ (from Table 2-4)}$$

$$K_t = \text{(from Table 2-5)}$$

$$f = \text{(from Table 2-5)}$$

$$z = 206$$

$$z_s = 29 \text{ (Mean elevation of base of structure above sea level)}$$

$$H = 0 \text{ (Ht. of the crest above surrounding terrain)}$$

$$K_{zt} = 1.00 \text{ (from 2.6.6.2.1)}$$

$$K_e = 1.00 \text{ (from 2.6.8)}$$

## 2.6.10 Design Ice Thickness

Max Ice Thickness =

Importance Factor =

$$t_i = 1.00 \text{ in}$$

$$I = 1.0 \text{ (from Table 2-3)}$$

$$K_{iz} = 1.20 \text{ (from Sec. 2.6.10)}$$

$$t_{iz} = t_i * I * K_{iz} * (K_{zt})^{0.35}$$

$$t_{iz} = 1.20 \text{ in}$$



Date: 7/23/2019

Project Name: N. HAVEN – 310 ORANGE ST – SBC CO.

Project No.: CT2034

Designed By: BD Checked By: MSC



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## 2.6.9 Gust Effect Factor

### 2.6.9.1 Self Supporting Lattice Structures

$G_h = 1.0$  Latticed Structures > 600 ft

$G_h = 0.85$  Latticed Structures 450 ft or less

$G_h = 0.85 + 0.15 [h/150 - 3.0]$

$h =$  ht. of structure

$h =$  166

$G_h =$  0.85

### 2.6.9.2 Guyed Masts

$G_h =$  0.85

### 2.6.9.3 Pole Structures

$G_h =$  1.1

### 2.6.9 Appurtenances

$G_h =$  1.0

### 2.6.9.4 Structures Supported on Other Structures

(Cantilivered tubular or latticed spines, pole, structures on buildings ( $ht. : width$  ratio > 5))

$G_h =$  1.35

$G_h =$  1.00

## 2.6.11.2 Design Wind Force on Appurtenances

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

$$q_z = 0.00256 * K_z * K_{zt} * K_s * K_e * K_d * V_{max}^2$$

$q_z =$  46.12

$q_z (ice) =$  7.38

$q_z (30) =$  2.66

$K_z =$  1.215 (from 2.6.5.2)

$K_{zt} =$  1.0 (from 2.6.6.2.1)

$K_s =$  1.0 (from 2.6.7)

$K_e =$  1.00 (from 2.6.8)

$K_d =$  0.95 (from Table 2-2)

$V_{max} =$  125 mph (Ultimate Wind Speed)

$V_{max (ice)} =$  50 mph

$V_{30} =$  30 mph

Table 2-2

| Structure Type                                                                        | Wind Direction Probability Factor, $K_d$ |
|---------------------------------------------------------------------------------------|------------------------------------------|
| Latticed structures with triangular, square or rectangular cross sections             | 0.85                                     |
| Tubular pole structures, latticed structures with other cross sections, appurtenances | 0.95                                     |
| Tubular pole structures supporting antennas enclosed within a cylindrical shroud      | 1.00                                     |

Date: 7/23/2019  
 Project Name: N. HAVEN – 310 ORANGE ST – SBC CO.  
 Project No.: CT2034  
 Designed By: BD Checked By: MSC



**Determine Ca:**

**Table 2-9**

| Force Coefficients (Ca) for Appurtenances |                               |                            |                            |                            |
|-------------------------------------------|-------------------------------|----------------------------|----------------------------|----------------------------|
| Member Type                               |                               | Aspect Ratio ≤ 2.5         | Aspect Ratio = 7           | Aspect Ratio ≥ 25          |
|                                           |                               | Ca                         | Ca                         | Ca                         |
| Flat                                      |                               | 1.2                        | 1.4                        | 2.0                        |
| Square/Rectangular HSS                    |                               | $1.2 - 2.8(r_s) \geq 0.85$ | $1.4 - 4.0(r_s) \geq 0.90$ | $2.0 - 6.0(r_s) \geq 1.25$ |
| Round                                     | C < 39<br>(Subcritical)       | 0.7                        | 0.8                        | 1.2                        |
|                                           | 39 ≤ C ≤ 78<br>(Transitional) | $4.14/(C^{0.485})$         | $3.66/(C^{0.415})$         | $46.8/(C^{1.0})$           |
|                                           | C > 78<br>(Supercritical)     | 0.5                        | 0.6                        | 0.6                        |

Aspect Ratio is the overall length/width ratio in the plane normal to the wind direction.  
 (Aspect ratio is independent of the spacing between support points of a linear appurtenance.)

Note: Linear interpolation may be used for aspect ratios other than those shown.

Ice Thickness = **1.20 in**      Angle = **0 (deg)**      Equivalent Angle = **180 (deg)**

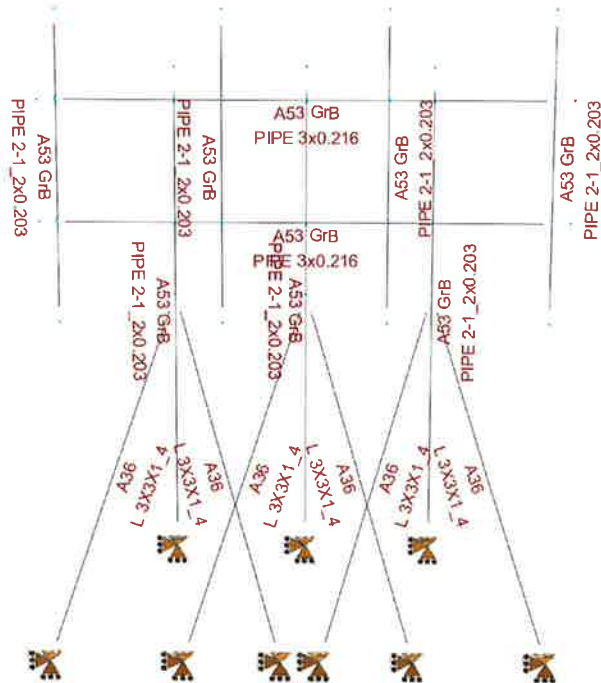
| Appurtenances                  | Height | Width | Depth | Flat Area | Aspect Ratio | Ca   | Force (lbs) | Force (lbs)<br>(w/ Ice) | Force (lbs)<br>(30 mph) |
|--------------------------------|--------|-------|-------|-----------|--------------|------|-------------|-------------------------|-------------------------|
| 800-10964 Antenna              | 59.0   | 20.0  | 6.9   | 8.19      | 2.95         | 1.22 | 461         | 86                      | 27                      |
| 800-10964 Antenna (Side)       | 59.0   | 6.9   | 20.0  | 2.83      | 8.55         | 1.45 | 189         | 42                      | 11                      |
| OPA-65R-LCUU-H4 Antenna        | 48.0   | 14.4  | 7.3   | 4.80      | 3.33         | 1.24 | 274         | 54                      | 16                      |
| OPA-65R-LCUU-H4 Antenna (Side) | 48.0   | 7.3   | 14.4  | 2.43      | 6.58         | 1.38 | 155         | 35                      | 9                       |
| OPA-65R-LCUU-H8 Antenna        | 92.7   | 14.4  | 7.0   | 9.27      | 6.44         | 1.38 | 588         | 113                     | 34                      |
| OPA-65R-LCUU-H8 Antenna (Side) | 92.7   | 7.0   | 14.4  | 4.51      | 13.24        | 1.61 | 334         | 74                      | 19                      |
| RRUS-11 RRH                    | 19.7   | 17.0  | 7.2   | 2.33      | 1.16         | 1.20 | 129         | 26                      | 7                       |
| RRUS-32 RRH                    | 27.2   | 12.1  | 7.0   | 2.29      | 2.25         | 1.20 | 126         | 26                      | 7                       |
| RRUS-E2 RRH                    | 20.4   | 18.5  | 7.5   | 2.62      | 1.10         | 1.20 | 145         | 29                      | 8                       |
| B14 4478 RRH                   | 18.1   | 13.4  | 8.3   | 1.68      | 1.35         | 1.20 | 93          | 20                      | 5                       |
| 4478 B5 RRH                    | 18.1   | 13.4  | 8.3   | 1.68      | 1.35         | 1.20 | 93          | 20                      | 5                       |
| 8843 B2/B66A RRH               | 14.9   | 13.2  | 10.9  | 1.37      | 1.13         | 1.20 | 76          | 17                      | 4                       |
| DBCT108F1V92-2 Diplexer        | 10.7   | 6.8   | 7.2   | 0.51      | 1.57         | 1.20 | 28          | 7                       | 2                       |
| Surge Arrestor                 | 15.2   | 17.7  | 6.4   | 1.87      | 0.86         | 1.20 | 103         | 22                      | 6                       |
| Squid Surge Arrestor           | 24.0   | 9.7   | 9.7   | 1.62      | 2.47         | 0.70 | 52          | 11                      | 3                       |
| 2" Pipe                        | 2.4    | 12.0  |       | 0.20      | 0.20         | 1.20 | 11          | 4                       | 1                       |
| 2-1/2" Pipe                    | 2.9    | 12.0  |       | 0.24      | 0.24         | 1.20 | 13          | 5                       | 1                       |
| 3" Pipe                        | 3.5    | 12.0  |       | 0.29      | 0.29         | 1.20 | 16          | 5                       | 1                       |
| 3x3 Angle                      | 3.0    | 12.0  |       | 0.25      | 0.25         | 2.00 | 23          | 8                       | 1                       |



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**Beta Sector  
Antenna Mount Calculations  
(Existing Conditions)**

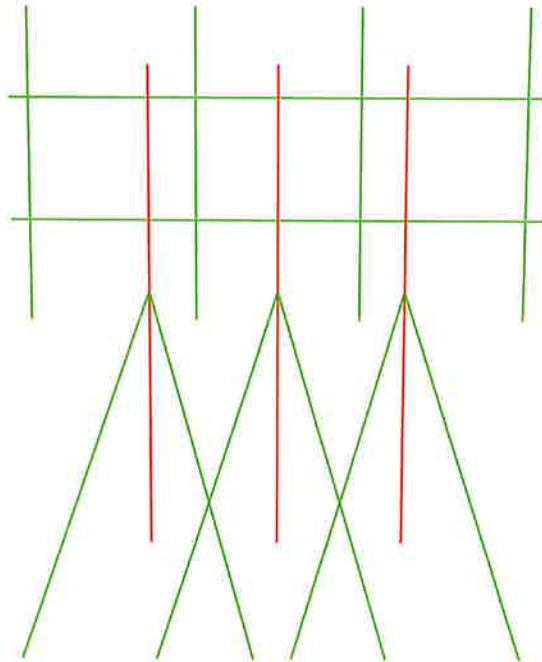


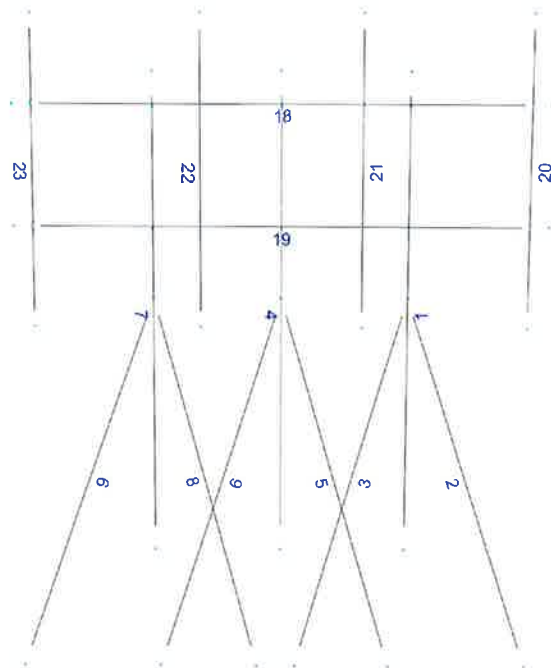




Design status

-  Not designed
-  Error on design
-  Design O.K.
-  With warnings





Current Date: 5/6/2019 3:00 PM

Units system: English

File name: W:\STRUCTURAL DEPARTMENT\ANALYSIS SOFTWARE\RAM Elements\RAM Projects\AT&T\CT\CT2034\LTE 4C-5C-6C-7C\CT2034 (LT 4C-5C-6C-7C) - Beta.etz\

## Load data

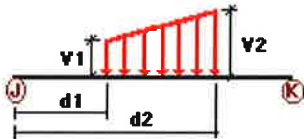
### GLOSSARY

Comb : Indicates if load condition is a load combination

### Load Conditions

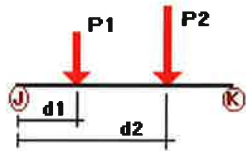
| Condition | Description       | Comb. | Category |
|-----------|-------------------|-------|----------|
| DL        | Dead Load         | No    | DL       |
| Wf        | Wind Load (FRONT) | No    | WIND     |
| Ws        | Wind Load (SIDE)  | No    | WIND     |
| Di        | Ice Load          | No    | LL       |

### Distributed force on members



| Condition | Member | Dir1 | Val1<br>[Kip/ft] | Val2<br>[Kip/ft] | Dist1<br>[ft] | %   | Dist2<br>[ft] | %   |
|-----------|--------|------|------------------|------------------|---------------|-----|---------------|-----|
| Di        | 1      | Y    | -0.006           | -0.006           | 0.00          | Yes | 100.00        | Yes |
|           | 2      | Y    | -0.008           | -0.008           | 0.00          | Yes | 100.00        | Yes |
|           | 3      | Y    | -0.008           | -0.008           | 0.00          | Yes | 100.00        | Yes |
|           | 4      | Y    | -0.006           | -0.006           | 0.00          | Yes | 100.00        | Yes |
|           | 5      | Y    | -0.008           | -0.008           | 0.00          | Yes | 100.00        | Yes |
|           | 6      | Y    | -0.008           | -0.008           | 0.00          | Yes | 100.00        | Yes |
|           | 7      | Y    | -0.006           | -0.006           | 0.00          | Yes | 100.00        | Yes |
|           | 8      | Y    | -0.008           | -0.008           | 0.00          | Yes | 100.00        | Yes |
|           | 9      | Y    | -0.008           | -0.008           | 0.00          | Yes | 100.00        | Yes |
|           | 18     | Y    | -0.007           | -0.007           | 0.00          | Yes | 100.00        | Yes |
|           | 19     | Y    | -0.007           | -0.007           | 0.00          | Yes | 100.00        | Yes |
|           | 20     | Y    | -0.006           | -0.006           | 0.00          | Yes | 100.00        | Yes |
|           | 21     | Y    | -0.006           | -0.006           | 0.00          | Yes | 100.00        | Yes |
|           | 22     | Y    | -0.006           | -0.006           | 0.00          | Yes | 100.00        | Yes |
|           | 23     | Y    | -0.006           | -0.006           | 0.00          | Yes | 100.00        | Yes |

## Concentrated forces on members



| Condition | Member | Dir1 | Value1<br>[Kip] | Dist1<br>[ft] | %  |
|-----------|--------|------|-----------------|---------------|----|
| DL        | 20     | y    | -0.044          | 0.50          | No |
|           |        | y    | -0.044          | 7.50          | No |
|           | 21     | y    | -0.042          | 1.50          | No |
|           |        | y    | -0.042          | 6.40          | No |
|           | 22     | y    | -0.044          | 0.50          | No |
|           |        | y    | -0.044          | 7.50          | No |
|           | 23     | y    | -0.044          | 0.50          | No |
|           |        | y    | -0.044          | 7.50          | No |
| Wf        | 20     | z    | -0.294          | 0.50          | No |
|           |        | z    | -0.294          | 7.50          | No |
|           | 21     | z    | -0.231          | 1.50          | No |
|           |        | z    | -0.231          | 6.40          | No |
|           | 22     | z    | -0.294          | 0.50          | No |
|           |        | z    | -0.294          | 7.50          | No |
|           | 23     | z    | -0.294          | 0.50          | No |
|           |        | z    | -0.294          | 7.50          | No |
| Ws        | 20     | x    | -0.167          | 0.50          | No |
|           |        | x    | -0.167          | 7.50          | No |
|           | 21     | x    | -0.095          | 1.50          | No |
|           |        | x    | -0.095          | 6.40          | No |
|           | 22     | x    | -0.167          | 0.50          | No |
|           |        | x    | -0.167          | 7.50          | No |
|           | 23     | x    | -0.167          | 0.50          | No |
|           |        | x    | -0.167          | 7.50          | No |
| Di        | 20     | y    | -0.098          | 0.50          | No |
|           |        | y    | -0.098          | 7.50          | No |
|           | 21     | y    | -0.081          | 1.50          | No |
|           |        | y    | -0.081          | 6.40          | No |
|           | 22     | y    | -0.098          | 0.50          | No |
|           |        | y    | -0.098          | 7.50          | No |
|           | 23     | y    | -0.098          | 0.50          | No |
|           |        | y    | -0.098          | 7.50          | No |

## Self weight multipliers for load conditions

| Condition | Description       | Self weight multiplier |       |       |       |
|-----------|-------------------|------------------------|-------|-------|-------|
|           |                   | Comb.                  | MultX | MultY | MultZ |
| DL        | Dead Load         | No                     | 0.00  | -1.00 | 0.00  |
| Wf        | Wind Load (FRONT) | No                     | 0.00  | 0.00  | 0.00  |
| Ws        | Wind Load (SIDE)  | No                     | 0.00  | 0.00  | 0.00  |
| Di        | Ice Load          | No                     | 0.00  | 0.00  | 0.00  |

## Earthquake (Dynamic analysis only)

| Condition | a/g  | Ang.<br>[Deg] | Damp.<br>[%] |
|-----------|------|---------------|--------------|
| DL        | 0.00 | 0.00          | 0.00         |
| Wf        | 0.00 | 0.00          | 0.00         |
| Ws        | 0.00 | 0.00          | 0.00         |
| Di        | 0.00 | 0.00          | 0.00         |

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## Steel Code Check

Report: Summary - Group by member

Load conditions to be included in design :

LC1=1.2DL+Wf

LC2=1.2DL+Ws

LC3=0.9DL+Wf

LC4=0.9DL+Ws

LC5=1.2DL+Wf+Di

LC6=1.2DL+Ws+Di

LC7=1.2DL

LC8=0.9DL

| Description | Section                 | Member    | Ctrl Eq.      | Ratio       | Status    | Reference |
|-------------|-------------------------|-----------|---------------|-------------|-----------|-----------|
|             | <b>L 3X3X1_4</b>        | <b>2</b>  | LC3 at 0.00%  | 0.79        | OK        | Eq. H2-1  |
|             |                         | <b>3</b>  | LC3 at 0.00%  | 0.80        | OK        | Eq. H2-1  |
|             |                         | <b>5</b>  | LC3 at 0.00%  | 0.57        | OK        | Eq. H2-1  |
|             |                         | <b>6</b>  | LC3 at 0.00%  | 0.56        | OK        | Eq. H2-1  |
|             |                         | <b>8</b>  | LC3 at 0.00%  | <b>0.84</b> | <b>OK</b> | Eq. H2-1  |
|             |                         | <b>9</b>  | LC3 at 0.00%  | 0.82        | OK        | Eq. H2-1  |
|             | <b>PIPE 2-1_2x0.203</b> | <b>1</b>  | LC3 at 45.31% | 1.27        | N.G.      | Eq. H1-1b |
|             |                         | <b>4</b>  | LC3 at 45.31% | 1.02        | N.G.      | Eq. H1-1b |
|             |                         | <b>7</b>  | LC3 at 45.31% | 1.31        | N.G.      | Eq. H1-1b |
|             |                         | <b>20</b> | LC5 at 64.58% | 0.26        | OK        | Eq. H1-1b |
|             |                         | <b>21</b> | LC6 at 64.58% | 0.12        | OK        | Eq. H1-1b |
|             |                         | <b>22</b> | LC5 at 27.08% | 0.24        | OK        | Eq. H1-1b |
|             |                         | <b>23</b> | LC5 at 64.58% | 0.27        | OK        | Eq. H1-1b |
|             | <b>PIPE 3x0.216</b>     | <b>18</b> | LC5 at 74.22% | 0.45        | OK        | Eq. H1-1b |
|             |                         | <b>19</b> | LC5 at 74.22% | 0.36        | OK        | Eq. H1-1b |



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## Geometry data

### GLOSSARY

|            |                                                                                              |
|------------|----------------------------------------------------------------------------------------------|
| Cb22, Cb33 | : Moment gradient coefficients                                                               |
| Cm22, Cm33 | : Coefficients applied to bending term in interaction formula                                |
| d0         | : Tapered member section depth at J end of member                                            |
| DJX        | : Rigid end offset distance measured from J node in axis X                                   |
| DJY        | : Rigid end offset distance measured from J node in axis Y                                   |
| DJZ        | : Rigid end offset distance measured from J node in axis Z                                   |
| DKX        | : Rigid end offset distance measured from K node in axis X                                   |
| DKY        | : Rigid end offset distance measured from K node in axis Y                                   |
| DKZ        | : Rigid end offset distance measured from K node in axis Z                                   |
| dL         | : Tapered member section depth at K end of member                                            |
| Ig factor  | : Inertia reduction factor (Effective Inertia/Gross Inertia) for reinforced concrete members |
| K22        | : Effective length factor about axis 2                                                       |
| K33        | : Effective length factor about axis 3                                                       |
| L22        | : Member length for calculation of axial capacity                                            |
| L33        | : Member length for calculation of axial capacity                                            |
| LB pos     | : Lateral unbraced length of the compression flange in the positive side of local axis 2     |
| LB neg     | : Lateral unbraced length of the compression flange in the negative side of local axis 2     |
| RX         | : Rotation about X                                                                           |
| RY         | : Rotation about Y                                                                           |
| RZ         | : Rotation about Z                                                                           |
| TO         | : 1 = Tension only member    0 = Normal member                                               |
| TX         | : Translation in X                                                                           |
| TY         | : Translation in Y                                                                           |
| TZ         | : Translation in Z                                                                           |

### Nodes

| Node | X<br>[ft] | Y<br>[ft] | Z<br>[ft] | Rigid Floor |
|------|-----------|-----------|-----------|-------------|
| 1    | 0.00      | 0.00      | -0.20     | 0           |
| 2    | 0.00      | 14.00     | -0.20     | 0           |
| 3    | 0.00      | 7.50      | -0.20     | 0           |
| 4    | -3.00     | 0.00      | -7.70     | 0           |
| 5    | 3.00      | 0.00      | -7.70     | 0           |
| 6    | 3.50      | 0.00      | -0.20     | 0           |
| 7    | 3.50      | 14.00     | -0.20     | 0           |
| 8    | 3.50      | 7.50      | -0.20     | 0           |
| 9    | 0.50      | 0.00      | -7.70     | 0           |
| 10   | 6.50      | 0.00      | -7.70     | 0           |
| 11   | 7.00      | 14.00     | -0.20     | 0           |
| 12   | 7.00      | 7.50      | -0.20     | 0           |
| 13   | 7.00      | 0.00      | -0.20     | 0           |
| 14   | 10.00     | 0.00      | -7.70     | 0           |
| 15   | 4.00      | 0.00      | -7.70     | 0           |
| 18   | 10.75     | 9.50      | 0.00      | 0           |
| 19   | -3.75     | 9.50      | 0.00      | 0           |
| 20   | 3.50      | 9.50      | 0.00      | 0           |
| 21   | 10.75     | 13.00     | 0.00      | 0           |
| 22   | -3.75     | 13.00     | 0.00      | 0           |
| 23   | 3.50      | 13.00     | 0.00      | 0           |

|    |       |       |       |   |
|----|-------|-------|-------|---|
| 24 | -3.25 | 9.50  | 0.00  | 0 |
| 25 | -3.25 | 13.00 | 0.00  | 0 |
| 26 | 10.25 | 9.50  | 0.00  | 0 |
| 27 | 10.25 | 13.00 | 0.00  | 0 |
| 28 | 1.25  | 13.00 | 0.00  | 0 |
| 29 | 5.75  | 13.00 | 0.00  | 0 |
| 30 | 1.25  | 9.50  | 0.00  | 0 |
| 31 | 5.75  | 9.50  | 0.00  | 0 |
| 32 | -3.25 | 9.50  | 0.20  | 0 |
| 33 | -3.25 | 13.00 | 0.20  | 0 |
| 34 | 1.25  | 9.50  | 0.20  | 0 |
| 35 | 1.25  | 13.00 | 0.20  | 0 |
| 36 | 5.75  | 13.00 | 0.20  | 0 |
| 37 | 5.75  | 9.50  | 0.20  | 0 |
| 38 | 10.25 | 9.50  | 0.20  | 0 |
| 39 | 10.25 | 13.00 | 0.20  | 0 |
| 44 | 10.25 | 15.50 | 0.20  | 0 |
| 45 | 5.75  | 15.50 | 0.20  | 0 |
| 46 | 1.25  | 15.50 | 0.20  | 0 |
| 47 | -3.25 | 15.50 | 0.20  | 0 |
| 48 | 10.25 | 6.50  | 0.20  | 0 |
| 49 | 5.75  | 6.50  | 0.20  | 0 |
| 50 | 1.25  | 6.50  | 0.20  | 0 |
| 51 | -3.25 | 6.50  | 0.20  | 0 |
| 52 | 0.00  | 13.00 | -0.20 | 0 |
| 53 | 7.00  | 13.00 | -0.20 | 0 |
| 54 | 0.00  | 9.50  | -0.20 | 0 |
| 55 | 7.00  | 9.50  | -0.20 | 0 |
| 56 | 0.00  | 13.00 | 0.00  | 0 |
| 57 | 7.00  | 13.00 | 0.00  | 0 |
| 58 | 0.00  | 9.50  | 0.00  | 0 |
| 59 | 7.00  | 9.50  | 0.00  | 0 |
| 60 | 3.50  | 13.00 | -0.20 | 0 |
| 61 | 3.50  | 9.50  | -0.20 | 0 |

## Restraints

| Node | TX | TY | TZ | RX | RY | RZ |
|------|----|----|----|----|----|----|
| 1    | 1  | 1  | 1  | 0  | 0  | 0  |
| 4    | 1  | 1  | 1  | 0  | 0  | 0  |
| 5    | 1  | 1  | 1  | 0  | 0  | 0  |
| 6    | 1  | 1  | 1  | 0  | 0  | 0  |
| 9    | 1  | 1  | 1  | 0  | 0  | 0  |
| 10   | 1  | 1  | 1  | 0  | 0  | 0  |
| 13   | 1  | 1  | 1  | 0  | 0  | 0  |
| 14   | 1  | 1  | 1  | 0  | 0  | 0  |
| 15   | 1  | 1  | 1  | 0  | 0  | 0  |

## Members

| Member | NJ | NK | Description | Section          | Material | d0<br>[in] | dL<br>[in] | Ig factor |
|--------|----|----|-------------|------------------|----------|------------|------------|-----------|
| 1      | 2  | 1  |             | PIPE 2-1_2x0.203 | A53 GrB  | 0.00       | 0.00       | 0.00      |
| 2      | 3  | 4  |             | L 3X3X1_4        | A36      | 0.00       | 0.00       | 0.00      |
| 3      | 3  | 5  |             | L 3X3X1_4        | A36      | 0.00       | 0.00       | 0.00      |
| 4      | 7  | 6  |             | PIPE 2-1_2x0.203 | A53 GrB  | 0.00       | 0.00       | 0.00      |
| 5      | 8  | 9  |             | L 3X3X1_4        | A36      | 0.00       | 0.00       | 0.00      |
| 6      | 8  | 10 |             | L 3X3X1_4        | A36      | 0.00       | 0.00       | 0.00      |
| 7      | 11 | 13 |             | PIPE 2-1_2x0.203 | A53 GrB  | 0.00       | 0.00       | 0.00      |
| 8      | 12 | 15 |             | L 3X3X1_4        | A36      | 0.00       | 0.00       | 0.00      |
| 9      | 12 | 14 |             | L 3X3X1_4        | A36      | 0.00       | 0.00       | 0.00      |
| 18     | 22 | 21 |             | PIPE 3x0.216     | A53 GrB  | 0.00       | 0.00       | 0.00      |
| 19     | 18 | 19 |             | PIPE 3x0.216     | A53 GrB  | 0.00       | 0.00       | 0.00      |
| 20     | 47 | 51 |             | PIPE 2-1_2x0.203 | A53 GrB  | 0.00       | 0.00       | 0.00      |
| 21     | 46 | 50 |             | PIPE 2-1_2x0.203 | A53 GrB  | 0.00       | 0.00       | 0.00      |
| 22     | 45 | 49 |             | PIPE 2-1_2x0.203 | A53 GrB  | 0.00       | 0.00       | 0.00      |
| 23     | 44 | 48 |             | PIPE 2-1_2x0.203 | A53 GrB  | 0.00       | 0.00       | 0.00      |

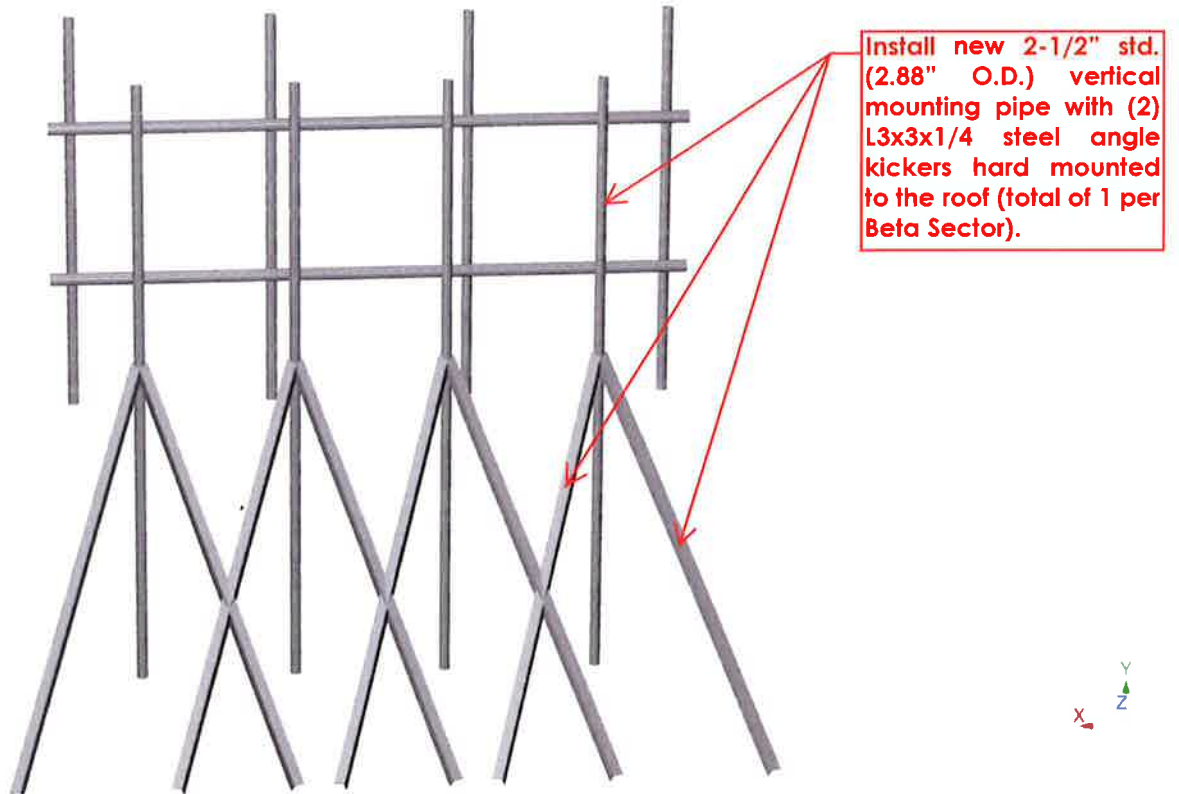
### Orientation of local axes

| Member | Rotation<br>[Deg] | Axes23 | NX   | NY   | NZ   |
|--------|-------------------|--------|------|------|------|
| 2      | 180.00            | 0      | 0.00 | 0.00 | 0.00 |
| 3      | 90.00             | 0      | 0.00 | 0.00 | 0.00 |
| 5      | 180.00            | 0      | 0.00 | 0.00 | 0.00 |
| 6      | 90.00             | 0      | 0.00 | 0.00 | 0.00 |
| 8      | 180.00            | 0      | 0.00 | 0.00 | 0.00 |
| 9      | 90.00             | 0      | 0.00 | 0.00 | 0.00 |



**HUDSON**  
Design Group LLC

**Beta Sector  
Antenna Mount Calculations  
(Modified Conditions)**

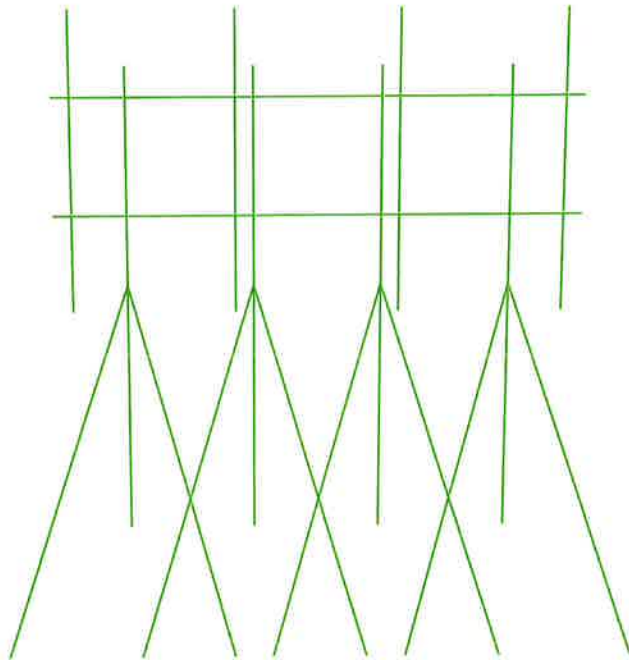


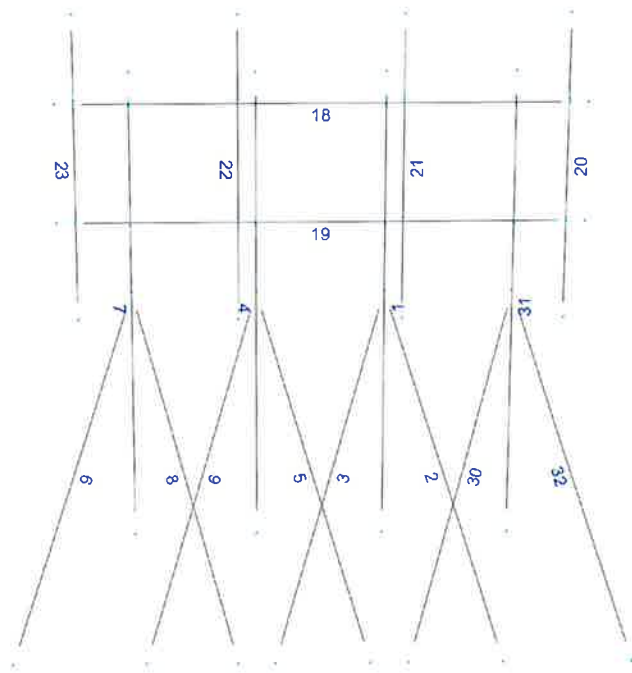




Design status

-  Not designed
-  Error on design
-  Design O.K.
-  With warnings





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## Steel Code Check

Report: Summary - Group by member

Load conditions to be included in design :

LC1=1.2DL+Wf

LC2=1.2DL+Ws

LC3=0.9DL+Wf

LC4=0.9DL+Ws

LC5=1.2DL+Wf+Di

LC6=1.2DL+Ws+Di

LC7=1.2DL

LC8=0.9DL

| Description             | Section | Member    | Ctrl Eq.      | Ratio       | Status    | Reference |
|-------------------------|---------|-----------|---------------|-------------|-----------|-----------|
| <b>L 3X3X1_4</b>        |         | <b>2</b>  | LC3 at 0.00%  | 0.47        | OK        | Eq. H2-1  |
|                         |         | <b>3</b>  | LC3 at 0.00%  | 0.47        | OK        | Eq. H2-1  |
|                         |         | <b>5</b>  | LC3 at 0.00%  | 0.48        | OK        | Eq. H2-1  |
|                         |         | <b>6</b>  | LC3 at 0.00%  | 0.48        | OK        | Eq. H2-1  |
|                         |         | <b>8</b>  | LC3 at 0.00%  | 0.61        | OK        | Eq. H2-1  |
|                         |         | <b>9</b>  | LC3 at 0.00%  | <b>0.62</b> | <b>OK</b> | Eq. H2-1  |
|                         |         | <b>30</b> | LC3 at 0.00%  | 0.59        | OK        | Eq. H2-1  |
|                         |         | <b>32</b> | LC3 at 0.00%  | 0.60        | OK        | Eq. H2-1  |
| <b>PIPE 2-1_2x0.203</b> |         | <b>1</b>  | LC3 at 45.31% | 0.82        | OK        | Eq. H1-1b |
|                         |         | <b>4</b>  | LC3 at 45.31% | 0.83        | OK        | Eq. H1-1b |
|                         |         | <b>7</b>  | LC3 at 45.31% | <b>0.98</b> | <b>OK</b> | Eq. H1-1b |
|                         |         | <b>20</b> | LC5 at 27.08% | 0.24        | OK        | Eq. H1-1b |
|                         |         | <b>21</b> | LC6 at 64.58% | 0.10        | OK        | Eq. H1-1b |
|                         |         | <b>22</b> | LC5 at 27.08% | 0.24        | OK        | Eq. H1-1b |
|                         |         | <b>23</b> | LC5 at 27.08% | 0.24        | OK        | Eq. H1-1b |
|                         |         | <b>31</b> | LC3 at 45.31% | 0.95        | OK        | Eq. H1-1b |
| <b>PIPE 3x0.216</b>     |         | <b>18</b> | LC5 at 86.81% | <b>0.24</b> | <b>OK</b> | Eq. H1-1b |
|                         |         | <b>19</b> | LC3 at 13.89% | 0.21        | OK        | Eq. H1-1b |

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## Geometry data

### GLOSSARY

|            |                                                                                              |
|------------|----------------------------------------------------------------------------------------------|
| Cb22, Cb33 | : Moment gradient coefficients                                                               |
| Cm22, Cm33 | : Coefficients applied to bending term in interaction formula                                |
| d0         | : Tapered member section depth at J end of member                                            |
| DJX        | : Rigid end offset distance measured from J node in axis X                                   |
| DJY        | : Rigid end offset distance measured from J node in axis Y                                   |
| DJZ        | : Rigid end offset distance measured from J node in axis Z                                   |
| DKX        | : Rigid end offset distance measured from K node in axis X                                   |
| DKY        | : Rigid end offset distance measured from K node in axis Y                                   |
| DKZ        | : Rigid end offset distance measured from K node in axis Z                                   |
| dL         | : Tapered member section depth at K end of member                                            |
| Ig factor  | : Inertia reduction factor (Effective Inertia/Gross Inertia) for reinforced concrete members |
| K22        | : Effective length factor about axis 2                                                       |
| K33        | : Effective length factor about axis 3                                                       |
| L22        | : Member length for calculation of axial capacity                                            |
| L33        | : Member length for calculation of axial capacity                                            |
| LB pos     | : Lateral unbraced length of the compression flange in the positive side of local axis 2     |
| LB neg     | : Lateral unbraced length of the compression flange in the negative side of local axis 2     |
| RX         | : Rotation about X                                                                           |
| RY         | : Rotation about Y                                                                           |
| RZ         | : Rotation about Z                                                                           |
| TO         | : 1 = Tension only member    0 = Normal member                                               |
| TX         | : Translation in X                                                                           |
| TY         | : Translation in Y                                                                           |
| TZ         | : Translation in Z                                                                           |

### Nodes

| Node | X<br>[ft] | Y<br>[ft] | Z<br>[ft] | Rigid Floor |
|------|-----------|-----------|-----------|-------------|
| 1    | 0.00      | 0.00      | -0.20     | 0           |
| 2    | 0.00      | 14.00     | -0.20     | 0           |
| 3    | 0.00      | 7.50      | -0.20     | 0           |
| 4    | -3.00     | 0.00      | -7.70     | 0           |
| 5    | 3.00      | 0.00      | -7.70     | 0           |
| 6    | 3.50      | 0.00      | -0.20     | 0           |
| 7    | 3.50      | 14.00     | -0.20     | 0           |
| 8    | 3.50      | 7.50      | -0.20     | 0           |
| 9    | 0.50      | 0.00      | -7.70     | 0           |
| 10   | 6.50      | 0.00      | -7.70     | 0           |
| 11   | 7.00      | 14.00     | -0.20     | 0           |
| 12   | 7.00      | 7.50      | -0.20     | 0           |
| 13   | 7.00      | 0.00      | -0.20     | 0           |
| 14   | 10.00     | 0.00      | -7.70     | 0           |
| 15   | 4.00      | 0.00      | -7.70     | 0           |
| 18   | 9.00      | 9.50      | 0.00      | 0           |
| 19   | -5.50     | 9.50      | 0.00      | 0           |
| 20   | 3.50      | 9.50      | 0.00      | 0           |
| 21   | 9.00      | 13.00     | 0.00      | 0           |
| 22   | -5.50     | 13.00     | 0.00      | 0           |
| 23   | 3.50      | 13.00     | 0.00      | 0           |

|    |       |       |       |   |
|----|-------|-------|-------|---|
| 24 | -5.00 | 9.50  | 0.00  | 0 |
| 25 | -5.00 | 13.00 | 0.00  | 0 |
| 26 | 8.50  | 9.50  | 0.00  | 0 |
| 27 | 8.50  | 13.00 | 0.00  | 0 |
| 28 | -0.50 | 13.00 | 0.00  | 0 |
| 29 | 4.00  | 13.00 | 0.00  | 0 |
| 30 | -0.50 | 9.50  | 0.00  | 0 |
| 31 | 4.00  | 9.50  | 0.00  | 0 |
| 32 | -5.00 | 9.50  | 0.20  | 0 |
| 33 | -5.00 | 13.00 | 0.20  | 0 |
| 34 | -0.50 | 9.50  | 0.20  | 0 |
| 35 | -0.50 | 13.00 | 0.20  | 0 |
| 36 | 4.00  | 13.00 | 0.20  | 0 |
| 37 | 4.00  | 9.50  | 0.20  | 0 |
| 38 | 8.50  | 9.50  | 0.20  | 0 |
| 39 | 8.50  | 13.00 | 0.20  | 0 |
| 44 | 8.50  | 15.50 | 0.20  | 0 |
| 45 | 4.00  | 15.50 | 0.20  | 0 |
| 46 | -0.50 | 15.50 | 0.20  | 0 |
| 47 | -5.00 | 15.50 | 0.20  | 0 |
| 48 | 8.50  | 6.50  | 0.20  | 0 |
| 49 | 4.00  | 6.50  | 0.20  | 0 |
| 50 | -0.50 | 6.50  | 0.20  | 0 |
| 51 | -5.00 | 6.50  | 0.20  | 0 |
| 52 | 0.00  | 13.00 | -0.20 | 0 |
| 53 | 7.00  | 13.00 | -0.20 | 0 |
| 54 | 0.00  | 9.50  | -0.20 | 0 |
| 55 | 7.00  | 9.50  | -0.20 | 0 |
| 56 | 0.00  | 13.00 | 0.00  | 0 |
| 57 | 7.00  | 13.00 | 0.00  | 0 |
| 58 | 0.00  | 9.50  | 0.00  | 0 |
| 59 | 7.00  | 9.50  | 0.00  | 0 |
| 60 | 3.50  | 13.00 | -0.20 | 0 |
| 61 | 3.50  | 9.50  | -0.20 | 0 |
| 62 | -0.50 | 0.00  | -7.70 | 0 |
| 63 | -3.50 | 0.00  | -0.20 | 0 |
| 64 | -6.50 | 0.00  | -7.70 | 0 |
| 65 | -3.50 | 7.50  | -0.20 | 0 |
| 66 | -3.50 | 9.50  | -0.20 | 0 |
| 67 | -3.50 | 9.50  | 0.00  | 0 |
| 68 | -3.50 | 13.00 | -0.20 | 0 |
| 69 | -3.50 | 13.00 | 0.00  | 0 |
| 70 | -3.50 | 14.00 | -0.20 | 0 |

## Restraints

| Node | TX | TY | TZ | RX | RY | RZ |
|------|----|----|----|----|----|----|
| 1    | 1  | 1  | 1  | 0  | 0  | 0  |
| 4    | 1  | 1  | 1  | 0  | 0  | 0  |
| 5    | 1  | 1  | 1  | 0  | 0  | 0  |
| 6    | 1  | 1  | 1  | 0  | 0  | 0  |
| 9    | 1  | 1  | 1  | 0  | 0  | 0  |
| 10   | 1  | 1  | 1  | 0  | 0  | 0  |
| 13   | 1  | 1  | 1  | 0  | 0  | 0  |
| 14   | 1  | 1  | 1  | 0  | 0  | 0  |

|    |   |   |   |   |   |   |
|----|---|---|---|---|---|---|
| 15 | 1 | 1 | 1 | 0 | 0 | 0 |
| 62 | 1 | 1 | 1 | 0 | 0 | 0 |
| 63 | 1 | 1 | 1 | 0 | 0 | 0 |
| 64 | 1 | 1 | 1 | 0 | 0 | 0 |

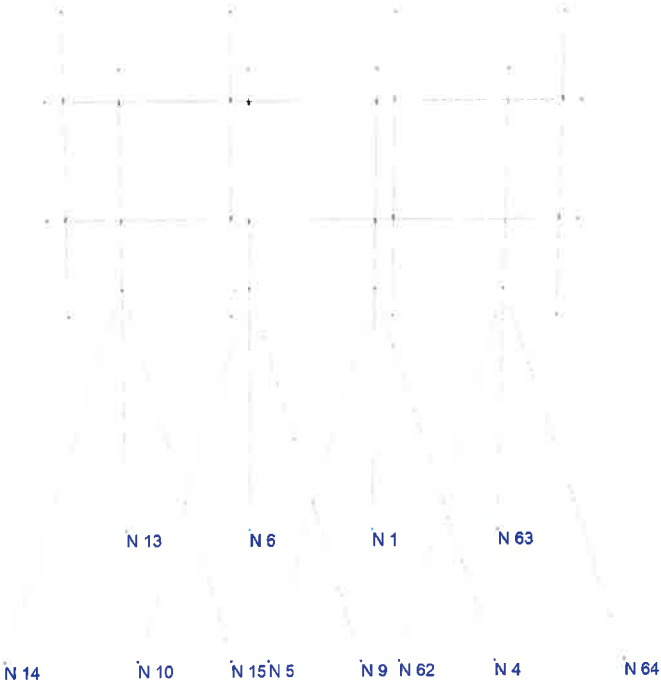
## Members

| Member | NJ | NK | Description | Section          | Material | d0<br>[in] | dL<br>[in] | Ig factor |
|--------|----|----|-------------|------------------|----------|------------|------------|-----------|
| 1      | 2  | 1  |             | PIPE 2-1_2x0.203 | A53 GrB  | 0.00       | 0.00       | 0.00      |
| 2      | 3  | 4  |             | L 3X3X1_4        | A36      | 0.00       | 0.00       | 0.00      |
| 3      | 3  | 5  |             | L 3X3X1_4        | A36      | 0.00       | 0.00       | 0.00      |
| 4      | 7  | 6  |             | PIPE 2-1_2x0.203 | A53 GrB  | 0.00       | 0.00       | 0.00      |
| 5      | 8  | 9  |             | L 3X3X1_4        | A36      | 0.00       | 0.00       | 0.00      |
| 6      | 8  | 10 |             | L 3X3X1_4        | A36      | 0.00       | 0.00       | 0.00      |
| 7      | 11 | 13 |             | PIPE 2-1_2x0.203 | A53 GrB  | 0.00       | 0.00       | 0.00      |
| 8      | 12 | 15 |             | L 3X3X1_4        | A36      | 0.00       | 0.00       | 0.00      |
| 9      | 12 | 14 |             | L 3X3X1_4        | A36      | 0.00       | 0.00       | 0.00      |
| 18     | 22 | 21 |             | PIPE 3x0.216     | A53 GrB  | 0.00       | 0.00       | 0.00      |
| 19     | 18 | 19 |             | PIPE 3x0.216     | A53 GrB  | 0.00       | 0.00       | 0.00      |
| 20     | 47 | 51 |             | PIPE 2-1_2x0.203 | A53 GrB  | 0.00       | 0.00       | 0.00      |
| 21     | 46 | 50 |             | PIPE 2-1_2x0.203 | A53 GrB  | 0.00       | 0.00       | 0.00      |
| 22     | 45 | 49 |             | PIPE 2-1_2x0.203 | A53 GrB  | 0.00       | 0.00       | 0.00      |
| 23     | 44 | 48 |             | PIPE 2-1_2x0.203 | A53 GrB  | 0.00       | 0.00       | 0.00      |
| 30     | 65 | 62 |             | L 3X3X1_4        | A36      | 0.00       | 0.00       | 0.00      |
| 31     | 70 | 63 |             | PIPE 2-1_2x0.203 | A53 GrB  | 0.00       | 0.00       | 0.00      |
| 32     | 65 | 64 |             | L 3X3X1_4        | A36      | 0.00       | 0.00       | 0.00      |

## Orientation of local axes

| Member | Rotation<br>[Deg] | Axes23 | NX   | NY   | NZ   |
|--------|-------------------|--------|------|------|------|
| 2      | 180.00            | 0      | 0.00 | 0.00 | 0.00 |
| 3      | 90.00             | 0      | 0.00 | 0.00 | 0.00 |
| 5      | 180.00            | 0      | 0.00 | 0.00 | 0.00 |
| 6      | 90.00             | 0      | 0.00 | 0.00 | 0.00 |
| 8      | 180.00            | 0      | 0.00 | 0.00 | 0.00 |
| 9      | 90.00             | 0      | 0.00 | 0.00 | 0.00 |
| 30     | 90.00             | 0      | 0.00 | 0.00 | 0.00 |
| 32     | 180.00            | 0      | 0.00 | 0.00 | 0.00 |





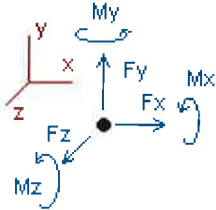
Current Date: 5/6/2019 3:01 PM

Units system: English

File name: W:\STRUCTURAL DEPARTMENT\ANALYSIS SOFTWARE\RAM Elements\RAM Projects\AT&T\CT\CT2034\LTE 4C-5C-6C-7C\CT2034 (LT 4C-5C-6C-7C) - Beta (MOD.).etx\

## Analysis result

### Reactions



Direction of positive forces and moments

| Node                          | Forces [Kip] |          |          | Moments [Kip*ft] |         |         |
|-------------------------------|--------------|----------|----------|------------------|---------|---------|
|                               | FX           | FY       | FZ       | MX               | MY      | MZ      |
| Condition <b>LC1=1.2DL+Wf</b> |              |          |          |                  |         |         |
| 1                             | 0.00042      | -0.34440 | -0.16202 | 0.00000          | 0.00000 | 0.00000 |
| 4                             | 0.09127      | 0.38604  | 0.29356  | 0.00000          | 0.00000 | 0.00000 |
| 5                             | -0.06546     | 0.31339  | 0.22791  | 0.00000          | 0.00000 | 0.00000 |
| 6                             | -0.00130     | -0.37083 | -0.16456 | 0.00000          | 0.00000 | 0.00000 |
| 9                             | 0.06848      | 0.32030  | 0.23594  | 0.00000          | 0.00000 | 0.00000 |
| 10                            | -0.09780     | 0.40503  | 0.31052  | 0.00000          | 0.00000 | 0.00000 |
| 13                            | -0.00569     | -0.58656 | -0.18656 | 0.00000          | 0.00000 | 0.00000 |
| 14                            | -0.17393     | 0.59911  | 0.50429  | 0.00000          | 0.00000 | 0.00000 |
| 15                            | 0.15048      | 0.53270  | 0.44772  | 0.00000          | 0.00000 | 0.00000 |
| 62                            | -0.13856     | 0.50003  | 0.41597  | 0.00000          | 0.00000 | 0.00000 |
| 63                            | 0.00511      | -0.53398 | -0.18143 | 0.00000          | 0.00000 | 0.00000 |
| 64                            | 0.16699      | 0.57753  | 0.48466  | 0.00000          | 0.00000 | 0.00000 |
| SUM                           | 0.00000      | 1.79836  | 2.22600  | 0.00000          | 0.00000 | 0.00000 |
| Condition <b>LC2=1.2DL+Ws</b> |              |          |          |                  |         |         |
| 1                             | -0.02437     | 0.14455  | -0.00311 | 0.00000          | 0.00000 | 0.00000 |
| 4                             | 0.15867      | 0.41948  | 0.39890  | 0.00000          | 0.00000 | 0.00000 |
| 5                             | 0.17106      | -0.37063 | -0.40241 | 0.00000          | 0.00000 | 0.00000 |
| 6                             | -0.02432     | 0.50353  | -0.00380 | 0.00000          | 0.00000 | 0.00000 |
| 9                             | 0.16492      | 0.43327  | 0.41374  | 0.00000          | 0.00000 | 0.00000 |
| 10                            | 0.16923      | -0.36564 | -0.39673 | 0.00000          | 0.00000 | 0.00000 |
| 13                            | -0.02495     | 0.07442  | -0.00149 | 0.00000          | 0.00000 | 0.00000 |
| 14                            | 0.16363      | -0.40062 | -0.42030 | 0.00000          | 0.00000 | 0.00000 |
| 15                            | 0.14205      | 0.37554  | 0.35539  | 0.00000          | 0.00000 | 0.00000 |
| 62                            | 0.15447      | -0.33059 | -0.36152 | 0.00000          | 0.00000 | 0.00000 |
| 63                            | -0.02458     | 0.85801  | -0.00482 | 0.00000          | 0.00000 | 0.00000 |
| 64                            | 0.16619      | 0.45704  | 0.42616  | 0.00000          | 0.00000 | 0.00000 |
| SUM                           | 1.19200      | 1.79836  | 0.00000  | 0.00000          | 0.00000 | 0.00000 |

Condition **LC3=0.9DL+Wf**

|    |          |          |          |         |         |         |
|----|----------|----------|----------|---------|---------|---------|
| 1  | 0.00042  | -0.42502 | -0.16119 | 0.00000 | 0.00000 | 0.00000 |
| 4  | 0.09244  | 0.37894  | 0.29294  | 0.00000 | 0.00000 | 0.00000 |
| 5  | -0.06649 | 0.30624  | 0.22715  | 0.00000 | 0.00000 | 0.00000 |
| 6  | -0.00130 | -0.45248 | -0.16373 | 0.00000 | 0.00000 | 0.00000 |
| 9  | 0.06949  | 0.31311  | 0.23515  | 0.00000 | 0.00000 | 0.00000 |
| 10 | -0.09897 | 0.39792  | 0.30989  | 0.00000 | 0.00000 | 0.00000 |
| 13 | -0.00564 | -0.70308 | -0.18574 | 0.00000 | 0.00000 | 0.00000 |
| 14 | -0.17362 | 0.59203  | 0.50355  | 0.00000 | 0.00000 | 0.00000 |
| 15 | 0.15193  | 0.52683  | 0.44822  | 0.00000 | 0.00000 | 0.00000 |
| 62 | -0.14000 | 0.49414  | 0.41645  | 0.00000 | 0.00000 | 0.00000 |
| 63 | 0.00506  | -0.65033 | -0.18060 | 0.00000 | 0.00000 | 0.00000 |
| 64 | 0.16668  | 0.57046  | 0.48392  | 0.00000 | 0.00000 | 0.00000 |

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|     |         |         |         |         |         |         |
|-----|---------|---------|---------|---------|---------|---------|
| SUM | 0.00000 | 1.34877 | 2.22600 | 0.00000 | 0.00000 | 0.00000 |
|-----|---------|---------|---------|---------|---------|---------|

Condition **LC4=0.9DL+Ws**

|    |          |          |          |         |         |         |
|----|----------|----------|----------|---------|---------|---------|
| 1  | -0.02437 | 0.06394  | -0.00228 | 0.00000 | 0.00000 | 0.00000 |
| 4  | 0.15984  | 0.41238  | 0.39827  | 0.00000 | 0.00000 | 0.00000 |
| 5  | 0.17004  | -0.37779 | -0.40316 | 0.00000 | 0.00000 | 0.00000 |
| 6  | -0.02433 | 0.42188  | -0.00297 | 0.00000 | 0.00000 | 0.00000 |
| 9  | 0.16593  | 0.42608  | 0.41295  | 0.00000 | 0.00000 | 0.00000 |
| 10 | 0.16806  | -0.37275 | -0.39737 | 0.00000 | 0.00000 | 0.00000 |
| 13 | -0.02489 | -0.04210 | -0.00067 | 0.00000 | 0.00000 | 0.00000 |
| 14 | 0.16394  | -0.40769 | -0.42104 | 0.00000 | 0.00000 | 0.00000 |
| 15 | 0.14350  | 0.36967  | 0.35589  | 0.00000 | 0.00000 | 0.00000 |
| 62 | 0.15303  | -0.33648 | -0.36104 | 0.00000 | 0.00000 | 0.00000 |
| 63 | -0.02463 | 0.74167  | -0.00400 | 0.00000 | 0.00000 | 0.00000 |
| 64 | 0.16588  | 0.44997  | 0.42542  | 0.00000 | 0.00000 | 0.00000 |

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|     |         |         |         |         |         |         |
|-----|---------|---------|---------|---------|---------|---------|
| SUM | 1.19200 | 1.34877 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
|-----|---------|---------|---------|---------|---------|---------|

Condition **LC5=1.2DL+Wf+Di**

|    |          |         |          |         |         |         |
|----|----------|---------|----------|---------|---------|---------|
| 1  | 0.00041  | 0.01192 | -0.16651 | 0.00000 | 0.00000 | 0.00000 |
| 4  | 0.08472  | 0.42427 | 0.29658  | 0.00000 | 0.00000 | 0.00000 |
| 5  | -0.05963 | 0.35166 | 0.23140  | 0.00000 | 0.00000 | 0.00000 |
| 6  | -0.00128 | 0.01484 | -0.16906 | 0.00000 | 0.00000 | 0.00000 |
| 9  | 0.06302  | 0.35942 | 0.24032  | 0.00000 | 0.00000 | 0.00000 |
| 10 | -0.09143 | 0.44364 | 0.31398  | 0.00000 | 0.00000 | 0.00000 |
| 13 | -0.00597 | 0.00225 | -0.19095 | 0.00000 | 0.00000 | 0.00000 |
| 14 | -0.17544 | 0.63699 | 0.50778  | 0.00000 | 0.00000 | 0.00000 |
| 15 | 0.14291  | 0.56532 | 0.44572  | 0.00000 | 0.00000 | 0.00000 |
| 62 | -0.13120 | 0.53317 | 0.41452  | 0.00000 | 0.00000 | 0.00000 |
| 63 | 0.00541  | 0.04988 | -0.18593 | 0.00000 | 0.00000 | 0.00000 |
| 64 | 0.16846  | 0.61546 | 0.48815  | 0.00000 | 0.00000 | 0.00000 |

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|     |         |         |         |         |         |         |
|-----|---------|---------|---------|---------|---------|---------|
| SUM | 0.00000 | 4.00881 | 2.22600 | 0.00000 | 0.00000 | 0.00000 |
|-----|---------|---------|---------|---------|---------|---------|

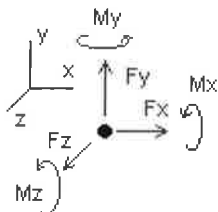
Condition **LC6=1.2DL+Ws+Di**

|    |          |          |          |         |         |         |
|----|----------|----------|----------|---------|---------|---------|
| 1  | -0.02438 | 0.50088  | -0.00760 | 0.00000 | 0.00000 | 0.00000 |
| 4  | 0.15212  | 0.45770  | 0.40192  | 0.00000 | 0.00000 | 0.00000 |
| 5  | 0.17690  | -0.33236 | -0.39891 | 0.00000 | 0.00000 | 0.00000 |
| 6  | -0.02430 | 0.88920  | -0.00830 | 0.00000 | 0.00000 | 0.00000 |
| 9  | 0.15947  | 0.47239  | 0.41812  | 0.00000 | 0.00000 | 0.00000 |
| 10 | 0.17559  | -0.32703 | -0.39328 | 0.00000 | 0.00000 | 0.00000 |
| 13 | -0.02522 | 0.66322  | -0.00588 | 0.00000 | 0.00000 | 0.00000 |
| 14 | 0.16213  | -0.36273 | -0.41681 | 0.00000 | 0.00000 | 0.00000 |
| 15 | 0.13447  | 0.40816  | 0.35339  | 0.00000 | 0.00000 | 0.00000 |
| 62 | 0.16183  | -0.29745 | -0.36297 | 0.00000 | 0.00000 | 0.00000 |
| 63 | -0.02428 | 1.44188  | -0.00932 | 0.00000 | 0.00000 | 0.00000 |

|                            |          |         |          |         |         |         |
|----------------------------|----------|---------|----------|---------|---------|---------|
| 64                         | 0.16766  | 0.49497 | 0.42965  | 0.00000 | 0.00000 | 0.00000 |
| SUM                        | 1.19200  | 4.00881 | 0.00000  | 0.00000 | 0.00000 | 0.00000 |
| Condition <b>LC7=1.2DL</b> |          |         |          |         |         |         |
| 1                          | -0.00001 | 0.32246 | -0.00333 | 0.00000 | 0.00000 | 0.00000 |
| 4                          | -0.00470 | 0.02839 | 0.00250  | 0.00000 | 0.00000 | 0.00000 |
| 5                          | 0.00411  | 0.02862 | 0.00303  | 0.00000 | 0.00000 | 0.00000 |
| 6                          | 0.00001  | 0.32660 | -0.00333 | 0.00000 | 0.00000 | 0.00000 |
| 9                          | -0.00405 | 0.02874 | 0.00315  | 0.00000 | 0.00000 | 0.00000 |
| 10                         | 0.00468  | 0.02844 | 0.00256  | 0.00000 | 0.00000 | 0.00000 |
| 13                         | -0.00021 | 0.46607 | -0.00328 | 0.00000 | 0.00000 | 0.00000 |
| 14                         | -0.00125 | 0.02829 | 0.00295  | 0.00000 | 0.00000 | 0.00000 |
| 15                         | -0.00580 | 0.02349 | -0.00200 | 0.00000 | 0.00000 | 0.00000 |
| 62                         | 0.00577  | 0.02357 | -0.00192 | 0.00000 | 0.00000 | 0.00000 |
| 63                         | 0.00022  | 0.46537 | -0.00329 | 0.00000 | 0.00000 | 0.00000 |
| 64                         | 0.00124  | 0.02830 | 0.00295  | 0.00000 | 0.00000 | 0.00000 |
| SUM                        | 0.00000  | 1.79836 | 0.00000  | 0.00000 | 0.00000 | 0.00000 |
| Condition <b>LC8=0.9DL</b> |          |         |          |         |         |         |
| 1                          | 0.00000  | 0.24185 | -0.00249 | 0.00000 | 0.00000 | 0.00000 |
| 4                          | -0.00353 | 0.02129 | 0.00187  | 0.00000 | 0.00000 | 0.00000 |
| 5                          | 0.00308  | 0.02147 | 0.00227  | 0.00000 | 0.00000 | 0.00000 |
| 6                          | 0.00001  | 0.24495 | -0.00250 | 0.00000 | 0.00000 | 0.00000 |
| 9                          | -0.00304 | 0.02156 | 0.00236  | 0.00000 | 0.00000 | 0.00000 |
| 10                         | 0.00351  | 0.02133 | 0.00192  | 0.00000 | 0.00000 | 0.00000 |
| 13                         | -0.00016 | 0.34955 | -0.00246 | 0.00000 | 0.00000 | 0.00000 |
| 14                         | -0.00093 | 0.02122 | 0.00222  | 0.00000 | 0.00000 | 0.00000 |
| 15                         | -0.00435 | 0.01762 | -0.00150 | 0.00000 | 0.00000 | 0.00000 |
| 62                         | 0.00432  | 0.01767 | -0.00144 | 0.00000 | 0.00000 | 0.00000 |
| 63                         | 0.00016  | 0.34903 | -0.00247 | 0.00000 | 0.00000 | 0.00000 |
| 64                         | 0.00093  | 0.02122 | 0.00222  | 0.00000 | 0.00000 | 0.00000 |
| SUM                        | 0.00000  | 1.34877 | 0.00000  | 0.00000 | 0.00000 | 0.00000 |

## Envelope for nodal reactions

Note.- **Ic** is the controlling load condition



*Direction of positive forces and moments*

Envelope of nodal reactions for

LC1=1.2DL+Wf  
 LC2=1.2DL+Ws  
 LC3=0.9DL+Wf  
 LC4=0.9DL+Ws  
 LC5=1.2DL+Wf+Di  
 LC6=1.2DL+Ws+Di  
 LC7=1.2DL  
 LC8=0.9DL

| Node |     | Forces      |     |             |     |             |     | Moments        |     |                |     |                |     |
|------|-----|-------------|-----|-------------|-----|-------------|-----|----------------|-----|----------------|-----|----------------|-----|
|      |     | Fx<br>[Kip] | lc  | Fy<br>[Kip] | lc  | Fz<br>[Kip] | lc  | Mx<br>[Kip*ft] | lc  | My<br>[Kip*ft] | lc  | Mz<br>[Kip*ft] | lc  |
| 1    | Max | 0.000       | LC3 | 0.501       | LC6 | -0.002      | LC4 | 0.00000        | LC1 | 0.00000        | LC1 | 0.00000        | LC1 |
|      | Min | -0.024      | LC6 | -0.425      | LC3 | -0.167      | LC5 | 0.00000        | LC1 | 0.00000        | LC1 | 0.00000        | LC1 |
| 4    | Max | 0.160       | LC4 | 0.458       | LC6 | 0.402       | LC6 | 0.00000        | LC1 | 0.00000        | LC1 | 0.00000        | LC1 |
|      | Min | -0.005      | LC7 | 0.021       | LC8 | 0.002       | LC8 | 0.00000        | LC1 | 0.00000        | LC1 | 0.00000        | LC1 |
| 5    | Max | 0.177       | LC6 | 0.352       | LC5 | 0.231       | LC5 | 0.00000        | LC1 | 0.00000        | LC1 | 0.00000        | LC1 |
|      | Min | -0.066      | LC3 | -0.378      | LC4 | -0.403      | LC4 | 0.00000        | LC1 | 0.00000        | LC1 | 0.00000        | LC1 |
| 6    | Max | 0.000       | LC7 | 0.889       | LC6 | -0.002      | LC8 | 0.00000        | LC1 | 0.00000        | LC1 | 0.00000        | LC1 |
|      | Min | -0.024      | LC4 | -0.452      | LC3 | -0.169      | LC5 | 0.00000        | LC1 | 0.00000        | LC1 | 0.00000        | LC1 |
| 9    | Max | 0.166       | LC4 | 0.472       | LC6 | 0.418       | LC6 | 0.00000        | LC1 | 0.00000        | LC1 | 0.00000        | LC1 |
|      | Min | -0.004      | LC7 | 0.022       | LC8 | 0.002       | LC8 | 0.00000        | LC1 | 0.00000        | LC1 | 0.00000        | LC1 |
| 10   | Max | 0.176       | LC6 | 0.444       | LC5 | 0.314       | LC5 | 0.00000        | LC1 | 0.00000        | LC1 | 0.00000        | LC1 |
|      | Min | -0.099      | LC3 | -0.373      | LC4 | -0.397      | LC4 | 0.00000        | LC1 | 0.00000        | LC1 | 0.00000        | LC1 |
| 13   | Max | 0.000       | LC8 | 0.663       | LC6 | -0.001      | LC4 | 0.00000        | LC1 | 0.00000        | LC1 | 0.00000        | LC1 |
|      | Min | -0.025      | LC6 | -0.703      | LC3 | -0.191      | LC5 | 0.00000        | LC1 | 0.00000        | LC1 | 0.00000        | LC1 |
| 14   | Max | 0.164       | LC4 | 0.637       | LC5 | 0.508       | LC5 | 0.00000        | LC1 | 0.00000        | LC1 | 0.00000        | LC1 |
|      | Min | -0.175      | LC5 | -0.408      | LC4 | -0.421      | LC4 | 0.00000        | LC1 | 0.00000        | LC1 | 0.00000        | LC1 |
| 15   | Max | 0.152       | LC3 | 0.565       | LC5 | 0.448       | LC3 | 0.00000        | LC1 | 0.00000        | LC1 | 0.00000        | LC1 |
|      | Min | -0.006      | LC7 | 0.018       | LC8 | -0.002      | LC7 | 0.00000        | LC1 | 0.00000        | LC1 | 0.00000        | LC1 |
| 62   | Max | 0.162       | LC6 | 0.533       | LC5 | 0.416       | LC3 | 0.00000        | LC1 | 0.00000        | LC1 | 0.00000        | LC1 |
|      | Min | -0.140      | LC3 | -0.336      | LC4 | -0.363      | LC6 | 0.00000        | LC1 | 0.00000        | LC1 | 0.00000        | LC1 |
| 63   | Max | 0.005       | LC5 | 1.442       | LC6 | -0.002      | LC8 | 0.00000        | LC1 | 0.00000        | LC1 | 0.00000        | LC1 |
|      | Min | -0.025      | LC4 | -0.650      | LC3 | -0.186      | LC5 | 0.00000        | LC1 | 0.00000        | LC1 | 0.00000        | LC1 |
| 64   | Max | 0.168       | LC5 | 0.615       | LC5 | 0.488       | LC5 | 0.00000        | LC1 | 0.00000        | LC1 | 0.00000        | LC1 |
|      | Min | 0.001       | LC8 | 0.021       | LC8 | 0.002       | LC8 | 0.00000        | LC1 | 0.00000        | LC1 | 0.00000        | LC1 |

Date: 5/6/2019  
 Project Name: N. HAVEN – 310 ORANGE ST – SBC CO.  
 Project No.: CT2034  
 Designed By: BD Checked By: MSC



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## BETA SECTOR

### CHECK EPOXY ANCHOR CONNECTION CAPACITY → PROPOSED ANCHORS

Reference: Hilti Anchor Fastening Technical Guide 2014

|                           |            |
|---------------------------|------------|
| Assumed Epoxy Type =      | HIT-HY 200 |
| Assumed Anchor Diameter = | 3/8 in.    |
| Assumed Embedment Depth = | 2 3/8 in.  |
| f'c of Concrete =         | 2500 psi   |

#### Allowable Tensile Load =

$$F_{Tall} = 2855 \text{ lbs.}$$

#### Allowable Shear Load =

$$F_{Vall} = 3075 \text{ lbs.}$$

### WIND FORCES

Reaction  
 (Worst Case)

$$F = 186 \text{ lbs.}$$

### GRAVITY LOADS

Ice and Equipment

$$1442 \text{ lbs.}$$

No. of Supports =

$$1$$

No. of Anchors / Support =

$$4$$

#### Tension Design Load / Anchor =

$$f_t = 46.50 \text{ lbs.} < 2855 \text{ lbs.} \text{ Therefore, OK!}$$

#### Shear Design Load / Anchor =

$$f_v = 360.50 \text{ lbs.} < 3075 \text{ lbs.} \text{ Therefore, OK!}$$

### CHECK COMBINED TENSION AND SHEAR

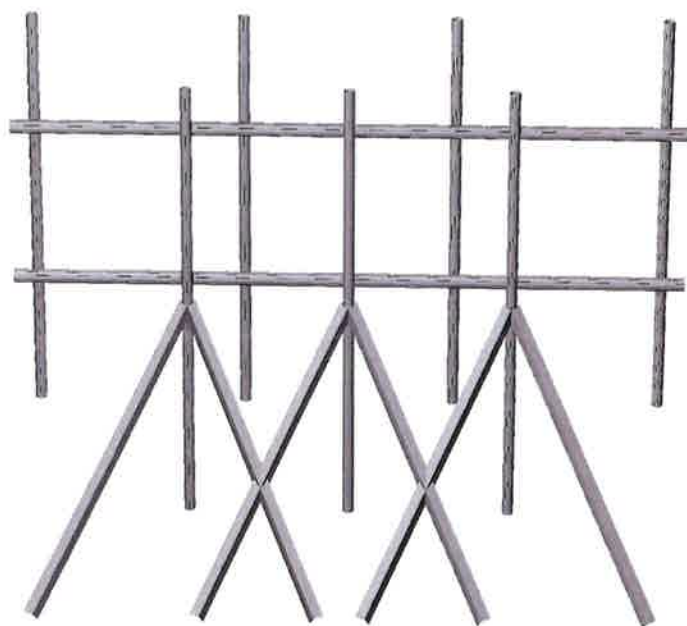
|             |   |             |        |                            |
|-------------|---|-------------|--------|----------------------------|
| $f_t / F_T$ | + | $f_v / F_V$ | $\leq$ | 1.0                        |
| 0.016       | + | 0.117       | =      | 0.134 < 1.0 Therefore, OK! |

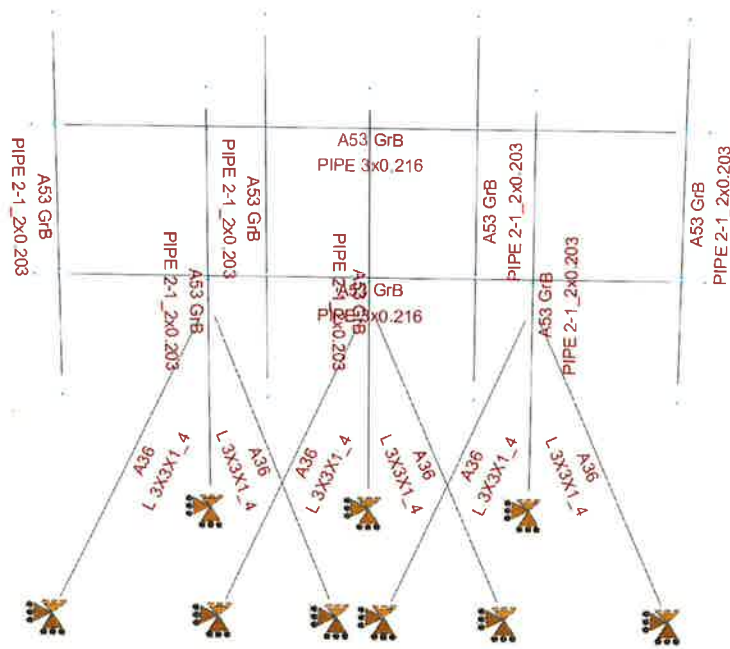


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## **Gamma Sector Antenna Mount Calculations**

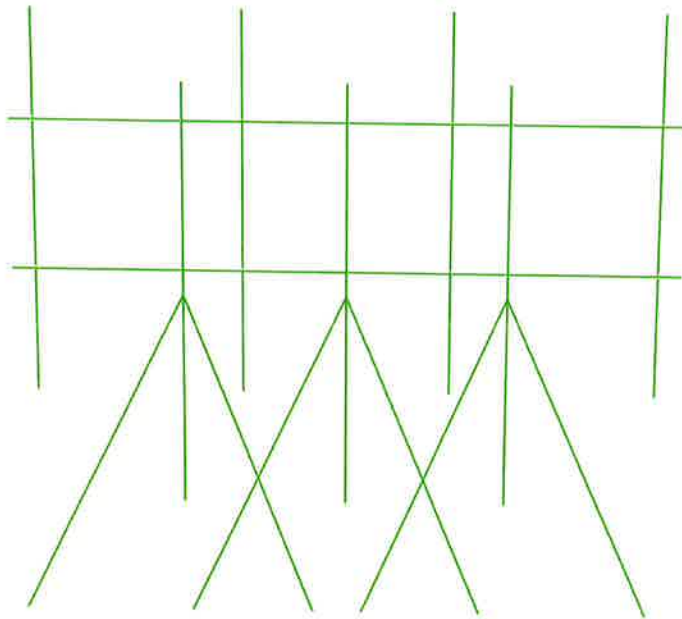


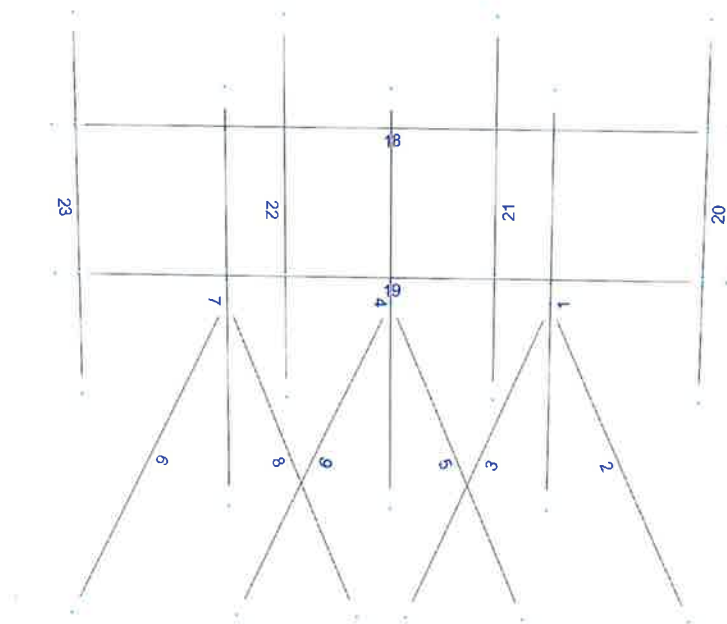




Design status

-  Not designed
-  Error on design
-  Design O.K.
-  With warnings





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## Load data

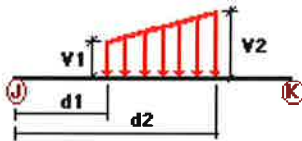
### GLOSSARY

Comb : Indicates if load condition is a load combination

### Load Conditions

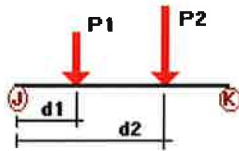
| Condition | Description       | Comb. | Category |
|-----------|-------------------|-------|----------|
| DL        | Dead Load         | No    | DL       |
| Wf        | Wind Load (FRONT) | No    | WIND     |
| Ws        | Wind Load (SIDE)  | No    | WIND     |
| Di        | Ice Load          | No    | LL       |

### Distributed force on members



| Condition | Member | Dir1 | Val1<br>[Kip/ft] | Val2<br>[Kip/ft] | Dist1<br>[ft] | %   | Dist2<br>[ft] | %   |
|-----------|--------|------|------------------|------------------|---------------|-----|---------------|-----|
| Di        | 1      | Y    | -0.006           | -0.006           | 0.00          | Yes | 100.00        | Yes |
|           | 2      | Y    | -0.008           | -0.008           | 0.00          | Yes | 100.00        | Yes |
|           | 3      | Y    | -0.008           | -0.008           | 0.00          | Yes | 100.00        | Yes |
|           | 4      | Y    | -0.006           | -0.006           | 0.00          | Yes | 100.00        | Yes |
|           | 5      | Y    | -0.008           | -0.008           | 0.00          | Yes | 100.00        | Yes |
|           | 6      | Y    | -0.008           | -0.008           | 0.00          | Yes | 100.00        | Yes |
|           | 7      | Y    | -0.006           | -0.006           | 0.00          | Yes | 100.00        | Yes |
|           | 8      | Y    | -0.008           | -0.008           | 0.00          | Yes | 100.00        | Yes |
|           | 9      | Y    | -0.008           | -0.008           | 0.00          | Yes | 100.00        | Yes |
|           | 18     | Y    | -0.007           | -0.007           | 0.00          | Yes | 100.00        | Yes |
|           | 19     | Y    | -0.007           | -0.007           | 0.00          | Yes | 100.00        | Yes |
|           | 20     | Y    | -0.006           | -0.006           | 0.00          | Yes | 100.00        | Yes |
|           | 21     | Y    | -0.006           | -0.006           | 0.00          | Yes | 100.00        | Yes |
|           | 22     | Y    | -0.006           | -0.006           | 0.00          | Yes | 100.00        | Yes |
|           | 23     | Y    | -0.006           | -0.006           | 0.00          | Yes | 100.00        | Yes |

## Concentrated forces on members



| Condition | Member | Dir1 | Value1<br>[Kip] | Dist1<br>[ft] | %  |
|-----------|--------|------|-----------------|---------------|----|
| DL        | 20     | y    | -0.029          | 1.50          | No |
|           |        | y    | -0.029          | 5.50          | No |
|           | 21     | y    | -0.042          | 1.50          | No |
|           |        | y    | -0.042          | 6.40          | No |
|           | 22     | y    | -0.029          | 1.50          | No |
|           |        | y    | -0.029          | 5.50          | No |
|           | 23     | y    | -0.029          | 1.50          | No |
|           |        | y    | -0.029          | 5.50          | No |
| Wf        | 20     | z    | -0.137          | 1.50          | No |
|           |        | z    | -0.137          | 5.50          | No |
|           | 21     | z    | -0.231          | 1.50          | No |
|           |        | z    | -0.231          | 6.40          | No |
|           | 22     | z    | -0.137          | 1.50          | No |
|           |        | z    | -0.137          | 5.50          | No |
|           | 23     | z    | -0.137          | 1.50          | No |
|           |        | z    | -0.137          | 5.50          | No |
| Ws        | 20     | x    | -0.078          | 1.50          | No |
|           |        | x    | -0.078          | 5.50          | No |
|           | 21     | x    | -0.095          | 1.50          | No |
|           |        | x    | -0.095          | 6.40          | No |
|           | 22     | x    | -0.078          | 1.50          | No |
|           |        | x    | -0.078          | 5.50          | No |
|           | 23     | x    | -0.078          | 1.50          | No |
|           |        | x    | -0.078          | 5.50          | No |
| Di        | 20     | y    | -0.051          | 1.50          | No |
|           |        | y    | -0.051          | 5.50          | No |
|           | 21     | y    | -0.081          | 1.50          | No |
|           |        | y    | -0.081          | 6.40          | No |
|           | 22     | y    | -0.051          | 1.50          | No |
|           |        | y    | -0.051          | 5.50          | No |
|           | 23     | y    | -0.051          | 1.50          | No |
|           |        | y    | -0.051          | 5.50          | No |

## Self weight multipliers for load conditions

| Condition | Description       | Self weight multiplier |       |       |       |
|-----------|-------------------|------------------------|-------|-------|-------|
|           |                   | Comb.                  | MultX | MultY | MultZ |
| DL        | Dead Load         | No                     | 0.00  | -1.00 | 0.00  |
| Wf        | Wind Load (FRONT) | No                     | 0.00  | 0.00  | 0.00  |
| Ws        | Wind Load (SIDE)  | No                     | 0.00  | 0.00  | 0.00  |
| Di        | Ice Load          | No                     | 0.00  | 0.00  | 0.00  |

## Earthquake (Dynamic analysis only)

| Condition | a/g  | Ang.<br>[Deg] | Damp.<br>[%] |
|-----------|------|---------------|--------------|
| DL        | 0.00 | 0.00          | 0.00         |
| Wf        | 0.00 | 0.00          | 0.00         |
| Ws        | 0.00 | 0.00          | 0.00         |
| Di        | 0.00 | 0.00          | 0.00         |



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## Steel Code Check

Report: Summary - Group by member

Load conditions to be included in design :

LC1=1.2DL+Wf

LC2=1.2DL+Ws

LC3=0.9DL+Wf

LC4=0.9DL+Ws

LC5=1.2DL+Wf+Di

LC6=1.2DL+Ws+Di

LC7=1.2DL

LC8=0.9DL

| Description             | Section | Member    | Ctrl Eq.      | Ratio       | Status    | Reference |
|-------------------------|---------|-----------|---------------|-------------|-----------|-----------|
| <b>L 3X3X1_4</b>        |         | <b>2</b>  | LC3 at 0.00%  | 0.28        | OK        | Eq. H2-1  |
|                         |         | <b>3</b>  | LC3 at 0.00%  | <b>0.32</b> | <b>OK</b> | Eq. H2-1  |
|                         |         | <b>5</b>  | LC3 at 0.00%  | 0.18        | OK        | Eq. H2-1  |
|                         |         | <b>6</b>  | LC3 at 0.00%  | 0.18        | OK        | Eq. H2-1  |
|                         |         | <b>8</b>  | LC3 at 0.00%  | 0.30        | OK        | Eq. H2-1  |
|                         |         | <b>9</b>  | LC3 at 0.00%  | 0.26        | OK        | Eq. H2-1  |
| <b>PIPE 2-1_2x0.203</b> |         | <b>1</b>  | LC3 at 48.44% | <b>0.51</b> | <b>OK</b> | Eq. H1-1b |
|                         |         | <b>4</b>  | LC3 at 48.44% | 0.42        | OK        | Eq. H1-1b |
|                         |         | <b>7</b>  | LC3 at 48.44% | 0.49        | OK        | Eq. H1-1b |
|                         |         | <b>20</b> | LC5 at 64.58% | 0.11        | OK        | Eq. H1-1b |
|                         |         | <b>21</b> | LC5 at 27.08% | 0.10        | OK        | Eq. H1-1b |
|                         |         | <b>22</b> | LC5 at 27.08% | 0.06        | OK        | Eq. H1-1b |
|                         |         | <b>23</b> | LC5 at 64.58% | 0.10        | OK        | Eq. H1-1b |
| <b>PIPE 3x0.216</b>     |         | <b>18</b> | LC5 at 74.22% | <b>0.25</b> | <b>OK</b> | Eq. H1-1b |
|                         |         | <b>19</b> | LC5 at 74.22% | 0.21        | OK        | Eq. H1-1b |

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## Geometry data

### GLOSSARY

|            |                                                                                              |
|------------|----------------------------------------------------------------------------------------------|
| Cb22, Cb33 | : Moment gradient coefficients                                                               |
| Cm22, Cm33 | : Coefficients applied to bending term in interaction formula                                |
| d0         | : Tapered member section depth at J end of member                                            |
| DJX        | : Rigid end offset distance measured from J node in axis X                                   |
| DJY        | : Rigid end offset distance measured from J node in axis Y                                   |
| DJZ        | : Rigid end offset distance measured from J node in axis Z                                   |
| DKX        | : Rigid end offset distance measured from K node in axis X                                   |
| DKY        | : Rigid end offset distance measured from K node in axis Y                                   |
| DKZ        | : Rigid end offset distance measured from K node in axis Z                                   |
| dL         | : Tapered member section depth at K end of member                                            |
| Ig factor  | : Inertia reduction factor (Effective Inertia/Gross Inertia) for reinforced concrete members |
| K22        | : Effective length factor about axis 2                                                       |
| K33        | : Effective length factor about axis 3                                                       |
| L22        | : Member length for calculation of axial capacity                                            |
| L33        | : Member length for calculation of axial capacity                                            |
| LB pos     | : Lateral unbraced length of the compression flange in the positive side of local axis 2     |
| LB neg     | : Lateral unbraced length of the compression flange in the negative side of local axis 2     |
| RX         | : Rotation about X                                                                           |
| RY         | : Rotation about Y                                                                           |
| RZ         | : Rotation about Z                                                                           |
| TO         | : 1 = Tension only member    0 = Normal member                                               |
| TX         | : Translation in X                                                                           |
| TY         | : Translation in Y                                                                           |
| TZ         | : Translation in Z                                                                           |

### Nodes

| Node | X<br>[ft] | Y<br>[ft] | Z<br>[ft] | Rigid Floor |
|------|-----------|-----------|-----------|-------------|
| 1    | 0.00      | 0.00      | -0.20     | 0           |
| 2    | 0.00      | 10.00     | -0.20     | 0           |
| 3    | 0.00      | 5.00      | -0.20     | 0           |
| 4    | -3.00     | 0.00      | -5.20     | 0           |
| 5    | 3.00      | 0.00      | -5.20     | 0           |
| 6    | 3.50      | 0.00      | -0.20     | 0           |
| 7    | 3.50      | 10.00     | -0.20     | 0           |
| 8    | 3.50      | 5.00      | -0.20     | 0           |
| 9    | 0.50      | 0.00      | -5.20     | 0           |
| 10   | 6.50      | 0.00      | -5.20     | 0           |
| 11   | 7.00      | 10.00     | -0.20     | 0           |
| 12   | 7.00      | 5.00      | -0.20     | 0           |
| 13   | 7.00      | 0.00      | -0.20     | 0           |
| 14   | 10.00     | 0.00      | -5.20     | 0           |
| 15   | 4.00      | 0.00      | -5.20     | 0           |
| 18   | 10.75     | 5.50      | 0.00      | 0           |
| 19   | -3.75     | 5.50      | 0.00      | 0           |
| 20   | 3.50      | 5.50      | 0.00      | 0           |
| 21   | 10.75     | 9.00      | 0.00      | 0           |
| 22   | -3.75     | 9.00      | 0.00      | 0           |
| 23   | 3.50      | 9.00      | 0.00      | 0           |

|    |       |       |       |   |
|----|-------|-------|-------|---|
| 24 | -3.25 | 5.50  | 0.00  | 0 |
| 25 | -3.25 | 9.00  | 0.00  | 0 |
| 26 | 10.25 | 5.50  | 0.00  | 0 |
| 27 | 10.25 | 9.00  | 0.00  | 0 |
| 28 | 1.25  | 9.00  | 0.00  | 0 |
| 29 | 5.75  | 9.00  | 0.00  | 0 |
| 30 | 1.25  | 5.50  | 0.00  | 0 |
| 31 | 5.75  | 5.50  | 0.00  | 0 |
| 32 | -3.25 | 5.50  | 0.20  | 0 |
| 33 | -3.25 | 9.00  | 0.20  | 0 |
| 34 | 1.25  | 5.50  | 0.20  | 0 |
| 35 | 1.25  | 9.00  | 0.20  | 0 |
| 36 | 5.75  | 9.00  | 0.20  | 0 |
| 37 | 5.75  | 5.50  | 0.20  | 0 |
| 38 | 10.25 | 5.50  | 0.20  | 0 |
| 39 | 10.25 | 9.00  | 0.20  | 0 |
| 44 | 10.25 | 11.50 | 0.20  | 0 |
| 45 | 5.75  | 11.50 | 0.20  | 0 |
| 46 | 1.25  | 11.50 | 0.20  | 0 |
| 47 | -3.25 | 11.50 | 0.20  | 0 |
| 48 | 10.25 | 2.50  | 0.20  | 0 |
| 49 | 5.75  | 2.50  | 0.20  | 0 |
| 50 | 1.25  | 2.50  | 0.20  | 0 |
| 51 | -3.25 | 2.50  | 0.20  | 0 |
| 52 | 0.00  | 9.00  | -0.20 | 0 |
| 53 | 7.00  | 9.00  | -0.20 | 0 |
| 54 | 0.00  | 5.50  | -0.20 | 0 |
| 55 | 7.00  | 5.50  | -0.20 | 0 |
| 56 | 0.00  | 9.00  | 0.00  | 0 |
| 57 | 7.00  | 9.00  | 0.00  | 0 |
| 58 | 0.00  | 5.50  | 0.00  | 0 |
| 59 | 7.00  | 5.50  | 0.00  | 0 |
| 60 | 3.50  | 9.00  | -0.20 | 0 |
| 61 | 3.50  | 5.50  | -0.20 | 0 |

## Restraints

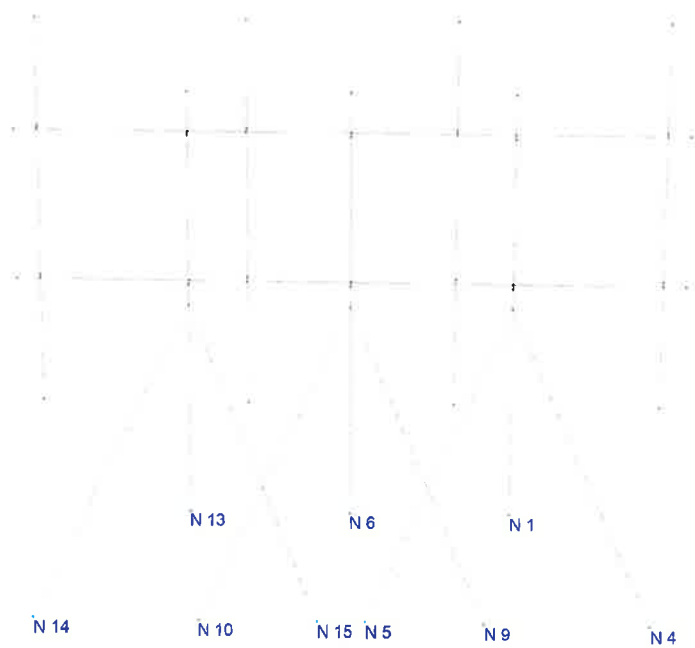
| Node | TX | TY | TZ | RX | RY | RZ |
|------|----|----|----|----|----|----|
| 1    | 1  | 1  | 1  | 0  | 0  | 0  |
| 4    | 1  | 1  | 1  | 0  | 0  | 0  |
| 5    | 1  | 1  | 1  | 0  | 0  | 0  |
| 6    | 1  | 1  | 1  | 0  | 0  | 0  |
| 9    | 1  | 1  | 1  | 0  | 0  | 0  |
| 10   | 1  | 1  | 1  | 0  | 0  | 0  |
| 13   | 1  | 1  | 1  | 0  | 0  | 0  |
| 14   | 1  | 1  | 1  | 0  | 0  | 0  |
| 15   | 1  | 1  | 1  | 0  | 0  | 0  |

## Members

| Member | NJ | NK | Description | Section          | Material | d0<br>[in] | dL<br>[in] | Ig factor |
|--------|----|----|-------------|------------------|----------|------------|------------|-----------|
| 1      | 2  | 1  |             | PIPE 2-1_2x0.203 | A53 GrB  | 0.00       | 0.00       | 0.00      |
| 2      | 3  | 4  |             | L 3X3X1_4        | A36      | 0.00       | 0.00       | 0.00      |
| 3      | 3  | 5  |             | L 3X3X1_4        | A36      | 0.00       | 0.00       | 0.00      |
| 4      | 7  | 6  |             | PIPE 2-1_2x0.203 | A53 GrB  | 0.00       | 0.00       | 0.00      |
| 5      | 8  | 9  |             | L 3X3X1_4        | A36      | 0.00       | 0.00       | 0.00      |
| 6      | 8  | 10 |             | L 3X3X1_4        | A36      | 0.00       | 0.00       | 0.00      |
| 7      | 11 | 13 |             | PIPE 2-1_2x0.203 | A53 GrB  | 0.00       | 0.00       | 0.00      |
| 8      | 12 | 15 |             | L 3X3X1_4        | A36      | 0.00       | 0.00       | 0.00      |
| 9      | 12 | 14 |             | L 3X3X1_4        | A36      | 0.00       | 0.00       | 0.00      |
| 18     | 22 | 21 |             | PIPE 3x0.216     | A53 GrB  | 0.00       | 0.00       | 0.00      |
| 19     | 18 | 19 |             | PIPE 3x0.216     | A53 GrB  | 0.00       | 0.00       | 0.00      |
| 20     | 47 | 51 |             | PIPE 2-1_2x0.203 | A53 GrB  | 0.00       | 0.00       | 0.00      |
| 21     | 46 | 50 |             | PIPE 2-1_2x0.203 | A53 GrB  | 0.00       | 0.00       | 0.00      |
| 22     | 45 | 49 |             | PIPE 2-1_2x0.203 | A53 GrB  | 0.00       | 0.00       | 0.00      |
| 23     | 44 | 48 |             | PIPE 2-1_2x0.203 | A53 GrB  | 0.00       | 0.00       | 0.00      |

### Orientation of local axes

| Member | Rotation<br>[Deg] | Axes23 | NX   | NY   | NZ   |
|--------|-------------------|--------|------|------|------|
| 2      | 180.00            | 0      | 0.00 | 0.00 | 0.00 |
| 3      | 90.00             | 0      | 0.00 | 0.00 | 0.00 |
| 5      | 180.00            | 0      | 0.00 | 0.00 | 0.00 |
| 6      | 90.00             | 0      | 0.00 | 0.00 | 0.00 |
| 8      | 180.00            | 0      | 0.00 | 0.00 | 0.00 |
| 9      | 90.00             | 0      | 0.00 | 0.00 | 0.00 |



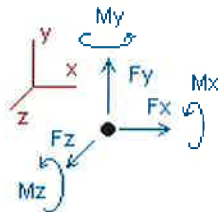
Current Date: 5/6/2019 3:02 PM

Units system: English

File name: W:\STRUCTURAL DEPARTMENT\ANALYSIS SOFTWARE\RAM Elements\RAM Projects\AT&T\CT\CT2034\LTE 4C-5C-6C-7C\CT2034 (LT 4C-5C-6C-7C) - Gamma.etz\

## Analysis result

### Reactions



Direction of positive forces and moments

| Node                          | Forces [Kip] |          |          | Moments [Kip*ft] |         |         |
|-------------------------------|--------------|----------|----------|------------------|---------|---------|
|                               | FX           | FY       | FZ       | MX               | MY      | MZ      |
| Condition <b>LC1=1.2DL+Wf</b> |              |          |          |                  |         |         |
| 1                             | 0.00606      | -0.38792 | -0.16313 | 0.00000          | 0.00000 | 0.00000 |
| 4                             | 0.18804      | 0.40422  | 0.34148  | 0.00000          | 0.00000 | 0.00000 |
| 5                             | -0.30084     | 0.57877  | 0.52544  | 0.00000          | 0.00000 | 0.00000 |
| 6                             | 0.00090      | -0.16086 | -0.13600 | 0.00000          | 0.00000 | 0.00000 |
| 9                             | 0.02494      | 0.12933  | 0.06493  | 0.00000          | 0.00000 | 0.00000 |
| 10                            | -0.02656     | 0.12891  | 0.06720  | 0.00000          | 0.00000 | 0.00000 |
| 13                            | -0.00589     | -0.27392 | -0.15499 | 0.00000          | 0.00000 | 0.00000 |
| 14                            | -0.15007     | 0.33704  | 0.27665  | 0.00000          | 0.00000 | 0.00000 |
| 15                            | 0.26342      | 0.51626  | 0.46242  | 0.00000          | 0.00000 | 0.00000 |
| SUM                           | 0.00000      | 1.27182  | 1.28400  | 0.00000          | 0.00000 | 0.00000 |
| Condition <b>LC2=1.2DL+Ws</b> |              |          |          |                  |         |         |
| 1                             | -0.01574     | 0.74456  | 0.00317  | 0.00000          | 0.00000 | 0.00000 |
| 4                             | 0.11701      | 0.21919  | 0.19982  | 0.00000          | 0.00000 | 0.00000 |
| 5                             | 0.09788      | -0.13407 | -0.15331 | 0.00000          | 0.00000 | 0.00000 |
| 6                             | -0.01392     | 0.11145  | 0.00396  | 0.00000          | 0.00000 | 0.00000 |
| 9                             | 0.12105      | 0.21210  | 0.19979  | 0.00000          | 0.00000 | 0.00000 |
| 10                            | 0.13601      | -0.19656 | -0.21609 | 0.00000          | 0.00000 | 0.00000 |
| 13                            | -0.01449     | 0.33411  | 0.00577  | 0.00000          | 0.00000 | 0.00000 |
| 14                            | 0.12513      | -0.20315 | -0.21529 | 0.00000          | 0.00000 | 0.00000 |
| 15                            | 0.10507      | 0.18419  | 0.17219  | 0.00000          | 0.00000 | 0.00000 |
| SUM                           | 0.65800      | 1.27182  | 0.00000  | 0.00000          | 0.00000 | 0.00000 |
| Condition <b>LC3=0.9DL+Wf</b> |              |          |          |                  |         |         |
| 1                             | 0.00621      | -0.52611 | -0.16429 | 0.00000          | 0.00000 | 0.00000 |
| 4                             | 0.18910      | 0.40233  | 0.34352  | 0.00000          | 0.00000 | 0.00000 |
| 5                             | -0.30002     | 0.57264  | 0.52323  | 0.00000          | 0.00000 | 0.00000 |
| 6                             | 0.00090      | -0.18715 | -0.13697 | 0.00000          | 0.00000 | 0.00000 |
| 9                             | 0.02679      | 0.12736  | 0.06693  | 0.00000          | 0.00000 | 0.00000 |
| 10                            | -0.02820     | 0.12658  | 0.06886  | 0.00000          | 0.00000 | 0.00000 |
| 13                            | -0.00605     | -0.40696 | -0.15609 | 0.00000          | 0.00000 | 0.00000 |
| 14                            | -0.15123     | 0.33525  | 0.27881  | 0.00000          | 0.00000 | 0.00000 |
| 15                            | 0.26250      | 0.50993  | 0.46001  | 0.00000          | 0.00000 | 0.00000 |
| SUM                           | 0.00000      | 0.95387  | 1.28400  | 0.00000          | 0.00000 | 0.00000 |

Condition **LC4=0.9DL+Ws**

|    |          |          |          |         |         |         |
|----|----------|----------|----------|---------|---------|---------|
| 1  | -0.01560 | 0.60637  | 0.00200  | 0.00000 | 0.00000 | 0.00000 |
| 4  | 0.11808  | 0.21731  | 0.20185  | 0.00000 | 0.00000 | 0.00000 |
| 5  | 0.09870  | -0.14020 | -0.15552 | 0.00000 | 0.00000 | 0.00000 |
| 6  | -0.01392 | 0.08516  | 0.00299  | 0.00000 | 0.00000 | 0.00000 |
| 9  | 0.12290  | 0.21013  | 0.20178  | 0.00000 | 0.00000 | 0.00000 |
| 10 | 0.13437  | -0.19889 | -0.21443 | 0.00000 | 0.00000 | 0.00000 |
| 13 | -0.01465 | 0.20107  | 0.00468  | 0.00000 | 0.00000 | 0.00000 |
| 14 | 0.12397  | -0.20494 | -0.21313 | 0.00000 | 0.00000 | 0.00000 |
| 15 | 0.10415  | 0.17786  | 0.16978  | 0.00000 | 0.00000 | 0.00000 |

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|     |         |         |         |         |         |         |
|-----|---------|---------|---------|---------|---------|---------|
| SUM | 0.65800 | 0.95387 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
|-----|---------|---------|---------|---------|---------|---------|

---

Condition **LC5=1.2DL+Wf+Di**

|    |          |          |          |         |         |         |
|----|----------|----------|----------|---------|---------|---------|
| 1  | 0.00548  | 0.23109  | -0.15904 | 0.00000 | 0.00000 | 0.00000 |
| 4  | 0.18442  | 0.41894  | 0.33429  | 0.00000 | 0.00000 | 0.00000 |
| 5  | -0.30318 | 0.60954  | 0.53431  | 0.00000 | 0.00000 | 0.00000 |
| 6  | 0.00090  | -0.04501 | -0.13292 | 0.00000 | 0.00000 | 0.00000 |
| 9  | 0.01607  | 0.14287  | 0.05629  | 0.00000 | 0.00000 | 0.00000 |
| 10 | -0.01934 | 0.14518  | 0.06121  | 0.00000 | 0.00000 | 0.00000 |
| 13 | -0.00517 | 0.30542  | -0.15140 | 0.00000 | 0.00000 | 0.00000 |
| 14 | -0.14576 | 0.35096  | 0.26849  | 0.00000 | 0.00000 | 0.00000 |
| 15 | 0.26657  | 0.54853  | 0.47277  | 0.00000 | 0.00000 | 0.00000 |

---

|     |         |         |         |         |         |         |
|-----|---------|---------|---------|---------|---------|---------|
| SUM | 0.00000 | 2.70752 | 1.28400 | 0.00000 | 0.00000 | 0.00000 |
|-----|---------|---------|---------|---------|---------|---------|

---

Condition **LC6=1.2DL+Ws+Di**

|    |          |          |          |         |         |         |
|----|----------|----------|----------|---------|---------|---------|
| 1  | -0.01632 | 1.36357  | 0.00725  | 0.00000 | 0.00000 | 0.00000 |
| 4  | 0.11339  | 0.23391  | 0.19263  | 0.00000 | 0.00000 | 0.00000 |
| 5  | 0.09554  | -0.10329 | -0.14444 | 0.00000 | 0.00000 | 0.00000 |
| 6  | -0.01392 | 0.22730  | 0.00704  | 0.00000 | 0.00000 | 0.00000 |
| 9  | 0.11219  | 0.22564  | 0.19114  | 0.00000 | 0.00000 | 0.00000 |
| 10 | 0.14323  | -0.18029 | -0.22208 | 0.00000 | 0.00000 | 0.00000 |
| 13 | -0.01377 | 0.91345  | 0.00937  | 0.00000 | 0.00000 | 0.00000 |
| 14 | 0.12944  | -0.18923 | -0.22344 | 0.00000 | 0.00000 | 0.00000 |
| 15 | 0.10822  | 0.21646  | 0.18253  | 0.00000 | 0.00000 | 0.00000 |

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|     |         |         |         |         |         |         |
|-----|---------|---------|---------|---------|---------|---------|
| SUM | 0.65800 | 2.70752 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
|-----|---------|---------|---------|---------|---------|---------|

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Condition **LC7=1.2DL**

|    |          |         |          |         |         |         |
|----|----------|---------|----------|---------|---------|---------|
| 1  | -0.00059 | 0.55279 | 0.00464  | 0.00000 | 0.00000 | 0.00000 |
| 4  | -0.00426 | 0.00755 | -0.00815 | 0.00000 | 0.00000 | 0.00000 |
| 5  | -0.00327 | 0.02452 | 0.00888  | 0.00000 | 0.00000 | 0.00000 |
| 6  | 0.00000  | 0.10517 | 0.00386  | 0.00000 | 0.00000 | 0.00000 |
| 9  | -0.00740 | 0.00789 | -0.00800 | 0.00000 | 0.00000 | 0.00000 |
| 10 | 0.00654  | 0.00931 | -0.00662 | 0.00000 | 0.00000 | 0.00000 |
| 13 | 0.00066  | 0.53216 | 0.00439  | 0.00000 | 0.00000 | 0.00000 |
| 14 | 0.00462  | 0.00713 | -0.00865 | 0.00000 | 0.00000 | 0.00000 |
| 15 | 0.00369  | 0.02530 | 0.00965  | 0.00000 | 0.00000 | 0.00000 |

---

|     |         |         |         |         |         |         |
|-----|---------|---------|---------|---------|---------|---------|
| SUM | 0.00000 | 1.27182 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
|-----|---------|---------|---------|---------|---------|---------|

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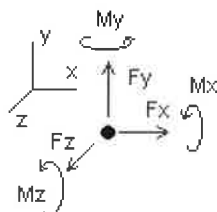


Condition **LC8=0.9DL**

|     |          |         |          |         |         |         |
|-----|----------|---------|----------|---------|---------|---------|
| 1   | -0.00044 | 0.41459 | 0.00348  | 0.00000 | 0.00000 | 0.00000 |
| 4   | -0.00319 | 0.00566 | -0.00611 | 0.00000 | 0.00000 | 0.00000 |
| 5   | -0.00245 | 0.01839 | 0.00666  | 0.00000 | 0.00000 | 0.00000 |
| 6   | 0.00000  | 0.07888 | 0.00289  | 0.00000 | 0.00000 | 0.00000 |
| 9   | -0.00555 | 0.00592 | -0.00600 | 0.00000 | 0.00000 | 0.00000 |
| 10  | 0.00491  | 0.00698 | -0.00496 | 0.00000 | 0.00000 | 0.00000 |
| 13  | 0.00050  | 0.39912 | 0.00329  | 0.00000 | 0.00000 | 0.00000 |
| 14  | 0.00347  | 0.00535 | -0.00649 | 0.00000 | 0.00000 | 0.00000 |
| 15  | 0.00277  | 0.01897 | 0.00723  | 0.00000 | 0.00000 | 0.00000 |
| SUM | 0.00000  | 0.95387 | 0.00000  | 0.00000 | 0.00000 | 0.00000 |

## Envelope for nodal reactions

Note.- **Ic** is the controlling load condition



Direction of positive forces and moments

Envelope of nodal reactions for :

LC1=1.2DL+Wf  
 LC2=1.2DL+Ws  
 LC3=0.9DL+Wf  
 LC4=0.9DL+Ws  
 LC5=1.2DL+Wf+Di  
 LC6=1.2DL+Ws+Di  
 LC7=1.2DL  
 LC8=0.9DL

| Node |     | Forces |     |        |     |        |     | Moments  |     |          |     |          |     |
|------|-----|--------|-----|--------|-----|--------|-----|----------|-----|----------|-----|----------|-----|
|      |     | Fx     | Ic  | Fy     | Ic  | Fz     | Ic  | Mx       | Ic  | My       | Ic  | Mz       | Ic  |
|      |     | [Kip]  |     | [Kip]  |     | [Kip]  |     | [Kip*ft] |     | [Kip*ft] |     | [Kip*ft] |     |
| 1    | Max | 0.006  | LC3 | 1.364  | LC6 | 0.007  | LC6 | 0.00000  | LC1 | 0.00000  | LC1 | 0.00000  | LC1 |
|      | Min | -0.016 | LC6 | -0.526 | LC3 | -0.164 | LC3 | 0.00000  | LC1 | 0.00000  | LC1 | 0.00000  | LC1 |
| 4    | Max | 0.189  | LC3 | 0.419  | LC5 | 0.344  | LC3 | 0.00000  | LC1 | 0.00000  | LC1 | 0.00000  | LC1 |
|      | Min | -0.004 | LC7 | 0.006  | LC8 | -0.008 | LC7 | 0.00000  | LC1 | 0.00000  | LC1 | 0.00000  | LC1 |
| 5    | Max | 0.099  | LC4 | 0.610  | LC5 | 0.534  | LC5 | 0.00000  | LC1 | 0.00000  | LC1 | 0.00000  | LC1 |
|      | Min | -0.303 | LC5 | -0.140 | LC4 | -0.156 | LC4 | 0.00000  | LC1 | 0.00000  | LC1 | 0.00000  | LC1 |
| 6    | Max | 0.001  | LC5 | 0.227  | LC6 | 0.007  | LC6 | 0.00000  | LC1 | 0.00000  | LC1 | 0.00000  | LC1 |
|      | Min | -0.014 | LC4 | -0.187 | LC3 | -0.137 | LC3 | 0.00000  | LC1 | 0.00000  | LC1 | 0.00000  | LC1 |
| 9    | Max | 0.123  | LC4 | 0.226  | LC6 | 0.202  | LC4 | 0.00000  | LC1 | 0.00000  | LC1 | 0.00000  | LC1 |
|      | Min | -0.007 | LC7 | 0.006  | LC8 | -0.008 | LC7 | 0.00000  | LC1 | 0.00000  | LC1 | 0.00000  | LC1 |
| 10   | Max | 0.143  | LC6 | 0.145  | LC5 | 0.069  | LC3 | 0.00000  | LC1 | 0.00000  | LC1 | 0.00000  | LC1 |
|      | Min | -0.028 | LC3 | -0.199 | LC4 | -0.222 | LC6 | 0.00000  | LC1 | 0.00000  | LC1 | 0.00000  | LC1 |

|    |     |        |     |        |     |        |     |         |     |         |     |         |     |
|----|-----|--------|-----|--------|-----|--------|-----|---------|-----|---------|-----|---------|-----|
| 13 | Max | 0.001  | LC7 | 0.913  | LC6 | 0.009  | LC6 | 0.00000 | LC1 | 0.00000 | LC1 | 0.00000 | LC1 |
|    | Min | -0.015 | LC4 | -0.407 | LC3 | -0.156 | LC3 | 0.00000 | LC1 | 0.00000 | LC1 | 0.00000 | LC1 |
| 14 | Max | 0.129  | LC6 | 0.351  | LC5 | 0.279  | LC3 | 0.00000 | LC1 | 0.00000 | LC1 | 0.00000 | LC1 |
|    | Min | -0.151 | LC3 | -0.205 | LC4 | -0.223 | LC6 | 0.00000 | LC1 | 0.00000 | LC1 | 0.00000 | LC1 |
| 15 | Max | 0.267  | LC5 | 0.549  | LC5 | 0.473  | LC5 | 0.00000 | LC1 | 0.00000 | LC1 | 0.00000 | LC1 |
|    | Min | 0.003  | LC8 | 0.019  | LC8 | 0.007  | LC8 | 0.00000 | LC1 | 0.00000 | LC1 | 0.00000 | LC1 |

Date: 5/6/2019

Project Name: N. HAVEN – 310 ORANGE ST – SBC CO.

Project No.: CT2034

Designed By: BD Checked By: MSC



**HUDSON**  
Design Group LLC

## GAMMA SECTOR

### CHECK EPOXY ANCHOR CONNECTION CAPACITY → PROPOSED ANCHORS

Reference: Hilti Anchor Fastening Technical Guide 2014

Assumed Epoxy Type = HIT-HY 200  
Assumed Anchor Diameter = 3/8 in.  
Assumed Embedment Depth = 2 3/8 in.  
f'c of Concrete = 2500 psi

#### Allowable Tensile Load =

$$F_{Tall} = 2855 \text{ lbs.}$$

#### Allowable Shear Load =

$$F_{Vall} = 3075 \text{ lbs.}$$

### WIND FORCES

Reaction F = 164 lbs.  
(Worst Case)

### GRAVITY LOADS

Ice and Equipment 1364 lbs.

No. of Supports = 1

No. of Anchors / Support = 4

#### Tension Design Load / Anchor =

$$f_t = 41.00 \text{ lbs.} < 2855 \text{ lbs.} \text{ Therefore, OK!}$$

#### Shear Design Load / Anchor =

$$f_v = 341.00 \text{ lbs.} < 3075 \text{ lbs.} \text{ Therefore, OK!}$$

### CHECK COMBINED TENSION AND SHEAR

$$\begin{array}{rclclcl} f_t / F_T & + & f_v / F_V & \leq & 1.0 \\ 0.014 & + & 0.111 & = & 0.125 < 1.0 \text{ Therefore, OK!} \end{array}$$



**HUDSON**  
Design Group LLC

## **RRH Mount Calculations**

**Date:** 5/6/2019  
**Project Name:** N. HAVEN – 310 ORANGE ST – SBC CO.  
**Project No.:** CT2034  
**Designed By:** BD      **Checked By:** MSC



**HUDSON**  
 Design Group LLC

**Calculate Total Ballast Required for Ballast Mount**

\*Assume (2) RRH's & Surge Arrestor  
 as projected area\*

**Force (F) =** 290 lbs.

**Height (H) =** 2.5 ft

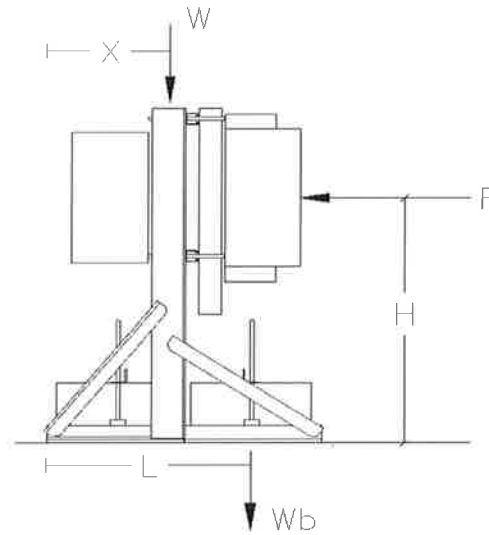
**Weight of Appurtenances (W) =** 255 lbs.

**Frame Width/2 (X) =** 1.3 ft

**Length (L) =** 2.2 ft

**Ballast (Wb) =** TBD

**Safety Factor (SF) =** 1.5



**Overturning at Ballast**

$$\Sigma M = 0 = (F * H) - (W * X) - (Wb * L) \rightarrow Wb = [(F * H * SF - W * X) / L] = 237 \text{ lbs.}$$

**Determine Number of Blocks Required**

(assume 4"x8"x16" solid blocks @ 38 lbs. each)

Number of Blocks Required =

**7 BLOCKS PER SIDE**



**HUDSON**  
Design Group LLC

## Equipment Calculations



**REFERENCES:**

- IBC 2015 with 2018 Connecticut State Building Code and ASCE 7-10.

**AT&T EQUIPMENT LOADING:**

|                                        | Weight (LBS) |
|----------------------------------------|--------------|
| • AC Power                             | 200          |
| • Telco                                | 50           |
| • FIF Rack                             | 300          |
| • Lucent AIF Rack                      | 300          |
| • RRU Rack                             | 335          |
| • RBS 3206 UMTS                        | 500          |
| • RBS 3303                             | 100          |
| • RxAIT Cabinet                        | 300          |
| • (3) Nokia BTS Cabinets (GSM)         | 2400         |
| • Battery Rack                         | 2500         |
| • Miscellaneous                        | 250          |
| • <b>Proposed NetSure 7100 Cabinet</b> | 2250         |

**TOTAL EQUIPMENT WEIGHT = 9485 LBS**

Total Equipment Room Area = 894 SF

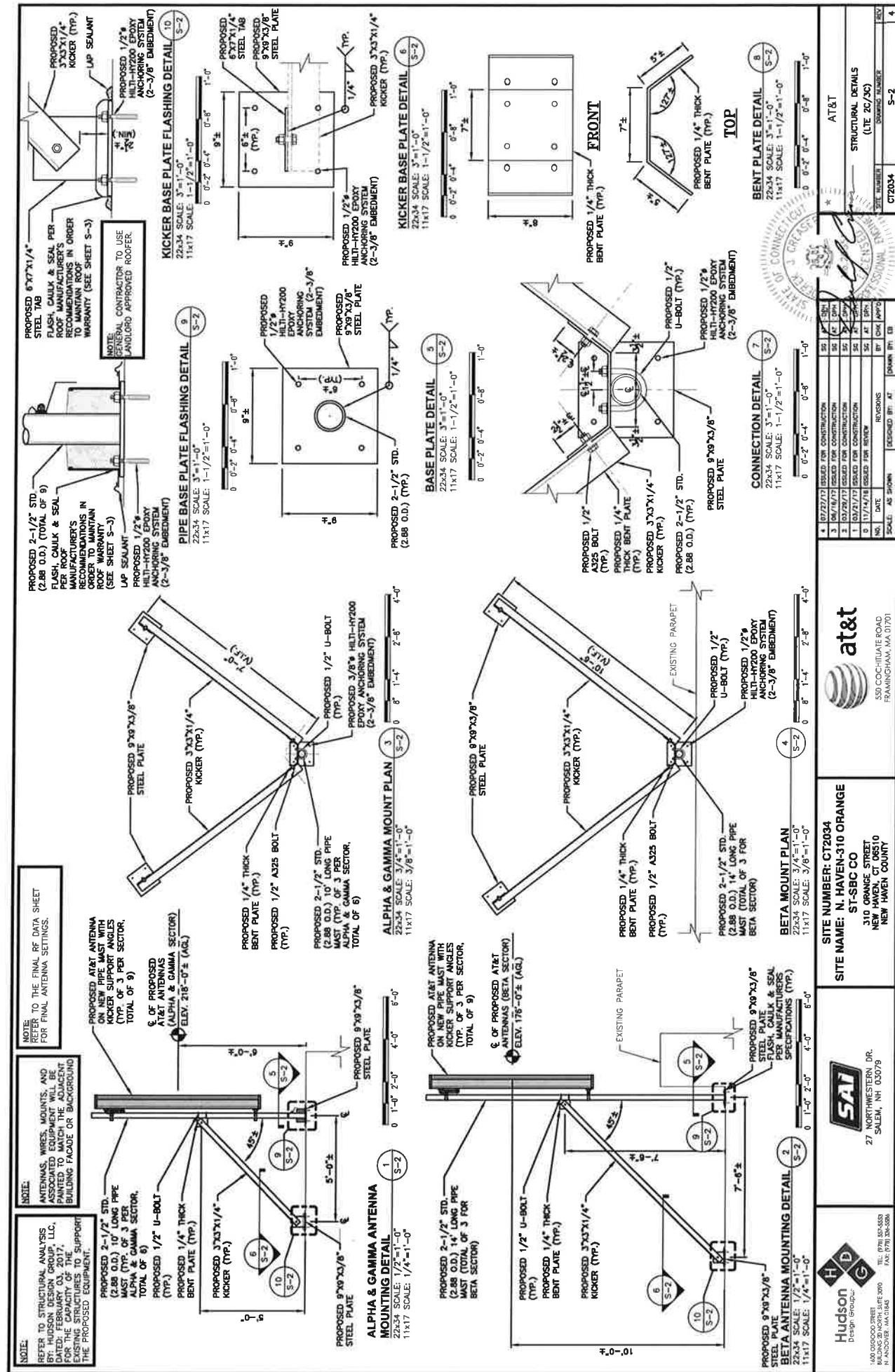
Total Area Load = 9485 LBS / 894 SF = **10.61 PSF < 50 PSF; Therefore, OK!**



**HUDSON**  
Design Group LLC

## Reference Documents





310 ORANGE ST

|            |                |                |                                |
|------------|----------------|----------------|--------------------------------|
| Location   | 310 ORANGE ST  | Mblu           | 243/ 0312/ 00300/ /            |
| Acct#      | 243 0312 00300 | Owner          | SOUTHERN NEW ENGLAND TELEPHONE |
| Assessment | \$16,040,150   | Appraisal      | \$22,914,500                   |
| PID        | 13872          | Building Count | 2                              |

Current Value

| Appraisal      |              |             |              |
|----------------|--------------|-------------|--------------|
| Valuation Year | Improvements | Land        | Total        |
| 2018           | \$16,721,800 | \$6,192,700 | \$22,914,500 |
| Assessment     |              |             |              |
| Valuation Year | Improvements | Land        | Total        |
| 2018           | \$11,705,260 | \$4,334,890 | \$16,040,150 |

Owner of Record

|          |                                |             |     |
|----------|--------------------------------|-------------|-----|
| Owner    | SOUTHERN NEW ENGLAND TELEPHONE | Sale Price  | \$0 |
| Co-Owner | C/O FRONTIER COMMUNICATIONS    | Certificate |     |
| Address  | 401 MERRITT 7                  | Book & Page |     |
|          | NORWALK, CT 06851              | Sale Date   |     |

Ownership History

| Ownership History              |            |             |             |           |
|--------------------------------|------------|-------------|-------------|-----------|
| Owner                          | Sale Price | Certificate | Book & Page | Sale Date |
| SOUTHERN NEW ENGLAND TELEPHONE | \$0        |             |             |           |

Building Information

Building 1 : Section 1

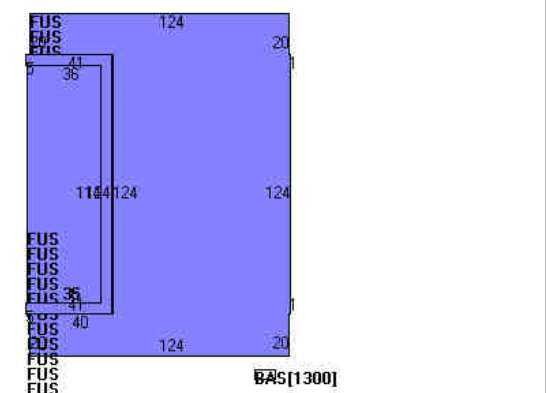
| Year Built:                         | 1955              |
|-------------------------------------|-------------------|
| Living Area:                        | 227,607           |
| Replacement Cost:                   | \$30,696,444      |
| Building Percent Good:              | 30                |
| Replacement Cost Less Depreciation: | \$9,208,900       |
| Building Attributes                 |                   |
| Field                               | Description       |
| STYLE                               | Equip Bldg        |
| MODEL                               | Commercial        |
| Grade                               | Good              |
| Stories:                            | 14                |
| Occupancy                           | 1                 |
| Exterior Wall 1                     | Stone             |
| Exterior Wall 2                     |                   |
| Roof Structure                      | Flat              |
| Roof Cover                          | T&G/Rubber        |
| Interior Wall 1                     | Drywall/Plaste    |
| Interior Wall 2                     |                   |
| Interior Floor 1                    | Carpet            |
| Interior Floor 2                    |                   |
| Heating Fuel                        | Oil/Gas           |
| Heating Type                        | Hot Water         |
| AC Type                             | Central           |
| Bldg Use                            | OFFICE BLD MDL-94 |
| Total Rooms                         |                   |
| Total Bedrms                        | 00                |
| Total Baths                         | 0                 |
| NBHD Code                           |                   |
| 1st Floor Use:                      | 3400              |
| Heat/AC                             | HEAT/AC SPLIT     |
| Frame Type                          | STEEL             |
| Baths/Plumbing                      | AVERAGE           |
| Ceiling/Wall                        | SUS-CEIL & WL     |
| Rooms/Prtns                         | AVERAGE           |
| Wall Height                         | 15                |
| % Comn Wall                         | 5                 |

Building Photo



(http://images.vgsi.com/photos/NewHavenCTPhotos/\\00\02\29\69.jpg)

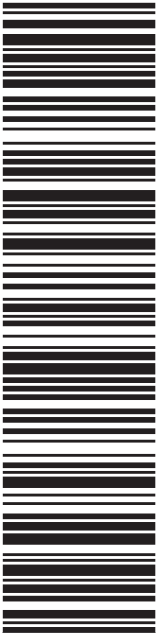
Building Layout



(http://images.vgsi.com/photos/NewHavenCTPhotos//Sketches/)

| Building Sub-Areas (sq ft) |                      |            | Legend      |
|----------------------------|----------------------|------------|-------------|
| Code                       | Description          | Gross Area | Living Area |
| FUS                        | Finished Upper Story | 216,670    | 205,837     |
| BAS                        | First Floor          | 21,770     | 21,770      |
| UBM                        | Unfinished Basement  | 20,470     | 0           |
|                            |                      | 258,910    | 227,607     |



|                                                                                                                     |  |                                                |
|---------------------------------------------------------------------------------------------------------------------|--|------------------------------------------------|
|  <b>Click-N-Ship®</b>            |  | <b>P</b>                                       |
| USPS.com<br>9405 5036 9930 0068 8344 62 0073 5000 0020 6851<br><b>US POSTAGE</b><br>Flat Rate Env                   |  | 07/26/2019<br>Mailed from 06268 062S0000000309 |
| <b>PRIORITY MAIL 2-DAY™</b>                                                                                         |  |                                                |
| MARK J ROBERTS<br>QC DEVELOPMENT<br>PO BOX 916<br>STORRS CT 06268-0916<br><b>0004</b>                               |  |                                                |
| Expected Delivery Date: 07/29/19                                                                                    |  |                                                |
| <b>Carrier -- Leave if No Response</b>                                                                              |  |                                                |
| <b>C007</b>                                                                                                         |  |                                                |
| SHIP<br>TO: SOUTHERN NEW ENGLAND TELEPHONE<br>C/O FRONTIER COMMUNICATIONS<br>401 MERRITT 7<br>NORWALK CT 06851-1000 |  |                                                |
| <b>USPS TRACKING #</b>                                                                                              |  |                                                |
|                                    |  |                                                |
| <b>9405 5036 9930 0068 8344 62</b>                                                                                  |  |                                                |
| Electronic Rate Approved #038555749                                                                                 |  |                                                |



Cut on dotted line.

## Instructions

- Each Click-N-Ship® label is unique. Labels are to be used as printed and used only once. DO NOT PHOTO COPY OR ALTER LABEL.
- Place your label so it does not wrap around the edge of the package.
- Adhere your label to the package. A self-adhesive label is recommended. If tape or glue is used, DO NOT TAPE OVER BARCODE. Be sure all edges are secure.
- To mail your package with PC Postage®, you may schedule a Package Pickup online, hand to your letter carrier, take to a Post Office™, or drop in a USPS collection box.
- Mail your package on the "Ship Date" you selected when creating this label.

## Click-N-Ship® Label Record

**USPS TRACKING # :**  
**9405 5036 9930 0068 8344 62**

Trans. #: 469042930  
 Print Date: 07/26/2019  
 Ship Date: 07/26/2019  
 Expected Delivery Date: 07/29/2019

Priority Mail® Postage: **\$7.35**  
 Total: **\$7.35**

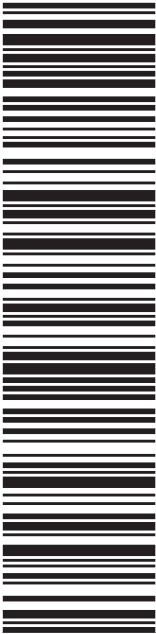
**From:** MARK J ROBERTS  
 QC DEVELOPMENT  
 PO BOX 916  
 STORRS CT 06268-0916

**To:** SOUTHERN NEW ENGLAND TELEPHONE  
 C/O FRONTIER COMMUNICATIONS  
 401 MERRITT 7  
 NORWALK CT 06851-1000

\* Retail Pricing Priority Mail rates apply. There is no fee for USPS Tracking® service on Priority Mail service with use of this electronic rate shipping label. Refunds for unused postage paid labels can be requested online 30 days from the print date.



Thank you for shipping with the United States Postal Service!  
 Check the status of your shipment on the USPS Tracking® page at [usps.com](http://usps.com)

|                                                                                                                                  |                                                |                                                           |            |
|----------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|-----------------------------------------------------------|------------|
|  <b>UNITED STATES POSTAL SERVICE®</b>         |                                                | <b>Click-N-Ship®</b>                                      |            |
|                                               | usps.com<br><b>US POSTAGE</b><br>Flat Rate Env | 9405 5036 9930 0068 8344 79 0073 5000 0010 6510<br>\$7.35 | 07/27/2019 |
|                                                                                                                                  | Mailed from 06268 062S00000000309              |                                                           |            |
| <b>PRIORITY MAIL 1-DAY™</b>                                                                                                      |                                                |                                                           |            |
| MARK J ROBERTS<br>QC DEVELOPMENT<br>PO BOX 916<br>STORRS CT 06268-0916                                                           |                                                | Expected Delivery Date: 07/29/19<br><b>0024</b>           |            |
| <b>Carrier -- Leave if No Response</b>                                                                                           |                                                |                                                           |            |
| <div style="border: 1px solid black; padding: 2px; display: inline-block;"><b>C110</b></div>                                     |                                                |                                                           |            |
| SHIP MAYOR TONI N HARP<br>TO: CITY OF NEW HAVEN<br>165 CHURCH ST<br>CC: MS AICHA S WOODS, EXEC DIR CI<br>NEW HAVEN CT 06510-2010 |                                                |                                                           |            |
| <b>USPS TRACKING #</b>                                                                                                           |                                                |                                                           |            |
|                                                 |                                                |                                                           |            |
| <b>9405 5036 9930 0068 8344 79</b>                                                                                               |                                                |                                                           |            |
| Electronic Rate Approved #038555749                                                                                              |                                                |                                                           |            |



Cut on dotted line.

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**To:** MAYOR TONI N HARP  
 CITY OF NEW HAVEN  
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 CC: MS AICHA S WOODS, EXEC DIR CI  
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