



November 22, 2016

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

Regarding: Notice of Exempt Modification – Antenna & Radio Head Swap  
Property Address: 125 Washington Avenue, North Haven  
AT&T Site: CT2209 - North Haven Railroad Tracks

Dear Ms. Bachman:

AT&T currently maintains a wireless telecommunications facility on an existing 120-foot monopole at the above-referenced address, latitude 41.39694444, longitude -72.85722222. Said monopole is owned by American Tower Corporation. The existing equipment shelter is 26' x 12' totaling 312 square feet.

AT&T desires to modify its existing telecommunications facility by swapping three (3) antennas and three (3) remote-radio heads (“RRHs”). The centerline height of said antennas is and will remain at 122 feet. Antennas are mounted utilizing a platform with hand rails.

Please accept this application as notification pursuant to R.C.S.A. §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 First Selectman of the Town of North Haven, Michael J. Freda, the ground owner Candid Associates, LLC, and to the monopole owner American Tower Corporation.

The planned modifications to AT&T’s facility fall squarely within those activities explicitly provided for in R.C.S.A. §16-50j-72 (b)(2). Specifically:

1. The planned modification will not result in an increase in the height of the existing structure. The antennas to be swapped will be installed at the existing height of 122 feet on the 120-foot monopole.
2. The proposed modifications will not involve any changes to ground-mounted equipment, and therefore will not require an extension of the site boundary.
3. The proposed modification will not increase the noise level at the facility by six decibel or more, or to levels that exceed state and local criteria.

4. The operation of the modified facility will not increase radio frequency (RF) emissions at the facility to a level at or above Federal Communications Commission (FCC) safety standard. An RF emissions calculation (attached) for AT&T's modified facility is herein provided.
5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The monopole and its foundation can support AT&T's proposed modifications (please see attached structural analysis completed by American Tower dated October 26, 2016).

For the foregoing reasons, AT&T respectfully requests that the proposed antenna swap and remote radio head installation be allowed within the exempt modifications under R.C.S.A. §16-50j-72 (b)(2).

Sincerely,

*Sarah Snell*

Sarah Snell  
Site Acquisition Specialist

cc: Michael J. Freda, First Selectman of the Town of North Haven (municipality)  
Candid Associates, LLC (land owner)  
American Tower Corporation (monopole owner)

**PROJECT TEAM**

CLIENT REPRESENTATIVE:  
EMPIRE TELECOM  
16 ESQUIRE ROAD  
BILLERICA, MA 01821  
DAVID COOPER  
617-639-4908  
dcooper@empiretelecomm.com

SITE ACQUISITION & ZONING:  
EMPIRE TELECOM  
16 ESQUIRE ROAD  
BILLERICA, MA 01821  
DAVID COOPER  
617-639-4908  
dcooper@empiretelecomm.com

ENGINEERING:  
TRYLON TSF  
24 QUEEN ST E  
BRAMPTON, ON L6V 1A2  
KATYA SERAVALLE  
PHONE: 519-465-4125

RF ENGINEER:  
AT&T MOBILITY - NEW ENGLAND  
550 COCHITUATE ROAD  
SUITE 550 13 & 14  
FRAMINGHAM, MA 01701  
CAMERON SYME  
508-596-7146  
cs6970@att.com

CONSTRUCTION MANAGEMENT:  
EMPIRE TELECOM  
16 ESQUIRE ROAD  
BILLERICA, MA 01821  
GRZEGORZ "GREG" DORMAN  
484-683-1750  
gdorman@empiretelecomm.com

TOWER OWNER:  
-

**GENERAL NOTES**

**DO NOT SCALE DRAWINGS**  
CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE ARCHITECT/ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

THE FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION. A TECHNICIAN WILL VISIT THE SITE AS REQUIRED FOR ROUTINE MAINTENANCE. THE PROJECT WILL NOT RESULT IN ANY SIGNIFICANT DISTURBANCE OR EFFECT ON DRAINAGE; NO SANITARY SEWER SERVICE, POTABLE WATER, OR TRASH DISPOSAL IS REQUIRED AND NO COMMERCIAL SIGNAGE IS PROPOSED.

**SITE INFORMATION**

LATITUDE: 41° 23' 52.17" N  
LONGITUDE: 72° 51' 24.09" W  
LAT./LONG. TYPE: NAD 83  
GROUND ELEVATION: N/A  
APN/UPC: -  
AREA OF CONSTRUCTION: EXISTING  
ZONING/JURISDICTION: CITY OF NORTH HAVEN  
CURRENT ZONING: -  
EXISTING USE: TELECOMMUNICATIONS FACILITY  
COUNTY: NEW HAVEN  
HANDICAP REQUIREMENTS: FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION. HANDICAPPED ACCESS NOT REQUIRED.



**REVIEWED**  
By Steven Phinney at 11:20 am, Nov 29, 2016

**LTE MULTI CARRIER RRH ADD  
CT2209  
NORTH HAVEN RAILROAD TRACKS  
127 WASHINGTON AVENUE  
NORTH HAVEN, CT 06473  
FA CODE: 10035221**

**APPROVALS**

DATE: \_\_\_\_\_

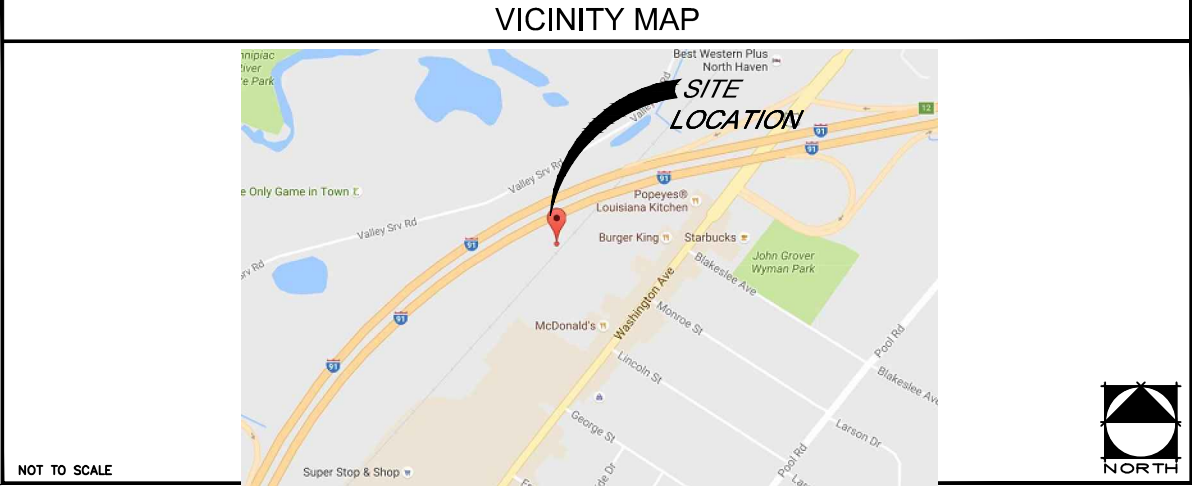
AT&T (CONST.): \_\_\_\_\_ DATE: \_\_\_\_\_

AT&T (OPS): \_\_\_\_\_ DATE: \_\_\_\_\_

TOWER OWNER: \_\_\_\_\_ DATE: \_\_\_\_\_

**JURISDICTIONAL APPROVAL**

BASED ON INFORMATION PROVIDED BY AT&T REGULATORY COMPLIANCE PROFESSIONALS AND LEGAL COUNSEL, THIS TELECOMMUNICATIONS EQUIPMENT DEPLOYMENT IS CONSIDERED AN ELIGIBLE FACILITY UNDER THE MIDDLE CLASS TAX RELIEF AND JOB CREATION ACT OF 2012, 47 USC 1455(A), SECTION 6409(A), AND IS SUBJECT TO AN ELIGIBLE FACILITY REQUEST, EXPEDITED REVIEW AND LIMITED/PARTIAL ZONING PRE-EMPTION FOR LOCAL DISCRETIONARY PERMITS (VARIANCE, SPECIAL PERMIT, SITE PLAN REVIEW OR ADMINISTRATIVE REVIEW).



**DRIVING DIRECTIONS**

2209 - NORTH HAVEN I-91 NORTH TO EXIT 12 TO WASHINGTON AVE. .3 MILES TO DRIVEWAY AFTER MCDONALD'S. GATE IN BACK OF PARKING LOT. NEXT TO VERI HIGH SPEED TRAIN TRACKS. HAVE TO OPEN GATE AND CROSS TRACKS TO GET TO CELL SITE. NUMBER ON GATE TO CALL FOR ACCESS. KEEP GATE CLOSED.

**CODE COMPLIANCE**

BUILDING CODE: 2012 CONNECTICUT COMMERCIAL BUILDING CODE  
ELECTRICAL CODE: 2014 CONNECTICUT ELECTRICAL CODE  
LIGHTNING PROTECTION CODE: NFPA 780 - 2000, LIGHTNING PROTECTION CODE

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.

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.



**PROJECT DESCRIPTION**

THIS PROJECT WILL BE COMPRISED OF:  
**CHANGES ON THE EXISTING MONOPOLE:**

- REMOVE (3) EXISTING AM-X-CD-16-65-00T-RET ANTENNA (1) PER SECTOR FOR (3) SECTORS.
- INSTALL (3) NEW QS66512-2 ANTENNA (1) PER SECTOR FOR (3) SECTORS.
- REMOVE (3) EXISTING RRUS-11 (1) PER SECTOR FOR (3) SECTORS.
- INSTALL (3) NEW RRUS-32 B2, (1) PER SECTOR FOR (3) SECTORS.
- REUSE (2) EXISTING DC6 SQUID.
- REUSE (4) EXISTING DC POWER TRUNK.
- REUSE (2) EXISTING FIBER TRUNK.
- REUSE (12) EXISTING RF CABLES.

**CHANGES IN THE EXISTING AT&T EQUIPMENT ENCLOSURE AREA:**

- INSTALL (1) NEW XMU.

SHEET	DESCRIPTION
T-1	TITLE SHEET
GN-1	GROUNDING & GENERAL NOTES
A-1	COMPOUND PLAN
A-2	EQUIPMENT LAYOUTS
A-3	ANTENNA LAYOUTS
A-4	TOWER ELEVATION
A-5	DETAILS
G-1	GROUNDING, ONE-LINE DIAGRAM & DETAILS



NO.	DATE	DESCRIPTION	BY
A	10/21/16	ISSUE FOR REVIEW	SE

**SITE INFORMATION:**

**CT2209  
NORTH HAVEN RAILROAD  
TRACKS  
FA CODE: 10035221  
127 WASHINGTON AVENUE  
NORTH HAVEN, CT 06473**

SEAL: \_\_\_\_\_

SHEET TITLE:

**TITLE SHEET**

SHEET NUMBER:

**T-1**

**GENERAL NOTES:**

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:
  - CONTRACTOR - EMPIRE TELECOM
  - SUBCONTRACTOR - GENERAL CONTRACTOR (CONSTRUCTION)
  - OWNER - AT&T MOBILITY
  - OEM - ORIGINAL EQUIPMENT MANUFACTURER
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. THE SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
7. 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.
8. 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. ROUTING OF TRENCHING SHALL BE APPROVED BY CONTRACTOR.
9. 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.
10. SUBCONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OFF ALL SCR1 AP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
11. SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.
12. ALL CONCRETE REPAIR WORK SHALL BE DONE IN ACCORDANCE WITH AMERICAN CONCRETE INSTITUTE (ACI) 301.
13. ANY NEW CONCRETE NEEDED FOR THE CONSTRUCTION SHALL HAVE 4000 PSI STRENGTH AT 28 DAYS UNLESS OTHERWISE SPECIFIED. ALL CONCRETING WORK SHALL BE DONE IN ACCORDANCE WITH ACI 318 CODE REQUIREMENTS.
14. 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). ALL STEEL EXPOSED TO WEATHER SHALL BE HOT DIPPED GALVANIZED. TOUCH UP ALL SCRATCHES AND OTHER MARKS IN THE FIELD AFTER STEEL IS ERECTED USING A COMPATIBLE ZINC RICH PAINT.
15. CONSTRUCTION SHALL COMPLY WITH SPECIFICATION 25741-000-3APS-A00Z-00002, "GENERAL CONSTRUCTION SERVICES FOR CONSTRUCTION OF AT&T MOBILITY SITES."
16. 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.
17. 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 MAY NEED TO BE SCHEDULED FOR AN APPROPRIATE MAINTENANCE WINDOW USUALLY IN LOW TRAFFIC PERIODS AFTER MIDNIGHT.
18. SINCE THE CELL SITE MAY BE 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 REQUIRED TO BE WORN TO ALERT OF ANY DANGEROUS EXPOSURE LEVELS.
19. 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.
  - INTERNATIONAL BUILDING CODE: IBC 2009 WITH LOCAL & COUNTY AMENDMENTS
  - NATIONAL ELECTRICAL CODE: NEC 2011 WITH LOCAL & COUNTY AMENDMENTS
  - FIRE/LIFE SAFETY CODE: NFPA-101 2009 WITH LOCAL & COUNTY AMENDMENTS
20. 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, THIRTEENTH EDITION
  - AMERICAN SOCIETY OF TESTING OF MATERIALS, ASTM
  - TELECOMMUNICATIONS INDUSTRY ASSOCIATION (ANSI/TIA-222-G-1), STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWER AND ANTENNA SUPPORTING STRUCTURES:
  - TIA 607, COMMERCIAL BUILDING GROUNDING AND BONDING REQUIREMENTS FOR TELECOMMUNICATIONS
  - OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION, OSHA
  - INSTITUTE FOR ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE) 81, GUIDE FOR MEASURING EARTH RESISTIVITY, GROUND IMPEDANCE, AND EARTH SURFACE POTENTIALS OF A GROUND SYSTEM IEEE 1100 (1999) RECOMMENDED PRACTICE FOR POWERING AND GROUNDING OF ELECTRONIC EQUIPMENT
  - TELCORDIA GR-1503, COAXIAL CABLE CONNECTIONS
21. 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.

**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) LIGHTNING 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. TESTS SHALL BE PERFORMED IN ACCORDANCE WITH 25471-000-3PS-EG00-0001, DESIGN & TESTING OF FACILITY GROUNDING FOR CELL SITES.
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 WITH STAINLESS STEEL HARDWARE TO THE BRIDGE AND THE TOWER 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 AND TRAY SHALL BE GROUNDING AND 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. GROUND CONDUCTORS USED IN THE FACILITY GROUND AND LIGHTNING PROTECTION SYSTEMS SHALL NOT BE ROUTED THROUGH METALLIC OBJECTS THAT FORM A RING AROUND THE CONDUCTOR, SUCH AS METALLIC CONDUITS, METAL SUPPORT CLIPS OR SLEEVES THROUGH WALLS OR FLOORS. WHEN IT IS REQUIRED TO BE HOUSED IN CONDUIT TO MEET CODE REQUIREMENTS OR LOCAL CONDITIONS, NON-METALLIC MATERIAL SUCH AS PVC PLASTIC CONDUIT SHALL BE USED. WHERE USE OF METAL CONDUIT IS UNAVOIDABLE (E.G., NON-METALLIC CONDUIT PROHIBITED BY LOCAL CODE) THE GROUND CONDUCTOR SHALL BE BONDED TO EACH END OF THE METAL CONDUIT.
13. ALL TOWER GROUNDING SYSTEMS SHALL COMPLY WITH THE REQUIREMENTS OF ANSI/TIA 222. FOR TOWERS BEING BUILT TO REV-G OF THE STANDARD, THE WIRE SIZE OF THE BURIED GROUND RING AND CONNECTIONS BETWEEN THE TOWER AND THE BURIED GROUND RING SHALL BE CHANGED FROM 2 AWG TO 2/0 AWG. IN ADDITION, THE MINIMUM LENGTH OF THE GROUND RODS SHALL BE INCREASED FROM EIGHT FEET (8') TO TEN FEET (10').
14. ALL NEW STRUCTURES WITH A FOUNDATION AND/OR FOOTING HAVING 20 FT. OR MORE 1/2" OR GREATER ELECTRICALLY CONDUCTIVE REINFORCING STEEL MUST HAVE IT BONDED TO THE GROUND RING USING AN EXOTHERMIC WELD CONNECTION USING #2 AWG SOLID TINNED COPPER GROUND WIRE, PER NEC 250.50.



NO.	DATE	DESCRIPTION	BY
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127 WASHINGTON AVENUE  
NORTH HAVEN, CT 06473

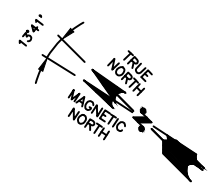
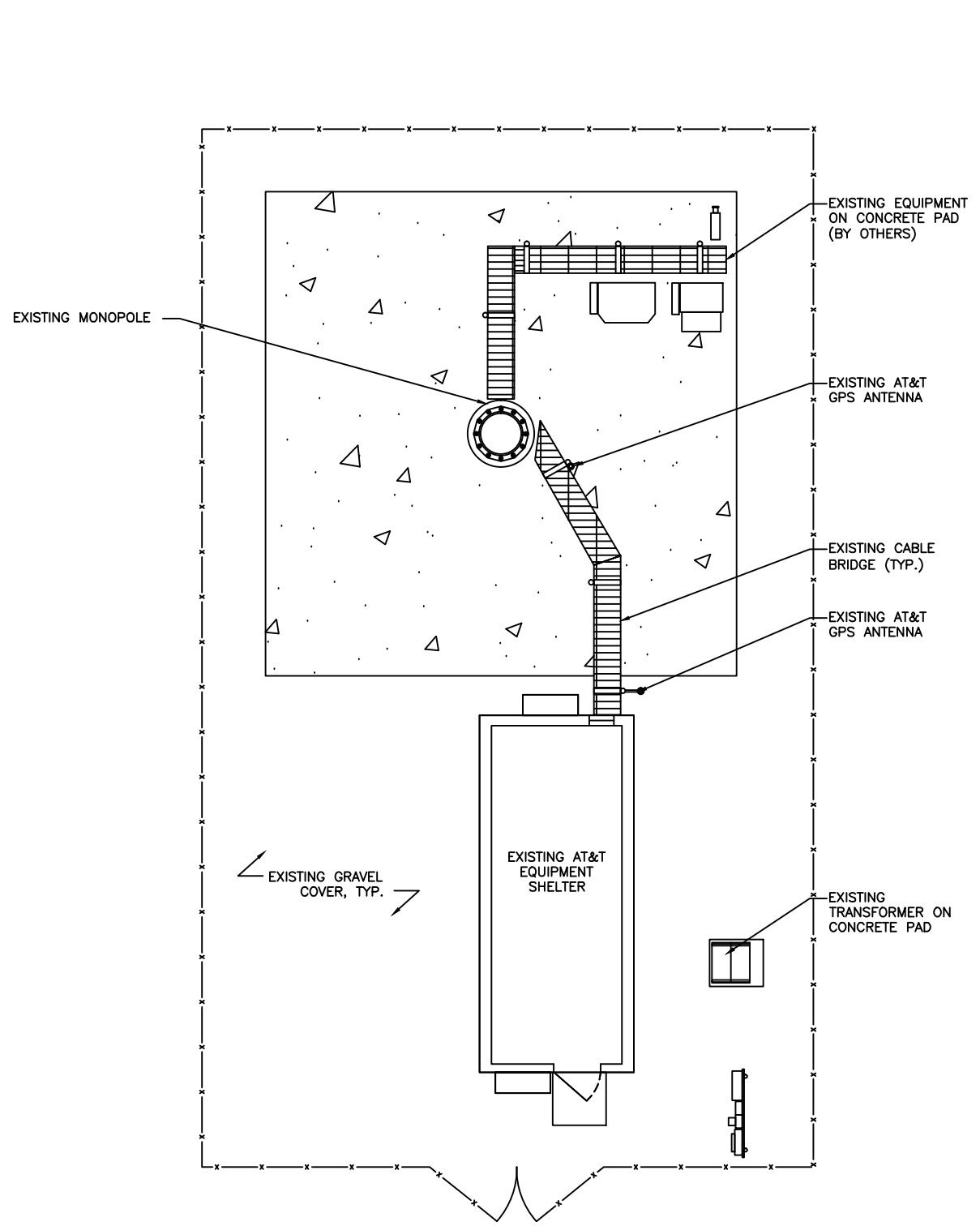
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SHEET TITLE:

**GENERAL NOTES &  
GROUNDING NOTES**

SHEET NUMBER:

**GN-1**



**at&t**  
Mobility  
1355 WEST UNIVERSITY DRIVE  
MESA, AZ 85201-5419

**EMPIRE**  
telecom  
16 ESQUIRE ROAD  
BILLERICA, MA 01821

PLANS PREPARED BY:  
**Trylon**  
24 QUEEN ST E  
BRAMPTON, ON  
1 (519) 572-9995

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SEAL:

SHEET TITLE:  
**ROOF PLAN**

SHEET NUMBER:  
**A-1**



PLANS PREPARED BY:

24 QUEEN ST E  
BRAMPTON, ON  
1 (519) 572-9995

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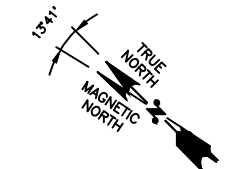
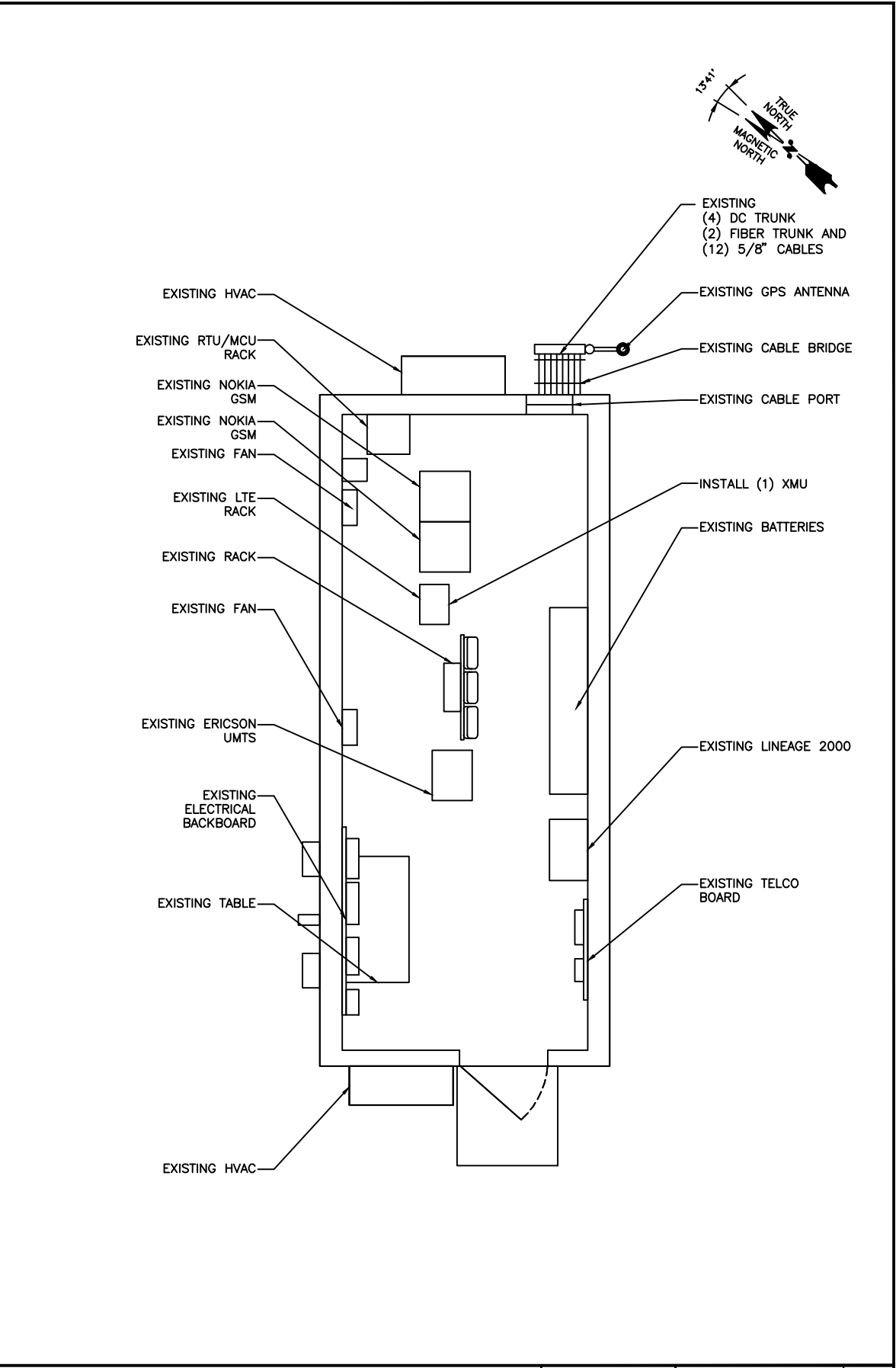
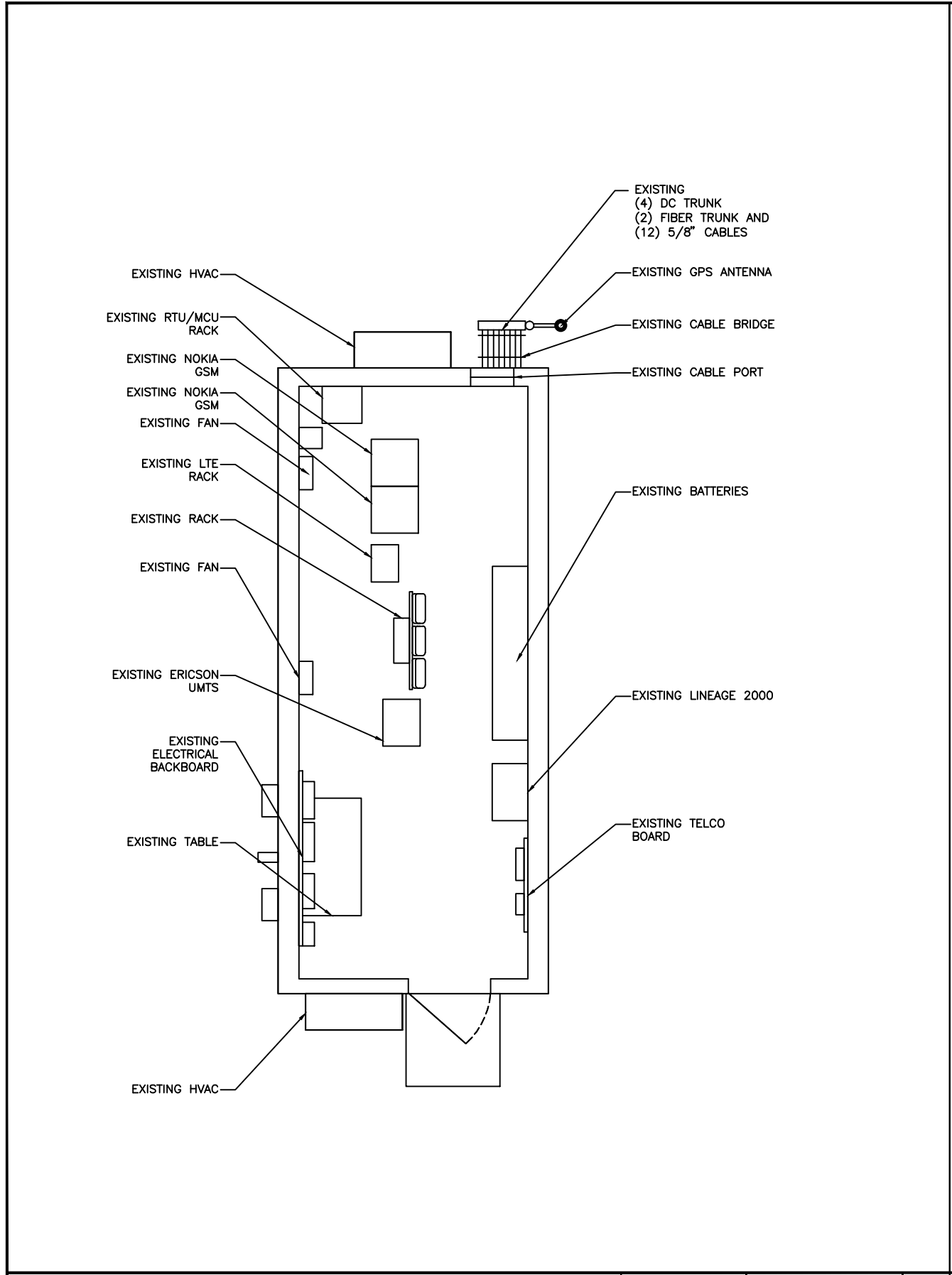
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EQUIPMENT LAYOUTS

SHEET NUMBER:

A-2



EXISTING EQUIPMENT LAYOUT

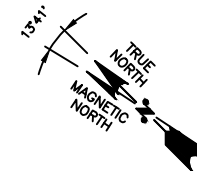
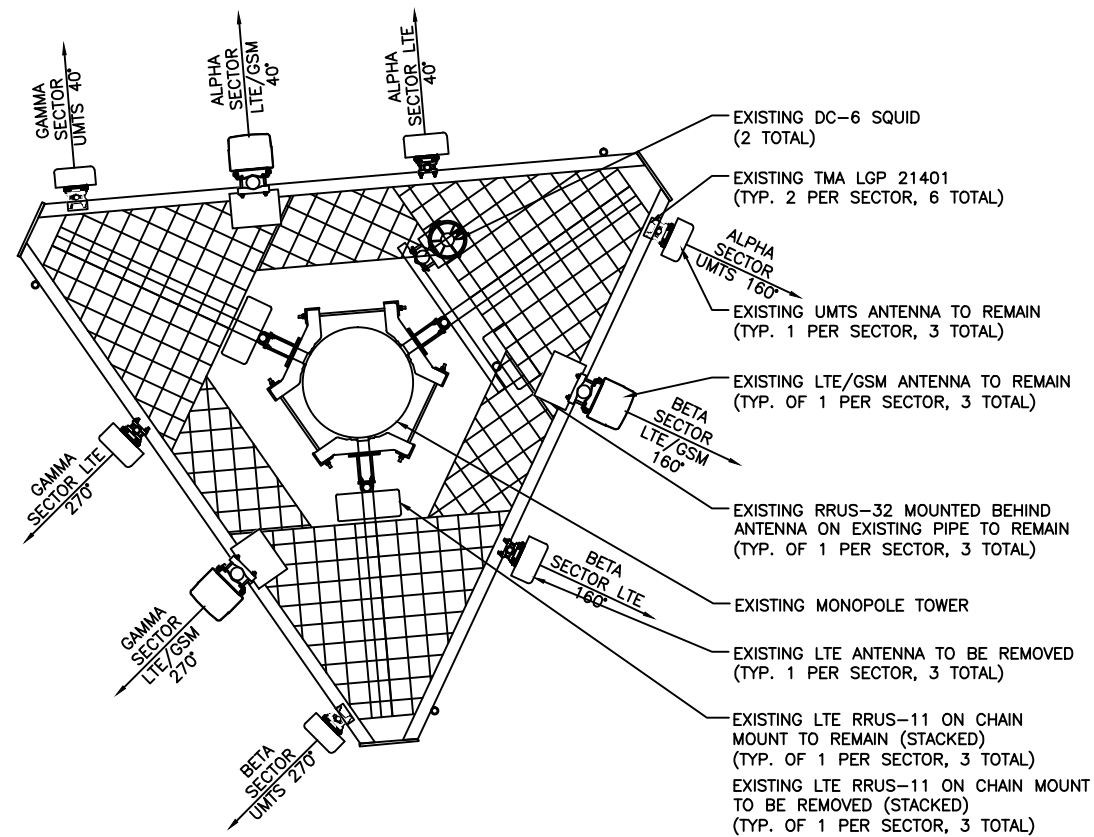
22"x34" SCALE: 3/8" = 1'-0"  
11"x17" SCALE: 3/16" = 1'-0"

1

PROPOSED EQUIPMENT LAYOUT

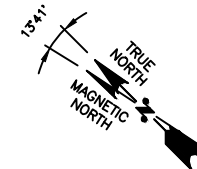
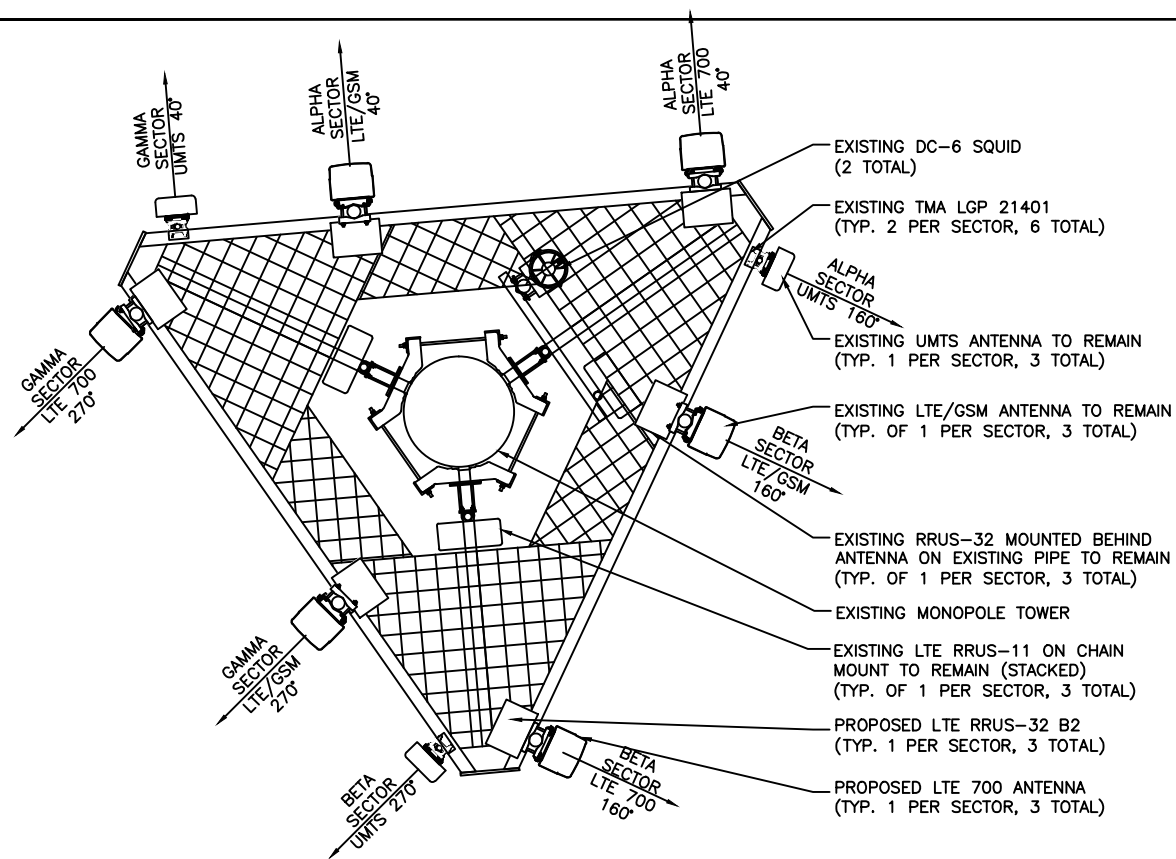
22"x34" SCALE: 3/8" = 1'-0"  
11"x17" SCALE: 3/16" = 1'-0"

2



EXISTING ANTENNA LAYOUT

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



PROPOSED ANTENNA LAYOUT

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

1355 WEST UNIVERSITY DRIVE  
MESA, AZ 85201-5419

16 ESQUIRE ROAD  
BILLERICA, MA 01821

PLANS PREPARED BY:

24 QUEEN ST E  
BRAMPTON, ON  
1 (519) 572-9995

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ANTENNA LAYOUTS

SHEET NUMBER:

A-3

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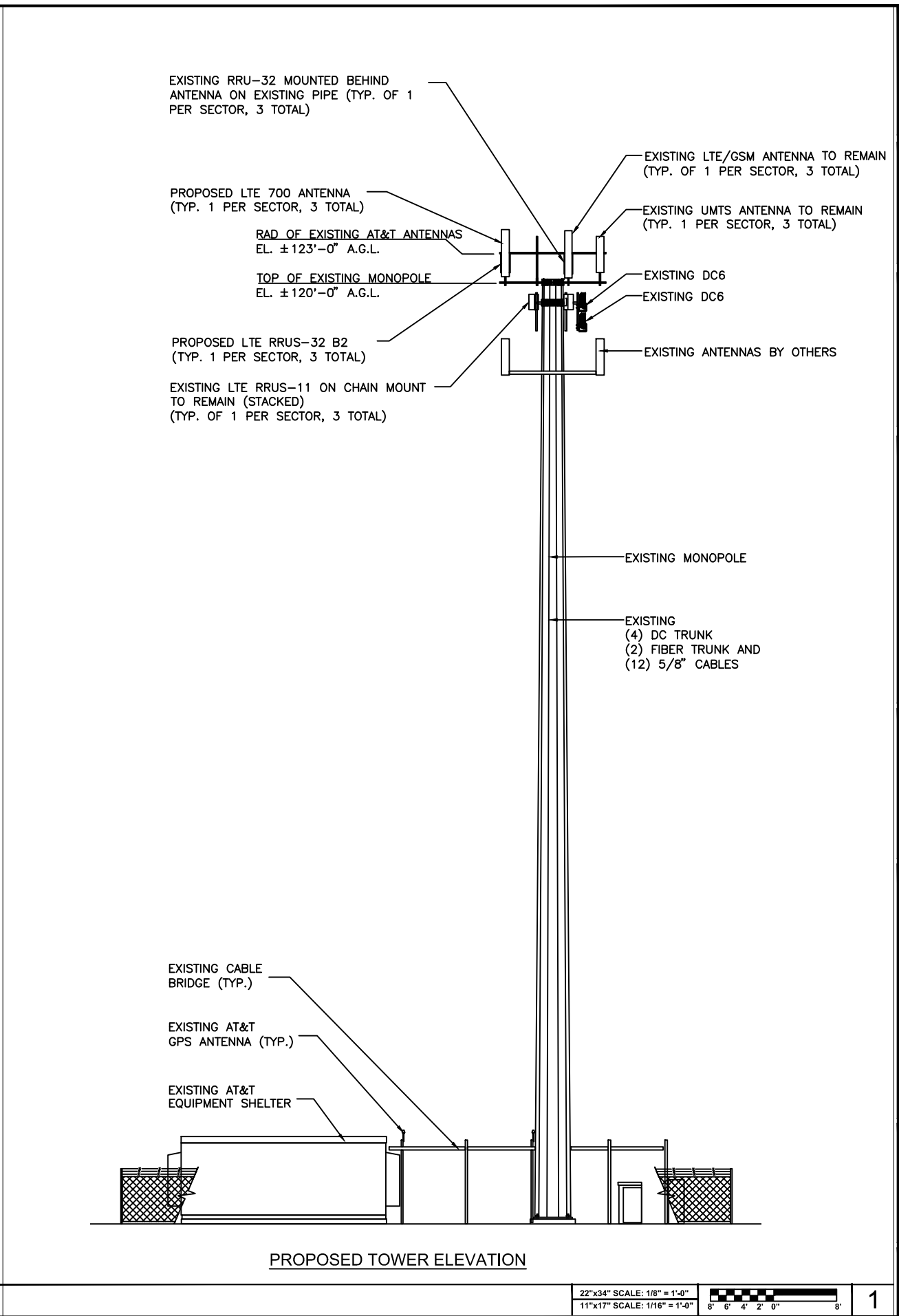
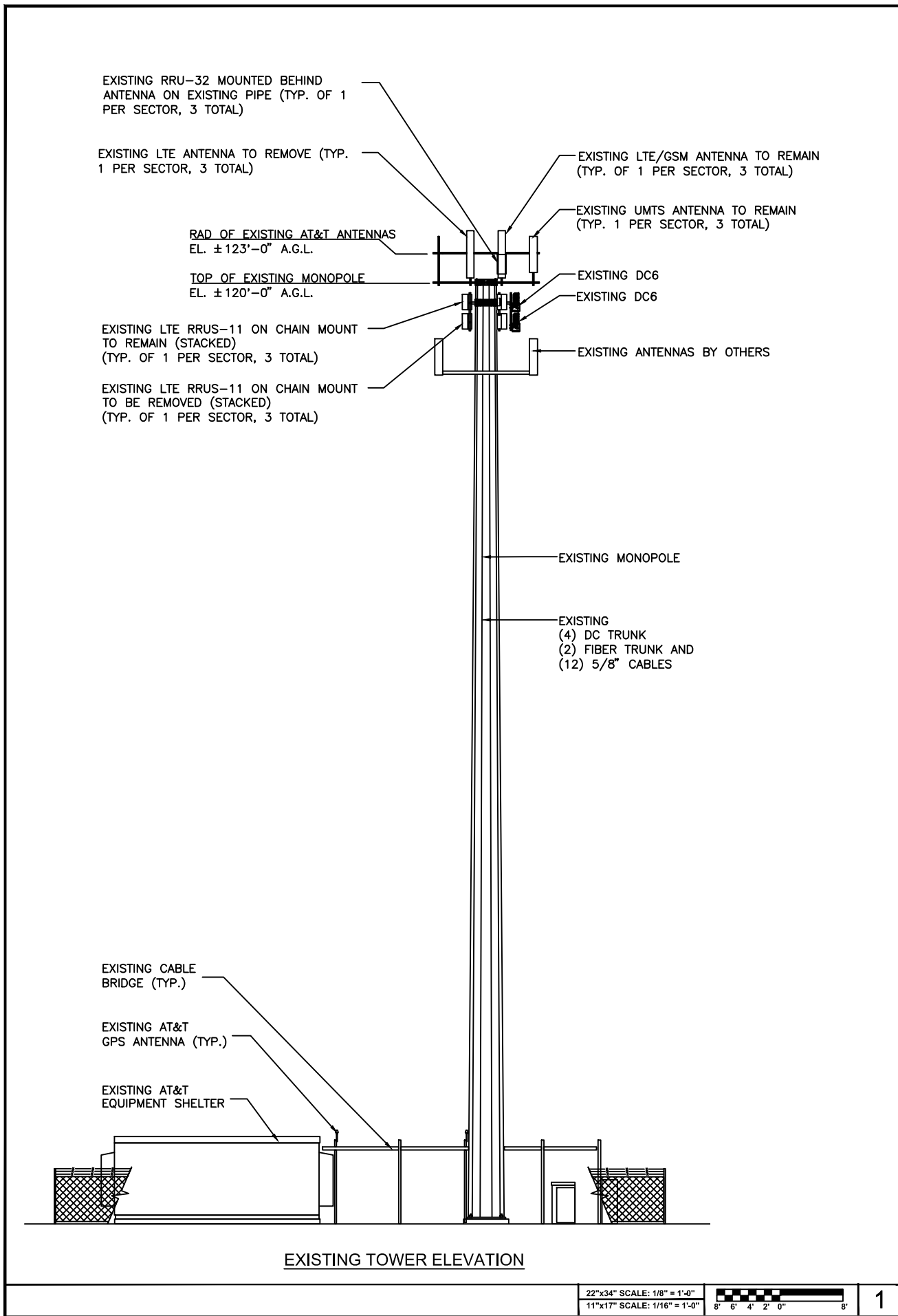
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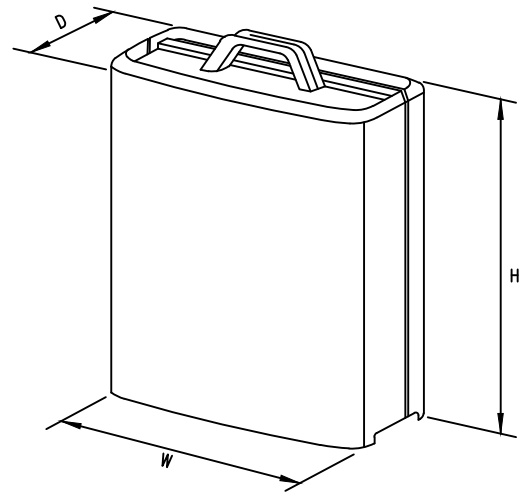
**BUILDING ELEVATION**

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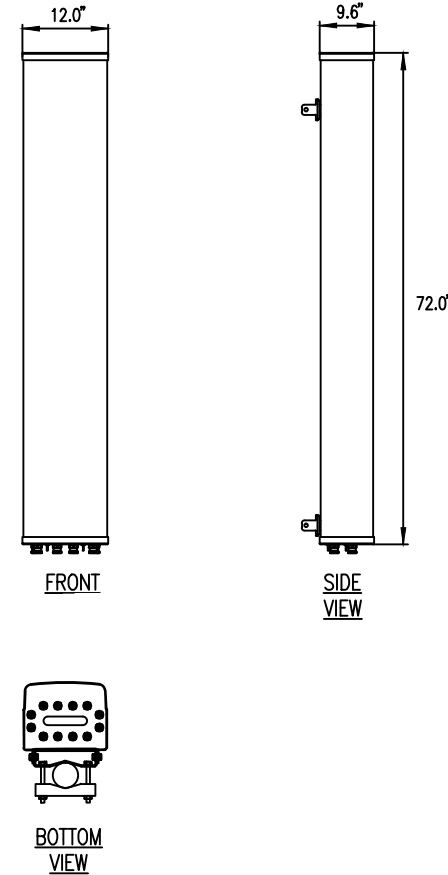
**A-4**







MODEL	L x W x H	WEIGHT
RRUS-11	19.69' x 16.97' x 7.17'	50.7 LBS
RRUS-12	20.4' x 18.5' x 7.5'	58 LBS
RRUS-32	29.9' x 13.3' x 9.5'	77 LBS
RRUS-32 B2	20.9' x 9.5' x 3.3'	77 LBS
RRUS-E2	20.4' x 18.5' x 7.5'	58 LBS
A2 MODULE	16.4' x 15.2' x 3.4'	22 LBS



MANUFACTURER	ANDREW
MODEL	QS66512-2
WEIGHT	111 LBS

  
 1355 WEST UNIVERSITY DRIVE  
 MESA, AZ 85201-5419

  
 16 ESQUIRE ROAD  
 BILLERICA, MA 01821

PLANS PREPARED BY:  
  
 24 QUEEN ST E  
 BRAMPTON, ON  
 1 (519) 572-9995

NO.	DATE	DESCRIPTION	BY
A	10/21/16	ISSUE FOR REVIEW	SE

RRUS DETAILS

N.T.S 1

ANTENNA DETAILS

N.T.S 2

SITE INFORMATION:

CT2209  
 NORTH HAVEN RAILROAD  
 TRACKS  
 FA CODE: 10035221  
 127 WASHINGTON AVENUE  
 NORTH HAVEN, CT 06473

SEAL:

SHEET TITLE:

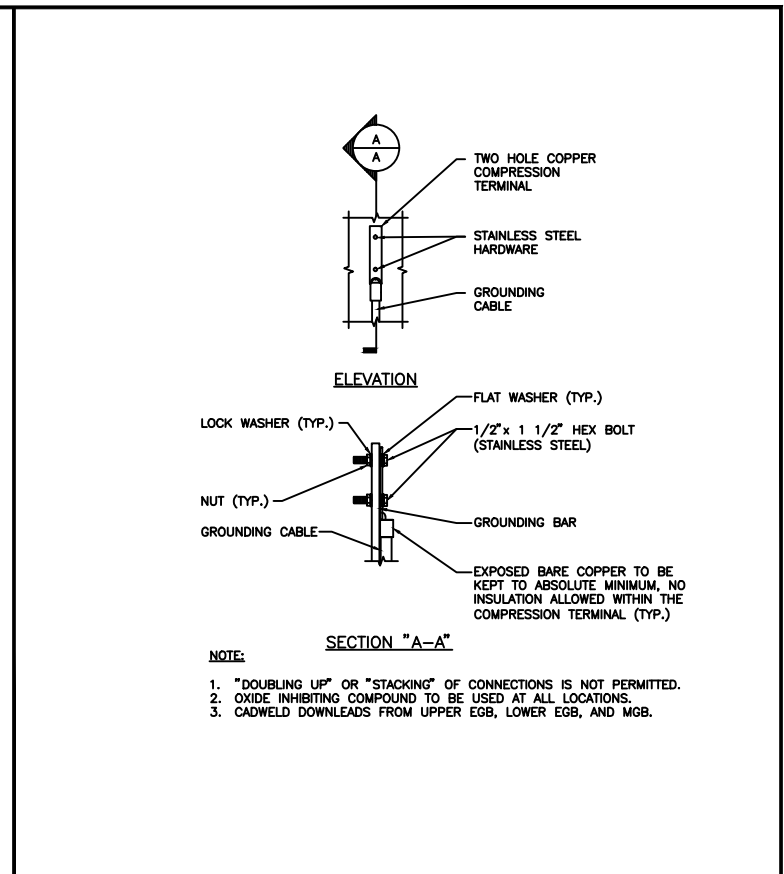
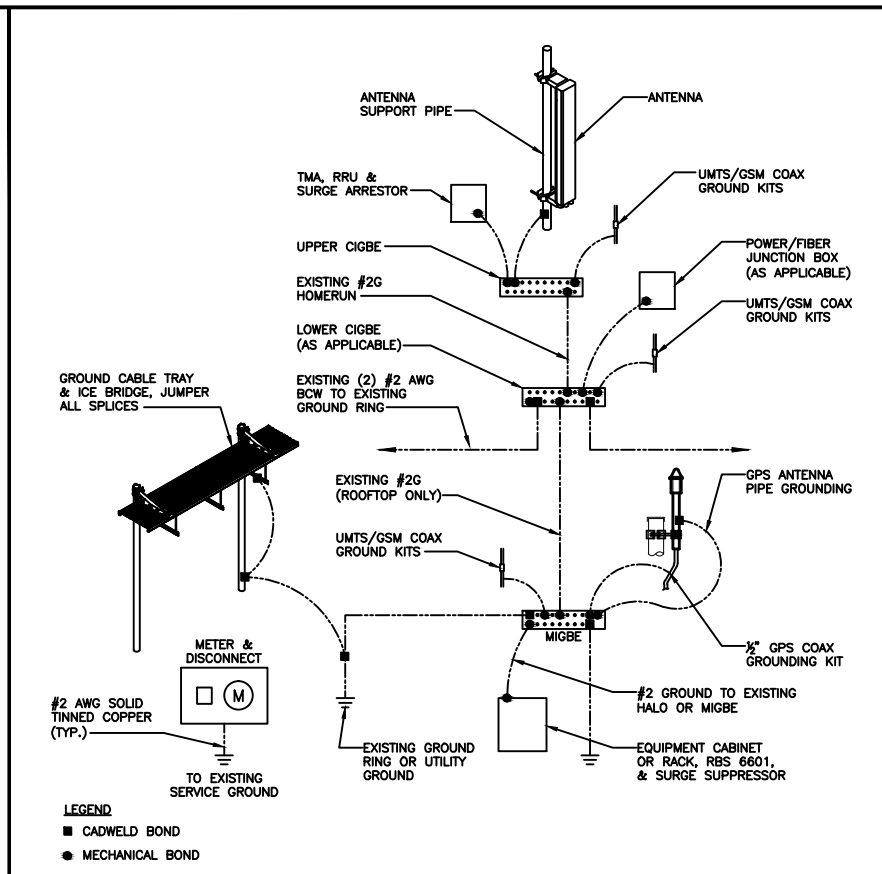
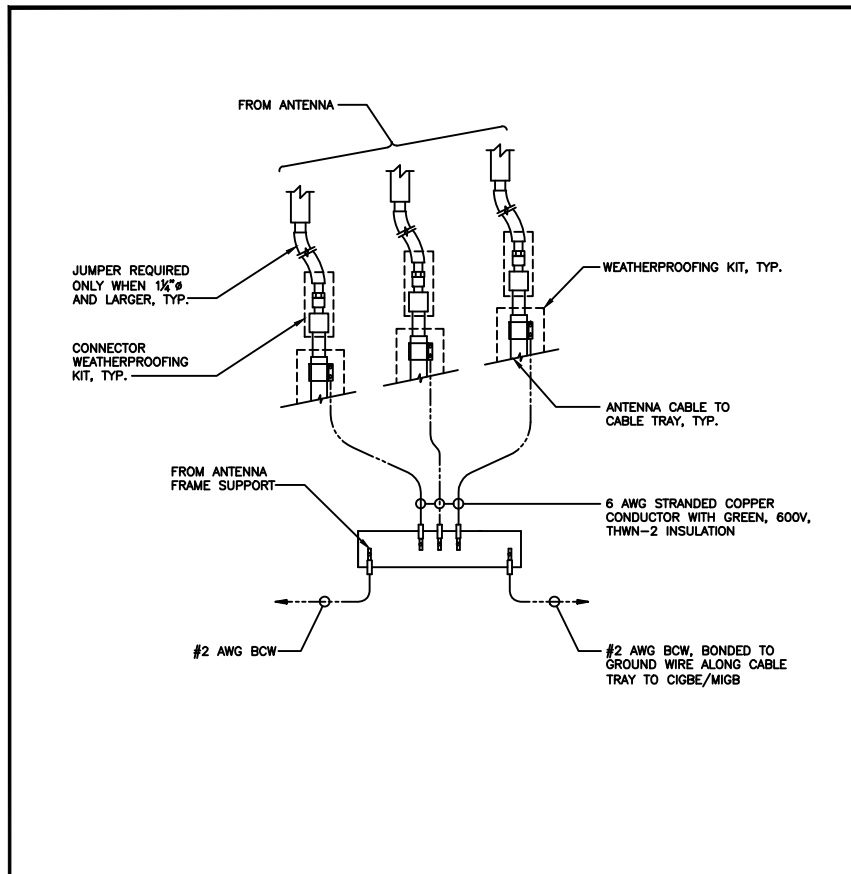
DETAILS

SHEET NUMBER:

A-5

NOT USED

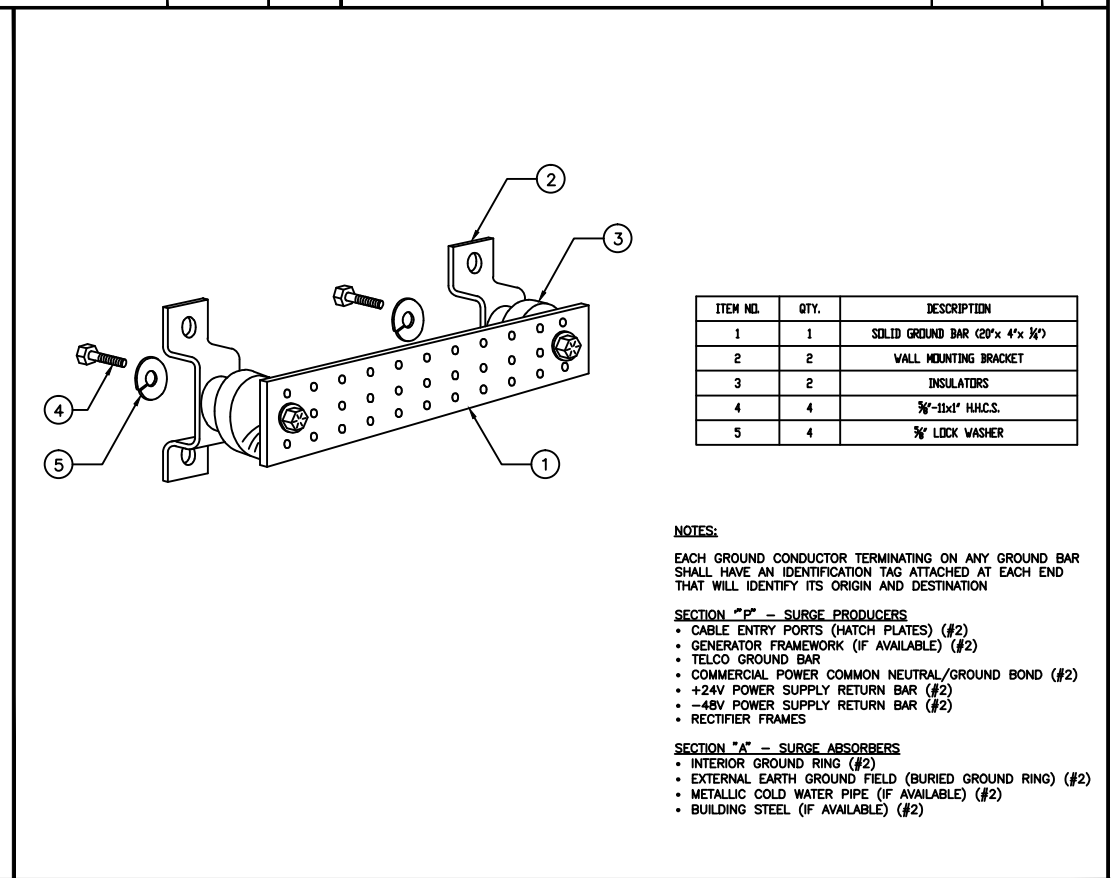
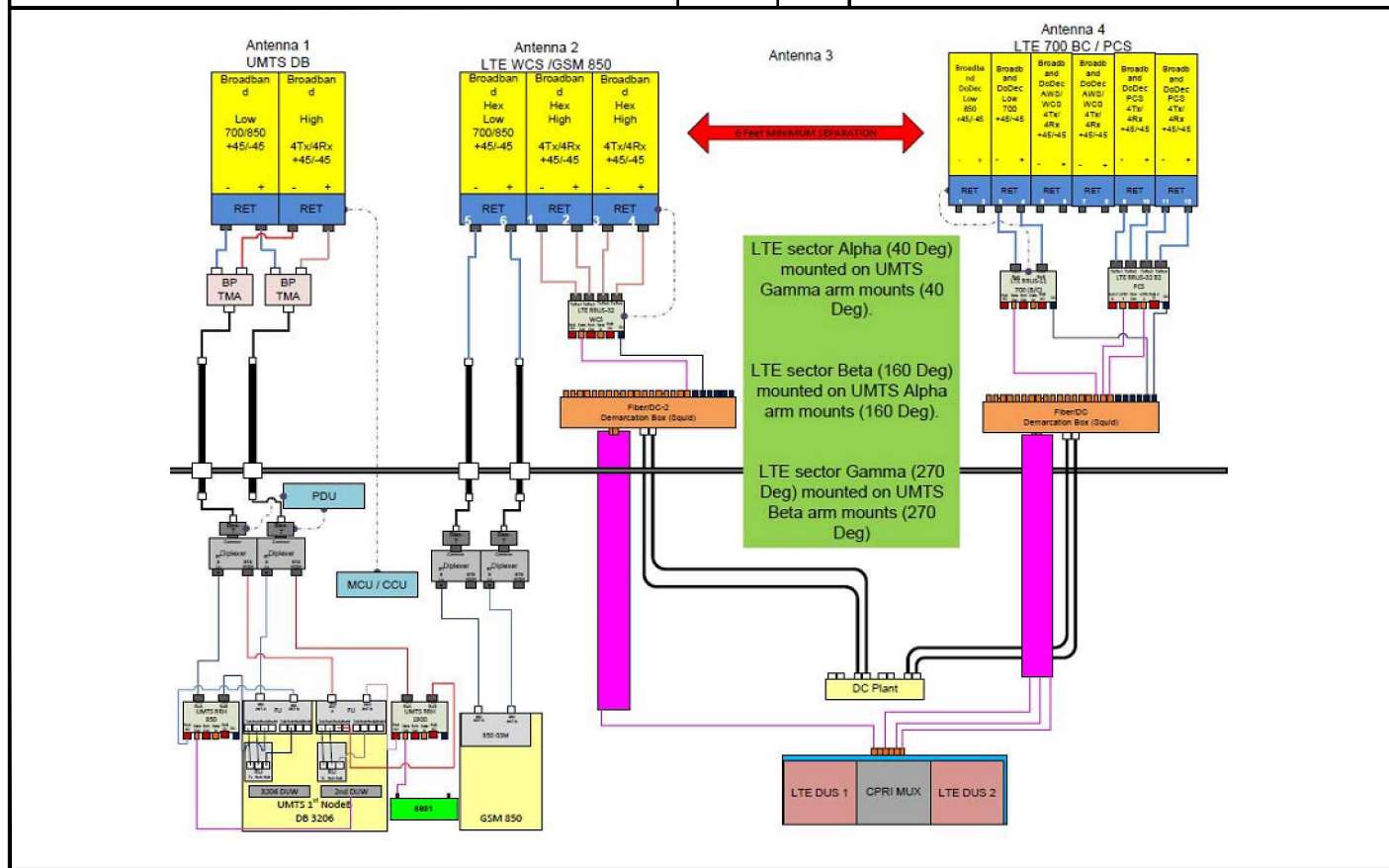
N.T.S 3



GROUND WIRE TO GROUND BAR CONNECTION DETAILS N.T.S 1

GROUND RISER DIAGRAM N.T.S 2

TYPICAL GROUND BAR CONNECTION DETAILS N.T.S 3



PLUMBING DIAGRAM N.T.S 4

GROUND BAR DETAILS N.T.S 5

1355 WEST UNIVERSITY DRIVE  
MESA, AZ 85201-5419

16 ESQUIRE ROAD  
BILLERICA, MA 01821

PLANS PREPARED BY:

24 QUEEN ST E  
BRAMPTON, ON  
1 (519) 572-9995

NO.	DATE	DESCRIPTION	BY
A	10/21/16	ISSUE FOR REVIEW	SE

SITE INFORMATION:

CT2209  
NORTH HAVEN RAILROAD TRACKS  
FA CODE: 10035221  
127 WASHINGTON AVENUE  
NORTH HAVEN, CT 06473

SEAL:

SHEET TITLE:

GROUNDING, ONE-LINE DIAGRAM & DETAILS

SHEET NUMBER:

G-1

## 125 WASHINGTON AVE

<b>Location</b>	125 WASHINGTON AVE	<b>Assessment</b>	\$223,580
<b>Mblu</b>	073/ / 011/ /	<b>Appraisal</b>	\$319,400
<b>Acct#</b>	200200	<b>PID</b>	8727
<b>Owner</b>	CANDID ASSOCIATES LLC	<b>Building Count</b>	1

### Current Value

Appraisal			
Valuation Year	Improvements	Land	Total
2016	\$193,300	\$126,100	\$319,400

Assessment			
Valuation Year	Improvements	Land	Total
2016	\$135,310	\$88,270	\$223,580

### Owner of Record

<b>Owner</b>	CANDID ASSOCIATES LLC	<b>Sale Price</b>	\$0
<b>Co-Owner</b>		<b>Certificate</b>	1
<b>Address</b>	110 WASHINGTON AVE NORTH HAVEN, CT 06473	<b>Book &amp; Page</b>	528/ 443
		<b>Sale Date</b>	09/15/1998

### Ownership History

Ownership History				
Owner	Sale Price	Certificate	Book & Page	Sale Date
CANDID ASSOCIATES LLC		1	528/ 443	09/15/1998
LONGOBARDI VINCENT		3	361/ 982	12/16/1986
LONGOBARDI VINCENT		4	299/ 167	02/01/1978

### Building Information

#### Building 1 : Section 1

**Year Built:** 1950  
**Living Area:** 4320  
**Replacement Cost:** \$152,453  
**Building Percent Good:** 53  
**Replacement Cost Less Depreciation:** \$80,800

#### Building Photo

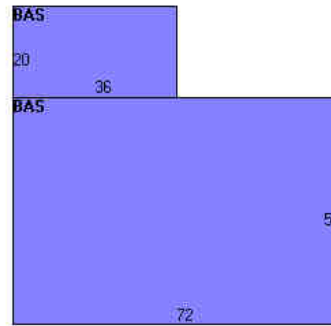
Building Attributes	
Field	Description
STYLE	Warehouse
MODEL	Ind/Comm

Grade	C
Stories:	1
Occupancy	1
Exterior Wall 1	Concr/Cinder
Exterior Wall 2	
Roof Structure	Flat
Roof Cover	T&G/Rubber
Interior Wall 1	Drywall
Interior Wall 2	
Interior Floor 1	Average
Interior Floor 2	
Heating Fuel	None
Heating Type	None
AC Type	None
Bldg Use	IND WHSES M96
Total Rooms	
Total Bedrms	
Total Baths	
1st Floor Use:	
Heat/AC	NONE
Frame Type	WOOD FRAME
Baths/Plumbing	AVERAGE
Ceiling/Wall	CEIL & WALLS
Rooms/Prtns	AVERAGE
Wall Height	14
% Comn Wall	



(<http://images.vgsi.com/photos/NorthHavenCTPhotos//00\01\98\81.jpg>)

**Building Layout**



Building Sub-Areas			Legend
Code	Description	Gross Area	Living Area
BAS	First Floor	4320	4320
		4320	4320

**Extra Features**

Extra Features				Legend
Code	Description	Size	Value	Bldg #
OVHD	OVER HEADDOOR	448 S.F.	\$0	1
OVHD	OVER HEADDOOR	120 S.F.	\$0	1

**Land**

**Land Use**

**Use Code** 4010  
**Description** IND WHSES M96  
**Zone** IL80  
**Neighborhood** 301  
**Alt Land Appr** No  
**Category**

**Land Line Valuation**

**Size (Acres)** 3.15  
**Frontage**  
**Depth**  
**Assessed Value** \$88,270  
**Appraised Value** \$126,100

**Outbuildings**

<b>Outbuildings</b>						<b>Legend</b>
<b>Code</b>	<b>Description</b>	<b>Sub Code</b>	<b>Sub Description</b>	<b>Size</b>	<b>Value</b>	<b>Bldg #</b>
TWR1	COMMU-TOWER			1 UNITS	\$112,500	1

**Valuation History**

<b>Appraisal</b>			
<b>Valuation Year</b>	<b>Improvements</b>	<b>Land</b>	<b>Total</b>
2013	\$107,700	\$126,100	\$233,800
2008	\$61,800	\$201,100	\$262,900
2007		\$70,770	\$114,030

<b>Assessment</b>			
<b>Valuation Year</b>	<b>Improvements</b>	<b>Land</b>	<b>Total</b>
2013	\$75,390	\$88,270	\$163,660
2008	\$43,260	\$140,770	\$184,030
2007		\$70,770	\$114,030

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**AMERICAN TOWER®**  
CORPORATION

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## Structural Analysis Report

**Structure** : 120 ft Monopole  
**ATC Site Name** : Northhaven I, CT  
**ATC Site Number** : 370629  
**Engineering Number** : OAA688019\_C3\_01  
**Proposed Carrier** : AT&T Mobility  
**Carrier Site Name** : North Haven Railroad Tracks  
**Carrier Site Number** : CT2209  
**Site Location** : 125 Washington Ave  
North Haven, CT 06473-0000  
41.397833, -72.856667  
**County** : New Haven  
**Date** : October 26, 2016  
**Max Usage** : 37%  
**Result** : Pass

Prepared By:  
Isaac P. Dodson  
Structural Engineer II

Reviewed By:

**COA: PEC.0001553**



**Table of Contents**

Introduction .....	1
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Conclusion.....	1
Existing and Reserved Equipment.....	2
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Deflection, Twist, and Sway.....	3
Standard Conditions .....	4
Calculations .....	Attached



## Introduction

The purpose of this report is to summarize results of a structural analysis performed on the 120 ft monopole to reflect the change in loading by AT&T Mobility.

## Supporting Documents

<b>Tower Drawings</b>	Valmont Project #F177, dated September 30, 1998
<b>Foundation Drawing</b>	Valmont Drawing #2652-F, dated October 9, 1998
<b>Geotechnical Report</b>	CTB Project #98143, dated September 30, 1998

## Analysis

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

<b>Basic Wind Speed:</b>	97 mph (3-Second Gust, Vasd) / 125 mph (3-Second Gust, Vult)
<b>Basic Wind Speed w/ Ice:</b>	50 mph (3-Second Gust) w/ 3/4" radial ice concurrent
<b>Code:</b>	ANSI/TIA-222-G / 2012 IBC / 2016 Connecticut State Building Code
<b>Structure Class:</b>	II
<b>Exposure Category:</b>	B
<b>Topographic Category:</b>	1
<b>Crest Height:</b>	0 ft
<b>Spectral Response:</b>	$S_s = 0.18, S_1 = 0.06$
<b>Site Class:</b>	D - Stiff Soil

## Conclusion3

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

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





**Existing and Reserved Equipment**

Elevation <sup>1</sup> (ft)		Qty	Antenna	Mount Type	Lines	Carrier	
Mount	RAD						
122.0	122.0	6	Powerwave LGP21401	Platform w/ Handrails	(12) 1 5/8" Coax	AT&T Mobility	
		3	Ericsson RRUS-32				
		3	Powerwave 7770.00				
		3	CCI HPA-65R-BUU-H6				
118.0	118.0	2	Raycap DC6-48-60-18-8F	Flush	(4) 0.78" 8 AWG 6 (2) 0.39" Fiber Trunk (2) 3" Conduit (2) 3/8" RET Control Cable		
		6	Ericsson RRUS 11 (Band 12)				
112.0	112.0	3	Ericsson KRY 112 144/1	Platform w/ Handrails	(12) 1 5/8" Coax (1) 1 1/4" Hybriflex		T-Mobile
		3	Ericsson RRUS 11 B12				
		3	Ericsson AIR 21, 1.3M, B2A B4P				
		3	Ericsson AIR 21, 1.3M, B4A B2P				
		3	Andrew LNX-6515DS-VTM				

**Equipment to be Removed**

Elevation <sup>1</sup> (ft)		Qty	Antenna	Mount Type	Lines	Carrier
Mount	RAD					
122.0	122.0	3	KMW AM-X-CD-17-65-00T-RET	-	-	AT&T Mobility

**Proposed Equipment**

Elevation <sup>1</sup> (ft)		Qty	Antenna	Mount Type	Lines	Carrier
Mount	RAD					
122.0	122.0	6	Powerwave 7020.00 Dual Band RET	Platform w/ Handrails	-	AT&T Mobility
		3	Ericsson RRUS 32 B2			
		3	Quintel QS66512-2			

<sup>1</sup>Mount elevation is defined as height above bottom of steel structure to the bottom of mount, RAD elevation is defined as center of antenna above ground level (AGL).



**Structure Usages**

Structural Component	Controlling Usage	Pass/Fail
Anchor Bolts	31%	Pass
Shaft	37%	Pass
Base Plate	36%	Pass

**Foundations**

Reaction Component	Original Design Reactions	Factored Design Reactions*	Analysis Reactions	% of Design
Moment (Kips-Ft)	4,149.0	5,601.2	1,940.8	35%
Shear (Kips)	37.1	50.1	23.4	47%

\* The design reactions are factored by 1.35 per ANSI/TIA-222-G, Sec. 15.5.1

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

**Deflection and Sway\***

Antenna Elevation (ft)	Antenna	Carrier	Deflection (ft)	Sway (Rotation) (°)
120.0	Powerwave Allgon 7020.00 Dual Band RET	AT&T Mobility	0.500	0.398
	Ericsson RRUS 32 B2			
	Quintel QS66512-2			

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



## Standard Conditions

All engineering services are performed on the basis that the information used is current and correct. This information may consist of, but is not necessary limited, to:

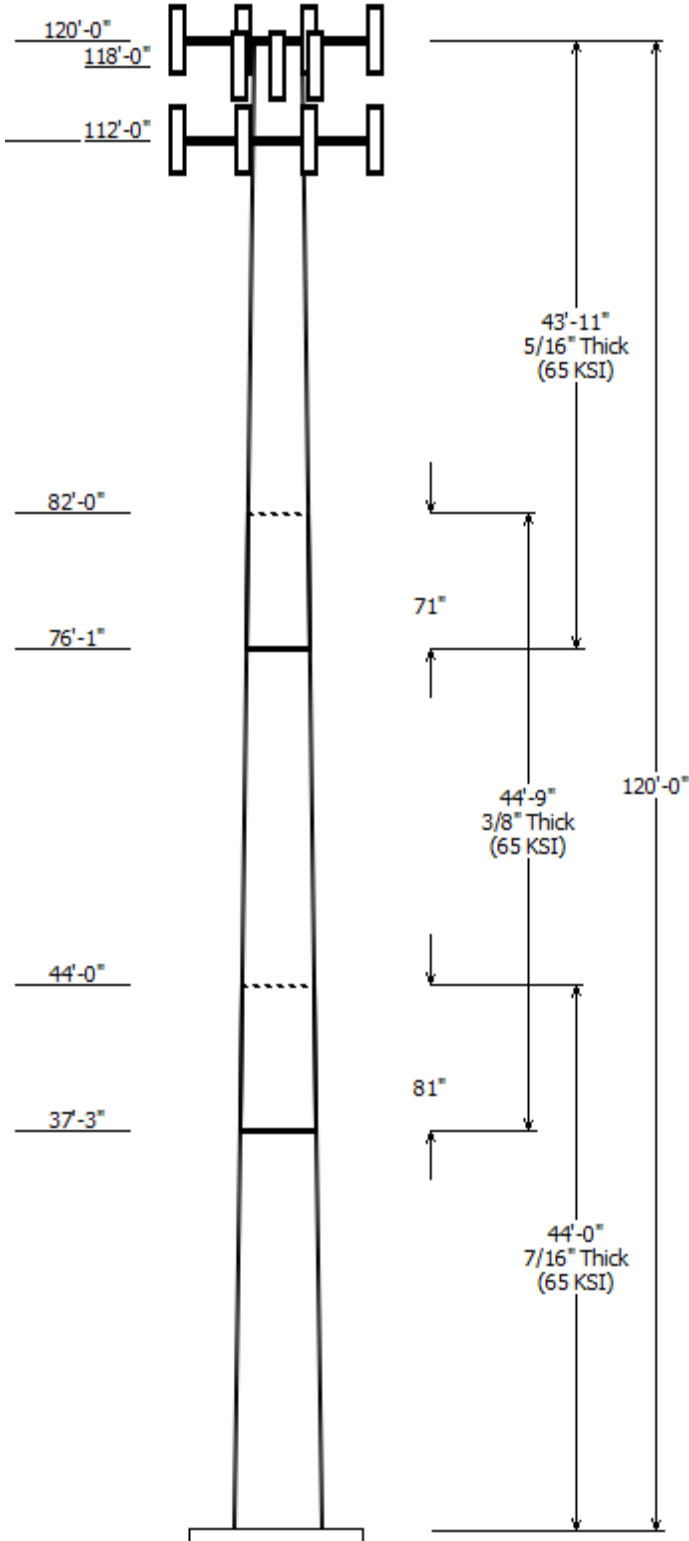
- Information supplied by the client regarding the structure itself, antenna, mounts and feed line loading on the structure and its components, or other relevant information.
- Information from drawings in the possession of American Tower Corporation, or generated by field inspections or measurements of the structure.

It is the responsibility of the client to ensure that the information provided to A.T. Engineering Service, PLLC and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, we assume that all structures were constructed in accordance with the drawings and specifications and that their capacity has not significantly changed from the "as new" condition.

Unless explicitly agreed by both the client and American Tower Corporation, all services will be performed in accordance with the current revision of ANSI/TIA -222. The design basic wind speed will be determined based on the minimum basic wind speed as prescribed in ANSI/TIA-222. Although every effort is taken to ensure that the loading considered is adequate to meet the requirements of all applicable regulatory entities, we can provide no assurance to meet any other local and state codes or requirements. If wind and ice loads or other relevant parameters are to be different from the minimum values recommended by the codes, the client shall specify the exact requirement.

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

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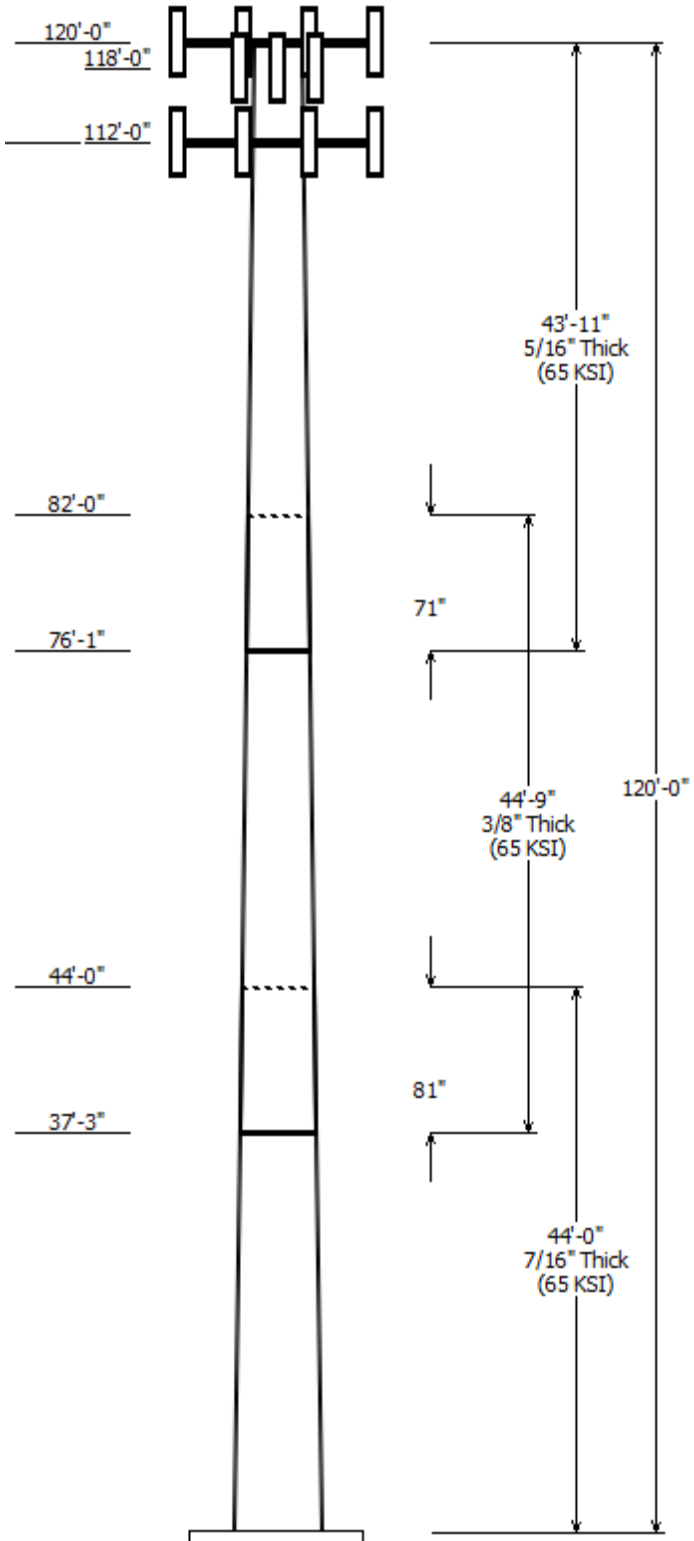
Job Information	
Pole :	370629
Code:	ANSI/TIA-222-G
Description :	120 ft Monopole
Client :	AT&T Mobility
Struct Class :	II
Location :	Northhaven I, CT
Shape :	12 Sides
Exposure :	B
Height :	120.00 (ft)
Topo :	1
Base Elev (ft):	0.00
Taper:	0.20000 in/ft

Sections Properties						
Shaft Section	Length (ft)	Diameter (in)		Thick Joint (in)	Overlap Length (in)	Steel Taper Grade (ksi)
		Accross Top	Flats Bottom			
1	44.000	45.70	54.50	0.438	0.000	0.200000 65
2	44.750	38.84	47.80	0.375	81.000	0.200000 65
3	43.917	31.87	40.65	0.313	71.000	0.200000 65

Discrete Appurtenance			
Attach Elev (ft)	Force Elev (ft)	Qty	Description
120.000	120.000	3	CCI HPA-65R-BUU-H6
120.000	120.000	3	Ericsson RRUS 32 B2
120.000	120.000	6	Powerwave Allgon LGP21401
120.000	120.000	3	Ericsson RRUS-32
120.000	120.000	3	Powerwave 7770.00
120.000	120.000	3	Quintel QS66512-2
120.000	120.000	6	Powerwave Allgon 7020.00
120.000	120.000	1	Flat Platform w/ Handrails
118.000	118.000	6	Ericsson RRUS 11 (Band 12)
118.000	118.000	2	Raycap DC6-48-60-18-8F
112.000	112.000	1	Flat Platform w/ Handrails
112.000	112.000	3	Andrew LNX-6515DS-VTM
112.000	112.000	3	Ericsson AIR 21, 1.3M, B4A B2P
112.000	112.000	3	Ericsson AIR 21, 1.3M, B2A B4P
112.000	112.000	3	Ericsson RRUS 11 B12
112.000	112.000	3	Ericsson KRY 112 144/1

Linear Appurtenance			
Elev (ft)		Description	Exposed To Wind
From	To		
5.000	112.0	1 1/4" Hybriflex	No
5.000	112.0	1 5/8" Coax	No
5.000	118.0	0.39" Fiber Trunk	No
5.000	118.0	0.78" 8 AWG 6	No
5.000	118.0	3" Conduit	No
5.000	118.0	3/8" RET Control	No
5.000	120.0	1 5/8" Coax	No

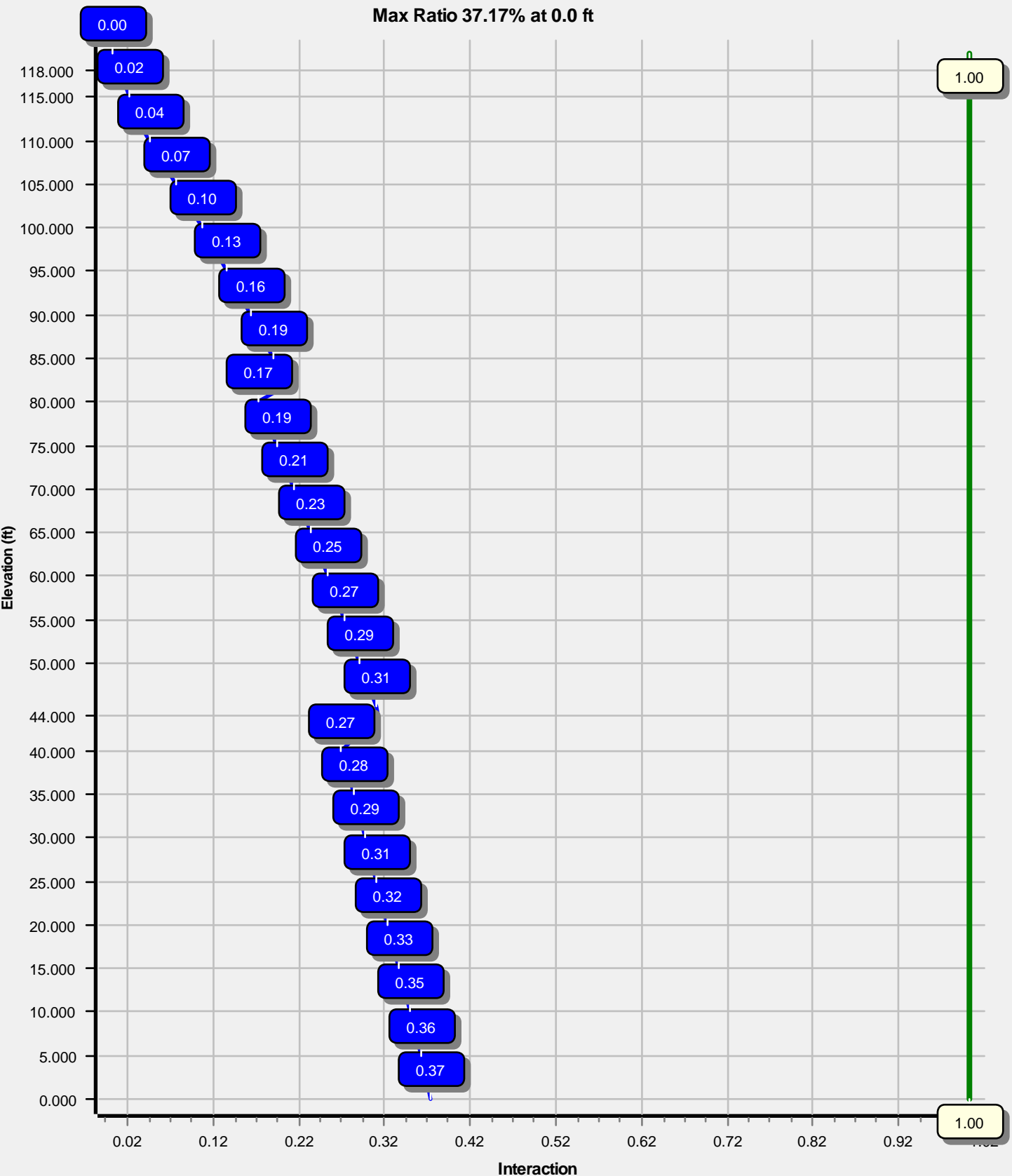
Load Cases	
1.2D + 1.6W	97 mph with No Ice
0.9D + 1.6W	97 mph with No Ice (Reduced DL)
1.2D + 1.0Di + 1.0Wi	50 mph with 0.75 in Radial Ice
(1.2 + 0.2Sds) * DL + E	Seismic Equivalent Lateral Forces Method
(1.2 + 0.2Sds) * DL + E	Seismic Equivalent Modal Analysis Method
(0.9 - 0.2Sds) * DL + E	Seismic (Reduced DL) Equivalent Lateral
(0.9 - 0.2Sds) * DL + E	Seismic (Reduced DL) Equivalent Modal
1.0D + 1.0W	Serviceability 60 mph



Reactions			
Load Case	Moment (kip-ft)	Shear (kip)	Axial (kip)
1.2D + 1.6W	1940.77	23.38	41.30
0.9D + 1.6W	1931.57	23.38	30.97
1.2D + 1.0Di + 1.0Wi	421.68	5.01	58.81
(1.2 + 0.2Sds) * DL + E ELFM	199.46	2.13	41.08
(1.2 + 0.2Sds) * DL + E EMAM	295.19	2.92	41.08
(0.9 - 0.2Sds) * DL + E ELFM	198.32	2.13	28.53
(0.9 - 0.2Sds) * DL + E EMAM	293.39	2.92	28.53
1.0D + 1.0W	462.63	5.59	34.44

Dish Deflections			
Load Case	Attach Elev (ft)	Deflection (in)	Rotation (deg)
	0.00	0.000	0.000

Load Case : 1.2D + 1.6W  
Max Ratio 37.17% at 0.0 ft



Site Number: 370629

Code: ANSI/TIA-222-G

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Site Name: Northhaven I, CT

Engineering Number: OAA688019\_C3\_01

10/26/2016 11:02:25 AM

Customer: AT&T Mobility

### Analysis Parameters

Location:	New Haven County, CT		
Code:	ANSI/TIA-222-G	Height (ft):	120
Shape:	12 Sides	Base Diameter (in):	54.50
Pole Type:	Taper	Top Diameter (in):	31.88
Pole Manufacturer:	Valmont	Taper (in/ft) :	0.200

### Ice & Wind Parameters

Structure Class:	II	Design Wind Speed Without Ice:	97 mph
Exposure Category:	B	Design Wind Speed With Ice:	50 mph
Topographic Category:	1	Operational Wind Speed:	60 mph
Crest Height:	0.0 ft	Design Ice Thickness:	0.75 in

### Seismic Parameters

Analysis Method:	Equivalent Modal Analysis & Equivalent Lateral Force Methods		
Site Class:	D - Stiff Soil		
Period Based on Rayleigh Method (sec):	1.39		
T <sub>L</sub> (sec):	6	p:	1.3
S <sub>s</sub> :	0.184	S <sub>1</sub> :	0.062
F <sub>a</sub> :	1.600	F <sub>v</sub> :	2.400
S <sub>ds</sub> :	0.196	S <sub>d1</sub> :	0.099
		C <sub>s</sub> :	0.048
		C <sub>s</sub> Max:	0.048
		C <sub>s</sub> Min:	0.030

### Load Cases

1.2D + 1.6W	97 mph with No Ice
0.9D + 1.6W	97 mph with No Ice (Reduced DL)
1.2D + 1.0Di + 1.0Wi	50 mph with 0.75 in Radial Ice
(1.2 + 0.2S <sub>ds</sub> ) * DL + E ELFM	Seismic Equivalent Lateral Forces Method
(1.2 + 0.2S <sub>ds</sub> ) * DL + E EMAM	Seismic Equivalent Modal Analysis Method
(0.9 - 0.2S <sub>ds</sub> ) * DL + E ELFM	Seismic (Reduced DL) Equivalent Lateral Forces Method
(0.9 - 0.2S <sub>ds</sub> ) * DL + E EMAM	Seismic (Reduced DL) Equivalent Modal Analysis Method
1.0D + 1.0W	Serviceability 60 mph

Site Number: 370629

Code: ANSI/TIA-222-G

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Site Name: Northhaven I, CT

Engineering Number: OAA688019\_C3\_01

10/26/2016 11:02:25 AM

Customer: AT&T Mobility

**Shaft Section Properties**

Sect Info	Length (ft)	Thick (in)	Fy (ksi)	Joint Type	Slip Joint Len (in)	Weight (lb)	Bottom						Top						
							Dia (in)	Elev (ft)	Area (in <sup>2</sup> )	Ix (in <sup>4</sup> )	W/t Ratio	D/t Ratio	Dia (in)	Elev (ft)	Area (in <sup>2</sup> )	Ix (in <sup>4</sup> )	W/t Ratio	D/t Ratio	Taper (in/ft)
1-12	44.000	0.4380	65		0.00	10,487	54.50	0.00	76.25	28444.1	31.20	124.43	45.70	44.00	63.84	16691.9	25.81	104.34	0.200008
2-12	44.750	0.3750	65	Slip	81.00	7,897	47.80	37.25	57.27	16439.4	32.01	127.47	38.84	82.00	46.46	8777.8	25.62	103.60	0.200008
3-12	43.917	0.3130	65	Slip	71.00	5,415	40.65	76.08	40.66	8448.5	32.66	129.90	31.87	120.00	31.81	4044.6	25.14	101.84	0.200008
Shaft Weight						23,799													

**Discrete Appurtenance Properties**

Attach Elev (ft)	Description	Qty	Weight (lb)	No Ice EPAa (sf)	Orientation Factor	Weight (lb)	Ice EPAa (sf)	Orientation Factor	Distance From Face (ft)	Vert Ecc (ft)
120.00	CCI HPA-65R-BUU-H6	3	51.00	9.660	0.83	292.52	10.993	0.83	0.000	0.000
120.00	Ericsson RRUS 32 B2	3	53.00	2.740	0.67	118.54	3.779	0.67	0.000	0.000
120.00	Ericsson RRUS-32	3	77.00	3.310	0.67	172.22	4.565	0.67	0.000	0.000
120.00	Flat Platform w/ Handrails	1	2000.00	42.400	1.00	3,391.49	62.934	1.00	0.000	0.000
120.00	Powerwave 7770.00	3	35.00	5.510	0.77	166.39	6.539	0.77	0.000	0.000
120.00	Powerwave Allgon 7020.00	6	2.20	0.400	0.50	17.39	0.616	0.50	0.000	0.000
120.00	Powerwave Allgon LGP21401	6	14.10	1.100	0.50	46.69	1.552	0.50	0.000	0.000
120.00	Quintel QS66512-2	3	111.00	8.130	0.92	239.35	5.951	0.92	0.000	0.000
118.00	Ericsson RRUS 11 (Band 12)	6	50.00	2.570	1.00	128.99	3.203	1.00	0.000	0.000
118.00	Raycap DC6-48-60-18-8F	2	31.80	1.280	1.00	121.92	2.835	1.00	0.000	0.000
112.00	Andrew LNX-6515DS-VTM	3	51.30	11.430	0.84	305.52	13.044	0.84	0.000	0.000
112.00	Ericsson AIR 21, 1.3M, B2A	3	91.50	6.040	0.85	252.71	7.097	0.85	0.000	0.000
112.00	Ericsson AIR 21, 1.3M, B4A	3	81.50	6.090	0.85	244.54	7.158	0.85	0.000	0.000
112.00	Ericsson KRY 112 144/1	3	11.00	0.410	0.50	26.65	0.625	0.50	0.000	0.000
112.00	Ericsson RRUS 11 B12	3	50.70	2.790	0.67	133.98	3.448	0.67	0.000	0.000
112.00	Flat Platform w/ Handrails	1	2000.00	42.400	1.00	3,381.84	62.792	1.00	0.000	0.000
Totals		52	6300.40			14,032.89			Number of Loadings : 16	

**Linear Appurtenance Properties**

Elev From (ft)	Elev To (ft)	Qty	Description	Coax Diameter (in)	Coax Weight (lb/ft)	Flat	Projected Width (in)	Exposed To Wind	Carrier
5.00	120.00	12	1 5/8" Coax	1.98	0.82	N	0.00	N	AT&T Mobility
5.00	118.00	2	0.39" Fiber Trunk	0.39	0.06	N	0.00	N	AT&T Mobility
5.00	118.00	4	0.78" 8 AWG 6	0.78	0.59	N	0.00	N	AT&T Mobility
5.00	118.00	2	3" Conduit	3.50	7.58	N	0.00	N	AT&T Mobility
5.00	118.00	2	3/8" RET Control Cable	0.38	0.23	N	0.00	N	AT&T Mobility
5.00	112.00	1	1 1/4" Hybriflex	1.54	1.00	N	0.00	N	T-Mobile
5.00	112.00	12	1 5/8" Coax	1.98	0.82	N	0.00	N	T-Mobile



Segment Properties (Max Len : 5. ft)

Seg Top Elev (ft)	Description	Thick (in)	Flat Dia (in)	Area (in <sup>2</sup> )	Ix (in <sup>4</sup> )	W/t Ratio	D/t Ratio	F'y (ksi)	S (in <sup>3</sup> )	Z (in <sup>3</sup> )	Weight (lb)
0.00		0.4380	54.500	76.247	28,444.1	31.20	124.43	70.7	1008.	0.0	0.0
5.00		0.4380	53.500	74.836	26,894.6	30.59	122.15	71.4	971.1	0.0	1,285.3
10.00		0.4380	52.500	73.426	25,402.5	29.97	119.86	72.0	934.7	0.0	1,261.3
15.00		0.4380	51.500	72.016	23,966.6	29.36	117.58	72.7	899.0	0.0	1,237.3
20.00		0.4380	50.500	70.605	22,585.8	28.75	115.30	73.4	864.0	0.0	1,213.3
25.00		0.4380	49.500	69.195	21,259.2	28.14	113.01	74.0	829.7	0.0	1,189.3
30.00		0.4380	48.500	67.784	19,985.5	27.53	110.73	74.7	796.1	0.0	1,165.3
35.00		0.4380	47.500	66.374	18,763.7	26.91	108.45	75.4	763.1	0.0	1,141.3
37.25	Bot - Section 2	0.4380	47.050	65.739	18,230.6	26.64	107.42	75.7	748.5	0.0	505.7
40.00		0.4380	46.500	64.964	17,592.8	26.30	106.16	76.0	730.9	0.0	1,144.3
44.00	Top - Section 1	0.3750	46.450	55.635	15,075.1	31.05	123.87	70.9	627.0	0.0	1,640.4
45.00		0.3750	46.250	55.394	14,879.6	30.90	123.33	71.0	621.5	0.0	188.9
50.00		0.3750	45.250	54.186	13,927.5	30.19	120.67	71.8	594.6	0.0	932.2
55.00		0.3750	44.250	52.979	13,017.0	29.47	118.00	72.6	568.3	0.0	911.6
60.00		0.3750	43.250	51.771	12,147.0	28.76	115.33	73.3	542.6	0.0	891.1
65.00		0.3750	42.249	50.563	11,316.7	28.04	112.67	74.1	517.5	0.0	870.6
70.00		0.3750	41.249	49.356	10,525.1	27.33	110.00	74.9	492.9	0.0	850.0
75.00		0.3750	40.249	48.148	9,771.4	26.62	107.33	75.7	469.0	0.0	829.5
76.08	Bot - Section 3	0.3750	40.033	47.887	9,612.9	26.46	106.75	75.9	463.9	0.0	177.0
80.00		0.3750	39.249	46.941	9,054.4	25.90	104.66	76.5	445.7	0.0	1,168.6
82.00	Top - Section 2	0.3130	39.475	39.470	7,726.7	31.65	126.12	70.2	378.1	0.0	587.8
85.00		0.3130	38.875	38.865	7,376.9	31.14	124.20	70.8	366.6	0.0	399.8
90.00		0.3130	37.875	37.857	6,817.7	30.28	121.01	71.7	347.7	0.0	652.7
95.00		0.3130	36.875	36.850	6,287.6	29.42	117.81	72.6	329.4	0.0	635.5
100.0		0.3130	35.875	35.842	5,785.6	28.57	114.62	73.6	311.6	0.0	618.4
105.0		0.3130	34.875	34.834	5,311.1	27.71	111.42	74.5	294.2	0.0	601.2
110.0		0.3130	33.875	33.826	4,863.3	26.86	108.23	75.4	277.3	0.0	584.1
112.0		0.3130	33.475	33.423	4,691.5	26.51	106.95	75.8	270.7	0.0	228.8
115.0		0.3130	32.875	32.818	4,441.4	26.00	105.03	76.4	261.0	0.0	338.1
118.0		0.3130	32.275	32.213	4,200.4	25.49	103.12	76.9	251.4	0.0	331.9
120.0		0.3130	31.875	31.810	4,044.6	25.14	101.84	77.3	245.1	0.0	217.9
23,799.0											

<b>Load Case: 1.2D + 1.6W</b>	<b>97 mph with No Ice</b>	<b>18 Iterations</b>
Gust Response Factor :1.10		Wind Importance Factor :1.00
Dead Load Factor :1.20		
Wind Load Factor :1.60		

Calculated Forces

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation (deg)	Ratio
0.00	-41.30	-23.38	0.00	-1,940.77	0.00	1,940.77	4,850.87	2,425.44	10,823.8	5,345.47	0.00	0.00	0.372
5.00	-39.72	-22.80	0.00	-1,823.86	0.00	1,823.86	4,806.08	2,403.04	10,523.9	5,197.36	0.05	-0.09	0.359
10.00	-37.94	-22.22	0.00	-1,709.87	0.00	1,709.87	4,759.60	2,379.80	10,224.0	5,049.29	0.20	-0.19	0.347
15.00	-36.19	-21.64	0.00	-1,598.80	0.00	1,598.80	4,711.42	2,355.71	9,924.57	4,901.37	0.45	-0.28	0.334
20.00	-34.48	-21.07	0.00	-1,490.59	0.00	1,490.59	4,661.55	2,330.77	9,625.56	4,753.70	0.79	-0.37	0.321
25.00	-32.79	-20.51	0.00	-1,385.24	0.00	1,385.24	4,609.98	2,304.99	9,327.28	4,606.39	1.23	-0.46	0.308
30.00	-31.13	-19.95	0.00	-1,282.69	0.00	1,282.69	4,556.72	2,278.36	9,029.93	4,459.54	1.76	-0.55	0.295
35.00	-29.51	-19.53	0.00	-1,182.96	0.00	1,182.96	4,501.76	2,250.88	8,733.73	4,313.26	2.39	-0.64	0.281
37.25	-28.79	-19.23	0.00	-1,139.03	0.00	1,139.03	4,476.48	2,238.24	8,600.87	4,247.64	2.70	-0.68	0.275
40.00	-27.28	-18.82	0.00	-1,086.14	0.00	1,086.14	4,445.11	2,222.56	8,438.88	4,167.65	3.10	-0.73	0.267
44.00	-25.11	-18.50	0.00	-1,010.86	0.00	1,010.86	3,547.79	1,773.89	6,746.39	3,331.79	3.74	-0.79	0.311
45.00	-24.83	-18.14	0.00	-992.36	0.00	992.36	3,540.16	1,770.08	6,702.42	3,310.07	3.91	-0.81	0.307
50.00	-23.46	-17.51	0.00	-901.69	0.00	901.69	3,500.99	1,750.49	6,482.60	3,201.51	4.81	-0.90	0.288
55.00	-22.12	-16.89	0.00	-814.12	0.00	814.12	3,460.13	1,730.06	6,262.98	3,093.05	5.80	-0.99	0.270
60.00	-20.80	-16.25	0.00	-729.69	0.00	729.69	3,417.57	1,708.79	6,043.76	2,984.79	6.89	-1.07	0.251
65.00	-19.52	-15.61	0.00	-648.44	0.00	648.44	3,373.32	1,686.66	5,825.16	2,876.83	8.06	-1.15	0.231
70.00	-18.26	-14.97	0.00	-570.38	0.00	570.38	3,327.38	1,663.69	5,607.39	2,769.28	9.31	-1.23	0.212
75.00	-17.03	-14.57	0.00	-495.53	0.00	495.53	3,279.75	1,639.87	5,390.65	2,662.24	10.64	-1.30	0.191
76.08	-16.76	-14.25	0.00	-479.75	0.00	479.75	3,269.20	1,634.60	5,343.85	2,639.13	10.93	-1.32	0.187
80.00	-15.18	-13.84	0.00	-423.94	0.00	423.94	3,230.41	1,615.21	5,175.17	2,555.82	12.04	-1.37	0.171
82.00	-14.38	-13.51	0.00	-396.25	0.00	396.25	2,493.57	1,246.78	4,030.93	1,990.72	12.62	-1.40	0.205
85.00	-13.76	-13.00	0.00	-355.72	0.00	355.72	2,474.96	1,237.48	3,939.06	1,945.35	13.51	-1.43	0.189
90.00	-12.75	-12.36	0.00	-290.72	0.00	290.72	2,442.59	1,221.30	3,785.91	1,869.72	15.05	-1.50	0.161
95.00	-11.76	-11.72	0.00	-228.93	0.00	228.93	2,408.53	1,204.26	3,632.91	1,794.16	16.64	-1.55	0.133
100.00	-10.80	-11.08	0.00	-170.35	0.00	170.35	2,372.77	1,186.38	3,480.25	1,718.76	18.29	-1.60	0.104
105.00	-9.86	-10.45	0.00	-114.94	0.00	114.94	2,335.32	1,167.66	3,328.15	1,643.65	19.98	-1.63	0.074
110.00	-8.93	-10.01	0.00	-62.67	0.00	62.67	2,296.17	1,148.08	3,176.83	1,568.92	21.71	-1.65	0.044
112.00	-5.25	-5.83	0.00	-42.66	0.00	42.66	2,280.04	1,140.02	3,116.57	1,539.15	22.40	-1.66	0.030
115.00	-4.76	-5.46	0.00	-25.17	0.00	25.17	2,255.33	1,127.67	3,026.49	1,494.67	23.45	-1.67	0.019
118.00	-3.85	-4.39	0.00	-8.79	0.00	8.79	2,230.01	1,115.01	2,936.85	1,450.40	24.49	-1.67	0.008
120.00	0.00	-4.28	0.00	0.00	0.00	0.00	2,212.80	1,106.40	2,877.35	1,421.02	25.19	-1.67	0.000

**Load Case: 0.9D + 1.6W** 97 mph with No Ice (Reduced DL) 18 Iterations

Gust Response Factor :1.10 Wind Importance Factor :1.00

Dead Load Factor :0.90

Wind Load Factor :1.60

Calculated Forces

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation (deg)	Ratio
0.00	-30.97	-23.38	0.00	-1,931.57	0.00	1,931.57	4,850.87	2,425.44	10,823.8	5,345.47	0.00	0.00	0.368
5.00	-29.78	-22.77	0.00	-1,814.70	0.00	1,814.70	4,806.08	2,403.04	10,523.9	5,197.36	0.05	-0.09	0.355
10.00	-28.44	-22.18	0.00	-1,700.84	0.00	1,700.84	4,759.60	2,379.80	10,224.0	5,049.29	0.20	-0.19	0.343
15.00	-27.12	-21.59	0.00	-1,589.96	0.00	1,589.96	4,711.42	2,355.71	9,924.57	4,901.37	0.44	-0.28	0.330
20.00	-25.82	-21.01	0.00	-1,482.02	0.00	1,482.02	4,661.55	2,330.77	9,625.56	4,753.70	0.79	-0.37	0.317
25.00	-24.55	-20.44	0.00	-1,376.98	0.00	1,376.98	4,609.98	2,304.99	9,327.28	4,606.39	1.22	-0.46	0.304
30.00	-23.30	-19.86	0.00	-1,274.81	0.00	1,274.81	4,556.72	2,278.36	9,029.93	4,459.54	1.75	-0.55	0.291
35.00	-22.08	-19.44	0.00	-1,175.49	0.00	1,175.49	4,501.76	2,250.88	8,733.73	4,313.26	2.37	-0.64	0.278
37.25	-21.54	-19.14	0.00	-1,131.75	0.00	1,131.75	4,476.48	2,238.24	8,600.87	4,247.64	2.68	-0.68	0.271
40.00	-20.40	-18.73	0.00	-1,079.11	0.00	1,079.11	4,445.11	2,222.56	8,438.88	4,167.65	3.09	-0.72	0.264
44.00	-18.77	-18.41	0.00	-1,004.21	0.00	1,004.21	3,547.79	1,773.89	6,746.39	3,331.79	3.72	-0.79	0.307
45.00	-18.55	-18.04	0.00	-985.80	0.00	985.80	3,540.16	1,770.08	6,702.42	3,310.07	3.89	-0.81	0.303
50.00	-17.52	-17.41	0.00	-895.60	0.00	895.60	3,500.99	1,750.49	6,482.60	3,201.51	4.78	-0.90	0.285
55.00	-16.51	-16.78	0.00	-808.53	0.00	808.53	3,460.13	1,730.06	6,262.98	3,093.05	5.77	-0.98	0.266
60.00	-15.53	-16.15	0.00	-724.62	0.00	724.62	3,417.57	1,708.79	6,043.76	2,984.79	6.85	-1.07	0.247
65.00	-14.56	-15.51	0.00	-643.89	0.00	643.89	3,373.32	1,686.66	5,825.16	2,876.83	8.01	-1.15	0.228
70.00	-13.62	-14.87	0.00	-566.36	0.00	566.36	3,327.38	1,663.69	5,607.39	2,769.28	9.25	-1.22	0.209
75.00	-12.69	-14.47	0.00	-492.04	0.00	492.04	3,279.75	1,639.87	5,390.65	2,662.24	10.57	-1.30	0.189
76.08	-12.49	-14.15	0.00	-476.37	0.00	476.37	3,269.20	1,634.60	5,343.85	2,639.13	10.87	-1.31	0.184
80.00	-11.31	-13.75	0.00	-420.95	0.00	420.95	3,230.41	1,615.21	5,175.17	2,555.82	11.97	-1.36	0.168
82.00	-10.71	-13.42	0.00	-393.46	0.00	393.46	2,493.57	1,246.78	4,030.93	1,990.72	12.55	-1.39	0.202
85.00	-10.24	-12.91	0.00	-353.20	0.00	353.20	2,474.96	1,237.48	3,939.06	1,945.35	13.43	-1.42	0.186
90.00	-9.49	-12.27	0.00	-288.66	0.00	288.66	2,442.59	1,221.30	3,785.91	1,869.72	14.96	-1.49	0.158
95.00	-8.75	-11.63	0.00	-227.32	0.00	227.32	2,408.53	1,204.26	3,632.91	1,794.16	16.54	-1.54	0.130
100.00	-8.02	-11.00	0.00	-169.16	0.00	169.16	2,372.77	1,186.38	3,480.25	1,718.76	18.18	-1.59	0.102
105.00	-7.32	-10.38	0.00	-114.15	0.00	114.15	2,335.32	1,167.66	3,328.15	1,643.65	19.86	-1.62	0.073
110.00	-6.63	-9.94	0.00	-62.25	0.00	62.25	2,296.17	1,148.08	3,176.83	1,568.92	21.57	-1.64	0.043
112.00	-3.90	-5.79	0.00	-42.37	0.00	42.37	2,280.04	1,140.02	3,116.57	1,539.15	22.26	-1.65	0.029
115.00	-3.53	-5.43	0.00	-25.00	0.00	25.00	2,255.33	1,127.67	3,026.49	1,494.67	23.30	-1.66	0.018
118.00	-2.86	-4.36	0.00	-8.73	0.00	8.73	2,230.01	1,115.01	2,936.85	1,450.40	24.35	-1.66	0.007
120.00	0.00	-4.28	0.00	0.00	0.00	0.00	2,212.80	1,106.40	2,877.35	1,421.02	25.04	-1.66	0.000

<b>Load Case: 1.2D + 1.0Di + 1.0Wi</b>			<b>50 mph with 0.75 in Radial Ice</b>			<b>17 Iterations</b>		
Gust Response Factor :1.10		Ice Dead Load Factor :1.00		Wind Importance Factor :1.00				
Dead Load Factor :1.20		Ice Importance Factor :1.00						
Wind Load Factor :1.00								

Calculated Forces

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation (deg)	Ratio
0.00	-58.81	-5.01	0.00	-421.68	0.00	421.68	4,850.87	2,425.44	10,823.8	5,345.47	0.00	0.00	0.091
5.00	-56.86	-4.89	0.00	-396.65	0.00	396.65	4,806.08	2,403.04	10,523.9	5,197.36	0.01	-0.02	0.088
10.00	-54.66	-4.77	0.00	-372.20	0.00	372.20	4,759.60	2,379.80	10,224.0	5,049.29	0.04	-0.04	0.085
15.00	-52.47	-4.66	0.00	-348.33	0.00	348.33	4,711.42	2,355.71	9,924.57	4,901.37	0.10	-0.06	0.082
20.00	-50.31	-4.55	0.00	-325.04	0.00	325.04	4,661.55	2,330.77	9,625.56	4,753.70	0.17	-0.08	0.079
25.00	-48.17	-4.43	0.00	-302.31	0.00	302.31	4,609.98	2,304.99	9,327.28	4,606.39	0.27	-0.10	0.076
30.00	-46.06	-4.32	0.00	-280.15	0.00	280.15	4,556.72	2,278.36	9,029.93	4,459.54	0.38	-0.12	0.073
35.00	-43.99	-4.23	0.00	-258.57	0.00	258.57	4,501.76	2,250.88	8,733.73	4,313.26	0.52	-0.14	0.070
37.25	-43.06	-4.17	0.00	-249.05	0.00	249.05	4,476.48	2,238.24	8,600.87	4,247.64	0.59	-0.15	0.068
40.00	-41.29	-4.09	0.00	-237.58	0.00	237.58	4,445.11	2,222.56	8,438.88	4,167.65	0.68	-0.16	0.066
44.00	-38.76	-4.02	0.00	-221.23	0.00	221.23	3,547.79	1,773.89	6,746.39	3,331.79	0.82	-0.17	0.077
45.00	-38.39	-3.94	0.00	-217.22	0.00	217.22	3,540.16	1,770.08	6,702.42	3,310.07	0.85	-0.18	0.076
50.00	-36.56	-3.82	0.00	-197.49	0.00	197.49	3,500.99	1,750.49	6,482.60	3,201.51	1.05	-0.20	0.072
55.00	-34.77	-3.68	0.00	-178.42	0.00	178.42	3,460.13	1,730.06	6,262.98	3,093.05	1.26	-0.22	0.068
60.00	-33.01	-3.55	0.00	-160.00	0.00	160.00	3,417.57	1,708.79	6,043.76	2,984.79	1.50	-0.23	0.063
65.00	-31.28	-3.42	0.00	-142.25	0.00	142.25	3,373.32	1,686.66	5,825.16	2,876.83	1.76	-0.25	0.059
70.00	-29.58	-3.28	0.00	-125.17	0.00	125.17	3,327.38	1,663.69	5,607.39	2,769.28	2.03	-0.27	0.054
75.00	-27.91	-3.19	0.00	-108.77	0.00	108.77	3,279.75	1,639.87	5,390.65	2,662.24	2.32	-0.28	0.049
76.08	-27.55	-3.13	0.00	-105.32	0.00	105.32	3,269.20	1,634.60	5,343.85	2,639.13	2.39	-0.29	0.048
80.00	-25.62	-3.04	0.00	-93.08	0.00	93.08	3,230.41	1,615.21	5,175.17	2,555.82	2.63	-0.30	0.044
82.00	-24.65	-2.97	0.00	-87.00	0.00	87.00	2,493.57	1,246.78	4,030.93	1,990.72	2.75	-0.31	0.054
85.00	-23.77	-2.86	0.00	-78.10	0.00	78.10	2,474.96	1,237.48	3,939.06	1,945.35	2.95	-0.31	0.050
90.00	-22.33	-2.72	0.00	-63.82	0.00	63.82	2,442.59	1,221.30	3,785.91	1,869.72	3.28	-0.33	0.043
95.00	-20.92	-2.58	0.00	-50.24	0.00	50.24	2,408.53	1,204.26	3,632.91	1,794.16	3.63	-0.34	0.037
100.00	-19.54	-2.44	0.00	-37.35	0.00	37.35	2,372.77	1,186.38	3,480.25	1,718.76	3.99	-0.35	0.030
105.00	-18.19	-2.30	0.00	-25.15	0.00	25.15	2,335.32	1,167.66	3,328.15	1,643.65	4.36	-0.36	0.023
110.00	-16.87	-2.20	0.00	-13.65	0.00	13.65	2,296.17	1,148.08	3,176.83	1,568.92	4.74	-0.36	0.016
112.00	-9.96	-1.27	0.00	-9.25	0.00	9.25	2,280.04	1,140.02	3,116.57	1,539.15	4.89	-0.36	0.010
115.00	-9.22	-1.19	0.00	-5.44	0.00	5.44	2,255.33	1,127.67	3,026.49	1,494.67	5.12	-0.36	0.008
118.00	-7.41	-0.94	0.00	-1.88	0.00	1.88	2,230.01	1,115.01	2,936.85	1,450.40	5.35	-0.37	0.005
120.00	0.00	-0.89	0.00	0.00	0.00	0.00	2,212.80	1,106.40	2,877.35	1,421.02	5.50	-0.37	0.000

Site Number: 370629

Code: ANSI/TIA-222-G

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Site Name: Northhaven I, CT

Engineering Number: OAA688019\_C3\_01

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Customer: AT&T Mobility

Load Case: 1.0D + 1.0W

Serviceability 60 mph

17 Iterations

Gust Response Factor :1.10

Wind Importance Factor :1.00

Dead Load Factor :1.00

Wind Load Factor :1.00

Calculated Forces

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation (deg)	Ratio
0.00	-34.44	-5.59	0.00	-462.63	0.00	462.63	4,850.87	2,425.44	10,823.8	5,345.47	0.00	0.00	0.094
5.00	-33.15	-5.45	0.00	-434.68	0.00	434.68	4,806.08	2,403.04	10,523.9	5,197.36	0.01	-0.02	0.091
10.00	-31.69	-5.31	0.00	-407.45	0.00	407.45	4,759.60	2,379.80	10,224.0	5,049.29	0.05	-0.04	0.087
15.00	-30.26	-5.17	0.00	-380.92	0.00	380.92	4,711.42	2,355.71	9,924.57	4,901.37	0.11	-0.07	0.084
20.00	-28.85	-5.03	0.00	-355.09	0.00	355.09	4,661.55	2,330.77	9,625.56	4,753.70	0.19	-0.09	0.081
25.00	-27.46	-4.89	0.00	-329.95	0.00	329.95	4,609.98	2,304.99	9,327.28	4,606.39	0.29	-0.11	0.078
30.00	-26.10	-4.76	0.00	-305.49	0.00	305.49	4,556.72	2,278.36	9,029.93	4,459.54	0.42	-0.13	0.074
35.00	-24.77	-4.66	0.00	-281.71	0.00	281.71	4,501.76	2,250.88	8,733.73	4,313.26	0.57	-0.15	0.071
37.25	-24.17	-4.58	0.00	-271.24	0.00	271.24	4,476.48	2,238.24	8,600.87	4,247.64	0.64	-0.16	0.069
40.00	-22.92	-4.49	0.00	-258.63	0.00	258.63	4,445.11	2,222.56	8,438.88	4,167.65	0.74	-0.17	0.067
44.00	-21.13	-4.41	0.00	-240.69	0.00	240.69	3,547.79	1,773.89	6,746.39	3,331.79	0.89	-0.19	0.078
45.00	-20.90	-4.32	0.00	-236.28	0.00	236.28	3,540.16	1,770.08	6,702.42	3,310.07	0.93	-0.19	0.077
50.00	-19.77	-4.17	0.00	-214.67	0.00	214.67	3,500.99	1,750.49	6,482.60	3,201.51	1.15	-0.21	0.073
55.00	-18.66	-4.02	0.00	-193.81	0.00	193.81	3,460.13	1,730.06	6,262.98	3,093.05	1.38	-0.24	0.068
60.00	-17.58	-3.87	0.00	-173.71	0.00	173.71	3,417.57	1,708.79	6,043.76	2,984.79	1.64	-0.26	0.063
65.00	-16.51	-3.72	0.00	-154.36	0.00	154.36	3,373.32	1,686.66	5,825.16	2,876.83	1.92	-0.28	0.059
70.00	-15.47	-3.56	0.00	-135.78	0.00	135.78	3,327.38	1,663.69	5,607.39	2,769.28	2.22	-0.29	0.054
75.00	-14.45	-3.47	0.00	-117.96	0.00	117.96	3,279.75	1,639.87	5,390.65	2,662.24	2.53	-0.31	0.049
76.08	-14.23	-3.39	0.00	-114.21	0.00	114.21	3,269.20	1,634.60	5,343.85	2,639.13	2.60	-0.31	0.048
80.00	-12.91	-3.30	0.00	-100.92	0.00	100.92	3,230.41	1,615.21	5,175.17	2,555.82	2.87	-0.33	0.043
82.00	-12.24	-3.22	0.00	-94.33	0.00	94.33	2,493.57	1,246.78	4,030.93	1,990.72	3.01	-0.33	0.052
85.00	-11.72	-3.09	0.00	-84.68	0.00	84.68	2,474.96	1,237.48	3,939.06	1,945.35	3.22	-0.34	0.048
90.00	-10.88	-2.94	0.00	-69.21	0.00	69.21	2,442.59	1,221.30	3,785.91	1,869.72	3.58	-0.36	0.041
95.00	-10.05	-2.79	0.00	-54.50	0.00	54.50	2,408.53	1,204.26	3,632.91	1,794.16	3.96	-0.37	0.035
100.00	-9.24	-2.64	0.00	-40.56	0.00	40.56	2,372.77	1,186.38	3,480.25	1,718.76	4.36	-0.38	0.027
105.00	-8.44	-2.49	0.00	-27.37	0.00	27.37	2,335.32	1,167.66	3,328.15	1,643.65	4.76	-0.39	0.020
110.00	-7.67	-2.38	0.00	-14.92	0.00	14.92	2,296.17	1,148.08	3,176.83	1,568.92	5.17	-0.39	0.013
112.00	-4.51	-1.39	0.00	-10.16	0.00	10.16	2,280.04	1,140.02	3,116.57	1,539.15	5.34	-0.40	0.009
115.00	-4.09	-1.30	0.00	-5.99	0.00	5.99	2,255.33	1,127.67	3,026.49	1,494.67	5.58	-0.40	0.006
118.00	-3.31	-1.05	0.00	-2.09	0.00	2.09	2,230.01	1,115.01	2,936.85	1,450.40	5.83	-0.40	0.003
120.00	0.00	-1.02	0.00	0.00	0.00	0.00	2,212.80	1,106.40	2,877.35	1,421.02	6.00	-0.40	0.000

### Equivalent Lateral Forces Method Analysis

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

Spectral Response Acceleration for Short Period ( $S_s$ ):	0.18
Spectral Response Acceleration at 1.0 Second Period ( $S_1$ ):	0.06
Long-Period Transition Period ( $T_L$ ):	6
Importance Factor ( $I_E$ ):	1.00
Site Coefficient $F_a$ :	1.60
Site Coefficient $F_v$ :	2.40
Response Modification Coefficient (R):	1.50
Design Spectral Response Acceleration at Short Period ( $S_{ds}$ ):	0.20
Design Spectral Response Acceleration at 1.0 Second Period ( $S_{d1}$ ):	0.10
Seismic Response Coefficient ( $C_s$ ):	0.05
Upper Limit $C_s$	0.05
Lower Limit $C_s$	0.03
Period based on Rayleigh Method (sec):	1.39
Redundancy Factor ( $\rho$ ):	1.30
Seismic Force Distribution Exponent (k):	1.44
Total Unfactored Dead Load:	34.44 k
Seismic Base Shear (E):	2.13 k

Load Case (1.2 + 0.2Sds) \* DL + E ELFM

Seismic Equivalent Lateral Forces Method

Segment	Height Above Base (ft)	Weight (lb)	$W_z$ (lb-ft)	$C_{vx}$	Horizontal Force (lb)	Vertical Force (lb)
30	119.00	238	237	0.015	32	294
29	116.50	416	402	0.025	54	515
28	113.50	422	392	0.025	53	523
27	111.00	306	276	0.017	37	380
26	107.50	778	669	0.042	90	964
25	102.50	795	638	0.040	86	985
24	97.50	812	607	0.038	82	1,007
23	92.50	829	574	0.036	78	1,028
22	87.50	847	541	0.034	73	1,049
21	83.50	516	308	0.020	42	640
20	81.00	665	380	0.024	51	825
19	78.04	1,320	715	0.045	97	1,636
18	75.54	219	113	0.007	15	271
17	72.50	1,023	498	0.032	67	1,268
16	67.50	1,044	458	0.029	62	1,294
15	62.50	1,064	418	0.027	56	1,319
14	57.50	1,085	378	0.024	51	1,345
13	52.50	1,106	338	0.021	46	1,370
12	47.50	1,126	298	0.019	40	1,396
11	44.50	228	55	0.003	7	282
10	42.00	1,795	397	0.025	54	2,225
9	38.63	1,251	245	0.016	33	1,550
8	36.13	593	106	0.007	14	735

Site Number: 370629

Code: ANSI/TIA-222-G

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Site Name: Northhaven I, CT

Engineering Number: OAA688019\_C3\_01

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Customer: AT&T Mobility

7	32.50	1,335	204	0.013	28	1,655
6	27.50	1,359	163	0.010	22	1,684
5	22.50	1,383	124	0.008	17	1,714
4	17.50	1,407	88	0.006	12	1,744
3	12.50	1,431	55	0.003	7	1,774
2	7.50	1,455	27	0.002	4	1,803
1	2.50	1,285	5	0.000	1	1,593
Powerwave Allgon 702	120.00	13	13	0.001	2	16
Powerwave Allgon LGP	120.00	85	85	0.005	12	105
Ericsson RRUS 32 B2	120.00	159	160	0.010	22	197
Ericsson RRUS-32	120.00	231	233	0.015	31	286
Powerwave 7770.00	120.00	105	106	0.007	14	130
Quintel QS66512-2	120.00	333	336	0.021	45	413
CCI HPA-65R-BUU-H6	120.00	153	154	0.010	21	190
Flat Platform w/ Han	120.00	2,000	2,016	0.128	272	2,479
Raycap DC6-48-60-18-	118.00	64	63	0.004	8	79
Ericsson RRUS 11 (Ba	118.00	300	295	0.019	40	372
Ericsson KRY 112 144	112.00	33	30	0.002	4	41
Ericsson RRUS 11 B12	112.00	152	139	0.009	19	188
Ericsson AIR 21, 1.3	112.00	275	250	0.016	34	340
Ericsson AIR 21, 1.3	112.00	244	223	0.014	30	303
Andrew LNX-6515DS-VT	112.00	154	140	0.009	19	191
Flat Platform w/ Han	112.00	2,000	1,825	0.116	247	2,479
		34,436	15,778	1.000	2,131	42,675

Load Case (0.9 - 0.2Sds) \* DL + E ELFM

Seismic (Reduced DL) Equivalent Lateral Forces Method

Segment	Height Above Base (ft)	Weight (lb)	W <sub>z</sub> (lb-ft)	C <sub>vx</sub>	Horizontal Force (lb)	Vertical Force (lb)
30	119.00	238	237	0.015	32	204
29	116.50	416	402	0.025	54	358
28	113.50	422	392	0.025	53	363
27	111.00	306	276	0.017	37	264
26	107.50	778	669	0.042	90	670
25	102.50	795	638	0.040	86	684
24	97.50	812	607	0.038	82	699
23	92.50	829	574	0.036	78	714
22	87.50	847	541	0.034	73	729
21	83.50	516	308	0.020	42	444
20	81.00	665	380	0.024	51	573
19	78.04	1,320	715	0.045	97	1,137
18	75.54	219	113	0.007	15	189
17	72.50	1,023	498	0.032	67	881
16	67.50	1,044	458	0.029	62	899
15	62.50	1,064	418	0.027	56	916
14	57.50	1,085	378	0.024	51	934
13	52.50	1,106	338	0.021	46	952
12	47.50	1,126	298	0.019	40	969
11	44.50	228	55	0.003	7	196
10	42.00	1,795	397	0.025	54	1,545
9	38.63	1,251	245	0.016	33	1,077
8	36.13	593	106	0.007	14	510
7	32.50	1,335	204	0.013	28	1,149
6	27.50	1,359	163	0.010	22	1,170
5	22.50	1,383	124	0.008	17	1,191
4	17.50	1,407	88	0.006	12	1,211
3	12.50	1,431	55	0.003	7	1,232
2	7.50	1,455	27	0.002	4	1,253
1	2.50	1,285	5	0.000	1	1,106
Powerwave Allgon 702	120.00	13	13	0.001	2	11

Site Number: 370629

Code: ANSI/TIA-222-G

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Site Name: Northhaven I, CT

Engineering Number: OAA688019\_C3\_01

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Customer: AT&T Mobility

Powerwave Allgon LGP	120.00	85	85	0.005	12	73
Ericsson RRUS 32 B2	120.00	159	160	0.010	22	137
Ericsson RRUS-32	120.00	231	233	0.015	31	199
Powerwave 7770.00	120.00	105	106	0.007	14	90
Quintel QS66512-2	120.00	333	336	0.021	45	287
CCI HPA-65R-BUU-H6	120.00	153	154	0.010	21	132
Flat Platform w/ Han	120.00	2,000	2,016	0.128	272	1,721
Raycap DC6-48-60-18-	118.00	64	63	0.004	8	55
Ericsson RRUS 11 (Ba	118.00	300	295	0.019	40	258
Ericsson KRY 112 144	112.00	33	30	0.002	4	28
Ericsson RRUS 11 B12	112.00	152	139	0.009	19	131
Ericsson AIR 21, 1.3	112.00	275	250	0.016	34	236
Ericsson AIR 21, 1.3	112.00	244	223	0.014	30	210
Andrew LNX-6515DS-VT	112.00	154	140	0.009	19	132
Flat Platform w/ Han	112.00	2,000	1,825	0.116	247	1,721
		34,436	15,778	1.000	2,131	29,641



Load Case (1.2 + 0.2Sds) \* DL + E ELFM

Seismic Equivalent Lateral Forces Method

Calculated Forces

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation (deg)	Ratio
0.00	-41.08	-2.13	0.00	-199.46	0.00	199.46	4,850.87	2,425.44	10,823.8	5,345.47	0.00	0.00	0.046
5.00	-39.28	-2.14	0.00	-188.79	0.00	188.79	4,806.08	2,403.04	10,523.9	5,197.36	0.01	-0.01	0.044
10.00	-37.50	-2.14	0.00	-178.10	0.00	178.10	4,759.60	2,379.80	10,224.0	5,049.29	0.02	-0.02	0.043
15.00	-35.76	-2.13	0.00	-167.43	0.00	167.43	4,711.42	2,355.71	9,924.57	4,901.37	0.05	-0.03	0.042
20.00	-34.05	-2.12	0.00	-156.79	0.00	156.79	4,661.55	2,330.77	9,625.56	4,753.70	0.08	-0.04	0.040
25.00	-32.36	-2.10	0.00	-146.20	0.00	146.20	4,609.98	2,304.99	9,327.28	4,606.39	0.13	-0.05	0.039
30.00	-30.71	-2.07	0.00	-135.71	0.00	135.71	4,556.72	2,278.36	9,029.93	4,459.54	0.18	-0.06	0.037
35.00	-29.97	-2.06	0.00	-125.34	0.00	125.34	4,501.76	2,250.88	8,733.73	4,313.26	0.25	-0.07	0.036
37.25	-28.42	-2.03	0.00	-120.70	0.00	120.70	4,476.48	2,238.24	8,600.87	4,247.64	0.28	-0.07	0.035
40.00	-26.20	-1.98	0.00	-115.12	0.00	115.12	4,445.11	2,222.56	8,438.88	4,167.65	0.32	-0.08	0.034
44.00	-25.91	-1.97	0.00	-107.21	0.00	107.21	3,547.79	1,773.89	6,746.39	3,331.79	0.39	-0.08	0.039
45.00	-24.52	-1.93	0.00	-105.24	0.00	105.24	3,540.16	1,770.08	6,702.42	3,310.07	0.41	-0.09	0.039
50.00	-23.15	-1.89	0.00	-95.59	0.00	95.59	3,500.99	1,750.49	6,482.60	3,201.51	0.50	-0.09	0.036
55.00	-21.80	-1.84	0.00	-86.15	0.00	86.15	3,460.13	1,730.06	6,262.98	3,093.05	0.61	-0.10	0.034
60.00	-20.48	-1.78	0.00	-76.97	0.00	76.97	3,417.57	1,708.79	6,043.76	2,984.79	0.72	-0.11	0.032
65.00	-19.19	-1.72	0.00	-68.06	0.00	68.06	3,373.32	1,686.66	5,825.16	2,876.83	0.84	-0.12	0.029
70.00	-17.92	-1.65	0.00	-59.46	0.00	59.46	3,327.38	1,663.69	5,607.39	2,769.28	0.98	-0.13	0.027
75.00	-17.65	-1.64	0.00	-51.20	0.00	51.20	3,279.75	1,639.87	5,390.65	2,662.24	1.12	-0.14	0.025
76.08	-16.01	-1.54	0.00	-49.43	0.00	49.43	3,269.20	1,634.60	5,343.85	2,639.13	1.15	-0.14	0.024
80.00	-15.19	-1.49	0.00	-43.41	0.00	43.41	3,230.41	1,615.21	5,175.17	2,555.82	1.26	-0.14	0.022
82.00	-14.55	-1.44	0.00	-40.44	0.00	40.44	2,493.57	1,246.78	4,030.93	1,990.72	1.32	-0.15	0.026
85.00	-13.50	-1.37	0.00	-36.11	0.00	36.11	2,474.96	1,237.48	3,939.06	1,945.35	1.42	-0.15	0.024
90.00	-12.47	-1.29	0.00	-29.27	0.00	29.27	2,442.59	1,221.30	3,785.91	1,869.72	1.58	-0.16	0.021
95.00	-11.47	-1.21	0.00	-22.82	0.00	22.82	2,408.53	1,204.26	3,632.91	1,794.16	1.75	-0.16	0.017
100.00	-10.48	-1.12	0.00	-16.79	0.00	16.79	2,372.77	1,186.38	3,480.25	1,718.76	1.92	-0.17	0.014
105.00	-9.52	-1.02	0.00	-11.20	0.00	11.20	2,335.32	1,167.66	3,328.15	1,643.65	2.09	-0.17	0.011
110.00	-9.14	-0.99	0.00	-6.08	0.00	6.08	2,296.17	1,148.08	3,176.83	1,568.92	2.27	-0.17	0.008
112.00	-5.07	-0.57	0.00	-4.11	0.00	4.11	2,280.04	1,140.02	3,116.57	1,539.15	2.35	-0.17	0.005
115.00	-4.56	-0.51	0.00	-2.40	0.00	2.40	2,255.33	1,127.67	3,026.49	1,494.67	2.46	-0.17	0.004
118.00	-3.81	-0.43	0.00	-0.86	0.00	0.86	2,230.01	1,115.01	2,936.85	1,450.40	2.56	-0.17	0.002
120.00	0.00	-0.42	0.00	0.00	0.00	0.00	2,212.80	1,106.40	2,877.35	1,421.02	2.64	-0.17	0.000

Load Case (0.9 - 0.2Sds) \* DL + E ELFM

Seismic (Reduced DL) Equivalent Lateral Forces Method

Calculated Forces

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation (deg)	Ratio
0.00	-28.53	-2.13	0.00	-198.32	0.00	198.32	4,850.87	2,425.44	10,823.8	5,345.47	0.00	0.00	0.043
5.00	-27.28	-2.13	0.00	-187.66	0.00	187.66	4,806.08	2,403.04	10,523.9	5,197.36	0.01	-0.01	0.042
10.00	-26.05	-2.13	0.00	-176.99	0.00	176.99	4,759.60	2,379.80	10,224.0	5,049.29	0.02	-0.02	0.041
15.00	-24.84	-2.12	0.00	-166.34	0.00	166.34	4,711.42	2,355.71	9,924.57	4,901.37	0.05	-0.03	0.039
20.00	-23.65	-2.11	0.00	-155.73	0.00	155.73	4,661.55	2,330.77	9,625.56	4,753.70	0.08	-0.04	0.038
25.00	-22.48	-2.09	0.00	-145.19	0.00	145.19	4,609.98	2,304.99	9,327.28	4,606.39	0.13	-0.05	0.036
30.00	-21.33	-2.06	0.00	-134.74	0.00	134.74	4,556.72	2,278.36	9,029.93	4,459.54	0.18	-0.06	0.035
35.00	-20.82	-2.05	0.00	-124.42	0.00	124.42	4,501.76	2,250.88	8,733.73	4,313.26	0.25	-0.07	0.033
37.25	-19.74	-2.02	0.00	-119.80	0.00	119.80	4,476.48	2,238.24	8,600.87	4,247.64	0.28	-0.07	0.033
40.00	-18.19	-1.97	0.00	-114.25	0.00	114.25	4,445.11	2,222.56	8,438.88	4,167.65	0.32	-0.08	0.032
44.00	-18.00	-1.96	0.00	-106.39	0.00	106.39	3,547.79	1,773.89	6,746.39	3,331.79	0.39	-0.08	0.037
45.00	-17.03	-1.92	0.00	-104.43	0.00	104.43	3,540.16	1,770.08	6,702.42	3,310.07	0.41	-0.08	0.036
50.00	-16.08	-1.87	0.00	-94.84	0.00	94.84	3,500.99	1,750.49	6,482.60	3,201.51	0.50	-0.09	0.034
55.00	-15.14	-1.82	0.00	-85.47	0.00	85.47	3,460.13	1,730.06	6,262.98	3,093.05	0.60	-0.10	0.032
60.00	-14.23	-1.77	0.00	-76.34	0.00	76.34	3,417.57	1,708.79	6,043.76	2,984.79	0.72	-0.11	0.030
65.00	-13.33	-1.71	0.00	-67.50	0.00	67.50	3,373.32	1,686.66	5,825.16	2,876.83	0.84	-0.12	0.027
70.00	-12.45	-1.64	0.00	-58.97	0.00	58.97	3,327.38	1,663.69	5,607.39	2,769.28	0.97	-0.13	0.025
75.00	-12.26	-1.62	0.00	-50.78	0.00	50.78	3,279.75	1,639.87	5,390.65	2,662.24	1.11	-0.14	0.023
76.08	-11.12	-1.53	0.00	-49.02	0.00	49.02	3,269.20	1,634.60	5,343.85	2,639.13	1.14	-0.14	0.022
80.00	-10.55	-1.47	0.00	-43.04	0.00	43.04	3,230.41	1,615.21	5,175.17	2,555.82	1.25	-0.14	0.020
82.00	-10.10	-1.43	0.00	-40.10	0.00	40.10	2,493.57	1,246.78	4,030.93	1,990.72	1.31	-0.15	0.024
85.00	-9.38	-1.36	0.00	-35.80	0.00	35.80	2,474.96	1,237.48	3,939.06	1,945.35	1.41	-0.15	0.022
90.00	-8.66	-1.28	0.00	-29.02	0.00	29.02	2,442.59	1,221.30	3,785.91	1,869.72	1.57	-0.16	0.019
95.00	-7.96	-1.20	0.00	-22.62	0.00	22.62	2,408.53	1,204.26	3,632.91	1,794.16	1.73	-0.16	0.016
100.00	-7.28	-1.11	0.00	-16.65	0.00	16.65	2,372.77	1,186.38	3,480.25	1,718.76	1.90	-0.17	0.013
105.00	-6.61	-1.02	0.00	-11.11	0.00	11.11	2,335.32	1,167.66	3,328.15	1,643.65	2.08	-0.17	0.010
110.00	-6.35	-0.98	0.00	-6.03	0.00	6.03	2,296.17	1,148.08	3,176.83	1,568.92	2.26	-0.17	0.007
112.00	-3.52	-0.56	0.00	-4.07	0.00	4.07	2,280.04	1,140.02	3,116.57	1,539.15	2.33	-0.17	0.004
115.00	-3.17	-0.51	0.00	-2.38	0.00	2.38	2,255.33	1,127.67	3,026.49	1,494.67	2.44	-0.17	0.003
118.00	-2.65	-0.43	0.00	-0.85	0.00	0.85	2,230.01	1,115.01	2,936.85	1,450.40	2.55	-0.17	0.002
120.00	0.00	-0.42	0.00	0.00	0.00	0.00	2,212.80	1,106.40	2,877.35	1,421.02	2.62	-0.17	0.000

### Equivalent Modal Forces Analysis

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

Spectral Response Acceleration for Short Period ( $S_s$ ):	0.18
Spectral Response Acceleration at 1.0 Second Period ( $S_1$ ):	0.06
Importance Factor ( $I_E$ ):	1.00
Site Coefficient $F_a$ :	1.60
Site Coefficient $F_v$ :	2.40
Response Modification Coefficient (R):	1.50
Design Spectral Response Acceleration at Short Period ( $S_{ds}$ ):	0.20
Design Spectral Response Acceleration at 1.0 Second Period ( $S_{d1}$ ):	0.10
Period Based on Rayleigh Method (sec):	1.39
Redundancy Factor ( $\rho$ ):	1.30

Load Case (1.2 + 0.2Sds) \* DL + E EMAM

Seismic Equivalent Modal Analysis Method

Segment	Height Above Base (ft)	Weight (lb)	a	b	c	Saz	Horizontal Force (lb)	Vertical Force (lb)
30	119.00	238	1.859	1.819	1.081	0.368	76	294
29	116.50	416	1.781	1.455	0.946	0.320	115	515
28	113.50	422	1.691	1.088	0.801	0.267	97	523
27	111.00	306	1.617	0.832	0.694	0.226	60	380
26	107.50	778	1.517	0.543	0.563	0.175	118	964
25	102.50	795	1.379	0.245	0.410	0.114	79	985
24	97.50	812	1.248	0.054	0.292	0.066	47	1,007
23	92.50	829	1.123	-0.056	0.201	0.031	23	1,028
22	87.50	847	1.005	-0.109	0.134	0.009	7	1,049
21	83.50	516	0.915	-0.121	0.093	0.000	0	640
20	81.00	665	0.861	-0.120	0.073	-0.003	-2	825
19	78.04	1,320	0.799	-0.112	0.054	-0.003	-3	1,636
18	75.54	219	0.749	-0.101	0.040	-0.001	0	271
17	72.50	1,023	0.690	-0.084	0.028	0.004	3	1,268
16	67.50	1,044	0.598	-0.052	0.014	0.014	12	1,294
15	62.50	1,064	0.513	-0.021	0.008	0.025	23	1,319
14	57.50	1,085	0.434	0.007	0.006	0.034	32	1,345
13	52.50	1,106	0.362	0.030	0.008	0.041	39	1,370
12	47.50	1,126	0.296	0.046	0.013	0.044	43	1,396
11	44.50	228	0.260	0.054	0.016	0.045	9	282
10	42.00	1,795	0.232	0.058	0.019	0.045	70	2,225
9	38.63	1,251	0.196	0.063	0.024	0.044	48	1,550
8	36.13	593	0.171	0.066	0.027	0.044	22	735
7	32.50	1,335	0.139	0.069	0.032	0.042	49	1,655
6	27.50	1,359	0.099	0.071	0.037	0.040	47	1,684
5	22.50	1,383	0.066	0.072	0.041	0.038	45	1,714
4	17.50	1,407	0.040	0.070	0.042	0.036	43	1,744
3	12.50	1,431	0.021	0.064	0.038	0.032	40	1,774
2	7.50	1,455	0.007	0.050	0.029	0.025	32	1,803
1	2.50	1,285	0.001	0.022	0.012	0.011	13	1,593
Powerwave Allgon 702	120.00	13	1.890	1.980	1.140	0.388	4	16
Powerwave Allgon LGP	120.00	85	1.890	1.980	1.140	0.388	28	105
Ericsson RRUS 32 B2	120.00	159	1.890	1.980	1.140	0.388	53	197
Ericsson RRUS-32	120.00	231	1.890	1.980	1.140	0.388	78	286

Site Number: 370629

Code: ANSI/TIA-222-G

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Site Name: Northhaven I, CT

Engineering Number: OAA688019\_C3\_01

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Customer: AT&T Mobility

Powerwave 7770.00	120.00	105	1.890	1.980	1.140	0.388	35	130
Quintel QS66512-2	120.00	333	1.890	1.980	1.140	0.388	112	413
CCI HPA-65R-BUU-H6	120.00	153	1.890	1.980	1.140	0.388	51	190
Flat Platform w/ Han	120.00	2,000	1.890	1.980	1.140	0.388	673	2,479
Raycap DC6-48-60-18-	118.00	64	1.828	1.667	1.025	0.348	19	79
Ericsson RRUS 11 (Ba	118.00	300	1.828	1.667	1.025	0.348	91	372
Ericsson KRY 112 144	112.00	33	1.646	0.929	0.735	0.242	7	41
Ericsson RRUS 11 B12	112.00	152	1.646	0.929	0.735	0.242	32	188
Ericsson AIR 21, 1.3	112.00	275	1.646	0.929	0.735	0.242	58	340
Ericsson AIR 21, 1.3	112.00	244	1.646	0.929	0.735	0.242	51	303
Andrew LNX-6515DS-VT	112.00	154	1.646	0.929	0.735	0.242	32	191
Flat Platform w/ Han	112.00	2,000	1.646	0.929	0.735	0.242	419	2,479
		34,436	49.321	30.753	21.355	7.384	2,930	42,675

Load Case (0.9 - 0.2Sds) \* DL + E EMAM

Seismic (Reduced DL) Equivalent Modal Analysis Method

Segment	Height Above Base (ft)	Weight (lb)	a	b	c	Saz	Horizontal Force (lb)	Vertical Force (lb)
30	119.00	238	1.859	1.819	1.081	0.368	76	204
29	116.50	416	1.781	1.455	0.946	0.320	115	358
28	113.50	422	1.691	1.088	0.801	0.267	97	363
27	111.00	306	1.617	0.832	0.694	0.226	60	264
26	107.50	778	1.517	0.543	0.563	0.175	118	670
25	102.50	795	1.379	0.245	0.410	0.114	79	684
24	97.50	812	1.248	0.054	0.292	0.066	47	699
23	92.50	829	1.123	-0.056	0.201	0.031	23	714
22	87.50	847	1.005	-0.109	0.134	0.009	7	729
21	83.50	516	0.915	-0.121	0.093	0.000	0	444
20	81.00	665	0.861	-0.120	0.073	-0.003	-2	573
19	78.04	1,320	0.799	-0.112	0.054	-0.003	-3	1,137
18	75.54	219	0.749	-0.101	0.040	-0.001	0	189
17	72.50	1,023	0.690	-0.084	0.028	0.004	3	881
16	67.50	1,044	0.598	-0.052	0.014	0.014	12	899
15	62.50	1,064	0.513	-0.021	0.008	0.025	23	916
14	57.50	1,085	0.434	0.007	0.006	0.034	32	934
13	52.50	1,106	0.362	0.030	0.008	0.041	39	952
12	47.50	1,126	0.296	0.046	0.013	0.044	43	969
11	44.50	228	0.260	0.054	0.016	0.045	9	196
10	42.00	1,795	0.232	0.058	0.019	0.045	70	1,545
9	38.63	1,251	0.196	0.063	0.024	0.044	48	1,077
8	36.13	593	0.171	0.066	0.027	0.044	22	510
7	32.50	1,335	0.139	0.069	0.032	0.042	49	1,149
6	27.50	1,359	0.099	0.071	0.037	0.040	47	1,170
5	22.50	1,383	0.066	0.072	0.041	0.038	45	1,191
4	17.50	1,407	0.040	0.070	0.042	0.036	43	1,211
3	12.50	1,431	0.021	0.064	0.038	0.032	40	1,232
2	7.50	1,455	0.007	0.050	0.029	0.025	32	1,253
1	2.50	1,285	0.001	0.022	0.012	0.011	13	1,106
Powerwave Allgon 702	120.00	13	1.890	1.980	1.140	0.388	4	11
Powerwave Allgon LGP	120.00	85	1.890	1.980	1.140	0.388	28	73
Ericsson RRUS 32 B2	120.00	159	1.890	1.980	1.140	0.388	53	137
Ericsson RRUS-32	120.00	231	1.890	1.980	1.140	0.388	78	199
Powerwave 7770.00	120.00	105	1.890	1.980	1.140	0.388	35	90
Quintel QS66512-2	120.00	333	1.890	1.980	1.140	0.388	112	287
CCI HPA-65R-BUU-H6	120.00	153	1.890	1.980	1.140	0.388	51	132
Flat Platform w/ Han	120.00	2,000	1.890	1.980	1.140	0.388	673	1,721
Raycap DC6-48-60-18-	118.00	64	1.828	1.667	1.025	0.348	19	55
Ericsson RRUS 11 (Ba	118.00	300	1.828	1.667	1.025	0.348	91	258
Ericsson KRY 112 144	112.00	33	1.646	0.929	0.735	0.242	7	28

Site Number: 370629

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10/26/2016 11:02:30 AM

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Ericsson RRUS 11 B12	112.00	152	1.646	0.929	0.735	0.242	32	131
Ericsson AIR 21, 1.3	112.00	275	1.646	0.929	0.735	0.242	58	236
Ericsson AIR 21, 1.3	112.00	244	1.646	0.929	0.735	0.242	51	210
Andrew LNX-6515DS-VT	112.00	154	1.646	0.929	0.735	0.242	32	132
Flat Platform w/ Han	112.00	2,000	1.646	0.929	0.735	0.242	419	1,721
		34,436	49.321	30.753	21.355	7.384	2,930	29,641

Load Case (1.2 + 0.2Sds) \* DL + E EMAM

Seismic Equivalent Modal Analysis Method

Calculated Forces

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation (deg)	Ratio
0.00	-41.08	-2.92	0.00	-295.19	0.00	295.19	4,850.87	2,425.44	10,823.8	5,345.47	0.00	0.00	0.064
5.00	-39.28	-2.90	0.00	-280.57	0.00	280.57	4,806.08	2,403.04	10,523.9	5,197.36	0.01	-0.01	0.062
10.00	-37.50	-2.87	0.00	-266.07	0.00	266.07	4,759.60	2,379.80	10,224.0	5,049.29	0.03	-0.03	0.061
15.00	-35.76	-2.83	0.00	-251.72	0.00	251.72	4,711.42	2,355.71	9,924.57	4,901.37	0.07	-0.04	0.059
20.00	-34.04	-2.80	0.00	-237.55	0.00	237.55	4,661.55	2,330.77	9,625.56	4,753.70	0.12	-0.06	0.057
25.00	-32.36	-2.75	0.00	-223.57	0.00	223.57	4,609.98	2,304.99	9,327.28	4,606.39	0.19	-0.07	0.056
30.00	-30.70	-2.71	0.00	-209.80	0.00	209.80	4,556.72	2,278.36	9,029.93	4,459.54	0.27	-0.09	0.054
35.00	-29.97	-2.69	0.00	-196.24	0.00	196.24	4,501.76	2,250.88	8,733.73	4,313.26	0.37	-0.10	0.052
37.25	-28.42	-2.65	0.00	-190.18	0.00	190.18	4,476.48	2,238.24	8,600.87	4,247.64	0.42	-0.11	0.051
40.00	-26.19	-2.58	0.00	-182.91	0.00	182.91	4,445.11	2,222.56	8,438.88	4,167.65	0.49	-0.12	0.050
44.00	-25.91	-2.57	0.00	-172.60	0.00	172.60	3,547.79	1,773.89	6,746.39	3,331.79	0.59	-0.13	0.059
45.00	-24.51	-2.53	0.00	-170.03	0.00	170.03	3,540.16	1,770.08	6,702.42	3,310.07	0.62	-0.13	0.058
50.00	-23.14	-2.49	0.00	-157.39	0.00	157.39	3,500.99	1,750.49	6,482.60	3,201.51	0.76	-0.15	0.056
55.00	-21.80	-2.46	0.00	-144.93	0.00	144.93	3,460.13	1,730.06	6,262.98	3,093.05	0.92	-0.16	0.053
60.00	-20.48	-2.44	0.00	-132.61	0.00	132.61	3,417.57	1,708.79	6,043.76	2,984.79	1.10	-0.18	0.050
65.00	-19.18	-2.43	0.00	-120.41	0.00	120.41	3,373.32	1,686.66	5,825.16	2,876.83	1.29	-0.19	0.048
70.00	-17.92	-2.43	0.00	-108.26	0.00	108.26	3,327.38	1,663.69	5,607.39	2,769.28	1.50	-0.21	0.044
75.00	-17.64	-2.43	0.00	-96.13	0.00	96.13	3,279.75	1,639.87	5,390.65	2,662.24	1.72	-0.22	0.041
76.08	-16.01	-2.43	0.00	-93.50	0.00	93.50	3,269.20	1,634.60	5,343.85	2,639.13	1.77	-0.22	0.040
80.00	-15.18	-2.43	0.00	-83.99	0.00	83.99	3,230.41	1,615.21	5,175.17	2,555.82	1.96	-0.23	0.038
82.00	-14.54	-2.43	0.00	-79.14	0.00	79.14	2,493.57	1,246.78	4,030.93	1,990.72	2.06	-0.24	0.046
85.00	-13.49	-2.42	0.00	-71.86	0.00	71.86	2,474.96	1,237.48	3,939.06	1,945.35	2.21	-0.25	0.042
90.00	-12.47	-2.39	0.00	-59.78	0.00	59.78	2,442.59	1,221.30	3,785.91	1,869.72	2.48	-0.26	0.037
95.00	-11.46	-2.34	0.00	-47.81	0.00	47.81	2,408.53	1,204.26	3,632.91	1,794.16	2.75	-0.27	0.031
100.00	-10.47	-2.26	0.00	-36.10	0.00	36.10	2,372.77	1,186.38	3,480.25	1,718.76	3.04	-0.28	0.025
105.00	-9.51	-2.14	0.00	-24.79	0.00	24.79	2,335.32	1,167.66	3,328.15	1,643.65	3.34	-0.29	0.019
110.00	-9.13	-2.08	0.00	-14.09	0.00	14.09	2,296.17	1,148.08	3,176.83	1,568.92	3.64	-0.29	0.013
112.00	-5.07	-1.36	0.00	-9.93	0.00	9.93	2,280.04	1,140.02	3,116.57	1,539.15	3.76	-0.29	0.009
115.00	-4.55	-1.24	0.00	-5.84	0.00	5.84	2,255.33	1,127.67	3,026.49	1,494.67	3.95	-0.29	0.006
118.00	-3.81	-1.06	0.00	-2.11	0.00	2.11	2,230.01	1,115.01	2,936.85	1,450.40	4.13	-0.30	0.003
120.00	0.00	-1.04	0.00	0.00	0.00	0.00	2,212.80	1,106.40	2,877.35	1,421.02	4.26	-0.30	0.000

Load Case (0.9 - 0.2Sds) \* DL + E EMAM

Seismic (Reduced DL) Equivalent Modal Analysis Method

Calculated Forces

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation (deg)	Ratio
0.00	-28.53	-2.92	0.00	-293.39	0.00	293.39	4,850.87	2,425.44	10,823.8	5,345.47	0.00	0.00	0.061
5.00	-27.28	-2.90	0.00	-278.78	0.00	278.78	4,806.08	2,403.04	10,523.9	5,197.36	0.01	-0.01	0.059
10.00	-26.05	-2.86	0.00	-264.30	0.00	264.30	4,759.60	2,379.80	10,224.0	5,049.29	0.03	-0.03	0.058
15.00	-24.84	-2.82	0.00	-249.99	0.00	249.99	4,711.42	2,355.71	9,924.57	4,901.37	0.07	-0.04	0.056
20.00	-23.65	-2.78	0.00	-235.87	0.00	235.87	4,661.55	2,330.77	9,625.56	4,753.70	0.12	-0.06	0.055
25.00	-22.47	-2.74	0.00	-221.95	0.00	221.95	4,609.98	2,304.99	9,327.28	4,606.39	0.19	-0.07	0.053
30.00	-21.32	-2.70	0.00	-208.25	0.00	208.25	4,556.72	2,278.36	9,029.93	4,459.54	0.27	-0.09	0.051
35.00	-20.81	-2.68	0.00	-194.77	0.00	194.77	4,501.76	2,250.88	8,733.73	4,313.26	0.37	-0.10	0.050
37.25	-19.74	-2.63	0.00	-188.75	0.00	188.75	4,476.48	2,238.24	8,600.87	4,247.64	0.42	-0.11	0.049
40.00	-18.19	-2.56	0.00	-181.52	0.00	181.52	4,445.11	2,222.56	8,438.88	4,167.65	0.48	-0.12	0.048
44.00	-17.99	-2.55	0.00	-171.28	0.00	171.28	3,547.79	1,773.89	6,746.39	3,331.79	0.58	-0.13	0.056
45.00	-17.03	-2.51	0.00	-168.73	0.00	168.73	3,540.16	1,770.08	6,702.42	3,310.07	0.61	-0.13	0.056
50.00	-16.07	-2.47	0.00	-156.18	0.00	156.18	3,500.99	1,750.49	6,482.60	3,201.51	0.76	-0.14	0.053
55.00	-15.14	-2.44	0.00	-143.81	0.00	143.81	3,460.13	1,730.06	6,262.98	3,093.05	0.92	-0.16	0.051
60.00	-14.22	-2.42	0.00	-131.60	0.00	131.60	3,417.57	1,708.79	6,043.76	2,984.79	1.09	-0.18	0.048
65.00	-13.32	-2.41	0.00	-119.50	0.00	119.50	3,373.32	1,686.66	5,825.16	2,876.83	1.28	-0.19	0.045
70.00	-12.44	-2.41	0.00	-107.45	0.00	107.45	3,327.38	1,663.69	5,607.39	2,769.28	1.49	-0.20	0.043
75.00	-12.25	-2.41	0.00	-95.42	0.00	95.42	3,279.75	1,639.87	5,390.65	2,662.24	1.71	-0.22	0.040
76.08	-11.12	-2.41	0.00	-92.82	0.00	92.82	3,269.20	1,634.60	5,343.85	2,639.13	1.76	-0.22	0.039
80.00	-10.54	-2.41	0.00	-83.39	0.00	83.39	3,230.41	1,615.21	5,175.17	2,555.82	1.95	-0.23	0.036
82.00	-10.10	-2.41	0.00	-78.58	0.00	78.58	2,493.57	1,246.78	4,030.93	1,990.72	2.05	-0.24	0.044
85.00	-9.37	-2.40	0.00	-71.35	0.00	71.35	2,474.96	1,237.48	3,939.06	1,945.35	2.20	-0.24	0.040
90.00	-8.65	-2.37	0.00	-59.36	0.00	59.36	2,442.59	1,221.30	3,785.91	1,869.72	2.46	-0.26	0.035
95.00	-7.96	-2.33	0.00	-47.49	0.00	47.49	2,408.53	1,204.26	3,632.91	1,794.16	2.73	-0.27	0.030
100.00	-7.27	-2.25	0.00	-35.85	0.00	35.85	2,372.77	1,186.38	3,480.25	1,718.76	3.02	-0.28	0.024
105.00	-6.60	-2.13	0.00	-24.62	0.00	24.62	2,335.32	1,167.66	3,328.15	1,643.65	3.31	-0.28	0.018
110.00	-6.34	-2.06	0.00	-14.00	0.00	14.00	2,296.17	1,148.08	3,176.83	1,568.92	3.61	-0.29	0.012
112.00	-3.52	-1.35	0.00	-9.87	0.00	9.87	2,280.04	1,140.02	3,116.57	1,539.15	3.73	-0.29	0.008
115.00	-3.16	-1.24	0.00	-5.81	0.00	5.81	2,255.33	1,127.67	3,026.49	1,494.67	3.92	-0.29	0.005
118.00	-2.64	-1.05	0.00	-2.10	0.00	2.10	2,230.01	1,115.01	2,936.85	1,450.40	4.10	-0.29	0.003
120.00	0.00	-1.04	0.00	0.00	0.00	0.00	2,212.80	1,106.40	2,877.35	1,421.02	4.22	-0.29	0.000

Site Number: 370629

Code: ANSI/TIA-222-G

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Site Name: Northhaven I, CT

Engineering Number: OAA688019\_C3\_01

10/26/2016 11:02:30 AM

Customer: AT&T Mobility

### Analysis Summary

Load Case	Reactions						Max Usage	
	Shear FX (kips)	Shear FZ (kips)	Axial FY (kips)	Moment MX (ft-kips)	Moment MY (ft-kips)	Moment MZ (ft-kips)	Elev (ft)	Interaction Ratio
1.2D + 1.6W	23.38	0.00	41.30	0.00	0.00	1940.77	0.00	0.37
0.9D + 1.6W	23.38	0.00	30.97	0.00	0.00	1931.57	0.00	0.37
1.2D + 1.0Di + 1.0Wi	5.01	0.00	58.81	0.00	0.00	421.68	0.00	0.09
(1.2 + 0.2Sds) * DL + E ELFM	2.13	0.00	41.08	0.00	0.00	199.46	0.00	0.05
(1.2 + 0.2Sds) * DL + E EMAM	2.92	0.00	41.08	0.00	0.00	295.19	0.00	0.06
(0.9 - 0.2Sds) * DL + E ELFM	2.13	0.00	28.53	0.00	0.00	198.32	0.00	0.04
(0.9 - 0.2Sds) * DL + E EMAM	2.92	0.00	28.53	0.00	0.00	293.39	0.00	0.06
1.0D + 1.0W	5.59	0.00	34.44	0.00	0.00	462.63	0.00	0.09



Site Number: 370629

Code: ANSI/TIA-222-G

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Site Name: Northhaven I, CT

Engineering Number: OAA688019\_C3\_01

10/26/2016 11:02:30 AM

Customer: AT&T Mobility

### Base Summary

#### Reactions

Original Design			Analysis			Moment Design %
Moment (kip-ft)	Axial (kip)	Shear (kip)	Moment (kip-ft)	Axial (kip)	Shear (kip)	
4,149.00	39.20	37.10	1,940.77	58.81	23.38	34.65

#### Base Plate

Yield (ksi)	Thick (in)	Width (in)	Style	Poly Sides	Clip Len (in)	Effective Len (in)	Mu (kip-in)	Phi Mn (kip-in)	Ratio
60.0	2.750	68.920	Polygon	12	0.00	8.762	324.04	894.54	0.36

#### Anchor Bolts

Bolt Circle	Num Bolts	Bolt Type	Bolt Dia (in)	Yield (ksi)	Ultimate (ksi)	Arrange	Cluster Dist (in)	Start Angle (deg)	Compression			Tension		
									Force (kip)	Allow (kip)	Ratio	Force (kip)	Allow (kip)	Ratio
62.92	20	2.25" 18J	2.25	75.00	100.00	Radial	0.00	0.0	76.97	260.00	0.31	71.09	260.00	0.28



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

AT&T Existing Facility

Site ID: CT2209

North Haven Railroad Tracks  
125 Washington Avenue  
North Haven, CT 06473

**November 6, 2016**

**EBI Project Number: 6216004992**

Site Compliance Summary	
Compliance Status:	<b>COMPLIANT</b>
Site total MPE% of FCC general public allowable limit:	<b>8.11 %</b>



November 6, 2016

AT&T Mobility – New England  
Attn: Cameron Syme, RF Manager  
550 Cochituate Road  
Suite 550 – 13&14  
Framingham, MA 06040

## Emissions Analysis for Site: **CT2209 – North Haven Railroad Tracks**

EBI Consulting was directed to analyze the proposed AT&T facility located at **125 Washington Avenue, North Haven, CT**, for the purpose of determining whether the emissions from the Proposed AT&T Antenna Installation located on this property are within specified federal limits.

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

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

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

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ( $\mu\text{W}/\text{cm}^2$ ). The general population exposure limits for the 700 and 850 MHz Bands are approximately  $467 \mu\text{W}/\text{cm}^2$  and  $567 \mu\text{W}/\text{cm}^2$  respectively. The general population exposure limit for the 1900 MHz (PCS), 2100 MHz (AWS) and 2300 MHz (WCS) bands is  $1000 \mu\text{W}/\text{cm}^2$ . Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.



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

Additional details can be found in FCC OET 65.

## CALCULATIONS

Calculations were done for the proposed AT&T Wireless antenna facility located at **125 Washington Avenue, North Haven, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since AT&T is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

For all calculations, all equipment was calculated using the following assumptions:

- 1) 2 UMTS channels (850 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
- 2) 2 UMTS channels (1900 MHz (PCS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
- 3) 2 GSM channels (850 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
- 4) 2 LTE channels (2300 MHz (WCS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.
- 5) 2 LTE channels (700 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.
- 6) 2 LTE channels (1900 MHz (PCS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.



- 7) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.
- 8) For the following calculations the sample point was the top of a 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications minus 10 dB was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 9) The antennas used in this modeling are the **Powerwave 7770**, **CCI HPA-65R-BUU-H6** and the **Quintel QS66512-2** for transmission in the 700 MHz, 850 MHz, 1900 MHz (PCS) and 2300 MHz (WCS) frequency bands. This is based on feedback from the carrier with regards to anticipated antenna selection. Maximum gain values for all antennas are listed in the Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 10) The antenna mounting height centerlines of the proposed antennas are **122 feet** above ground level (AGL) for **Sector A**, **122 feet** above ground level (AGL) for **Sector B** and **122 feet** above ground level (AGL) for Sector C.
- 11) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

All calculations were done with respect to uncontrolled / general public threshold limits.



## AT&T Site Inventory and Power Data by Antenna

Sector:	A	Sector:	B	Sector:	C
Antenna #:	<b>1</b>	Antenna #:	<b>1</b>	Antenna #:	<b>1</b>
Make / Model:	Powerwave 7770	Make / Model:	Powerwave 7770	Make / Model:	Powerwave 7770
Gain:	11.4 / 13.4 dBd	Gain:	11.4 / 13.4 dBd	Gain:	11.4 / 13.4 dBd
Height (AGL):	<b>122 feet</b>	Height (AGL):	<b>122 feet</b>	Height (AGL):	<b>122 feet</b>
Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	120 Watts	Total TX Power(W):	120 Watts	Total TX Power(W):	120 Watts
ERP (W):	2,140.89	ERP (W):	2,140.89	ERP (W):	2,140.89
Antenna A1 MPE%	<b>0.74 %</b>	Antenna B1 MPE%	<b>0.74 %</b>	Antenna C1 MPE%	<b>0.74 %</b>
Antenna #:	<b>2</b>	Antenna #:	<b>2</b>	Antenna #:	<b>2</b>
Make / Model:	CCI HPA-65R-BUU-H6	Make / Model:	CCI HPA-65R-BUU-H6	Make / Model:	CCI HPA-65R-BUU-H6
Gain:	12.65 / 15.25 dBd	Gain:	12.65 / 15.25 dBd	Gain:	12.65 / 15.25 dBd
Height (AGL):	<b>122 feet</b>	Height (AGL):	<b>122 feet</b>	Height (AGL):	<b>122 feet</b>
Frequency Bands	850 MHz / 2300 MHz (WCS)	Frequency Bands	850 MHz / 2300 MHz (WCS)	Frequency Bands	850 MHz / 2300 MHz (WCS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	180 Watts	Total TX Power(W):	180 Watts	Total TX Power(W):	180 Watts
ERP (W):	5,124.05	ERP (W):	5,124.05	ERP (W):	5,124.05
Antenna A2 MPE%	<b>1.59 %</b>	Antenna B2 MPE%	<b>1.59 %</b>	Antenna C2 MPE%	<b>1.59 %</b>
Antenna #:	<b>3</b>	Antenna #:	<b>3</b>	Antenna #:	<b>3</b>
Make / Model:	Quintel QS66512-2	Make / Model:	Quintel QS66512-2	Make / Model:	Quintel QS66512-2
Gain:	10.85 / 13.85 dBd	Gain:	10.85 / 13.85 dBd	Gain:	10.85 / 13.85 dBd
Height (AGL):	<b>122 feet</b>	Height (AGL):	<b>122 feet</b>	Height (AGL):	<b>122 feet</b>
Frequency Bands	700 MHz / 1900 MHz (PCS)	Frequency Bands	700 MHz / 1900 MHz (PCS)	Frequency Bands	700 MHz / 1900 MHz (PCS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	240 Watts	Total TX Power(W):	240 Watts	Total TX Power(W):	240 Watts
ERP (W):	4,371.36	ERP (W):	4,371.36	ERP (W):	4,371.36
Antenna A3 MPE%	<b>1.61 %</b>	Antenna B3 MPE%	<b>1.61 %</b>	Antenna C3 MPE%	<b>1.61 %</b>

Site Composite MPE%	
Carrier	MPE%
AT&T – Max per sector	<b>3.95 %</b>
XM Satellite Radio	0.21 %
T-Mobile	3.95 %
<b>Site Total MPE %:</b>	<b>8.11 %</b>

AT&T Sector A Total:	3.95 %
AT&T Sector B Total:	3.95 %
AT&T Sector C Total:	3.95 %
<b>Site Total:</b>	<b>8.11 %</b>

AT&T _ Frequency Band / Technology per Sector	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ( $\mu\text{W}/\text{cm}^2$ )	Frequency (MHz)	Allowable MPE ( $\mu\text{W}/\text{cm}^2$ )	Calculated % MPE
AT&T 850 MHz UMTS	2	414.12	122	2.21	850 MHz	567	0.39%
AT&T 1900 MHz (PCS) UMTS	2	656.33	122	3.51	1900 MHz (PCS)	1000	0.35%
AT&T 850 MHz GSM	2	552.23	122	2.95	850 MHz	567	0.52%
AT&T 2300 MHz (WCS) LTE	2	2,009.79	122	10.74	2300 MHz (WCS)	1000	1.07%
AT&T 700 MHz LTE	2	729.71	122	3.90	700 MHz	467	0.83%
AT&T 1900 MHz (PCS) LTE	2	1,455.97	122	7.78	1900 MHz (PCS)	1000	0.78%
						Total*:	3.95%

\*NOTE: Totals may vary by 0.01% due to summing of remainders



## Summary

All calculations performed for this analysis yielded results that were **within** the allowable limits for general public exposure to RF Emissions.

The anticipated maximum composite contributions from the AT&T facility as well as the site composite emissions value with regards to compliance with FCC's allowable limits for general public exposure to RF Emissions are shown here:

AT&T Sector	Power Density Value (%)
Sector A:	3.95 %
Sector B:	3.95 %
Sector C:	3.95 %
AT&T Maximum Total (per sector):	3.95 %
Site Total:	8.11 %
Site Compliance Status:	<b>COMPLIANT</b>

The anticipated composite MPE value for this site assuming all carriers present is **8.11 %** of the allowable FCC established general public limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

FCC guidelines state that if a site is found to be out of compliance (over allowable thresholds), that carriers over a 5% contribution to the composite value will require measures to bring the site into compliance. For this facility, the composite values calculated were well within the allowable 100% threshold standard per the federal government.