



March 19th, 2020

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

Regarding: Notice of Exempt Modification – Equipment Modification
Property Address: 120 Universal Drive, North Haven CT 06473
Applicant: Empire Telecom on behalf of AT&T (“AT&T”, Site # CT5107)

Dear Ms. Bachman:

AT&T currently maintains a wireless telecommunications facility on an existing 120-foot monopole at the above-referenced address latitude 41.3441919°, longitude -72.8705989°. Said monopole is owned by Crown Castle and the underlying property owners are 120 Universal Drive, LLC.

AT&T desires to modify its existing telecommunications facility by adding: (1) DC Squid (3) CB-C23SR-43 Combiners, (3) SDARS Remote Radios, (1) Main Unit, (3) RR-FA3 Mounts, and ancillary equipment and cables. The centerline height of the existing antennas and ancillary tower-mounted equipment is and will remain at 120 feet.

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 Frist Selectman, Michael J. Freda; the Zoning Enforcement Officer, Laura Magaraci; Tower Owners, Crown Castle Corporation; and property owners, 120 Universal Drive, LLC.

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 modified equipment will be installed at the existing height of 120 feet on the 120 foot tower.
2. The proposed modifications will not involve any changes to AT&T’s ground-space footprint, and therefore 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 decibels or more, or to levels that exceed state and local criteria.

AT&T at 120 Universal Drive North Haven CT 06473 / CT5448
March 19th, 2020

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 (enclosed) 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 existing structure and its foundation can support AT&T's proposed modifications. Please see enclosed structural analysis completed by completed by Malouf Engineering Intl. Inc., dated December 3rd, 2019; stamped December 3rd, 2019.

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

Sincerely,

Moriah King

Moriah King
Site Acquisition Specialist
Empire Telecom USA, LLC
moking@empiretelecomm.com

Enclosures: Exhibit 1 – Field Card and GIS Map
Exhibit 2 – Construction Drawings
Exhibit 3 – Structural Analysis
Exhibit 4 – RF Emissions Analysis Report Evaluation

cc:

Michael J. Freda
First Selectman - Selectman's Office
18 Church Street North Haven, CT 06473

Laura Magaraci
Zoning Enforcement Officer
Memorial Town Hall
18 Church Street North Haven, CT 06473

120 Universal Drive Associates, LLC
120 Universal Drive North Haven, CT 06473

Crown Castle
12 Gill Street, Suite 5800
Woburn, MA 01801

Create Label

Preferences

Shipping History

Address Book

SCAN Fc

Account # 1

Label Details

Label Number:

[9410803699300119873450](#)

SCAN® Form: [9475703699300347323260](#)

Terms

Acceptance Cutoff: [03/24/2020 4:30 PM](#)

Acceptance Time: [03/24/2020 5:39 PM](#)

Expected Date: [03/25/2020 11:59 PM](#)

Delivery Status: **Delivered**
[2020-03-25](#)
[12:00:00.0](#)

Label Actions

[USPS Tracking®](#)

[Ship Again](#)

Need help 

[File an Insurance claim](#)

[Request A Service Refund](#)

Return Address:

MORIAH KING
QUALTEK
16 ESQUIRE RD
N BILLERICA, MA 01862-2527
noliver@empiretelecomm.com

Delivery Address:

CROWN CASTLE
12 GILL ST
WOBURN, MA 01801-1765

Package:

Ship Date: [03/24/20](#)
Value: \$1.00
Weight: 1 lbs 0 oz
From: 01862

Service:

Priority Mail® 1-Day
Signature Confirmation

Transaction Number: [487294961](#)

Transaction Type: Label

Payment Method: VISA-4143

Payment Status: Account Charged

Postage Cost
Signature Confirmation

Label Total: \$10.15

Order Total: \$20.30

Timestamp	Message
03/24/2020 4:39:07	LABEL PRINTED

Did you know you can request a refund online for unused Click-N-Ship® labels in your Shipping History? Click [here](#) to learn more.

Create Label Preferences **Shipping History** Address Book

Account # 161858927

Label Details

Label Number:
[9410803699300119873467](#)

SCAN® Form: 9475703699300347323280

Terms /
Acceptance Cutoff: 03/24/2020 4:30 PM
Acceptance Time: 03/24/2020 6:39 PM
Expected Date: 03/28/2020 11:09 PM

Delivery Status: [Delivered](#)
2020-03-28
Label Actions / 10:42:00.0

[USPS Tracking®](#)
[Ship Again](#)

Need help /
[File an insurance claim](#)
[Request A Service Refund](#)

Return Address:
MORIAH KING
EMPIRE TELECOM
16 ESQUIRE RD
N BILLERICA, MA 01862-2527
ne_sa_deliverable@empiretelecomm.com

Delivery Address:
120 UNIVERSAL DRIVE ASSOCIATES, LLC
120 UNIVERSAL DR
NORTH HAVEN, CT 06473-3630

Package:
Ship Date: 03/24/20
Value: \$1.00
Weight: 1 lbs 0 oz
From: 01862

Service:
Priority Mail® 2-Day
Signature Confirmation

Transaction Number: 487294961
Transaction Type: Label
Payment Method: VISA-4143
Payment Status: Account Charged

Postage Cost \$7.50
Signature Confirmation \$2.65

Label Total: \$10.15
Order Total: \$20.30

Timestamp	Message
03-24-2020 14:23:28	LABEL PRINTED
03-24-2020 14:23:04	Getting Payment
03-24-2020 14:18:02	Setting Payment

Did you know you can request a refund online for unused Click-N-Ship® labels in your Shipping History? Click [here](#) to learn more.

Create Label Preferences **Shipping History** Address Book

Account # 161858927

Label Details

Label Number:
[9405503699300277672480](#)

SCAN® Form: 9476703699300349347602

Terms /
Acceptance Cutoff: 03/09/2020 4:30 PM
Acceptance Time: 03/24/2020 5:39 PM
Expected Date: 03/11/2020 11:09 PM

Delivery Status: [Delivered, Left with Individual](#)
2020-03-26
Label Actions / 10:09:00.0

[USPS Tracking®](#)
[Ship Again](#)

Need help /
[File an insurance claim](#)
[Request A Service Refund](#)

Return Address:
MORIAH KING
EMPIRE TELECOM
16 ESQUIRE RD
N BILLERICA, MA 01862-2527
ne_sa_deliverable@empiretelecomm.com

Delivery Address:
LAURA MAGARACI
TOWN OF NORTH HAVEN ZONING ENFORCEMENT
18 CHURCHST
NORTH HAVEN, CT 06473-2503

Package:
Ship Date: 03/09/20
Value: \$50.00
From: 01862

Service:
Priority Mail® 2-Day
Flat Rate Envelope
USPS Tracking®

Transaction Number: 485916961
Transaction Type: Label
Payment Method: VISA-4382
Payment Status: Account Charged

Postage Cost \$7.75
USPS Tracking® Free

Label Total: \$7.75
Order Total: \$31.00

Timestamp	Message
03-09-2020 09:00:15	LABEL PRINTED

Did you know you can request a refund online for unused Click-N-Ship® labels in your Shipping History? Click [here](#) to learn more.

Create Label Preferences **Shipping History** Address Book

Account # 161058927

Label Details

Label Number:

[9405503699300277672473](#)

SCAN® Form: [9475702699300346347602](#)

Terms

Acceptance Cutoff: 03/09/2020 4:30 PM

Acceptance Time: 03/24/2020 5:38 PM

Expected Date: 03/11/2020 11:59 PM

Delivery Status: **Delivered, Left with Individual**

2020-03-30
10:04:00.0

Label Actions

[USPS Tracking®](#)

[Ship Again](#)

Need help

[File an insurance claim](#)

[Request A Service Refund](#)

Return Address:

MORIAH KING
EMPIRE TELECOM
16 ESQUIRE RD
N BILLERICA, MA 01862-2527
ne_sa_deliverable@empiretelecomm.com

Delivery Address:

MICHAEL J FRED A
TOWN OF NORTH HAVEN SELECTMAN'S
OFFICE
18 CHURCH ST
NORTH HAVEN, CT 06473-2503

Package:

Ship Date: 03/09/20
Value: \$50.00
From: 01862

Service:

Priority Mail® 2-Day
Flat Rate Envelope
USPS Tracking®

Transaction Number: **485916961**

Transaction Type: Label

Payment Method: VISA-4382

Payment Status: Account Charged

Postage Cost
USPS Tracking®

Label Total: **\$7.76**

Order Total: **\$31.00**

\$7.75
Free

120 UNIVERSAL DR

Location 120 UNIVERSAL DR

Mblu 011//001//

Acct# 027540

Owner 120 UNIVERSAL DRIVE ASSOCIATES LLC

Assessment \$996,030

Appraisal \$1,422,900

PID 8457

Building Count 1

Current Value

Appraisal			
Valuation Year	Improvements	Land	Total
2014	\$1,025,400	\$397,500	\$1,422,900

Assessment			
Valuation Year	Improvements	Land	Total
2014	\$717,780	\$278,250	\$996,030

Owner of Record

Owner 120 UNIVERSAL DRIVE ASSOCIATES LLC
Co-Owner
Address 120 UNIVERSAL DR
 NORTH HAVEN, CT 06473

Sale Price \$0
Certificate
Book & Page 799/ 46
Sale Date 10/28/2008

Ownership History

Ownership History				
Owner	Sale Price	Certificate	Book & Page	Sale Date
120 UNIVERSAL DRIVE ASSOCIATES LLC	\$0		799/ 46	10/28/2008
BERLUTI MARIO	\$0	1	482/ 458	07/18/1995
BERLUTI, MARIO & HELEN	\$0	3		09/01/1990
BERLUTI MARIO & HELEN & SURV	\$0	4	305/ 427	12/06/1978

Building Information

Building 1 : Section 1

Year Built: 1985
Living Area: 19,180
Replacement Cost: \$1,089,079

Building Percent Good: 78
Replacement Cost
Less Depreciation: \$849,500

Building Photo



(<http://images.vgsl.com/photos/NorthHavenCTPhotos/A0010126/42.jpg>)

Building Attributes	
Field	Description
STYLE	Service Shop
MODEL	Comm/Ind
Grade	C +
Stories:	1
Occupancy	1
Exterior Wall 1	Metal
Exterior Wall 2	
Roof Structure	Flat
Roof Cover	Metal/Tin
Interior Wall 1	Drywall
Interior Wall 2	
Interior Floor 1	Average
Interior Floor 2	
Heating Fuel	Gas
Heating Type	Hot Air-no Duc
AC Type	None
Bldg Use	AUTO REPAIR
Total Rooms	
Total Bedrms	
Total Baths	
1st Floor Use:	
Heat/AC	NONE
Frame Type	WOOD FRAME
Baths/Plumbing	AVERAGE
Ceiling/Wall	SUS-CEIL/MN WL
Rooms/Prtns	AVERAGE
Wall Height	20
% Conn Wall	

Building Layout



Building Sub-Areas (sq ft)			Legend
Code	Description	Gross Area	Living Area
BAS	First Floor	15,020	15,020
AOF	Office	4,160	4,160
		19,180	19,180

Extra Features

Extra Features				Legend
Code	Description	Size	Value	Bldg #
A/C	AIR CONDITION	6612 S.F.	\$10,300	1
SPR1	SPRINKLERS-WET	19220 S.F.	\$13,500	1
MEZ1	MEZZANINE-UNF	2500 S.F.	\$17,600	1

Land

Land Use

Use Code 3320
 Description AUTO REPAIR
 Zone IL30
 Neighborhood 305
 Alt Land Appr No
 Category

Land Line Valuation

Size (Acres) 3
 Frontage
 Depth
 Assessed Value \$278,250
 Appraised Value \$397,500

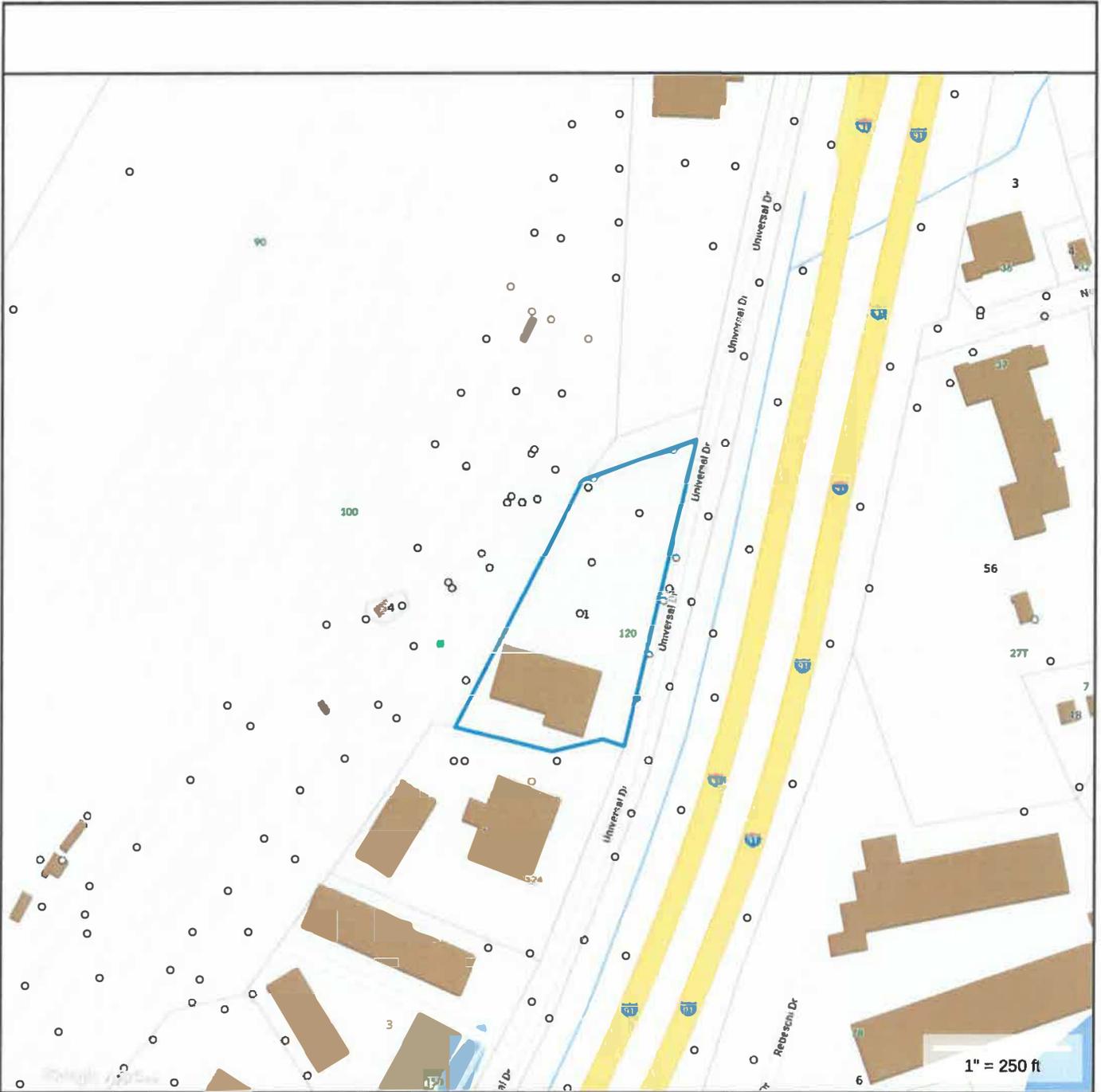
Outbuildings

Outbuildings						Legend
Code	Description	Sub Code	Sub Description	Size	Value	Bldg #
FN3	FENCE-6' CHAIN			640 L.F.	\$2,900	1
PAV1	PAVING-ASPHALT			52000 S.F.	\$35,100	1
SHD7	COMM GOOD			240 S.F.	\$9,900	1
TWR1	COMMU-TOWER			1 UNITS	\$112,500	1
SHD7	COMM GOOD			240 S.F.	\$9,900	1

Valuation History

Appraisal			
Valuation Year	Improvements	Land	Total
2013	\$1,238,100	\$450,000	\$1,688,100
2008	\$733,900	\$450,000	\$1,183,900
2007		\$315,000	\$828,730

Assessment			
Valuation Year	Improvements	Land	Total
2013	\$866,670	\$315,000	\$1,181,670
2008	\$513,730	\$315,000	\$828,730
2007		\$315,000	\$828,730



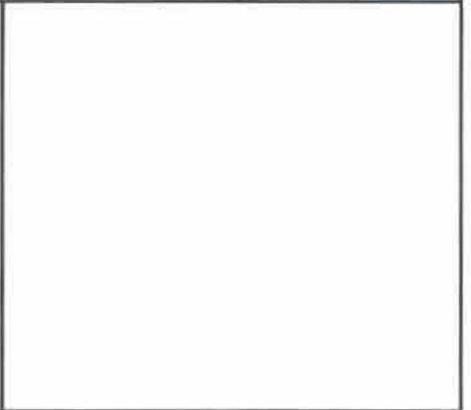
Property Information	
Property ID	11/1
Location	120 UNIVERSAL DR
Owner	120 UNIVERSAL DRIVE ASSOCIATES LLC



**MAP FOR REFERENCE ONLY
NOT A LEGAL DOCUMENT**

Town of North Haven, CT makes no claims and no warranties, expressed or implied, concerning the validity or accuracy of the GIS data presented on this map.

Geometry updated 07/01/2018
Data updated 11/18/2018



PROJECT INFORMATION

SCOPE OF WORK: UNMANNED COMMUNICATIONS FACILITY MODIFICATIONS INCLUDING:
 - (P) SIRIUS-XM NEW COMSCOPE ION-M23 SWMS REMOTE RADIO ON NEW RR-FAS MOUNT (1/SECT., 3 TOT.)
 - (P) SIRIUS-XM NEW COMSCOPE CXC23SR-43 COMBNER ON NEW RR-FAS MOUNT (1/SECT., 3 TOT.)
 - (P) AT&T ALPHA-Delta/GAMMA LINES TRUS-32 TRUNK PORT TO BE CONNECTED TO NEW COMSCOPE SWMS/ACS DPLXER CXC23SR43 (1/SECT., 3 TOT.)
 - (P) AT&T NEW (1) DCB-48 80-18.82VZ ALONG WITH EXISTING (2) DCB48B018NF, (1) DCB48B008F (4 TOT.)
 - (P) NEW 2-00 POWER LINES HOOK MONOPOLE FOR A TOTAL OF 2-48ER TRUNK + 6-00 POWER LINES IN SHELTER.
 - SIRIUS-XM EQUIPMENT NEW COMSCOPE RACK
 - ADD 2-5A BREAKER IN AT&T POWER PLANT FOR SIRIUS-XM EQUIPMENT

SITE NUMBER: CT5107
SITE NAME: NORTH HAVEN SOUTH
SITE ADDRESS: 120 UNIVERSAL DR. NORTH HAVEN, CT 06473
TOWER OWNER: CROWN CASTLE INTERNATIONAL 500 W. CUMMINGS PARK WOBURN, MA 01801
APPLICANT: AT&T MOBILITY 550 COCHITUATE RD SUITES 13 & 14 FRAMINGHAM, MA 01701
NSC CONTACT: TEL 866-915-5600
COORDINATES: LAT. N41° 20' 38.76" LONG. W72° 52' 14.16"
GROUND LEVEL: ±21'
DEED REFERENCE: N/A
SITE PARCEL NO.: N/A
CURRENT ZONING: N/A
HORIZONTAL DATUM: (NAD) 1983



at&t
 Mobility

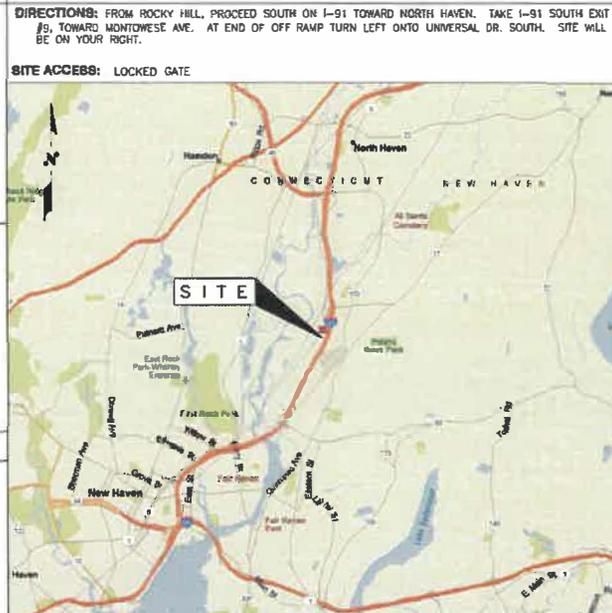
SITE NUMBER: CT5107 FA: 10071172
SITE NAME: NORTH HAVEN SOUTH
PROJECT: RF MOD // IP REPEATER MRTCB037956
CROWN SITE ID: 881536

DRAWING INDEX

REV

01	TITLE SHEET	2
02	NOTES	2
03	SITE PLAN & EQUIPMENT PLAN	2
04	ELEVATION VIEW & ANTENNA LAYOUT	2
05	GROUNDING DETAILS	2

LOCATION MAP



APPLICABLE BUILDING CODES AND STANDARDS

SUBCONTRACTOR'S WORK SHALL COMPLY WITH PROJECT STANDARDS AND SPECIFICATIONS. SUBCONTRACTOR WORK SHALL COMPLY WITH ALL APPLICABLE NATIONAL, STATE, AND LOCAL CODES AS ADOPTED BY THE LOCAL AUTHORITY HAVING JURISDICTION (AHJ) FOR THE LOCATION. THE EDITION OF THE AHJ ADOPTED CODES AND STANDARDS IN EFFECT ON THE DATE OF CONTRACT AWARD SHALL GOVERN THE DESIGN.

BUILDING CODE:
 CONNECTICUT STATE BUILDING CODE

ELECTRICAL CODE:
 NATIONAL ELECTRICAL CODE LATEST EDITION
 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, ASO, NINTH EDITION
 AMERICAN NATIONAL STANDARDS INSTITUTE/TELECOMMUNICATIONS INDUSTRY ASSOCIATION (ANSI/TIA) 222-F OR G AS APPLICABLE, STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWER AND ANTENNA SUPPORTING STRUCTURES:
 TIA 607, COMMERCIAL BUILDING GROUNDING AND BONDING REQUIREMENTS FOR TELECOMMUNICATIONS

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

IEEE C62.41, RECOMMENDED PRACTICES ON SURGE VOLTAGES IN LOW VOLTAGE AC POWER CIRCUITS (FOR LOCATION CATEGORY "C3" AND "HIGH SYSTEM EXPOSURE")

TELCORDIA GR-1503, COAXIAL CABLE CONNECTIONS

ANSI T1.311, FOR TELECOM - DC POWER SYSTEMS - TELECOM, ENVIRONMENTAL PROTECTION

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.



CONNECTICUT LAW REQUIRES TWO WORKING DAYS NOTICE PRIOR TO ANY EARTH MOVING ACTIVITIES BY CALLING 800-922-4455 OR DIAL 811

CONTACT & UTILITY INFORMATION

CONTACT	CONTACT	COMPANY	PHONE NO.
ENGINEERING:	MIGUEL NOBRE	VRG	(508) 931-9590
SITE ACQUISITION:	DAVID COOPER	EMPIRE	(617) 639-4908
CONSTRUCTION:	GREG DORMAN	EMPIRE	(484) 683-1750
UTILITIES:			
POWER:	WORK REQUEST GROUP	NATIONAL GRID	(800) 375-7405
TELCO:		VERIZON	(800) 941-9900

SITE NUMBER: CT5107
SITE NAME: NORTH HAVEN S
PROJECT: RF MOD // IP
CROWN ID: 881536
 120 UNIVERSAL DR.
 NORTH HAVEN, CT 06473
 NEW HAVEN COUNTY



at&t
 Mobility
 550 COCHITUATE RD
 SUITES 13 & 14
 FRAMINGHAM, MA 01701

REV	DATE	REVISION	BY	CHK	APP'D
12/10/19		GENERAL REVISIONS	ELP	GAM	
01/16/19		GENERAL REVISIONS	ELP	GAM	
06/12/19		FOR CONSTRUCTION	ELP	GAM	



AT&T MOBILITY

TITLE SHEET

JOB NUMBER	DRAWING NUMBER	REV
0107-000000	01	2

VRG
 VERTICAL RESOURCES GRP.

489 Washington Street
 Auburn, MA 01501
 Tel. (508) 981-9590
 Fax (508) 519-8939
 mcnore@verticalresourcesgrp.com

EMPIRE telecom
 EMPIRE TELECOM USA, LLC
 16 ESQUIRE ROAD
 BILLERICA, MA 01821

GENERAL NOTES

- FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:
 CONTRACTOR - PRIME CONTRACTOR
 SUBCONTRACTOR - GENERAL CONTRACTOR (CONSTRUCTION)
 OWNER - AT&T WIRELESS
 OEM - ORIGINAL EQUIPMENT MANUFACTURER
- UPON 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.
- 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.
- DRAWINGS PROVIDED HERE ARE NOT TO SCALE UNLESS OTHERWISE NOTED AND ARE INTENDED TO SHOW OUTLINE ONLY.
- UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
- THE SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
- IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE SUBCONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY THE CONTRACTOR.
- SUBCONTRACTOR SHALL DETERMINE ACTUAL ROUTING OF CONDUIT, POWER AND T1 CABLES, GROUNDING CABLES AS SHOWN ON THE POWER, GROUNDING AND TELCO PLAN DRAWING. ROUTING OF CONDUIT FOR POWER AND TELCO SHALL BE APPROVED BY OWNER OF SITE.
- 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.
- SUBCONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS CONCRETE CURBS AND OTHER ITEMS PROVIDED FROM THE EXISTING FACILITY. AUTOMOBILES REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
- SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.

SITE WORK GENERAL NOTES

- THE SUBCONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION.
- ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC, AND OTHER UTILITIES WHERE ENCOUNTERED IN THE WORK, SHALL BE PROTECTED AT ALL TIMES. IF WORK IS REQUIRED FOR THE PROPER LOCATION OF THE WORK, SHALL BE RELOCATED AS DIRECTED BY CONTRACTOR. EXTREME CAUTION SHOULD BE USED BY THE SUBCONTRACTOR WHEN EXCAVATING OR DRILLING HOLES IN CONCRETE. SPECIAL INSPECTIONS, REQUIRED BY OVERSEEING CODES, SHALL BE PERFORMED IN ORDER TO MAINTAIN MANUFACTURER'S MAXIMUM ALLOWABLE LOADS. ALL EXPANSION/WEAR ANCHORS SHALL BE STAINLESS STEEL OR HOT DIP GALVANIZED. EXPANSION BOLTS SHALL BE PROVIDED BY RAMSEY/REMEAD. HELIX OR APPROVED EQUAL.
- ALL SITE WORK SHALL BE AS INDICATED ON THE DRAWINGS AND PROJECT SPECIFICATIONS.
- IF NECESSARY, RUBBER STAMPS, DEBRIS, STICKS, STONES, TOP SOIL AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.
- ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES, WHICH INTERFERE WITH THE EXECUTION OF THE WORK, SHALL BE REMOVED AND/OR CAPPED, PLUGGED OR OTHERWISE DISCONTINUED AT POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK, SUBJECT TO THE APPROVAL OF CONTRACTOR, OWNER AND/OR LOCAL UTILITIES.
- SUBCONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION.
- THE SUBCONTRACTOR SHALL PROVIDE SITE STORAGE IN ACCORDANCE WITH THE OTHER SPECIFICATION FOR SITE STORAGE.
- THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE TRANSMISSION EQUIPMENT AND TOWER AREAS.
- NO FILL OR EMBANKMENT MATERIAL SHALL BE PLACED ON FROZEN GROUND. FROZEN MATERIALS, SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OR EMBANKMENT.
- THE SLAB GRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION. SEE DETAIL 303.
- THE AREAS OF THE OWNER'S PROPERTY DISTURBED BY THE WORK AND NOT COVERED BY THE TOWER, EQUIPMENT OR DRIVEWAY, SHALL BE GRADED TO A UNIFORM SLOPE, AND STABILIZED TO PREVENT EROSION.
- EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN CONFORMANCE WITH THE LOCAL JURISDICTION'S ORDINANCES FOR EROSION AND SEDIMENT CONTROL.
- ALL EARTH WORK SHALL BE PERFORMED IN ACCORDANCE WITH TECHNICAL SPECIFICATION FOR CONSTRUCTION OF RADIO ACCESS NETWORK SITES.

STRUCTURAL STEEL NOTES:

- ALL STEEL WORK SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 (HOT-DIP) UNLESS NOTED OTHERWISE. STRUCTURAL STEEL SHALL BE ASTM-A36 UNLESS OTHERWISE NOTED ON THE SITE SPECIFIC DRAWINGS. STEEL DESIGN, INSTALLATION AND BOLLING SHALL BE PERFORMED IN ACCORDANCE WITH THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC) MANUAL OF STEEL CONSTRUCTION.
- ALL WELDING SHALL BE PERFORMED USING COVER ELECTRODES AND WELDING SHALL CONFORM TO AISC. WEDGE FILLET WELD SIZES ARE NOT SHOWN. PROVIDE THE MINIMUM SIZE PER TABLE J2.4 IN THE AISC "MANUAL OF STEEL CONSTRUCTION". PAINTED SURFACES SHALL BE TOUCHED UP.
- BOLTED CONNECTIONS SHALL BE ASTM A325 BEARING TYPE (3/4") CONNECTIONS AND SHALL HAVE MINIMUM OF TWO BOLTS UNLESS NOTED OTHERWISE. STEEL FASTENER HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 (HOT-DIP)
- NON-STRUCTURAL CONNECTIONS FOR STEEL GRATING MAY USE 5/8" DIA. ASTM A 307 BOLTS UNLESS NOTED OTHERWISE.
- INSTALLATION OF CONCRETE EXPANSION/WEAR ANCHOR, SHALL BE PER MANUFACTURER'S WRITTEN RECOMMENDED PROCEDURE. THE ANCHOR BOLT, BOWL OR ROD SHALL CONFORM TO MANUFACTURER'S RECOMMENDATION FOR EMBEDMENT DEPTH OR AS SHOWN ON THE DRAWINGS. NO REBAR SHALL BE CUT WITHOUT PRIOR CONTRACTOR APPROVAL WHEN DRILLING HOLES IN CONCRETE. SPECIAL INSPECTIONS, REQUIRED BY OVERSEEING CODES, SHALL BE PERFORMED IN ORDER TO MAINTAIN MANUFACTURER'S MAXIMUM ALLOWABLE LOADS. ALL EXPANSION/WEAR ANCHORS SHALL BE STAINLESS STEEL OR HOT DIP GALVANIZED. EXPANSION BOLTS SHALL BE PROVIDED BY RAMSEY/REMEAD. HELIX OR APPROVED EQUAL.
- ALL STRUCTURAL STEEL SHALL BE SUPPLIED IN ACCORDANCE WITH TECHNICAL SPECIFICATION FOR CONSTRUCTION OF RADIO ACCESS NETWORK SITES.

CONCRETE AND REINFORCING STEEL NOTES:

- ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH THE ACI 309, ACI 308, ACI 308.1, ACI 308.2, ACI 308.3, ACI 308.4, ACI 308.5 AND THE DESIGN AND CONSTRUCTION SPECIFICATION FOR CAST-IN-PLACE CONCRETE.
- ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS, UNLESS NOTED OTHERWISE. A HIGHER STRENGTH (4000 PSI) MAY BE USED.
- REINFORCING STEEL SHALL CONFORM TO ASTM A 615, GRADE 60, DEFORMED UNLESS NOTED OTHERWISE. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A 185 WELDED STEEL WIRE FABRIC UNLESS NOTED OTHERWISE. SPICES SHALL BE CLASS "B" AND ALL HOOKS SHALL BE STANDARD, UNO.
- THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCING STEEL UNLESS SHOWN OTHERWISE ON DRAWINGS:
 CONCRETE CAST AGAINST EARTH.....3 IN.
 CONCRETE EXPOSED TO ENVIRONMENT WEATHER:
 (B) AND LARGER2 INCH
 (C) AND SMALLER & WFL.....1 1/2 INCH
 CONCRETE NOT EXPOSED TO ENVIRONMENT OR WEATHER OR HOT CLIMATE AGAINST THE GRADE:
 SLAB AND WALL3/4 INCH
 BEAMS AND COLUMNS.....1 1/2 INCH
- A 3/4" CHAMFER SHALL BE PROVIDED AT ALL EXPOSED EDGES OF CONCRETE, UNO, IN ACCORDANCE WITH ACI 308 SECTION 4.2.4
- INSTALLATION OF CONCRETE EXPANSION/WEAR ANCHOR, SHALL BE PER MANUFACTURER'S WRITTEN RECOMMENDED PROCEDURE. THE ANCHOR BOLT, BOWL OR ROD SHALL CONFORM TO MANUFACTURER'S RECOMMENDATION FOR EMBEDMENT DEPTH OR AS SHOWN ON THE DRAWINGS. NO REBAR SHALL BE CUT WITHOUT PRIOR CONTRACTOR APPROVAL WHEN DRILLING HOLES IN CONCRETE. SPECIAL INSPECTIONS, REQUIRED BY OVERSEEING CODES, SHALL BE PERFORMED IN ORDER TO MAINTAIN MANUFACTURER'S MAXIMUM ALLOWABLE LOADS. ALL EXPANSION/WEAR ANCHORS SHALL BE STAINLESS STEEL OR HOT DIP GALVANIZED. EXPANSION BOLTS SHALL BE PROVIDED BY RAMSEY/REMEAD. HELIX OR APPROVED EQUAL.
- CONCRETE CILINDER TEST IS NOT REQUIRED FOR SLAB ON GRADE WHEN CONCRETE IS LESS THAN 30 CYCLES VARD (BC 1954.6.2.3) IN THAT EVENT THE FOLLOWING RECORDS SHALL BE PROVIDED BY THE CONCRETE SUPPLIER:
 (A) RESULTS OF CONCRETE CYLINDER TESTS PERFORMED AT THE SUPPLIER'S PLANT.
 (B) CERTIFICATION OF MINIMUM COMPRESSIVE STRENGTH FOR THE CONCRETE GRADE SUPPLIED.
 FOR GREATER THAN 50 CYCLES YARDS THE GC SHALL PERFORM THE CONCRETE CILINDER TEST.
- AS AN ALTERNATIVE TO ITEM 7, TEST CYLINDERS SHALL BE TAKEN INITIALLY AND THEREAFTER FOR EVERY 50 YARDS OF CONCRETE FROM EACH DIFFERENT BATCH PLANT.
- EQUIPMENT SHALL NOT BE PLACED ON NEW PADS FOR SEVEN DAYS AFTER PAD IS POURED, UNLESS IT IS VERIFIED BY TESTS THAT COMPRESSIVE STRENGTH HAS BEEN ATTAINED.
- ALL CONCRETE SHALL BE SUPPLIED IN ACCORDANCE WITH TECHNICAL SPECIFICATION FOR CONSTRUCTION OF RADIO ACCESS NETWORK SITES.

SOIL COMPACTION NOTES FOR SLAB ON GRADE:

- DECAVATE AS REQUIRED TO REMOVE VEGETATION AND TOPSOIL, EXPOSE UNDISTURBED NATURAL SUBGRADE AND PLACE CRUSHED STONE AS REQUIRED.
- COMPACTION CERTIFICATION: AN INSPECTION AND WRITTEN CERTIFICATION BY A QUALIFIED GEOTECHNICAL ENGINEER OR DESIGNER IS ACCEPTABLE.
- AS AN ALTERNATIVE TO INSPECTION AND WRITTEN CERTIFICATION, THE "UNDISTURBED SOIL" BASE SHALL BE COMPACTED WITH "COMPACTION EQUIPMENT", LISTED BELOW, TO AT LEAST 90% MOISTURE PROCTOR MAXIMUM DENSITY PER ASTM D 1557 METHOD C.
- COMPACTED SUBBASE SHALL BE UNIFORM AND LEVELLED. PROVIDE 6" MINIMUM CRUSHED STONE OR GRAVEL COMPACTED IN 3" LIFTS ABOVE COMPACTION EQUIPMENT. GRAVEL SHALL BE NATURAL OR CRUSHED WITH 100% PASSING #1 sieve.
- AS AN ALTERNATIVE TO ITEMS 2 AND 3, PROCTOR ROLL THE SUBGRADE SOILS WITH 5 PASSES OF A MEDIUM SIZED VIBRATORY PLATE COMPACTOR (200# AS BOLLING (HW 30/20) OR HAND-OPERATED SINGLE DRUM VIBRATORY ROLLER (SUCH AS BOLLING BY SCL). ANY SOFT AREAS THAT ARE ENCOUNTERED SHOULD BE REMOVED AND REPLACED WITH A WELL-GRADED GRANULAR FILL AND COMPACTED AS STATED ABOVE.
- COMPACTION CRITERIA FOR OTHER FILL AREAS ON SITE SHALL MEET THE SAME REQUIREMENTS AS NOTED ABOVE.
- SOIL COMPACTION SHALL BE PERFORMED IN ACCORDANCE WITH TECHNICAL SPECIFICATION FOR CONSTRUCTION OF RADIO ACCESS NETWORK SITES.

COMPACTION EQUIPMENT:

HAND OPERATED DOUBLE DRUM, VIBRATORY ROLLER, VIBRATORY PLATE COMPACTOR OR JUMPING JACK COMPACTOR.

ELECTRICAL INSTALLATION NOTES

- ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE PRODUCT SPECIFICATIONS, NEC AND ALL APPLICABLE LOCAL CODES.
- CONDUIT ROUTINGS ARE SCHEMATIC. SUBCONTRACTOR SHALL INSTALL CONDUITS SO THAT ACCESS TO EQUIPMENT IS NOT BLOCKED.
- WIRING, RACEWAY AND SUPPORT METHODS AND MATERIALS SHALL COMPLY WITH THE REQUIREMENTS OF THE NEC AND TELCORDIA.
- ALL CIRCUITS SHALL BE SEPARATED AND MAINTAIN MINIMUM CABLE SEPARATION AS REQUIRED BY THE NEC AND TELCORDIA.
- CABLES SHALL NOT BE ROUTED THROUGH LADDER-STYLE CABLE TRAY RUNWAYS.
- EACH END OF EVERY POWER, POWER PHASE CONDUCTOR (I.E., HOT'S), GROUNDING, AND T1 CONDUCTOR AND CABLE SHALL BE LABELED WITH COLOR-CODED INSULATION OR ELECTRICAL TAPE (3M BRAND), 1/2 INCH PLASTIC ELECTRICAL TAPE WITH UV PROTECTION, OR EQUAL. THE IDENTIFICATION METHOD SHALL CONFORM WITH NEC & OSHA.
- ALL ELECTRICAL COMPONENTS SHALL BE CLEARLY LABELED WITH PERMANENT LABELS. ALL EQUIPMENT SHALL BE LABELED WITH THEIR VOLTAGE RATING, PHASE CONFIGURATION, WIRE CONFIGURATION, POWER OR AMPACITY RATING, AND BRANCH CIRCUIT ID NUMBERS (I.E., PANELBOARD AND CIRCUIT ID'S). NO HAND WRITTEN LABELS ALLOWED.
- PANELBOARDS (NO NUMBERS) AND INTERNAL CIRCUIT BREAKERS (CIRCUIT ID NUMBERS) SHALL BE CLEARLY LABELED. NO HAND WRITTEN LABELS ALLOWED.
- ALL THE WRAPS SHALL BE CUT FLUSH WITH APPROVED CUTTING TOOL TO REMOVE SHARP EDGES.

- POWER, CONTROL, AND EQUIPMENT GROUND WIRING IN TUBING OR CONDUIT SHALL BE SINGLE CONDUCTOR (SIZE 14 AWG OR LARGER), 600V, OIL RESISTANT THIN OR THIN-2, CLASS B STRANDED COPPER CABLE RATED FOR 90 °C (WET AND DRY) OPERATION, LISTED OR LABELED FOR THE LOCATION AND RACEWAY SYSTEM USED, UNLESS OTHERWISE SPECIFIED.
- SUPPLEMENTAL EQUIPMENT GROUND WIRING LOCATED INDOORS SHALL BE SINGLE CONDUCTOR (SIZE 8 AWG OR LARGER), 600V, OIL RESISTANT THIN OR THIN-2 GREEN INSULATION, CLASS B STRANDED COPPER CABLE RATED FOR 90 °C (WET AND DRY) OPERATION, LISTED OR LABELED FOR THE LOCATION AND RACEWAY SYSTEM USED, UNLESS OTHERWISE SPECIFIED.
- POWER AND CONTROL WIRING, NOT IN TUBING OR CONDUIT, SHALL BE MULTI-CONDUCTOR, TYPE TC CABLE (SIZE 14 AWG OR LARGER), 600V, OIL RESISTANT THIN OR THIN-2, CLASS B STRANDED COPPER CABLE RATED FOR 90 °C (WET AND DRY) OPERATION, WITH OUTER JACKET LISTED OR LABELED FOR THE LOCATION USED, UNLESS OTHERWISE SPECIFIED.
- ALL POWER AND POWER GROUNDING CONNECTIONS SHALL BE CRIMP-STYLE, COMPRESSION WIRE LUGS AND WRENUTS BY THOMAS AND BETTS (OR EQUAL). LUGS AND WRENUTS SHALL BE RATED FOR OPERATION AT NO LESS THAN 75°C (165°F IF AVAILABLE).
- RACEWAY AND CABLE TRAY SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA UL ANSI/IEEE AND NEC.

ELECTRICAL INSTALLATION NOTES (cont.)

- ELECTRICAL METALLIC TUBING (EMT) OR RIGID NONMETALLIC CONDUIT (I.E., RIGID PVC SCHEDULE 40, OR RIGID PVC SCHEDULE 80 FOR LOCATIONS SUBJECT TO PHYSICAL DAMAGE) SHALL BE USED FOR EXPOSED INDOOR LOCATIONS.
- ELECTRICAL METALLIC TUBING (EMT), ELECTRICAL NONMETALLIC TUBING (ENT), OR RIGID NONMETALLIC CONDUIT (RIGID PVC, SCHEDULE 40) SHALL BE USED FOR CONCEALED INDOOR LOCATIONS.
- GALVANIZED STEEL INTERMEDIATE METALLIC CONDUIT (IMC) SHALL BE USED FOR OUTDOOR LOCATIONS ABOVE GRADE.
- RIGID NONMETALLIC CONDUIT (I.E., RIGID PVC SCHEDULE 40 OR RIGID PVC SCHEDULE 80) SHALL BE USED UNDERGROUND, DIRECT BURIED, IN AREAS OF OCCASIONAL LIGHT VEHICLE TRAFFIC OR EXPOSED IN REINFORCED CONCRETE IN AREAS OF HEAVY VEHICLE TRAFFIC.
- LIQUID-TIGHT FLEXIBLE METALLIC CONDUIT (LOAD-TITE FLEX) SHALL BE USED INDOORS AND OUTDOORS, WHERE VIBRATION OCCURS OR FLEXIBILITY IS NEEDED.
- CONDUIT AND TUBING FITTINGS SHALL BE THREADED OR COMPRESSION-TYPE AND APPROVED FOR THE LOCATION USED. SETSCREW FITTINGS ARE NOT ACCEPTABLE.
- CABINETS, BOXES, AND WRENUTS SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE, AND NEC.
- WRENUTS SHALL BE EPOXY-COATED (GRAY) AND INCLUDE A HINGED COVER, DESIGNED TO SWING OPEN DOWNWARD. SHALL BE PAINTED TYPE E (OR EQUAL), AND RATED NEMA 1 (OR BETTER) INDOORS, OR NEMA 3R (OR BETTER) OUTDOORS.
- EQUIPMENT CABINETS, TERMINAL BOXES, JUNCTION BOXES, AND PULL BOXES SHALL BE GALVANIZED OR EPOXY-COATED SHEET STEEL, SHALL MEET OR EXCEED UL 50, AND RATED NEMA 1 (OR BETTER) INDOORS, OR NEMA 3R (OR BETTER) OUTDOORS.
- METAL RECEPTACLE, SWITCH, AND DEVICE BOXES SHALL BE GALVANIZED, EPOXY-COATED, OR NON-CORRODING; SHALL MEET OR EXCEED UL 514A AND NEMA OS 1; AND RATED NEMA 1 (OR BETTER) INDOORS, OR WEATHER PROTECTED (WP OR BETTER) OUTDOORS.
- NONMETALLIC RECEPTACLE, SWITCH, AND DEVICE BOXES SHALL MEET OR EXCEED NEMA OS 2; AND RATED NEMA 1 (OR BETTER) INDOORS, OR WEATHER PROTECTED (WP OR BETTER) OUTDOORS.
- THE SUBCONTRACTOR SHALL NOTIFY AND OBTAIN NECESSARY AUTHORIZATION FROM THE CONTRACTOR BEFORE COMMENCING WORK ON THE AC POWER DISTRIBUTION PANELS.
- THE SUBCONTRACTOR SHALL PROVIDE NECESSARY TAPPING ON THE BREAKERS, CABLES AND DISTRIBUTION PANELS IN ACCORDANCE WITH THE APPLICABLE CODES AND STANDARDS TO SAFEGUARD AGAINST LIFE AND PROPERTY.

VRG
VERTICAL RESOURCES GRP.

489 Washington Street
Auburn, MA 01501
Tel. (508) 981-9590
Fax (508) 519-9939
mob@vrgrp.com

EMPIRE telecom
EMPIRE TELECOM USA, LLC
16 ESQUIRE ROAD
BILLENICA, MA 01821

SITE NUMBER: CT5107
SITE NAME: NORTH HAVEN S
PROJECT: RF MOD # IP
CROWN ID: 861536
120 UNIVERSAL DR.
NORTH HAVEN, CT 06473
NEW HAVEN COUNTY



at&t
Mobility
550 COCHITUATE RD
SUITES 13 & 14
FRAMINGHAM, MA 01701

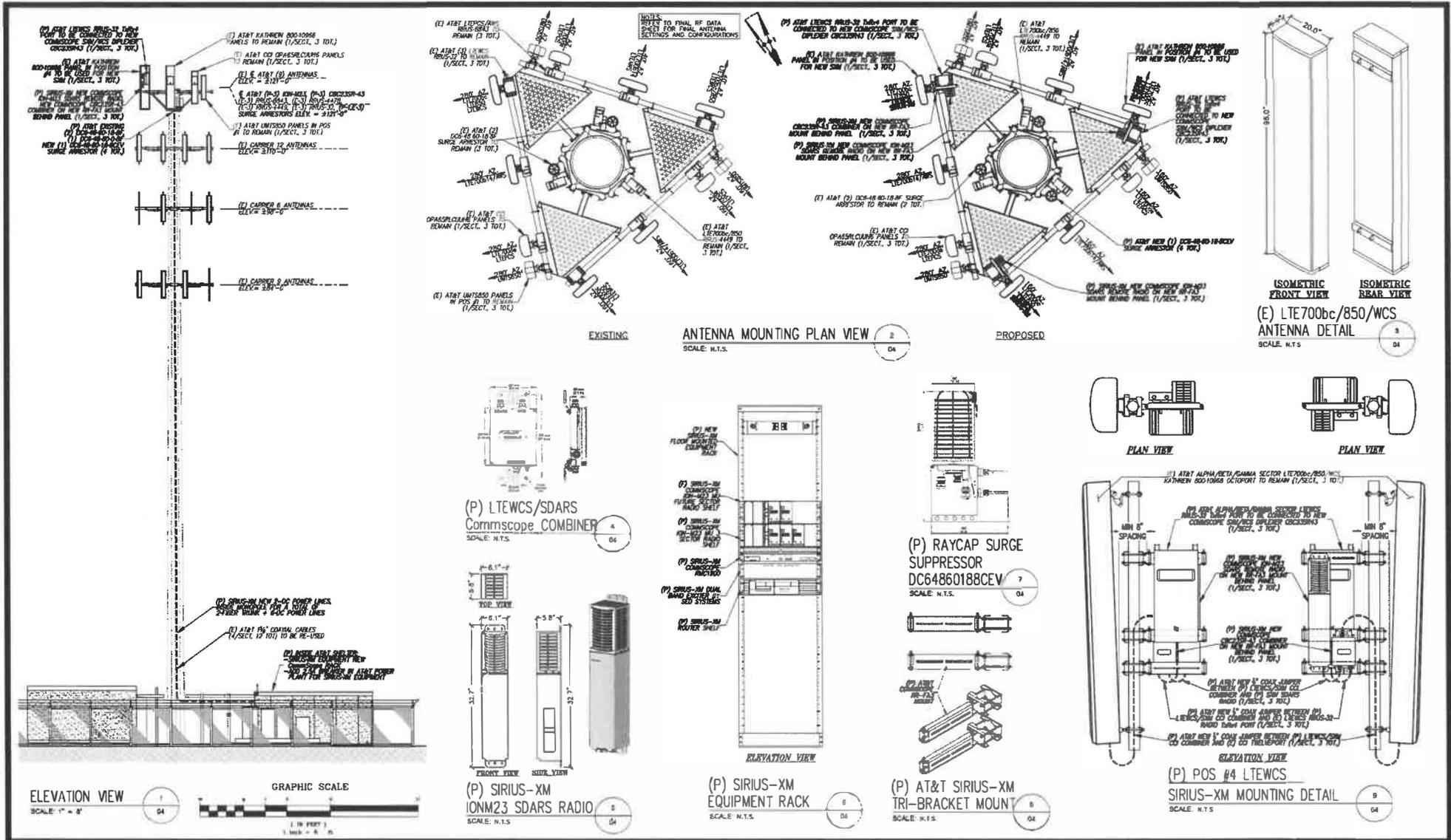
REV	DATE	REVISION	BY	CHK	APP'D
1	12/10/18	GENERAL REVISIONS	E.L.P.	C.A.M.	
2	09/18/19	GENERAL REVISIONS	E.L.P.	C.A.M.	
3	08/12/19	FOR CONSTRUCTION	E.L.P.	C.A.M.	
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					
32					
33					
34					
35					
36					
37					
38					
39					
40					
41					
42					
43					
44					
45					
46					
47					
48					
49					
50					
51					
52					
53					
54					
55					
56					
57					
58					
59					
60					
61					
62					
63					
64					
65					
66					
67					
68					
69					
70					
71					
72					
73					
74					
75					
76					
77					
78					
79					
80					
81					
82					
83					
84					
85					
86					
87					
88					
89					
90					
91					
92					
93					
94					
95					
96					
97					
98					
99					
100					



AT&T MOBILITY

NOTES

CELL NUMBER	DRAWING NUMBER	REV
05107-49	02	2



VRG
VERTICAL RESOURCES GRP.

489 Washington Street
Auburn, MA 01501
Tel. (508) 981-8590
Fax (508) 519-8939
mrc@verticalresourcesgrp.com

EMPIRE telecom
EMPIRE TELECOM USA, LLC
16 ESQUIRE ROAD
BILLERICA, MA 01821

SITE NUMBER: CT5107
SITE NAME: NORTH HAVEN S
PROJECT: RF MOD II IP
CROWN ID: 881538
120 UNIVERSAL DR.
NORTH HAVEN, CT 06473
NEW HAVEN COUNTY



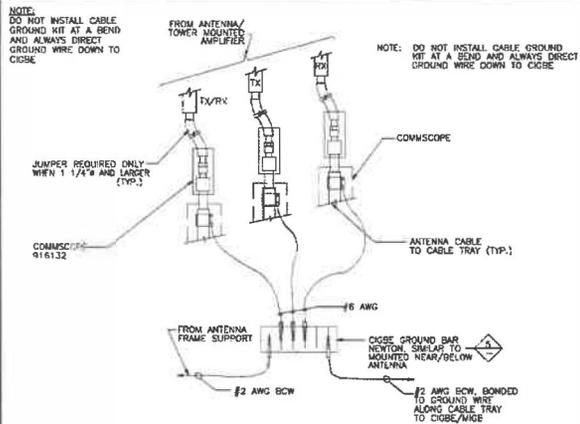
at&t
Mobility
550 COCHITUATE RD
SUITES 13 & 14
FRAMINGHAM, MA 01701



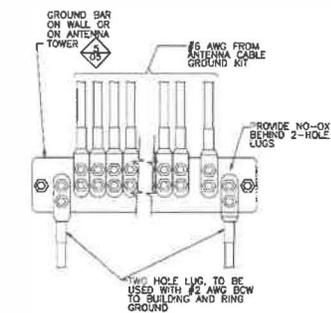
AT&T MOBILITY
ELEVATION VIEW & ANTENNA LAYOUT

DATE	REVISION	BY	CHK'D
08/12/19			

DRAWING NUMBER: 04

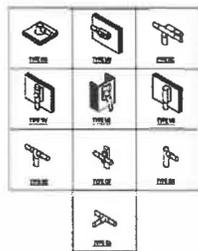


CONNECTION OF GROUND WIRES TO GROUNDING BAR (CIGBE)



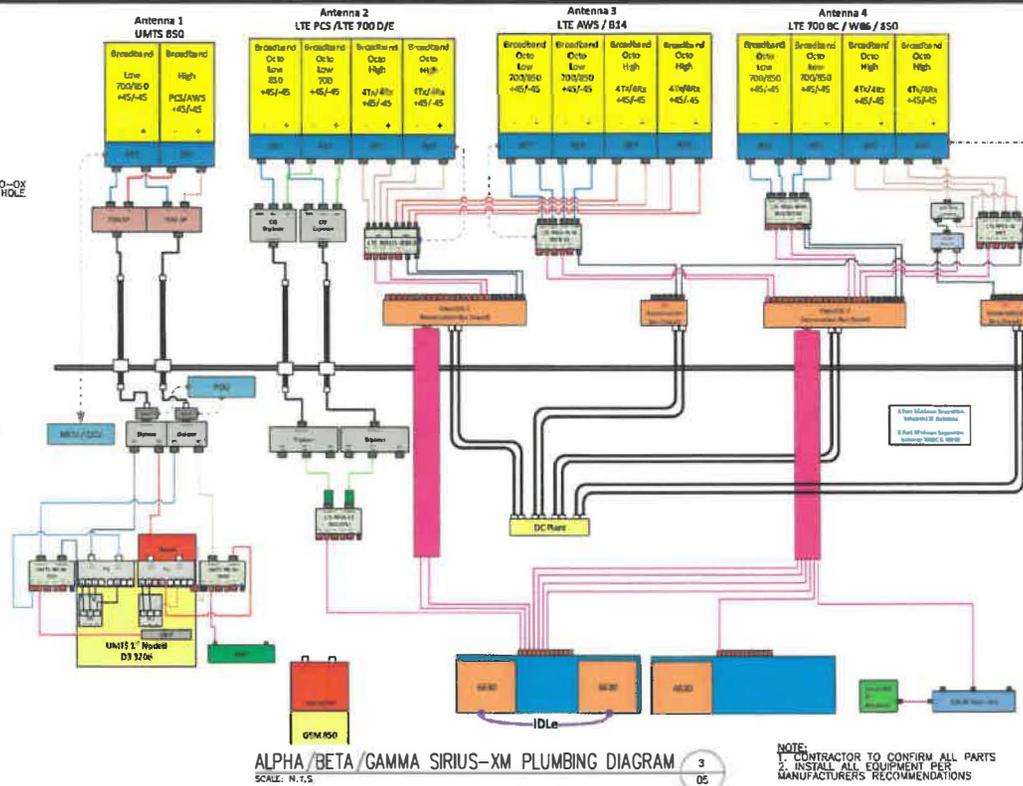
INSTALLATION OF GROUND WIRE TO GROUND BAR

SCALE: N.T.S.



GROUNDING CONNECTION DETAIL

SCALE: N.T.S.

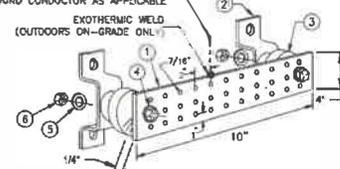


ALPHA/BETA/GAMMA SIRIUS-XM PLUMBING DIAGRAM

SCALE: N.T.S.

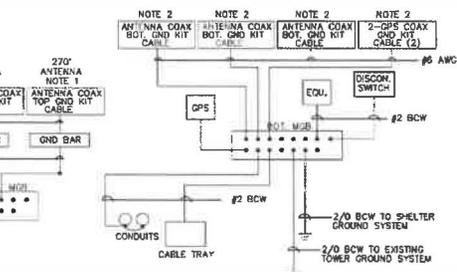
ITEM	REQ.	PART NO.	DESCRIPTION
1	1	1/4"x4"x12"	PRE DRILLED GND. BAR
2	2	A-5056	WALL MTC. BRKT.
3	2	3081-4	INSULATORS
4	2	3012-13	5/8"-11x4" H.M.C.S.
5	4	3015-8	5/8 LOCKWASHER
6	2	3014-8	5/8"-11 HEX NUT

1-2 AWG TO MAIN GROUND BAR (MGB) IN EQUIPMENT SPACE OR BURIED GROUND CONDUCTOR AS APPLICABLE



GROUND BAR DETAIL

SCALE: N.T.S.



SCHEMATIC GROUNDING DIAGRAM

SCALE: N.T.S.

VRG
VERTICAL RESOURCES GRP.

489 Washington Street
Auburn, MA 01501
Tel. (508) 981-9590
Fax (508) 519-8939
mob@vrscaleresourcesgrp.com

EMPIRE telecom

EMPIRE TELECOM USA, LLC
16 ESQUIRE ROAD
BILLERICA, MA 01821

SITE NUMBER: CT5107
SITE NAME: NORTH HAVEN S
PROJECT: RF MOD II IP
CROWN ID: 881536

120 UNIVERSAL DR.
NORTH HAVEN, CT 06473
NEW HAVEN COUNTY



at&t
Mobility
550 COCHITUATE RD
SUITES 13 & 14
FRAMINGHAM, MA 01701

DATE	REVISION	BY	CHK	APP'D
12/10/18	GENERAL REVISIONS	C.L.P.	C.A.M.	
11/18/18	GENERAL REVISIONS	E.L.P.	C.A.M.	
11/12/18	FOR CONSTRUCTION	E.L.P.	C.A.M.	

DESIGNED BY: M.N. DRAWN BY: C.A.M.



AT&T MOBILITY
GROUNDING DETAILS

JOB NUMBER	DRAWING NUMBER	REV
107-P100001	05	2



SITE SAFE
RF COMPLIANCE EXPERTS

®

8618 Westwood Center Drive, Suite 315, Vienna, VA 22182
703.276.1100 • 703.276.1169 fax
info@sitesafe.com • www.sitesafe.com



**Empire Telecom on behalf of
AT&T Mobility, LLC
Site FA – 10071172
Site ID – CT5107
USID – 15207
Site Name – NORTH HAVEN SOUTH
(MRCTB037956)**

**120 Universal Drive
North Haven, CT 06473**

Latitude: N41-20-39.09
Longitude: W72-52-14.16
Structure Type: Monopole

Report generated date: January 30, 2020
Report by: Young Kim
Customer Contact: Nora Oliver

**AT&T Mobility, LLC will be compliant when the
remediation recommended in Section 5.2 or
other appropriate remediation is implemented.**

Sitesafe logo is a registered trademark of Site Safe, LLC. All rights reserved.



Table of Contents

1	GENERAL SITE SUMMARY	3
1.1	REPORT SUMMARY	3
1.2	FALL ARREST ANCHOR POINT SUMMARY	3
1.3	SIGNAGE SUMMARY.....	4
2	SCALE MAPS OF SITE	5
3	ANTENNA INVENTORY	7
4	EMISSION PREDICTIONS	9
5	SITE COMPLIANCE	13
5.1	SITE COMPLIANCE STATEMENT	13
5.2	ACTIONS FOR SITE COMPLIANCE	13
6	REVIEWER CERTIFICATION	14
	APPENDIX A – STATEMENT OF LIMITING CONDITIONS	15
	APPENDIX B – REGULATORY BACKGROUND INFORMATION	16
	FCC RULES AND REGULATIONS.....	16
	OSHA STATEMENT.....	17
	APPENDIX C – SAFETY PLAN AND PROCEDURES	18
	APPENDIX D – RF EMISSIONS	19
	APPENDIX E – ASSUMPTIONS AND DEFINITIONS	20
	GENERAL MODEL ASSUMPTIONS	20
	USE OF GENERIC ANTENNAS	20
	APPENDIX F – DEFINITIONS	21
	APPENDIX G – REFERENCES	23



1 General Site Summary

1.1 Report Summary

AT&T Mobility, LLC	Summary
Max Cumulative Simulated RFE Level on the Ground	<1% General Public Limit
Compliant per FCC Rules and Regulations?	Will Be Compliant
Compliant per AT&T Mobility, LLC's Policy?	No

The following documents were provided by the client and were utilized to create this report:

RFDS: 10071172.PM201.RFDS.01092019_As-Built-In-Progress.CT5107

CD's: 10071172.AE201.CT5107.CD.LTE.RFMod.Rev2.12.10.2019

RF Powers Used: Max RRH Powers

1.2 Fall Arrest Anchor Point Summary

Fall Arrest Anchor & Parapet Info	Parapet Available (Y/N)	Parapet Height (Inches)	Fall Arrest Anchor Available (Y/N)
Roof Safety Info	N	N/A	N

1.3 Signage Summary

a. Pre-Site Visit AT&T Signage (Existing Signage)

AT&T Signage Locations									
	Information 1	Information 2	Notice	Notice 2	Caution	Caution 2	Warning	Warning 2	Barriers
Access Point(s)									
Alpha									
Beta									
Gamma									

b. Proposed AT&T Signage

AT&T Signage Locations									
	Information 1	Information 2	Notice	Notice 2	Caution	Caution 2B	Warning	Warning 2	Barriers
Access Point(s)						1			
Alpha									
Beta									
Gamma									

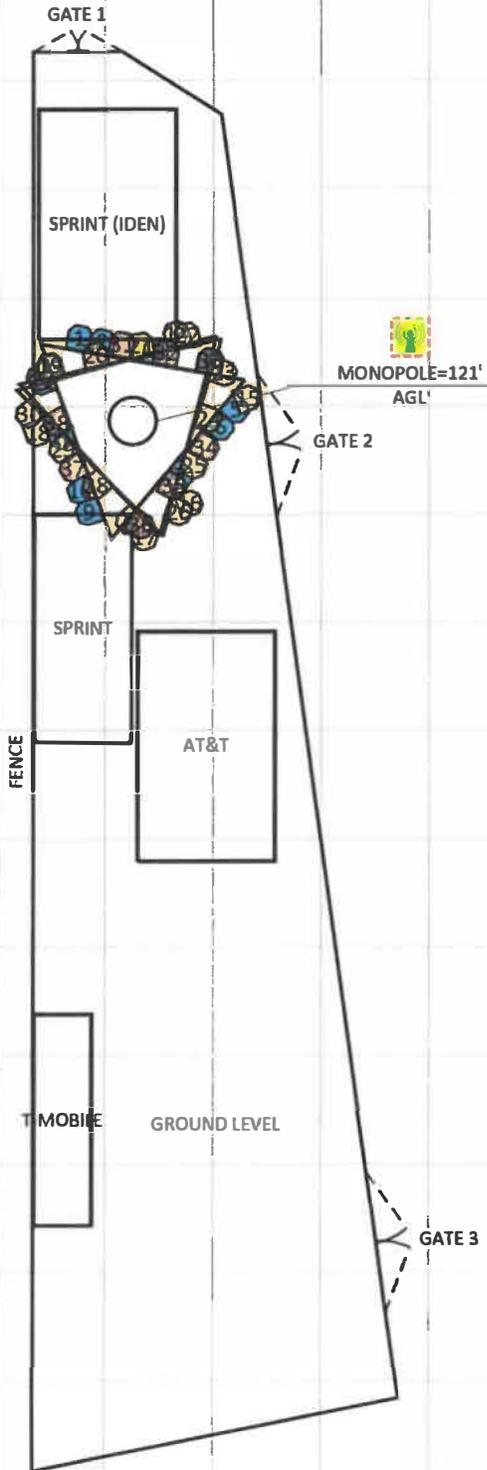


2 Scale Maps of Site

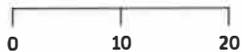
The following diagrams are included:

- Site Scale Map
- RF Exposure Diagram – Composite View
- RF Exposure Diagram – AT&T Mobility, LLC Contribution
- RF Exposure Diagram – Elevation View - Southeast

Site Scale Map For: NORTH HAVEN SOUTH



(Feet)



www.sitesafe.com
 Site Name: NORTH HAVEN SOUTH
 1/30/2020 11:44:11 AM

Carrier Identification

- AT&T MOBILITY LLC (Blue circle)
- VERIZON WIRELESS (Red circle)
- T-MOBILE (Pink circle)
- SPRINT (Yellow circle)
- LINENOWH CARRIER (White circle)

Sign Legend

- Caution 1 (Yellow sign with exclamation mark)
- Caution 2 (Yellow sign with exclamation mark)
- Notice 2 (Blue sign with exclamation mark)
- Notice 1 (Blue sign with exclamation mark)
- Warning (Red sign with exclamation mark)
- Warning 2 (Red sign with exclamation mark)
- Info 1 (Green sign with exclamation mark)
- Info 2 (Black sign with exclamation mark)

Barrier (Red line)

Proposed Barriers/Signs (Dashed red line)

RFID (Black square)



3 Antenna Inventory

The following antenna inventory was obtained by the customer and was utilized to create the site model diagrams:

Ant ID	Operator	Antenna Make & Model	Type	Tx Freq (MHz)	Technology	Az (Deg)	Hor BW (Deg)	Ant Len (ft)	Power	Power Type	Power Unit	Misc Loss	Tx Count	Total ERP (Watts)	Ant Gain (dBi)	Z (AGL)	MDT	EDT
1	AT&T MOBILITY LLC	Powerwave 7770	Panel	850	UMTS	40	82	4.6	40	TPO	Watt	0	1	566.3	11.51	118.7'	0°	4°
2	AT&T MOBILITY LLC	Cci OPA-65R-LCUU-H6	Panel	722	LTE	40	66.4	6	40	TPO	Watt	0	2	1256.3	11.96	118'	0°	3°
2	AT&T MOBILITY LLC	Cci OPA-65R-LCUU-H6	Panel	1900	LTE	40	61.9	6	40	TPO	Watt	0	4	4678.6	14.66	118'	0°	3°
3	AT&T MOBILITY LLC	Kathrein-Scala 800-10966	Panel	763	LTE	40	67.9	8	40	TPO	Watt	0	4	3623.4	13.55	117'	0°	3°
3	AT&T MOBILITY LLC	Kathrein-Scala 800-10966	Panel	2100	LTE	40	64.4	8	40	TPO	Watt	0	4	6593.6	16.15	117'	0°	3°
4	AT&T MOBILITY LLC	Kathrein-Scala 800-10966	Panel	737	LTE	40	67.9	8	40	TPO	Watt	0	4	3623.4	13.55	117'	0°	3°
4	AT&T MOBILITY LLC	Kathrein-Scala 800-10966	Panel	850	LTE	40	66	8	40	TPO	Watt	0	2	2128.6	14.25	117'	0°	3°
4	AT&T MOBILITY LLC	Kathrein-Scala 800-10966	Panel	650	5G	40	66	8	40	TPO	Watt	0	2	2128.6	14.25	117'	0°	3°
4	AT&T MOBILITY LLC (Proposed)	Kathrein-Scala 800-10966	Panel	2300	LTE	40	59.7	8	25	TPO	Watt	0	4	3935.5	15.95	117'	0°	3°
5	AT&T MOBILITY LLC	Powerwave 7770	Panel	850	UMTS	160	82	4.6	40	TPO	Watt	0	1	566.3	11.51	118.7'	0°	2°
6	AT&T MOBILITY LLC	Cci OPA-65R-LCUU-H6	Panel	722	LTE	160	66.4	6	40	TPO	Watt	0	2	1256.3	11.96	118'	0°	3°
6	AT&T MOBILITY LLC	Cci OPA-65R-LCUU-H6	Panel	1900	LTE	160	61.9	6	40	TPO	Watt	0	4	4678.6	14.66	118'	0°	2°
7	AT&T MOBILITY LLC	Kathrein-Scala 800-10966	Panel	763	LTE	160	67.9	8	40	TPO	Watt	0	4	3623.4	13.55	117'	0°	2°
7	AT&T MOBILITY LLC	Kathrein-Scala 800-10966	Panel	2100	LTE	160	64.4	8	40	TPO	Watt	0	4	6593.6	16.15	117'	0°	2°
8	AT&T MOBILITY LLC	Kathrein-Scala 800-10966	Panel	737	LTE	160	67.9	8	40	TPO	Watt	0	4	3623.4	13.55	117'	0°	2°
8	AT&T MOBILITY LLC	Kathrein-Scala 800-10966	Panel	850	LTE	160	66	8	40	TPO	Watt	0	2	2128.6	14.25	117'	0°	2°
8	AT&T MOBILITY LLC	Kathrein-Scala 800-10966	Panel	850	5G	160	66	8	40	TPO	Watt	0	2	2128.6	14.25	117'	0°	2°
8	AT&T MOBILITY LLC (Proposed)	Kathrein-Scala 800-10966	Panel	2300	LTE	160	59.7	8	25	TPO	Watt	0	4	3935.5	15.95	117'	0°	3°
9	AT&T MOBILITY LLC	Powerwave 7770	Panel	850	UMTS	280	82	4.6	40	TPO	Watt	0	1	566.3	11.51	118.7'	0°	4°
10	AT&T MOBILITY LLC	Cci OPA-65R-LCUU-H6	Panel	722	LTE	280	66.4	6	40	TPO	Watt	0	2	1256.3	11.96	118'	0°	3°
10	AT&T MOBILITY LLC	Cci OPA-65R-LCUU-H6	Panel	1900	LTE	280	61.9	6	40	TPO	Watt	0	4	4678.6	14.66	118'	0°	6°
11	AT&T MOBILITY LLC	Kathrein-Scala 800-10966	Panel	763	LTE	280	67.9	8	40	TPO	Watt	0	4	3623.4	13.55	117'	0°	6°
11	AT&T MOBILITY LLC	Kathrein-Scala 800-10966	Panel	2100	LTE	280	64.4	8	40	TPO	Watt	0	4	6593.6	16.15	117'	0°	6°
12	AT&T MOBILITY LLC	Kathrein-Scala 800-10966	Panel	737	LTE	280	67.9	8	40	TPO	Watt	0	4	3623.4	13.55	117'	0°	6°
12	AT&T MOBILITY LLC	Kathrein-Scala 800-10966	Panel	850	LTE	280	66	8	40	TPO	Watt	0	2	2128.6	14.25	117'	0°	6°
12	AT&T MOBILITY LLC	Kathrein-Scala 800-10966	Panel	850	5G	280	66	8	40	TPO	Watt	0	2	2128.6	14.25	117'	0°	6°
12	AT&T MOBILITY LLC (Proposed)	Kathrein-Scala 800-10966	Panel	2300	LTE	280	59.7	8	25	TPO	Watt	0	4	3935.5	15.95	117'	0°	3°
13	SPRINT	Generic	Panel	850		10	65	4.6	100	TPO	Watt	0	0	1892.3	12.77	93.7'	0°	0°
13	SPRINT	Generic	Panel	1900		10	65	4.6	90	TPO	Watt	0	0	3142.3	15.43	93.7'	0°	0°
14	SPRINT	RFS APXVTM14-C-420	Panel	2500		10	68	4.7	160	TPO	Watt	0	0	6167.7	15.86	93.7'	0°	0°
15	SPRINT	RFS APXVSP18-C-A20	Panel	850		100	65	6	100	TPO	Watt	0	0	2172.7	13.37	93'	0°	0°
15	SPRINT	RFS APXVSP18-C-A20	Panel	1900		100	65	6	90	TPO	Watt	0	0	3812.8	16.27	93'	0°	0°



Ant ID	Operator	Antenna Make & Model	Type	TX Freq (MHz)	Technology	Az (Deg)	Hor BW (Deg)	Ant Len (ft)	Power	Power Type	Power Unit	Misc Loss	TX Count	Total ERP (Watts)	Ant Gain (dBd)	Z (AGL)	MDT	EDT
16	SPRINT	RFS APXVTM14-C-120	Panel	2500		100	68	4.7	160	TPO	Watt	0	0	6167.7	15.86	93.7'	0°	0°
17	SPRINT	Generic	Panel	850		190	65	4.6	100	TPO	Watt	0	0	1892.3	12.77	93.7'	0°	0°
17	SPRINT	Generic	Panel	1900		190	65	4.6	90	TPO	Watt	0	0	3142.3	15.43	93.7'	0°	0°
18	SPRINT	RFS APXVTM14-C-120	Panel	2500		190	68	4.7	160	TPO	Watt	0	0	6167.7	15.86	93.7'	0°	0°
19	SPRINT (Decommissioned)	Andrew 844G65VTZASX	Panel	850		20	65	4	0	TPO	Watt	0	0	0	13.81	108'	0°	0°
20	SPRINT (Decommissioned)	Andrew 844G65VTZASX	Panel	850		20	65	4	0	TPO	Watt	0	0	0	13.81	108'	0°	0°
21	SPRINT (Decommissioned)	Andrew 844G65VTZASX	Panel	850		20	65	4	0	TPO	Watt	0	0	0	13.81	108'	0°	0°
22	SPRINT (Decommissioned)	Andrew 844G65VTZASX	Panel	850		20	65	4	0	TPO	Watt	0	0	0	13.81	108'	0°	0°
23	SPRINT (Decommissioned)	Andrew 844G65VTZASX	Panel	850		140	65	4	0	TPO	Watt	0	0	0	13.81	108'	0°	0°
24	SPRINT (Decommissioned)	Andrew 844G65VTZASX	Panel	850		140	65	4	0	TPO	Watt	0	0	0	13.81	108'	0°	0°
25	SPRINT (Decommissioned)	Andrew 844G65VTZASX	Panel	850		140	65	4	0	TPO	Watt	0	0	0	13.81	108'	0°	0°
26	SPRINT (Decommissioned)	Andrew 844G65VTZASX	Panel	850		140	65	4	0	TPO	Watt	0	0	0	13.81	108'	0°	0°
27	SPRINT (Decommissioned)	Andrew 844G65VTZASX	Panel	850		260	65	4	0	TPO	Watt	0	0	0	13.81	108'	0°	0°
28	SPRINT (Decommissioned)	Andrew 844G65VTZASX	Panel	850		260	65	4	0	TPO	Watt	0	0	0	13.81	108'	0°	0°
29	SPRINT (Decommissioned)	Andrew 844G65VTZASX	Panel	850		260	65	4	0	TPO	Watt	0	0	0	13.81	108'	0°	0°
30	SPRINT (Decommissioned)	Andrew 844G65VTZASX	Panel	850		260	65	4	0	TPO	Watt	0	0	0	13.81	108'	0°	0°
31	T-MOBILE	Ericsson AIR 21 B2A B4P	Panel	1900		40	65	4.7	40	TPO	Watt	0	0	1377.4	15.37	81.7'	0°	0°
31	T-MOBILE	Ericsson AIR 21 B2A B4P	Panel	2100		40	65	4.7	160	TPO	Watt	0	0	5509.6	15.37	81.7'	0°	0°
32	T-MOBILE	Andrew LNX-6515DS-VTM	Panel	700		40	65	8	160	TPO	Watt	0	0	4427.1	14.42	80'	0°	0°
33	T-MOBILE	Ericsson AIR 32 B2A B66AA	Panel	1900		40	63	4.9	160	TPO	Watt	0	0	6167.7	15.86	81.5'	0°	0°
33	T-MOBILE	Ericsson AIR 32 B2A B66AA	Panel	2100		40	61	4.9	160	TPO	Watt	0	0	6167.7	15.86	81.5'	0°	0°
34	T-MOBILE	Ericsson AIR 21 B2A B4P	Panel	1900		150	65	4.7	40	TPO	Watt	0	0	1377.4	15.37	81.7'	0°	0°
34	T-MOBILE	Ericsson AIR 21 B2A B4P	Panel	2100		150	65	4.7	160	TPO	Watt	0	0	5509.6	15.37	81.7'	0°	0°
35	T-MOBILE	Andrew LNX-6515DS-VTM	Panel	700		150	65	8	160	TPO	Watt	0	0	4427.1	14.42	80'	0°	0°
36	T-MOBILE	Ericsson AIR 32 B2A B66AA	Panel	1900		150	63	4.9	160	TPO	Watt	0	0	6167.7	15.86	81.5'	0°	0°
36	T-MOBILE	Ericsson AIR 32 B2A B66AA	Panel	2100		150	61	4.9	160	TPO	Watt	0	0	6167.7	15.86	81.5'	0°	0°
37	T-MOBILE	Ericsson AIR 21 B2A B4P	Panel	1900		270	65	4.7	40	TPO	Watt	0	0	1377.4	15.37	81.7'	0°	0°
37	T-MOBILE	Ericsson AIR 21 B2A B4P	Panel	2100		270	65	4.7	160	TPO	Watt	0	0	5509.6	15.37	81.7'	0°	0°
38	T-MOBILE	Andrew LNX-6515DS-VTM	Panel	700		270	65	8	160	TPO	Watt	0	0	4427.1	14.42	80'	0°	0°
39	T-MOBILE	Ericsson AIR 32 B2A B66AA	Panel	1900		270	63	4.9	160	TPO	Watt	0	0	6167.7	15.86	81.5'	0°	0°
39	T-MOBILE	Ericsson AIR 32 B2A B66AA	Panel	2100		270	61	4.9	160	TPO	Watt	0	0	6167.7	15.86	81.5'	0°	0°

Note: The Z reference indicates the bottom of the antenna height above ground level (AGL). Effective Radiated Power (ERP) is provided by the operator or based on Sitesafe experience. The values used in the modeling may be greater than are currently deployed. For other operators at this site the use of "Generic" as an antenna model or "Unknown" for a wireless operator means the information with regard to operator, their FCC license and/or antenna information was not available nor could it be secured while on site. Other operator's equipment, antenna models and powers used for modeling are based on obtained information or Sitesafe experience. Proposed equipment is tagged as (Proposed) under Operator or Antenna Make & Model.

Note: AT&T plans to add 2300 MHz SDARS remotes to antennas 4, 8 and 12.

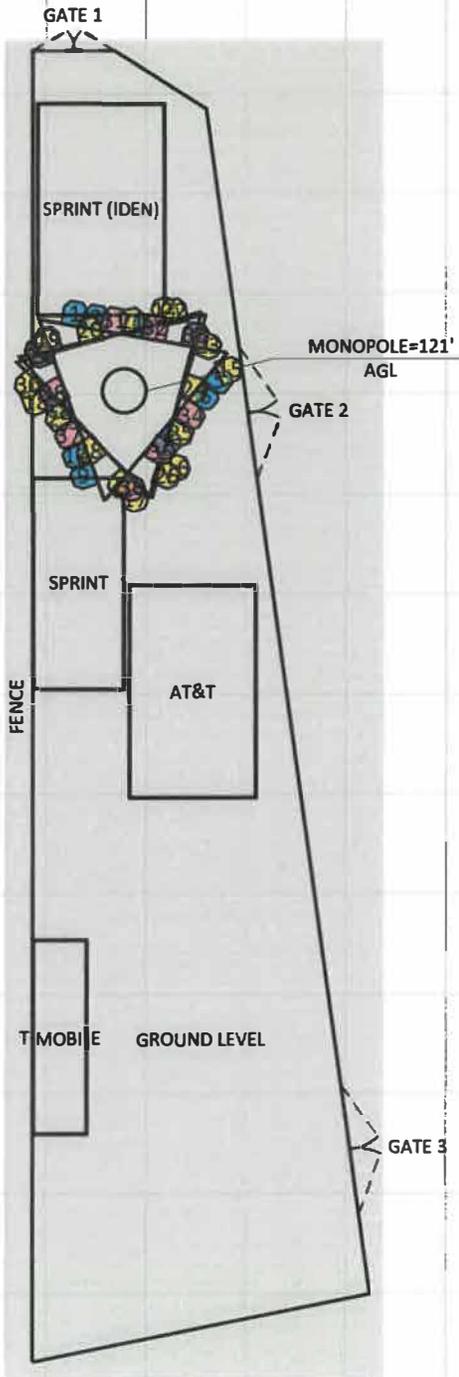
4 Emission Predictions

In the RF Exposure Simulations below, all heights are reflected with respect to main site level. In most rooftop cases this is the height of the main rooftop and in other cases this can be ground level. Each different height area, rooftop, or platform level is labeled with its height relative to the main site level. Emissions are calculated appropriately based on the relative height and location of that area to all antennas. The total analyzed elevations in the below RF Exposure Simulations are listed below.

- GROUND LEVEL = 0'

The Antenna Inventory heights are referenced to the same level.

RF Exposure Simulation For: NORTH HAVEN SOUTH Composite View



% of FCC Public Exposure Limit
Spatial average 0' - 6'



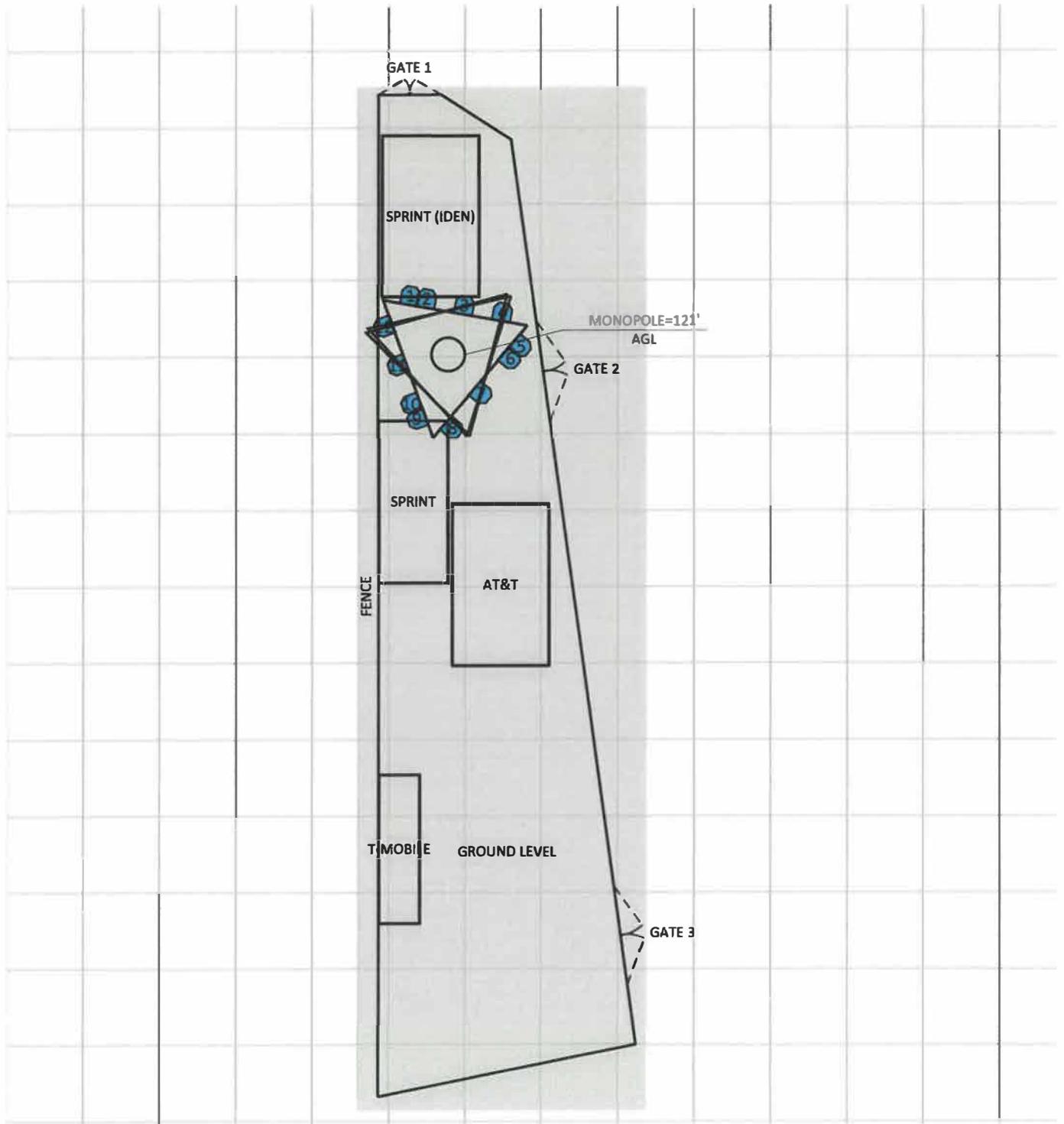
(Feet)



www.sitesafe.com
Site Name: NORTH HAVEN SOUTH
1/30/2020 11:51:02 AM

Sitesafe OET-65 Model
Near Field Boundary:
1.5° Aperture
Reflection Factor: 1
Spatially Averaged

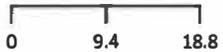
RF Exposure Simulation For: NORTH HAVEN SOUTH AT&T Mobility, LLC Contribution



% of FCC Public Exposure Limit
Spatial average 0' - 6'



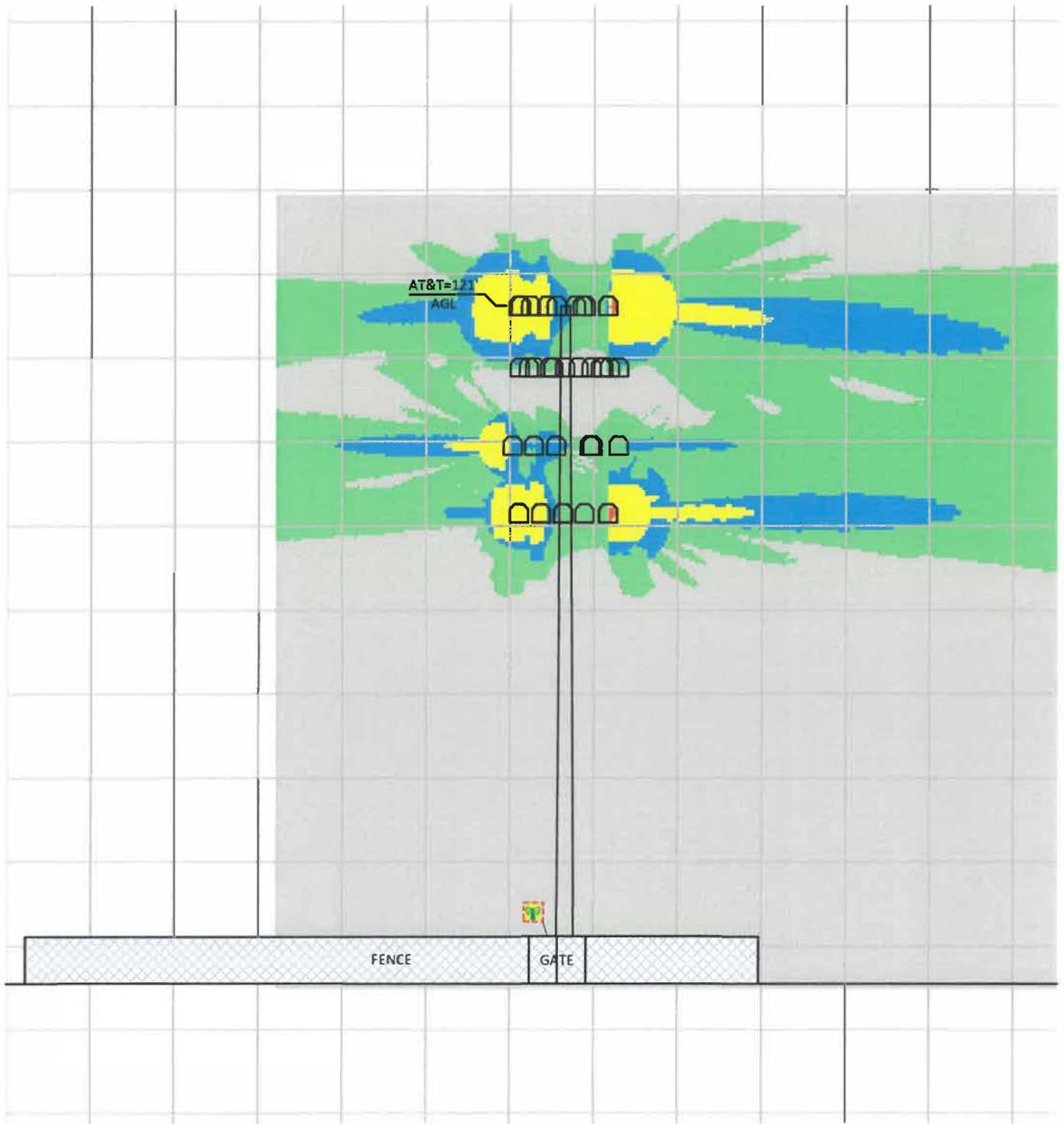
(Feet)



www.sitesafe.com
Site Name: NORTH HAVEN SOUTH
1/30/2020 11:53:44 AM

Sitesafe OET-65 Model
Near Field Boundary:
1.5 ° Aperture
Reflection Factor: 1
Spatially Averaged

RF Exposure Simulation For: NORTH HAVEN SOUTH Elevation View - Southeast



% of FCC Public Exposure Limit
Spatial average 0' - 6'

(Feet)

www.sitesafe.com
Site Name: NORTH HAVEN SOUTH
1/30/2020 12:36:33 PM

% of FCC Public Exposure Limit

>= 5000	>= 500	>= 100	>= 5	< 5
---------	--------	--------	------	-------

Carrier Identification

AT&T MOBILITY LLC	VERIZON WIRELESS	T-MOBILE	SPRINT	UNKNOWN CARRIER

Sign Legend

Caution 1	Caution 2	Notice 2	Notice 1	Warning 1	Warning 2

Proposed Barriers/Signs

Barrier	Barrier	Barrier	Barrier	Barrier

RF Emissions Diagram

Sitesafe OET-65 Model
Near Field Boundary:
1.5 ° Aperture
Reflection Factor: 1
Single Level (0)

5 Site Compliance

5.1 Site Compliance Statement

Upon evaluation of the cumulative RF emission levels from all operators at this site, RF hazard signage and antenna locations, Sitesafe has determined that:

AT&T Mobility, LLC will be compliant when the remediation recommended in Section 5.2 or other appropriate remediation is implemented.

The compliance determination is based on General Public RFE levels derived from theoretical modeling, RF signage placement, proposed antenna inventory and the level of restricted access to the antennas at the site. Any deviation from the proposed AT&T Mobility, LLC deployment plan could result in the site being rendered non-compliant.

Modeling is used for determining compliance and the percentage of MPE contribution.

5.2 Actions for Site Compliance

Based on FCC regulations, common industry practice, and our understanding of AT&T Mobility, LLC's RF Safety Policy requirements, this section provides a statement of recommendations for site compliance. Recommendations have been proposed based on our understanding of existing access restrictions, signage, and an analysis of predicted RFE levels.

AT&T Mobility, LLC will be made compliant if the following changes are implemented:

Monopole Access Location

(1) Yellow Caution 2B sign(s) required.

Notes:

- Any existing signage that conflicts with the proposed signage in this report should be removed per AT&T Signage Posting Rules.
- Signage may already be in place. Sitesafe does not have record of any existing signage because there were no previous visits or data supplied regarding them. All remediation is based on a worst-case scenario.



6 Reviewer Certification

The reviewer whose signature appears below hereby certifies and affirms:

That I am an employee of Site Safe, LLC, in Vienna, Virginia, at which place the staff and I provide RF compliance services to clients in the wireless communications industry; and

That I am thoroughly familiar with the Rules and Regulations of the Federal Communications Commission (FCC) as well as the regulations of the Occupational Safety and Health Administration (OSHA), both in general and specifically as they apply to the FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields; and

That I have thoroughly reviewed this Site Compliance Report and believe it to be true and accurate to the best of my knowledge as assembled by and attested to by Young Kim.

January 30, 2020

A handwritten signature in black ink, appearing to read "Anthony Handley", written in a cursive style.

Anthony Handley



Appendix A – Statement of Limiting Conditions

Sitesafe has provided computer generated model(s) in this Site Compliance Report to show approximate dimensions of the site, and the model is included to assist the reader of the compliance report to visualize the site area, and to provide supporting documentation for Sitesafe's recommendations.

Sitesafe may note in the Site Compliance Report any adverse physical conditions, such as needed repairs, that Sitesafe became aware of during the normal research involved in creating this report. Sitesafe will not be responsible for any such conditions that do exist or for any engineering or testing that might be required to discover whether such conditions exist. Because Sitesafe is not an expert in the field of mechanical engineering or building maintenance, the Site Compliance Report must not be considered a structural or physical engineering report.

Sitesafe obtained information used in this Site Compliance Report from sources that Sitesafe considers reliable and believes them to be true and correct. Sitesafe does not assume any responsibility for the accuracy of such items that were furnished by other parties. When conflicts in information occur between data collected by Sitesafe provided by a second party and data collected by Sitesafe, the data will be used.

Appendix B – Regulatory Background Information

FCC Rules and Regulations

In 1996, the Federal Communications Commission (FCC) adopted regulations for evaluating the effects of RF emissions in 47 CFR § 1.1307 and 1.1310. The guideline from the FCC Office of Engineering and Technology is Bulletin 65 ("OET Bulletin 65"), *Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields*, Edition 97-01, published August 1997. Since 1996, the FCC periodically reviews these rules and regulations as per their congressional mandate.

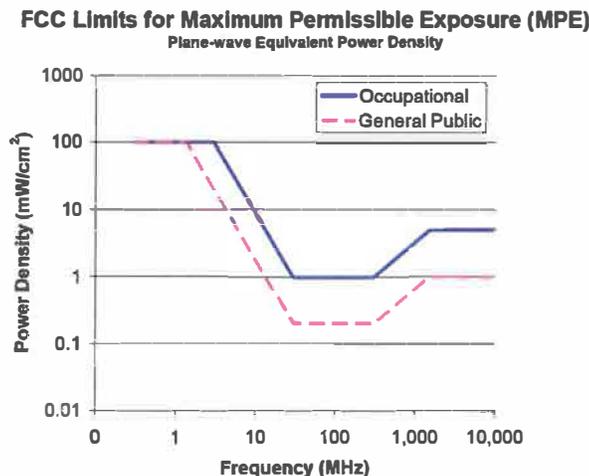
FCC regulations define two separate tiers of exposure limits: Occupational or "Controlled environment" and General Public or "Uncontrolled environment". The General Public limits are generally five times more conservative or restrictive than the Occupational limit. These limits apply to accessible areas where workers or the general public may be exposed to Radio Frequency (RF) electromagnetic fields.

Occupational or Controlled limits apply in situations in which persons are exposed as a consequence of their employment and where those persons exposed have been made fully aware of the potential for exposure and can exercise control over their exposure.

An area is considered a Controlled environment when access is limited to these aware personnel. Typical criteria are restricted access (i.e. locked or alarmed doors, barriers, etc.) to the areas where antennas are located coupled with proper RF warning signage. A site with Controlled environments is evaluated with Occupational limits.

All other areas are considered Uncontrolled environments. If a site has no access controls or no RF warning signage it is evaluated with General Public limits.

The theoretical modeling of the RF electromagnetic fields has been performed in accordance with OET Bulletin 65. The Maximum Permissible Exposure (MPE) limits utilized in this analysis are outlined in the following diagram:



Limits for Occupational/Controlled Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f ²)*	6
30-300	61.4	0.163	1.0	6
300-1500	--	--	f/300	6
1500-100,000	--	--	5	6

Limits for General Population/Uncontrolled Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f ²)*	30
30-300	27.5	0.073	0.2	30
300-1500	--	--	f/1500	30
1500-100,000	--	--	1.0	30

f = frequency in MHz

*Plane-wave equivalent power density

OSHA Statement

The General Duty clause of the OSHA Act (Section 5) outlines the occupational safety and health responsibilities of the employer and employee. The General Duty clause in Section 5 states:

(a) Each employer –

- (1) shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees;
- (2) shall comply with occupational safety and health standards promulgated under this Act.

(b) Each employee shall comply with occupational safety and health standards and all rules, regulations, and orders issued pursuant to this Act which are applicable to his own actions and conduct.

OSHA has defined Radiofrequency and Microwave Radiation safety standards for workers who may enter hazardous RF areas. Regulation Standards 29 CFR § 1910.147 identify a generic Lockout/Tagout procedure aimed to control the unexpected energization or startup of machines when maintenance or service is being performed.



Appendix C – Safety Plan and Procedures

The following items are general safety recommendations that should be administered on a site by site basis as needed by the carrier.

General Maintenance Work: Any maintenance personnel required to work immediately in front of antennas and / or in areas indicated as above 100% of the Occupational MPE limits should coordinate with the wireless operators to disable transmitters during their work activities.

Training and Qualification Verification: All personnel accessing areas indicated as exceeding the General Population MPE limits should have a basic understanding of EME awareness and RF Safety procedures when working around transmitting antennas. Awareness training increases a worker's understanding to potential RF exposure scenarios. Awareness can be achieved in a number of ways (e.g. videos, formal classroom lecture or internet-based courses).

Physical Access Control: Access restrictions to transmitting antennas locations is the primary element in a site safety plan. Examples of access restrictions are as follows:

- Locked door or gate
- Alarmed door
- Locked ladder access
- Restrictive Barrier at antenna (e.g. Chain link with posted RF Sign)

RF Signage: Everyone should obey all posted signs at all times. RF signs play an important role in properly warning a worker prior to entering into a potential RF Exposure area.

Assume all antennas are active: Due to the nature of telecommunications transmissions, an antenna transmits intermittently. Always assume an antenna is transmitting. Never stop in front of an antenna. If you have to pass by an antenna, move through as quickly and safely as possible thereby reducing any exposure to a minimum.

Maintain a 3-foot clearance from all antennas: There is a direct correlation between the strength of an EME field and the distance from the transmitting antenna. The further away from an antenna, the lower the corresponding EME field is.

Site RF Emissions Diagram(s): Section 4 of this report contains RF Diagram(s) that outline various theoretical Maximum Permissible Exposure (MPE) areas at the site. The modeling is a worst-case scenario assuming a duty cycle of 100% for each transmitting antenna at full power. This analysis is based on one of two access control criteria: General Public criteria means the access to the site is uncontrolled and anyone can gain access. Occupational criteria means the access is restricted and only properly trained individuals can gain access to the antenna locations.

Appendix D – RF Emissions

The RF Emissions Simulation(s) in this report display theoretical spatially averaged percentage of the Maximum Permissible Exposure for all systems at the site unless otherwise noted. These diagrams use modeling as prescribed in OET Bulletin 65 and assumptions detailed in Appendix E.

The key at the bottom of each RF Emissions Simulation indicates percentages displayed referenced to FCC General Public Maximum Permissible Exposure (MPE) limits. Color coding on the diagram is as follows:

- Areas indicated as Gray are predicted to be below 5% of the MPE limits. Gray represents areas more than 20 times below the most conservative exposure limit. **Gray areas are accessible to anyone.**
- Green represents areas are predicted to be between 5% and 100% of the MPE limits. **Green areas are accessible to anyone.**
- Blue represents areas predicted to exceed the General Public MPE limits but are less than Occupational limits. **Blue areas should be accessible only to RF trained workers.**
- Yellow represents areas predicted to exceed Occupational MPE limits. **Yellow areas should be accessible only to RF trained workers able to assess current exposure levels.**
- Red represents areas predicted to have exposure more than 10 times the Occupational MPE limits. **Red indicates that the RF levels must be reduced prior to access.** An RF Safety Plan is required which outlines how to reduce the RF energy in these areas prior to access.

If trained occupational personnel require access to areas that are delineated as above 100% of the limit, Sitesafe recommends that they utilize the proper personal protection equipment (RF monitors), coordinate with the carriers to reduce or shutdown power, or make real-time power density measurements with the appropriate power density meter to determine real-time MPE levels. This will allow the personnel to ensure that their work area is within exposure limits.

Appendix E – Assumptions and Definitions

General Model Assumptions

In this site compliance report, it is assumed that all antennas are operating at **full power at all times**. Software modeling was performed for all transmitting antennas located on the site. Sitesafe has further assumed a 100% duty cycle and maximum radiated power.

The modeling is based on recommendations from the FCC's OET-65 bulletin with the following variances per AT&T guidance. Reflection has not been considered in the modeling, i.e. the reflection factor is 1.0. The near / far field boundary has been set to 1.5 times the aperture height of the antenna and modeling beyond that point is the lesser of the near field cylindrical model and the far field model taking into account the gain of the antenna.

The site has been modeled with these assumptions to show the maximum RF energy density. Areas modeled with exposure greater than 100% of the General Public MPE level may not actually occur but are shown as a prediction that could be realized. Sitesafe believes these areas to be safe for entry by occupationally trained personnel utilizing appropriate personal protective equipment (in most cases, a personal monitor).

Use of Generic Antennas

For the purposes of this report, the use of "Generic" as an antenna model, or "Unknown" for an operator means the information about a carrier, their FCC license and/or antenna information was not provided and could not be obtained while on site. In the event of unknown information, Sitesafe will use our industry specific knowledge of equipment, antenna models, and transmit power to model the site. If more specific information can be obtained for the unknown measurement criteria, Sitesafe recommends remodeling of the site utilizing the more complete and accurate data. Information about similar facilities is used when the service is identified and associated with a particular antenna. If no information is available regarding the transmitting service associated with an unidentified antenna, using the antenna manufacturer's published data regarding the antenna's physical characteristics makes more conservative assumptions.

Where the frequency is unknown, Sitesafe uses the closest frequency in the antenna's range that corresponds to the highest Maximum Permissible Exposure (MPE), resulting in a conservative analysis.

Appendix F – Definitions

5% Rule – The rules adopted by the FCC specify that, in general, at multiple transmitter sites actions necessary to bring the area into compliance with the guidelines are the shared responsibility of all licensees whose transmitters produce field strengths or power density levels at the area in question in excess of 5% of the exposure limits. In other words, any wireless operator that contributes 5% or greater of the MPE limit in an area that is identified to be greater than 100% of the MPE limit is responsible for taking corrective actions to bring the site into compliance.

Compliance – The determination of whether a site complies with FCC standards with regards to Human Exposure to Radio Frequency Electromagnetic Fields from transmitting antennas.

Decibel (dB) – A unit for measuring power or strength of a signal.

Duty Cycle – The percent of pulse duration to the pulse period of a periodic pulse train. Also, may be a measure of the temporal transmission characteristic of an intermittently transmitting RF source such as a paging antenna by dividing average transmission duration by the average period for transmission. A duty cycle of 100% corresponds to continuous operation.

Effective (or Equivalent) Isotropic Radiated Power (EIRP) – The product of the power supplied to the antenna and the antenna gain in a given direction relative to an isotropic antenna.

Effective Radiated Power (ERP) – The product of the power supplied to the antenna and the antenna gain in a given direction relative to a half-wave dipole antenna.

Gain (of an antenna) – The ratio of the maximum power in a given direction to the maximum power in the same direction from an isotropic radiator. Gain is a measure of the relative efficiency of a directional antenna as compared to an omnidirectional antenna.

General Population/Uncontrolled Environment – Defined by the FCC as an area where RF exposure may occur to persons who are **unaware** of the potential for exposure and who have no control over their exposure. General Population is also referenced as General Public.

Generic Antenna – For the purposes of this report, the use of “Generic” as an antenna model means the antenna information was not provided and could not be obtained while on site. In the event of unknown information, Sitesafe will use its industry specific knowledge of antenna models to select a worst-case scenario antenna to model the site.

Isotropic Antenna – An antenna that is completely non-directional. In other words, an antenna that radiates energy equally in all directions.

Maximum Measurement – This measurement represents the single largest measurement recorded when performing a spatial average measurement.

Maximum Permissible Exposure (MPE) – The rms and peak electric and magnetic field strength, their squares, or the plane-wave equivalent power densities associated with these fields to which a person may be exposed without harmful effect and with acceptable safety factor.



Occupational/Controlled Environment – Defined by the FCC as an area where RF exposure may occur to persons who are **aware** of the potential for exposure as a condition of employment or specific activity and can exercise control over their exposure.

OET Bulletin 65 – Technical guideline developed by the FCC's Office of Engineering and Technology to determine the impact of RF exposure on humans. The guideline was published in August 1997.

OSHA (Occupational Safety and Health Administration) – Under the Occupational Safety and Health Act of 1970, employers are responsible for providing a safe and healthy workplace for their employees. OSHA's role is to promote the safety and health of America's working men and women by setting and enforcing standards; providing training, outreach and education; establishing partnerships; and encouraging continual process improvement in workplace safety and health. For more information, visit www.osha.gov.

Radio Frequency Exposure or Electromagnetic Fields – Electromagnetic waves that are propagated from antennas through space.

Spatial Average Measurement – A technique used to average a minimum of ten (10) measurements taken in a ten (10) second interval from zero (0) to six (6) feet. This measurement is intended to model the average energy a 6-foot tall human body will absorb while present in an electromagnetic field of energy.

Transmitter Power Output (TPO) – The radio frequency output power of a transmitter's final radio frequency stage as measured at the output terminal while connected to a load.



Appendix G – References

The following references can be followed for further information about RF Health and Safety.

Site Safe, LLC

<http://www.sitesafe.com>

FCC Radio Frequency Safety

<http://www.fcc.gov/encyclopedia/radio-frequency-safety>

National Council on Radiation Protection and Measurements (NCRP)

<http://www.ncrponline.org>

Institute of Electrical and Electronics Engineers, Inc., (IEEE)

<http://www.ieee.org>

American National Standards Institute (ANSI)

<http://www.ansi.org>

Environmental Protection Agency (EPA)

<http://www.epa.gov/radtown/wireless-tech.html>

National Institutes of Health (NIH)

<http://www.niehs.nih.gov/health/topics/agents/emf/>

Occupational Safety and Health Agency (OSHA)

<http://www.osha.gov/SLTC/radiofrequencyradiation/>

International Commission on Non-Ionizing Radiation Protection (ICNIRP)

<http://www.icnirp.org>

World Health Organization (WHO)

<http://www.who.int/peh-emf/en/>

National Cancer Institute

<http://www.cancer.gov/cancertopics/factsheet/Risk/cellphones>

American Cancer Society (ACS)

http://www.cancer.org/docroot/PED/content/PED_1_3X_Cellular_Phone_Towers.asp?sitearea=PED

European Commission Scientific Committee on Emerging and Newly Identified Health Risks

http://ec.europa.eu/health/ph_risk/committees/04_scenihp/docs/scenihp_o_022.pdf

Fairfax County, Virginia Public School Survey

<http://www.fcps.edu/fts/safety-security/RFEESurvey/>

UK Health Protection Agency Advisory Group on Non-Ionizing Radiation

http://www.hpa.org.uk/webw/HPAweb&HPAwebStandard/HPAweb_C/1317133826368

Norwegian Institute of Public Health

<http://www.fhi.no/dokumenter/545eea7147.pdf>

Rigorous Structural Analysis Report



AT&T - North Haven South Site #CT5107 FA #10071172

**Owner: Crown Castle
North Haven, Connecticut**

December 03, 2019

MEI PROJECT ID: CT05943M-19V0

MALOUF ENGINEERING INTL., INC.



STRUCTURAL CONSULTANTS

17950 PRESTON ROAD, SUITE 720 ■ DALLAS, TEXAS 75252 ■ TEL. 972-783-2578 FAX 972-783-2583
www.maloufengineering.com





December 03, 2019

Mr. Miguel Nobre
Vertical Resources Group
 Auburn, MA 01501

RIGOROUS STRUCTURAL ANALYSIS

Structure/Make/Model:	120 ft Monopole	Engineered Endeavors Inc / 18-Sided
Client/Site Name/#:	Vertical Resources Group AT&T	North Haven South #CT5107 - FA 10071172
Owner/Site Name/#:	Crown Castle	North Haven Tower – BU 881536
MEI Project ID:	CT05943M-19V0	
Location:	120 Universal Drive North Haven, Connecticut 06473	New Haven County FCC #N/A
	LAT 41-20-38.76 N	LON 72-52-14.16 W

EXECUTIVE SUMMARY:

Malouf Engineering Int'l (MEI), as requested, has performed a rigorous structural analysis of the above-mentioned structure to assess the impact of the changed condition as noted in Table 1.

Based on the stress analysis performed, the existing structure **is in conformance** with the Int'l Building Code (IBC) / ANSI/TIA-222-G Standard for the loading considered under the criteria listed and referenced in the report sections – tower rated at 76.9% - Base Plate.

The installation of the proposed changed condition as noted in Table 1 is structurally acceptable. Please refer to Appendix 1 for Schematic Lines Layout.

MEI appreciates the opportunity of providing our continuing professional services to you. If you have any questions or need further assistance on this or other projects, please contact us.

Respectfully submitted,

MALOUF ENGINEERING INT'L, INC.

Analysis performed by:

Reviewed & Approved by:

Luan Nguyen, PE
 Sr. Project Engineer

E. Mark Malouf, PE
 Connecticut #17715
 972-783-2578 ext. 106
 mmalouf@maloufengineering.com



12/3/2019

TABLE OF CONTENTS

1.	INTRODUCTION & SCOPE _____	4
2.	SOURCE OF DATA _____	4
	Background Information: -----	4
3.	ANALYSIS CRITERIA _____	5
	Appurtenances Configuration -----	5
4.	ANALYSIS PROCEDURE _____	7
	Analysis Program -----	7
	Assumptions -----	7
5.	ANALYSIS RESULTS _____	8
6.	FINDINGS & RECOMMENDATIONS _____	9
7.	REPORT DISCLAIMER _____	10
	APPENDIX 1 - ANALYSIS PRINTOUT & GRAPHICS _____	11
	APPENDIX 2 – SOURCE / CHANGED CONDITION _____	12



1. INTRODUCTION & SCOPE

A rigorous structural analysis was performed by Malouf Engineering Int'l (MEI), as requested and authorized by Mr. Miguel Nobre, Vertical Resources Group, on behalf of AT&T, to determine the acceptance of the proposed changed conditions in conformance with the IBC / ANSI/TIA-222-G Standard, "Structural Standard for Antenna Supporting Structures and Antennas".

The scope of this independent analysis is to determine the overall stability and the adequacy of structural members, foundations, and member connections, as available and stated. This analysis considers the structure to have been properly installed and maintained with no structural defects. Installation procedures and related loading are not within the scope of this analysis and should be performed and evaluated by a competent person of the erection contractor.

The different report sections detail the applicable information used in this evaluation, relating to the tower data, the appurtenances configuration and the wind and ice loading considered.

2. SOURCE OF DATA

The following information has been used in this evaluation as source data that accurately represent the existing structure and the related appurtenances:

	Source	Information	Reference
STRUCTURE			
Tower	Vertical Resources Group Mr. Miguel Nobre	Previous SA Crown Castle Project #1177434	Dated 01/14/2016
Foundation	Vertical Resources Group Mr. Miguel Nobre	Previous SA Crown Castle Project #1177434	Dated 01/14/2016
Material Grade	Available from supplied documents noted above-refer to Appendix		
CURRENT APPURTENANCES			
	Vertical Resources Group Mr. Miguel Nobre	Previous SA Crown Castle Project #1177434	Dated 01/14/2016
CHANGED CONDITION			
	Vertical Resources Group Mr. Miguel Nobre	AT&T RFDS	Dated 01/09/2019
		Email Instructions	Dated 11/07/2019

Background Information:

Based on available information, the following is known regarding this structure:

DESIGNER / FABRICATOR	Engineered Endeavors Inc / 18-Sided
ORIGINAL DESIGN CRITERIA	Not Known
PRIOR STRUCTURAL MODIFICATIONS	Not Known



3. ANALYSIS CRITERIA

The structural analysis performed used the following criteria:

CODE / STANDARD	2018 CT Bldg. Code / 2015 Int'l Building Code / ANSI/TIA-222-G-4 Standard	
LOADING CASES	Full Wind:	125 Mph ultimate gust [equiv. 97 Mph (3-sec gust)] w/No Radial Ice**
	Iced Case:	50 Mph + 0.75" Radial Ice
	Service:	60 Mph
	Seismic:	S _s = 0.184 / S ₁ = 0.062 / Site Class: D – Default Soil
STRUCTURE CRITERIA	Risk Category (Structural Class): Class II	
	Exposure Category: 'C' – Topographic Category: 1	

Appurtenances Configuration

The following appurtenances configuration is denoted by the summation of Tables 1 & 2:

Table 1: Tenant with Changed Condition Appurtenances Configuration

Elev (ft)	Tenant	Ants Qty	Appurtenance Model / Description	Mount Description	Lines Qty	Line size & Location
121	AT&T	3	ION-M23 SDARS RRU Boxes	[Existing Mount]		
		3	CBC23SR-43 Diplexer Boxes			
		1	DC6-48-60-18-8C-EV Suppressor Box			
Appurtenances to Remain						
121	AT&T	3	7770.00 Panel Antennas	LP Platform Mount w/ Ladder	12	1-5/8" – (I) Fiber Trunk Cables – (I) DC Power Trunk Cables – (I)
		3	OPA-65R-LCUU-H6 Panel Antennas			
		6	800-10966 Panel Antennas			
		6	LGP21401 TMA's			
		6	TPX-070821 Triplexer's			
		3	RRUS 8843 B2/B66A Boxes			
		3	RRUS 4478 B14 Boxes			
		3	RRUS 4449 B5/B12 Boxes			
		3	RRUS 32 B30 Boxes			
		2	DC6-48-60-18-8F Suppressor Box			
1	DC6-48-60-0-8F Suppressor Box					

Table 2: Remaining Tenants Current and Reserved/Future Appurtenances

Elev (ft)	Tenant	Ants Qty	Appurtenance Model / Description	Mount Description	Lines Qty	Line size & Location
120		1	Top Lightning Rod			
110		12	844G65VTZASX Panel Antennas	LP Platform Mount	12	1 1/4" – (I)
100		3	1900MHz RRH Boxes	(3) Close Contact Mounts	3	1 1/4" – (E) 1 5/8" – (E)
		3	TME-800MHz RRH Boxes			
98		2	P40-16-XLPP-RR-A Panel Antennas	LP Platform Mount w/ Ladder		
		3	APXVTM14-C-120 Panel Antennas			
		1	APXVSPP18-C-A20 Panel Antennas			
		9	ACU-A20-N RET Boxes			
		3	800 Ext. Notch Filters			
		3	TD-RRH 8x20-25 Boxes			
84		3	LNX-6515DS-A1M Panel Antennas	LP Platform Mount	12	1 5/8" – (I) 1 1/4" – (I) 1/4" – (I)
		3	AIR21 B2A B4P Panel Antennas			
		3	AIR21 B4A B2P Panel Antennas			
		3	RRUS-11 B12 Boxes			
		3	ATMAA1412D-1A20 TMA's			
51		1	GPS Antenna (KS24019-L112A)	Side Mount	1	1/2" – (E)



Notes:

1. **As per 2015 IBC for ultimate 3-sec gust wind speed converted to nominal 3-sec gust wind speed as per Sect. 1609.3.1 as required to be used in ANSI/TIA-222-G Standard per exception 5 of Sect. 1609.1.1.
2. All elevations are measured from tower base.
3. Please note appurtenances not listed above are to be removed/not present as per data supplied.
4. (I) = Internal; (E) = External; (FZ) = Within Face Zone; (OFZ) = Outside Face Zone - as per TIA-222-G.
5. The above appurtenances represent MEI's understanding of the appurtenances configuration. If different than above, the analysis is invalid. Please contact MEI if any discrepancies are found.

4. ANALYSIS PROCEDURE

The subject structure is analyzed for feasibility of the installation of the proposed changed condition previously noted. The data records furnished were reviewed and a computer stress analysis was performed in accordance with the TIA-222 Standard provisions and with the agreed scope of work terms and the results of this analysis are reported.

Analysis Program

The computer program used to model the structure is a rigorous Finite Element Analysis program, tnxTower (ver. 8.05), a commercially available program by Tower Numerics Inc. The latticed structures members are modeled using beam/truss and cable members and the pole members using tubular beam elements. The structural parameters and geometry of the members are included in the model. The dead loads, temperature loads and the wind loads are internally calculated by the program for the different wind directions and then applied as external loads on the structure. Any applicable exemptions, as per Section 15.6 of the TIA-222-G Standard for existing structures originally designed in accordance with a previous revision of the TIA-222 Standard, have been taken.

Assumptions

This engineering study is based on the theoretical capacity of the members and is not a condition assessment of the structure. This analysis is based on information supplied, and therefore, its results are based on and as accurate as that supplied data. MEI has made no independent determination, nor is it required to, of its accuracy. The following assumptions were made for this structural stress analysis:

- This existing tower is assumed, for the purpose of this analysis, to have been properly maintained and to be in good condition with no structural defects and with no deterioration to its member capacities ('as-new' condition).
- The member sizes and configuration are considered accurate as supplied. The material grade is as per data supplied and/or as assumed and as stated.
- The appurtenances configuration is as supplied and/or as stated in the report. It is assumed to be complete and accurate. All antennas, mounts, feed lines are assumed to be properly installed and supported as per manufacturer requirements.
- Some assumptions are made regarding antennas and mounts sizes and their projected areas based on best interpretation of data supplied and of best knowledge of antenna type & industry practice.
- Mounts/Platforms are considered adequate to support the loading. No actual analysis of the platform/mount itself is performed, with the analysis being limited to analyzing the structure.
- The soil parameters are as per data supplied or as assumed and as stated. If no data is available, the foundation system is assumed to support the structure with its new reactions.
- All welds and connections are assumed to develop at least the member capacity, unless determined otherwise and explicitly stated in this report.
- All prior structural modifications, if any, are assumed to be as per data supplied/available, and to have been properly installed and to be fully effective.

If any of the above assumptions are not valid or have been made in error, this analysis results may be invalidated, MEI should be contacted to review any contradictory information to determine its effect.

5. ANALYSIS RESULTS

The results of the structural stress analysis based on data available and with the previous listed criteria, indicated the following:

Note: The Wind loading controls over the Seismic loading as per TIA Section 2.7.

Table 3: Stress Analysis Results

Component Type	Maximum Stress Ratio	Controlling Elev. (ft) / Component	Pass/Fail	Comment
POLE	51.2%	41.63 - 0	Pass	
BASE PLATE	76.9%	Bending	Pass	
ANCHOR RODS	41.8%	Tension	Pass	
FOUNDATION	-	Moment	Acceptable	

Table 4: Serviceability Requirements

	Maximum Value	TIA Requirement (10dB)	Pass/Fail	Comment
TWIST/SWAY	0.745 Deg.	1.13 Deg. from Vert. or Horiz. Axis	Pass	
HORIZONTAL DISPLACEMENT	10.796 In./ 0.75% of Ht.	3.0% of Height	Pass	

Notes:

1. The Maximum Stress Ratio is the percentage that the maximum load in the member is relative to the allowable load as determined by Code requirements.
2. Refer to the Appendix 1 for more details on the member loads.
3. A maximum stress ratio between 100% and 105% may be considered as *Acceptable* according to industry standard practice.

6. FINDINGS & RECOMMENDATIONS

- Based on the rigorous stress analysis results, the subject structure is **rated at 76.9%** of its support capacity (controlling component: Base Plate) with the proposed changed condition considered. Please refer to Table 3 and to Appendix 1 for more details of the analysis results.
- Based on the stress analysis performed, the existing structure **is in conformance** with the IBC / ANSI/TIA **222-G** Standard for the loading considered under the criteria listed and referenced in the report sections.
- **The installation of the proposed changed condition as noted in Table 1 is structurally acceptable.** Please refer to Appendix 1 for Schematic Lines Layout.
- *It is recommended that the AT&T mounts be evaluated for suitability to properly support the proposed loads (mount analysis not within scope of work).*
- This structure has additional support capacity for the appurtenances and loading criteria considered. However, no changes to the configuration considered should be made without performing a new proper evaluation.

Rigging and temporary supports required for the erection/modification shall be determined, documented, furnished and installed by the erector/contractor accounting for the loads imposed on the structure due to the proposed construction method.

7. REPORT DISCLAIMER

The engineering services rendered by Malouf Engineering International, Inc. ('MEI') in connection with this Structural Analysis are limited to a computer analysis of the tower structure, size and capacity of its members. MEI does not analyze the fabrication, including welding and connection capacities, except as included in this Report.

The analysis performed, and the conclusions contained herein are based on the assumption that the tower has been properly installed and maintained, including, but not limited to the following:

1. Proper alignment and plumbness.
2. Correct guy tensions, as applicable.
3. Correct bolt tightness or slip jacking of sleeved connections.
4. No significant deterioration or damage to any structural component.

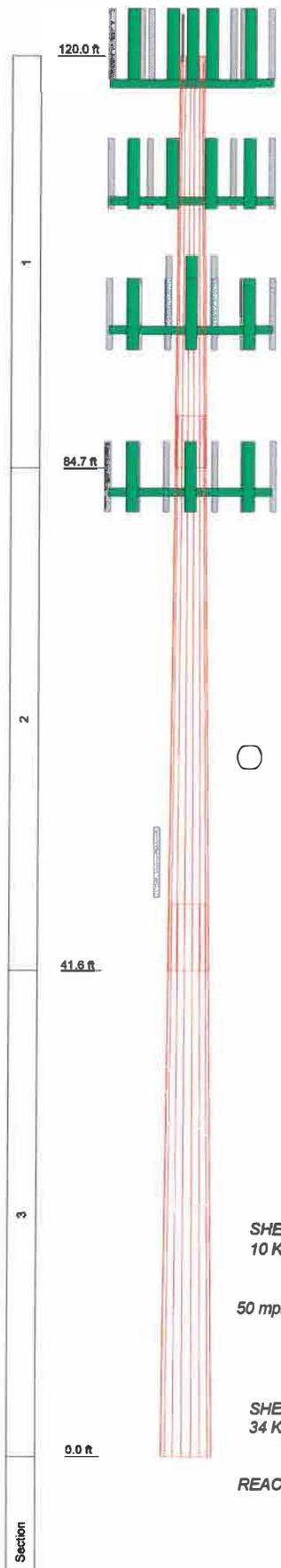
Furthermore, the information and conclusions contained in this Report were determined by application of the current "state-of-the-art" engineering and analysis procedures and formulae. MALOUF ENGINEERING INTERNATIONAL, INC. assumes no obligation to revise any of the information or conclusions contained in this Report in the event that such engineering and analysis procedures and formulae are hereafter modified or revised. In addition, under no circumstances will MALOUF ENGINEERING INTERNATIONAL, INC. have any obligation or responsibility whatsoever for or on account of consequential or incidental damages sustained by any person, firm or organization as a result of any information or conclusions contained in the Report, and the maximum liability of MALOUF ENGINEERING INTERNATIONAL, INC., if any, pursuant to this Report shall be limited to the total funds actually received by MALOUF ENGINEERING INTERNATIONAL, INC. for preparation of this Report.

Customer has requested MALOUF ENGINEERING INTERNATIONAL, INC. to prepare and submit to Customer an engineering analysis with respect to the Subject Tower and has further requested MALOUF ENGINEERING INTERNATIONAL, INC. to make appropriate recommendations regarding suggested structural modifications and changes to the Subject Tower. In making such request of MALOUF ENGINEERING INTERNATIONAL, INC., Customer has informed MALOUF ENGINEERING INTERNATIONAL, INC. that Customer will make a determination as to whether or not to implement any of the changes or modifications which may be suggested by MALOUF ENGINEERING INTERNATIONAL, INC. and that Customer will have any such changes or modifications made by riggers, erectors and other subcontractors of Customer's choice. MALOUF ENGINEERING INTERNATIONAL, INC. shall have the right to rely upon the accuracy of the information supplied by the customer and shall not be held responsible for the Customer's misrepresentation or omission of relevant fact whether intentional or otherwise.

Customer hereby agrees and acknowledges that MALOUF ENGINEERING INTERNATIONAL, INC. shall have no liability whatsoever to Customer or to others for any work or services performed by any persons other than MALOUF ENGINEERING INTERNATIONAL, INC. in connection with the implementation of services including but not limited to any services rendered for Customer or for others by riggers, erectors or other subcontractors. Customer acknowledges and agrees that any riggers, erectors or subcontractors retained or employed by Customer shall be solely responsible to Customer and to others for the quality of work performed by them and that MALOUF ENGINEERING INTERNATIONAL, INC. shall have no liability or responsibility whatsoever as a result of any negligence or breach of contract by any such rigger, erector or subcontractor and that Customer and rigger, erector, or subcontractor will provide MALOUF ENGINEERING INTERNATIONAL, INC. with a Certificate of Insurance naming MALOUF ENGINEERING INTERNATIONAL, INC. as additional insured.

APPENDIX 1 - ANALYSIS PRINTOUT & GRAPHICS



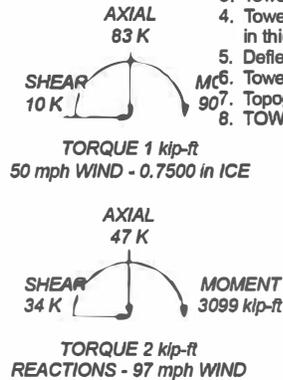


DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
7770.00 Panels w/ Pipe Mount (ATI / E)	121	(4) 844 G85VTZASX w/Mount Pipe (E)	110
7770.00 Panels w/ Pipe Mount (ATI / E)	121	LP Platform Mount (E)	108
7770.00 Panels w/ Pipe Mount (ATI / E)	121	1800MHz RRH w/ Pipe Mount (E)	100
OPA-65R-LCUU-H6 w/ Pipe Mounts (ATI / E)	121	1900MHz RRH w/ Pipe Mount (E)	100
OPA-65R-LCUU-H6 w/ Pipe Mounts (ATI / E)	121	1900MHz RRH w/ Pipe Mount (E)	100
OPA-65R-LCUU-H6 w/ Pipe Mounts (ATI / E)	121	Close Contact Mounts (3) (E)	100
(2) 800-10968 w/ Pipe Mount (ATI / E)	121	TME-800MHz RRH (E)	99
(2) 800-10968 w/ Pipe Mount (ATI / E)	121	TME-800MHz RRH (E)	99
(2) 800-10968 w/ Pipe Mount (ATI / E)	121	TME-800MHz RRH (E)	99
(2) LGP21401 TMA'S (ATI / E)	121	P40-16-XLPP-RR-A w/ Pipe Mount (E)	98
(2) LGP21401 TMA'S (ATI / E)	121	P40-16-XLPP-RR-A w/ Pipe Mount (E)	98
(2) LGP21401 TMA'S (ATI / E)	121	P40-16-XLPP-RR-A w/ Pipe Mount (E)	98
(2) TPX-070821 Triplexer (ATI / E)	121	APXVTM14-C-120 w/ Pipe Mount (E)	98
(2) TPX-070821 Triplexer (ATI / E)	121	APXVTM14-C-120 w/ Pipe Mount (E)	98
(2) TPX-070821 Triplexer (ATI / E)	121	APXVTM14-C-120 w/ Pipe Mount (E)	98
RADIO 8843 B2/B88A (ATI / E)	121	APXVSP18-C-A20 w/ Pipe Mount (E)	98
RADIO 8843 B2/B88A (ATI / E)	121	(3) ACU-A20-N RET (E)	96
RADIO 8843 B2/B88A (ATI / E)	121	(3) ACU-A20-N RET (E)	96
RRUS-4478 B14 (ATI / E)	121	(3) ACU-A20-N RET (E)	96
RRUS-4478 B14 (ATI / E)	121	800 Ext. Notch Filter (E)	96
RRUS-4478 B14 (ATI / E)	121	800 Ext. Notch Filter (E)	96
RADIO 4449 - B5 + B12 (ATI / E)	121	800 Ext. Notch Filter (E)	96
RADIO 4449 - B5 + B12 (ATI / E)	121	800 Ext. Notch Filter (E)	96
RADIO 4449 - B5 + B12 (ATI / E)	121	TD-RRH 8x20-25 (E)	96
RRUS-32 B30 (ATI / E)	121	TD-RRH 8x20-25 (E)	96
RRUS-32 B30 (ATI / E)	121	TD-RRH 8x20-25 (E)	96
RRUS-32 B30 (ATI / E)	121	TD-RRH 8x20-25 (E)	96
Raycap DC8-48-60-18-8F SUPPRESSOR (ATI / E)	121	Empty Pipe Mount (E)	96
Raycap DC8-48-60-18-8F SUPPRESSOR (ATI / E)	121	Empty Pipe Mount (E)	96
Raycap DC8-48-60-18-8F SUPPRESSOR (ATI / E)	121	Empty Pipe Mount (E)	96
ION-M23 SDARS RRU (ATI / P)	121	LP Platform Mount w/ Ladder (E)	97
ION-M23 SDARS RRU (ATI / P)	121	LNK-6515DS-A1M w/ Pipe Mnt. (E)	84
ION-M23 SDARS RRU (ATI / P)	121	LNK-6515DS-A1M w/ Pipe Mnt. (E)	84
CBC23SR-43 Diplexer (ATI / P)	121	LNK-8515DS-A1M w/ Pipe Mnt. (E)	84
CBC23SR-43 Diplexer (ATI / P)	121	LNK-8515DS-A1M w/ Pipe Mnt. (E)	84
CBC23SR-43 Diplexer (ATI / P)	121	LNK-8515DS-A1M w/ Pipe Mnt. (E)	84
DC8-48-60-18-8C-EV Surge Suppressor Box (ATI / P)	121	AIR21 B2A B4P w/ pipe Mount (E)	84
Top Lightning Rod (E)	120	AIR21 B2A B4P w/ pipe Mount (E)	84
LP Platform Mount w/ Ladder (ATI / E)	118	AIR21 B2A B4P w/ pipe Mount (E)	84
(4) 844G85VTZASX w/Mount Pipe (E)	110	AIR21 B4A B2P w/ pipe Mount (E)	84
(4) 844G85VTZASX w/Mount Pipe (E)	110	AIR21 B4A B2P w/ pipe Mount (E)	84
		AIR21 B4A B2P w/ pipe Mount (E)	84
		AIR21 B4A B2P w/ pipe Mount (E)	84
		RRUS-11 B12 (E)	84
		RRUS-11 B12 (E)	84
		RRUS-11 B12 (E)	84
		RRUS-11 B12 (E)	84
		ATMAA1412D-1A20 TMA'S (E)	84
		ATMAA1412D-1A20 TMA'S (E)	84
		ATMAA1412D-1A20 TMA'S (E)	84
		ATMAA1412D-1A20 TMA'S (E)	84
		Empty Pipe Mount (E)	84
		Empty Pipe Mount (E)	84
		Empty Pipe Mount (E)	84
		Empty Pipe Mount (E)	84
		LP Platform Mount (E)	83
		GPS Antenna (KS24019-L112A) - Mount (E)	51

TOWER DESIGN NOTES

- ALL REACTIONS ARE FACTORED
1. Tower is located in New Haven County, Connecticut.
 2. Tower designed for Exposure C to the TIA-222-G Standard.
 3. Tower designed for a 97 mph basic wind in accordance with the TIA-222-G Standard.
 4. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
 5. Deflections are based upon a 60 mph wind.
 6. Tower Structure Class II.
 7. Topographic Category 1 with Crest Height of 0.00 ft
 8. TOWER RATING: 76.9%



<p>Malouf Engineering Intl., Inc. 17950 Preston Road, Suite #720 Dallas, TX 75252 Phone: (972) 783-2578 FAX: (972) 783-2583</p>	<p>Job: 120 FT MP, North Haven South Site CT510</p>
	<p>Project: CT05943M-19V0</p>
	<p>Client: VRG / AT&T Drawn by: Luan Nguyen App'd:</p>
	<p>Code: TIA-222-G Date: 12/03/19 Scale: NTS</p>
	<p>Path: E:\MEIP\proj\119 DATA\MNP\CT05943M-19V0\CT05943M-19V0.dwg Dwg No. E-1</p>

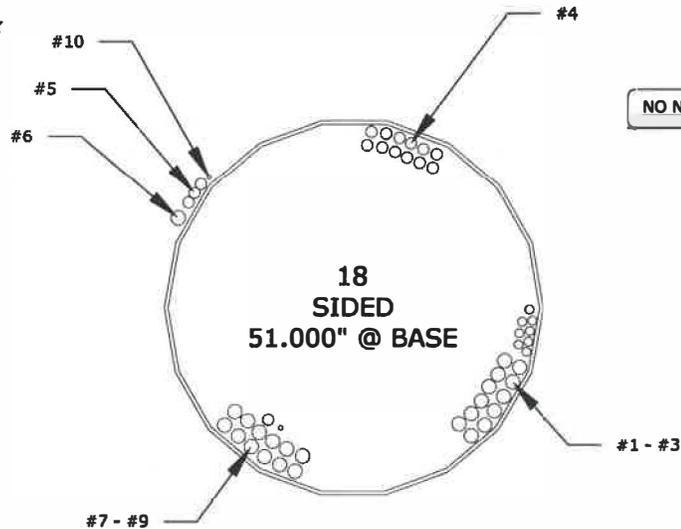
ALL RIGHTS RESERVED. THIS DRAWING SHALL REMAIN THE PROPERTY OF MALOUF ENGINEERING INTERNATIONAL, INC. NO PART THEREOF SHALL BE REPRODUCED, COPIED, ADAPTED, DISCLOSED, OR DISTRIBUTED TO OTHERS WITHOUT WRITTEN PERMISSION OF MEI, INC.

No.	QTY.	DESCRIPTION	ELEV.	TENANT
1	12	1 5/8"	120'	AT&T / E
2	2	Fiber Trunk Cable	120'	AT&T / E
3	6	DC Power Trunk Cable	120'	AT&T / E
4	12	1 1/4"	110'	E
5	3	1 1/4"	98'	E
6	1	1 5/8"	98'	E
7	12	1 5/8"	84'	E
8	1	1 1/4"	84'	E
9	1	1/4"	84'	E
10	1	1/2"	51'	E

CONTACT MEI IF LINE LAYOUT IS DIFFERENT FROM WHAT IS SHOWN BELOW.

LEGEND:

- E = EXISTING #X
- P = PROPOSED #X
- F = FUTURE #X
- R = REMOVE #X
- TO RELOCATE



101 PLAN: SCHEMATIC Tx-LINE LAYOUT
SCALE: NOT TO SCALE

- NOTES:**
1. Tx LINE LAYOUT IS SCHEMATIC ONLY, BASED UPON LIMITED DATA PROVIDED.
 2. NEW BRACKET SUPPORT SPECIFICATION BY OTHERS.

DECEMBER 03, 2019

MALOUF ENGINEERING INTERNATIONAL, INC.

 STRUCTURAL CONSULTANTS

17950 PRESTON ROAD SUITE 720
 DALLAS, TEXAS 75252-5635
 972-783-2578 (fax: 2583)
 www.maloufengineering.com

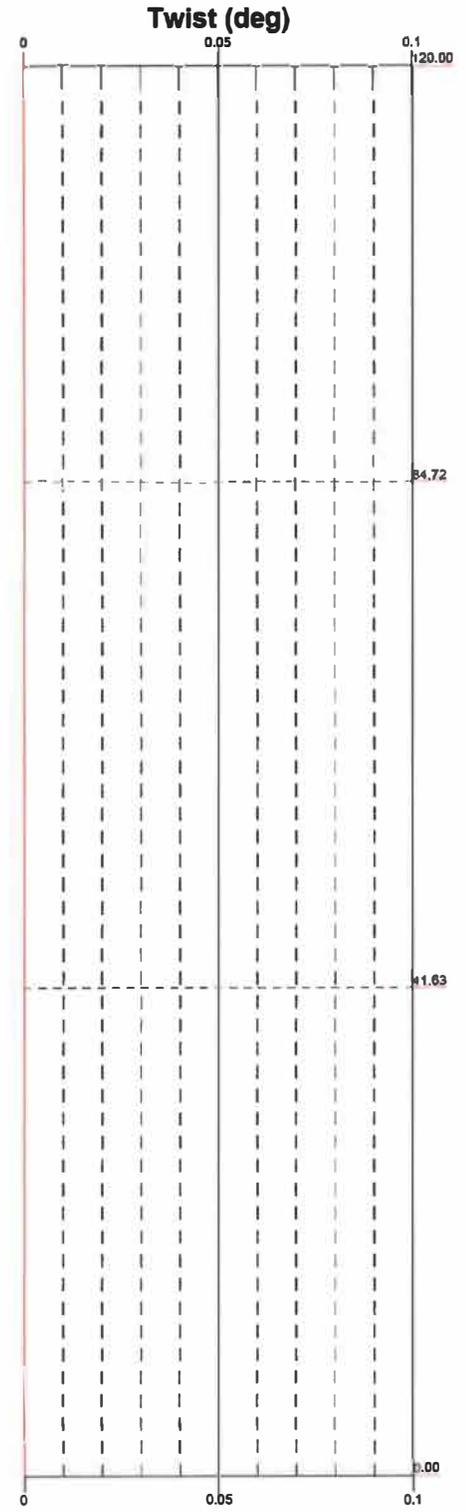
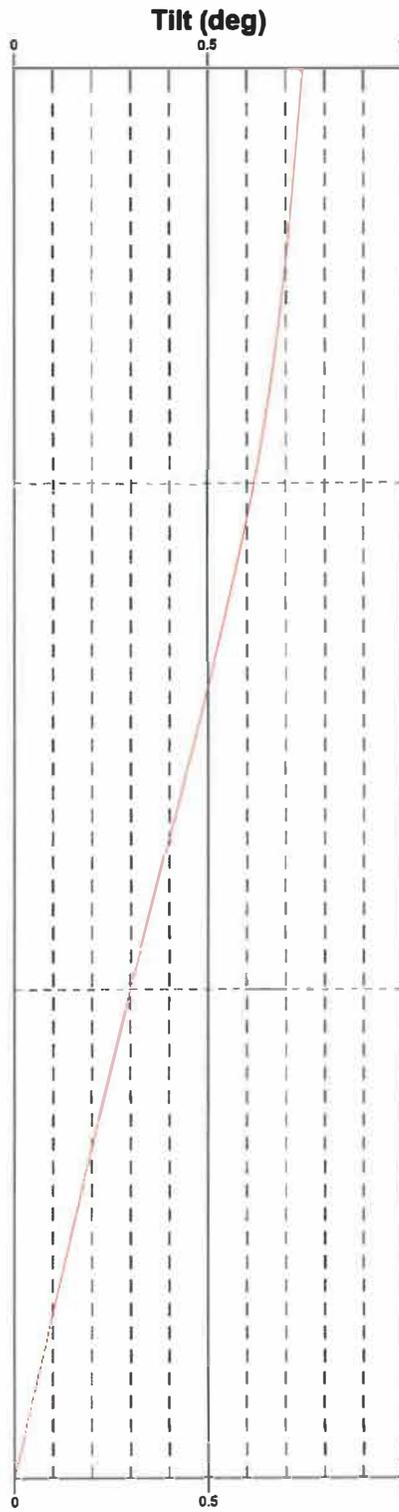
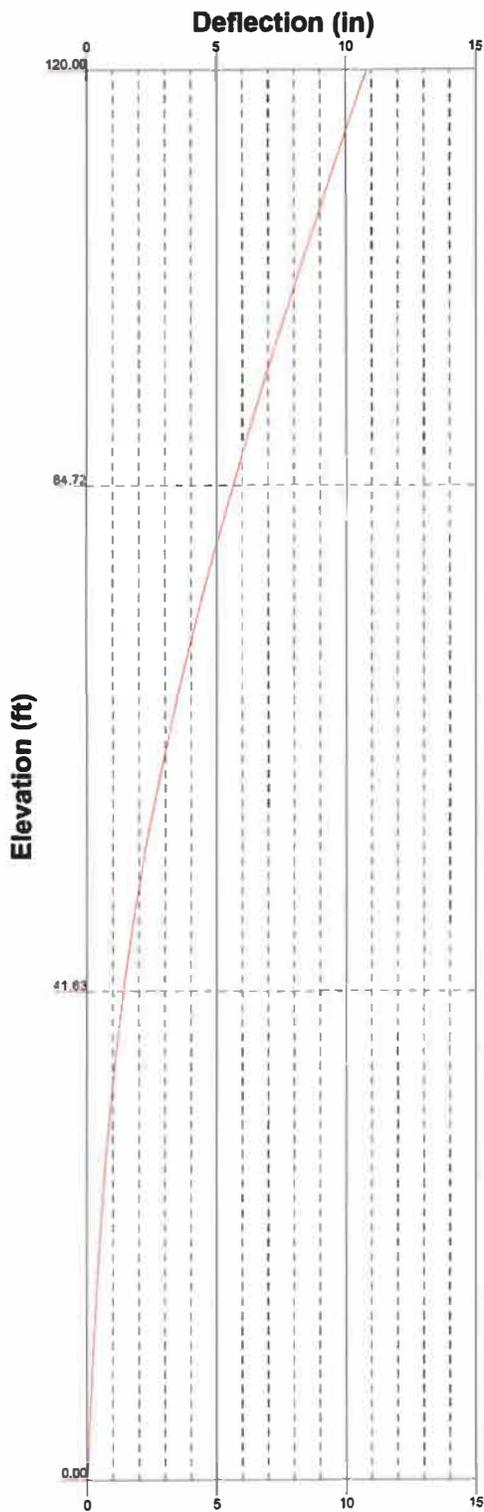
© MEI, INC. 2019



120 FT± MNP / NORTH HAVEN SOUTH SITE

MONOPOLE TX-LINE LAYOUT

MEI PROJECT ID	SHEET NUMBER	REV.
CT05943M-19V0	L01	0



 maloufengineering.com	Malouf Engineering Intl., Inc. 17950 Preston Road, Suite #720 Dallas, TX 75252 Phone: (972) 783-2578 FAX: (972) 783-2583		Job: 120 FT MP, North Haven South Site CT510 Project: CT05943M-19v0		
	Client: VRG / AT&T	Drawn by: Luan Nguyen	App'd:		
	Code: TIA-222-G	Date: 12/03/19	Scale: NTS		
	Path:		Dwg No. E-5		
	<small>F:\ME\Projects\18\DATA\MP\CT05943M-19\CT05943M-19-D-01</small>				

tnxTower Malouf Engineering Intl., Inc. 17950 Preston Road, Suite #720 Dallas, TX 75252 Phone: (972) 783-2578 FAX: (972) 783-2583	Job 120 FT MP, North Haven South Site CT5107	Page 1 of 6
	Project CT05943M-19V0	Date 15:34:22 12/03/19
	Client VRG / AT&T	Designed by Luan Nguyen

Tower Input Data

The tower is a monopole.

This tower is designed using the TIA-222-G standard.

The following design criteria apply:

Tower is located in New Haven County, Connecticut.

ASCE 7-10 Wind Data is used (wind speeds converted to nominal values).

Basic wind speed of 97 mph.

Structure Class II.

Exposure Category C.

Topographic Category 1.

Crest Height 0.00 ft.

Nominal ice thickness of 0.7500 in.

Ice thickness is considered to increase with height.

Ice density of 56 pcf.

A wind speed of 50 mph is used in combination with ice.

Temperature drop of 50 °F.

Deflections calculated using a wind speed of 60 mph.

A non-linear (P-delta) analysis was used.

Pressures are calculated at each section.

Stress ratio used in pole design is 1.

Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Placement	Total Number
	ft	
1 1/4 (E)	98.00 - 0.00	3
1 5/8 (E)	98.00 - 0.00	1

Description	Placement	Total Number
	ft	
1/2 (E)	51.00 - 0.00	1

Feed Line/Linear Appurtenances - Entered As Area

Description	Placement	Total Number
	ft	
Safety Line 5/16 (E)	120.00 - 0.00	1
Step Bolts (E)	120.00 - 0.00	1
1 5/8 (AT&T / E)	120.00 - 0.00	12
Fiber Trunk Cable (AT&T / E)	120.00 - 0.00	2
DC Power Trunk Cable (AT&T / E)	120.00 - 0.00	6
1 1/4	110.00 - 0.00	12

Description	Placement	Total Number
	ft	
(E)		
1 5/8 (E)	84.00 - 0.00	12
1 1/4 (E)	84.00 - 0.00	1
1/4 (E)	84.00 - 0.00	1

tnxTower Malouf Engineering Intl., Inc. 17950 Preston Road, Suite #720 Dallas, TX 75252 Phone: (972) 783-2578 FAX: (972) 783-2583	Job	120 FT MP, North Haven South Site CT5107	Page	2 of 6
	Project	CT05943M-19V0	Date	15:34:22 12/03/19
	Client	VRG / AT&T	Designed by	Luan Nguyen

Discrete Tower Loads

Description	Placement		Description	Placement	
	ft	K		ft	K
Top Lightning Rod (E)	120.00	0.03	RRUS-4478 B14 (AT&T / E)	121.00	0.11
		0.04			0.06
		0.05			0.07
7770.00 Panels w/ Pipe Mount (AT&T / E)	121.00	0.04	RRUS-4478 B14 (AT&T / E)	121.00	0.09
		0.09			0.06
		0.15			0.07
7770.00 Panels w/ Pipe Mount (AT&T / E)	121.00	0.04	RRUS-4478 B14 (AT&T / E)	121.00	0.09
		0.09			0.06
		0.15			0.07
7770.00 Panels w/ Pipe Mount (AT&T / E)	121.00	0.04	RADIO 4449 - B5 + B12 (AT&T / E)	121.00	0.09
		0.09			0.07
		0.15			0.09
OPA-65R-LCUU-H6 w/ Pipe Mounts (AT&T / E)	121.00	0.10	RADIO 4449 - B5 + B12 (AT&T / E)	121.00	0.11
		0.17			0.07
		0.26			0.09
OPA-65R-LCUU-H6 w/ Pipe Mounts (AT&T / E)	121.00	0.10	RADIO 4449 - B5 + B12 (AT&T / E)	121.00	0.11
		0.17			0.07
		0.26			0.09
OPA-65R-LCUU-H6 w/ Pipe Mounts (AT&T / E)	121.00	0.10	RRUS-32 B30 (AT&T / E)	121.00	0.11
		0.17			0.06
		0.26			0.08
(2) 800-10966 w/ Pipe Mount (AT&T / E)	121.00	0.14	RRUS-32 B30 (AT&T / E)	121.00	0.11
		0.26			0.06
		0.38			0.08
(2) 800-10966 w/ Pipe Mount (AT&T / E)	121.00	0.14	RRUS-32 B30 (AT&T / E)	121.00	0.11
		0.26			0.06
		0.38			0.08
(2) 800-10966 w/ Pipe Mount (AT&T / E)	121.00	0.14	Raycap DC6-48-60-18-8F SUPPRESSOR (AT&T / E)	121.00	0.03
		0.26			0.05
		0.38			0.08
(2) LGP21401 TMA'S (AT&T / E)	121.00	0.02	Raycap DC6-48-60-18-8F SUPPRESSOR (AT&T / E)	121.00	0.03
		0.03			0.05
		0.04			0.08
(2) LGP21401 TMA'S (AT&T / E)	121.00	0.02	Raycap DC6-48-60-0-8F SUPPRESSOR (AT&T / E)	121.00	0.03
		0.03			0.05
		0.04			0.07
(2) LGP21401 TMA'S (AT&T / E)	121.00	0.02	ION-M23 SDARS RRU (AT&T / P)	121.00	0.06
		0.03			0.08
		0.04			0.09
(2) TPX-070821 Triplexer (AT&T / E)	121.00	0.01	ION-M23 SDARS RRU (AT&T / P)	121.00	0.06
		0.01			0.08
		0.02			0.09
(2) TPX-070821 Triplexer (AT&T / E)	121.00	0.01	ION-M23 SDARS RRU (AT&T / P)	121.00	0.06
		0.01			0.08
		0.02			0.09
(2) TPX-070821 Triplexer (AT&T / E)	121.00	0.01	CBC23SR-43 Diplexer (AT&T / P)	121.00	0.01
		0.01			0.01
		0.02			0.02
RADIO 8843 B2/B66A (AT&T / E)	121.00	0.07	CBC23SR-43 Diplexer (AT&T / P)	121.00	0.01
		0.09			0.01
		0.11			0.02
RADIO 8843 B2/B66A (AT&T / E)	121.00	0.07	CBC23SR-43 Diplexer (AT&T / P)	121.00	0.01
		0.09			0.01
		0.11			0.02
RADIO 8843 B2/B66A (AT&T / E)	121.00	0.07	DC6-48-60-18-8C-EV Surge	121.00	0.03
		0.09			

tnxTower Malouf Engineering Intl., Inc. 17950 Preston Road, Suite #720 Dallas, TX 75252 Phone: (972) 783-2578 FAX: (972) 783-2583	Job 120 FT MP, North Haven South Site CT5107	Page 3 of 6
	Project CT05943M-19V0	Date 15:34:22 12/03/19
	Client VRG / AT&T	Designed by Luan Nguyen

Description	Placement	Weight	
		ft	K
Suppressor Box (AT&T / P)			0.06
LP Platform Mount w/ Ladder (AT&T / E)	118.00		0.10
(4) 844G65VTZASX w/Mount Pipe (E)	110.00		1.50
(4) 844G65VTZASX w/Mount Pipe (E)	110.00		2.25
(4) 844G65VTZASX w/Mount Pipe (E)	110.00		3.00
LP Platform Mount (E)	108.00		0.04
1900MHz RRH w/ Pipe Mount (E)	100.00		0.10
1900MHz RRH w/ Pipe Mount (E)	100.00		0.16
1900MHz RRH w/ Pipe Mount (E)	100.00		0.04
TME-800MHz RRH (E)	99.00		0.10
TME-800MHz RRH (E)	99.00		0.16
TME-800MHz RRH (E)	99.00		0.04
Close Contact Mounts (3) (E)	100.00		0.10
P40-16-XLPP-RR-A w/ Pipe Mount (E)	98.00		1.25
P40-16-XLPP-RR-A w/ Pipe Mount (E)	98.00		1.80
APXVTM14-C-120 w/ Pipe Mount (E)	98.00		2.35
APXVTM14-C-120 w/ Pipe Mount (E)	98.00		0.06
APXVTM14-C-120 w/ Pipe Mount (E)	98.00		0.09
APXVTM14-C-120 w/ Pipe Mount (E)	98.00		0.12
APXVTM14-C-120 w/ Pipe Mount (E)	98.00		0.06
APXVSPPI8-C-A20 w/ Pipe Mount (E)	98.00		0.09
(3) ACU-A20-N RET (E)	98.00		0.07
			0.09
			0.12
			0.15
			0.10
			0.17
			0.25
			0.10
			0.17
			0.25
			0.08
			0.13
			0.20
			0.08
			0.13
			0.20
			0.08
			0.13
			0.20
			0.09
			0.16
			0.24
			0.00
			0.00
			0.00

Description	Placement	Weight	
		ft	K
(3) ACU-A20-N RET (E)	98.00		0.00
(3) ACU-A20-N RET (E)	98.00		0.00
800 Ext. Notch Filter (E)	98.00		0.01
800 Ext. Notch Filter (E)	98.00		0.02
800 Ext. Notch Filter (E)	98.00		0.01
800 Ext. Notch Filter (E)	98.00		0.02
TD-RRH 8x20-25 (E)	98.00		0.07
TD-RRH 8x20-25 (E)	98.00		0.10
TD-RRH 8x20-25 (E)	98.00		0.13
TD-RRH 8x20-25 (E)	98.00		0.07
TD-RRH 8x20-25 (E)	98.00		0.10
TD-RRH 8x20-25 (E)	98.00		0.13
Empty Pipe Mount (E)	98.00		0.03
Empty Pipe Mount (E)	98.00		0.04
Empty Pipe Mount (E)	98.00		0.04
Empty Pipe Mount (E)	98.00		0.03
Empty Pipe Mount (E)	98.00		0.04
Empty Pipe Mount (E)	98.00		0.04
LP Platform Mount w/ Ladder (E)	97.00		1.50
LNX-6515DS-A1M w/ Pipe Mnt. (E)	84.00		2.25
LNX-6515DS-A1M w/ Pipe Mnt. (E)	84.00		3.00
LNX-6515DS-A1M w/ Pipe Mnt. (E)	84.00		0.07
LNX-6515DS-A1M w/ Pipe Mnt. (E)	84.00		0.16
LNX-6515DS-A1M w/ Pipe Mnt. (E)	84.00		0.26
LNX-6515DS-A1M w/ Pipe Mnt. (E)	84.00		0.07
LNX-6515DS-A1M w/ Pipe Mnt. (E)	84.00		0.16
LNX-6515DS-A1M w/ Pipe Mnt. (E)	84.00		0.26
AIR21 B2A B4P w/ pipe Mount (E)	84.00		0.13
AIR21 B2A B4P w/ pipe Mount (E)	84.00		0.18
AIR21 B2A B4P w/ pipe Mount (E)	84.00		0.25
AIR21 B2A B4P w/ pipe Mount (E)	84.00		0.13
AIR21 B2A B4P w/ pipe Mount (E)	84.00		0.18
AIR21 B2A B4P w/ pipe Mount (E)	84.00		0.25
AIR21 B4A B2P w/ pipe Mount (E)	84.00		0.13
AIR21 B4A B2P w/ pipe Mount (E)	84.00		0.18
AIR21 B4A B2P w/ pipe Mount (E)	84.00		0.25
AIR21 B4A B2P w/ pipe Mount (E)	84.00		0.13
AIR21 B4A B2P w/ pipe Mount (E)	84.00		0.18
AIR21 B4A B2P w/ pipe Mount (E)	84.00		0.25
AIR21 B4A B2P w/ pipe Mount (E)	84.00		0.13
AIR21 B4A B2P w/ pipe Mount (E)	84.00		0.18
AIR21 B4A B2P w/ pipe Mount (E)	84.00		0.25

inxTower Malouf Engineering Intl., Inc. 17950 Preston Road, Suite #720 Dallas, TX 75252 Phone: (972) 783-2578 FAX: (972) 783-2583	Job 120 FT MP, North Haven South Site CT5107	Page 4 of 6
	Project CT05943M-19V0	Date 15:34:22 12/03/19
	Client VRG / AT&T	Designed by Luan Nguyen

Description	Placement	Weight	Description	Placement	Weight
	ft	K		ft	K
(E)		0.25	TMA'S		0.02
AIR21 B4A B2P w/ pipe	84.00	0.13	(E)		0.03
Mount		0.18	Empty Pipe Mount	84.00	0.03
(E)		0.25	(E)		0.04
RRUS-11 B12	84.00	0.05	Empty Pipe Mount	84.00	0.03
(E)		0.07	(E)		0.04
		0.10	Empty Pipe Mount	84.00	0.03
RRUS-11 B12	84.00	0.05	(E)		0.04
(E)		0.07	Empty Pipe Mount	84.00	0.03
		0.10	(E)		0.04
RRUS-11 B12	84.00	0.05	LP Platform Mount	83.00	1.25
(E)		0.07	(E)		1.80
		0.10			2.35
ATMAA1412D-1A20	84.00	0.01	GPS Antenna	51.00	0.06
TMA'S		0.02	(KS24019-L112A) & Mount		0.09
(E)		0.03	(E)		0.12
ATMAA1412D-1A20	84.00	0.01			
TMA'S		0.02			
(E)		0.03			
ATMAA1412D-1A20	84.00	0.01			

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	33	83.09	-0.02	-9.94
	Max. H _x	20	47.33	33.29	0.09
	Max. H _z	2	47.33	0.09	33.31
	Max. M _x	2	3067.51	0.09	33.31
	Max. M _z	8	3066.36	-33.29	-0.09
	Max. Torsion	8	1.66	-33.29	-0.09
	Min. Vert	7	35.49	-28.78	16.57
	Min. H _x	8	47.33	-33.29	-0.09
	Min. H _z	14	47.33	-0.09	-33.31
	Min. M _x	14	-3068.20	-0.09	-33.31
	Min. M _z	20	-3067.27	33.29	0.09
	Min. Torsion	20	-1.67	33.29	0.09

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	120 - 84.72	10.796	49	0.7450	0.0012
L2	89.29 - 41.63	6.233	49	0.6436	0.0007
L3	47.39 - 0	1.771	49	0.3426	0.0003

tnxTower Malouf Engineering Intl., Inc. 17950 Preston Road, Suite #720 Dallas, TX 75252 Phone: (972) 783-2578 FAX: (972) 783-2583	Job 120 FT MP, North Haven South Site CT5107	Page 5 of 6
	Project CT05943M-19V0	Date 15:34:22 12/03/19
	Client VRG / AT&T	Designed by Luan Nguyen

Critical Deflections and Radius of Curvature - Service Wind

Elevation	Appurtenance	Gov. Load Comb.	Deflection	Tilt	Twist	Radius of Curvature
ft			in	°	°	ft
121.00	7770.00 Panels w/ Pipe Mount	49	10.796	0.7450	0.0012	160961
120.00	Top Lightning Rod	49	10.796	0.7450	0.0012	160961
118.00	LP Platform Mount w/ Ladder	49	10.487	0.7402	0.0011	160961
110.00	(4) 844G65VTZASX w/Mount Pipe	49	9.258	0.7199	0.0010	32192
108.00	LP Platform Mount	49	8.953	0.7143	0.0010	26827
100.00	1900MHz RRH w/ Pipe Mount	49	7.757	0.6891	0.0008	16096
99.00	TME-800MHz RRH	49	7.610	0.6855	0.0008	15329
98.00	P40-1 6-XLPP-RR-A w/ Pipe Mount	49	7.465	0.6818	0.0008	14632
97.00	LP Platform Mount w/ Ladder	49	7.320	0.6780	0.0008	13996
84.00	LNx-6515DS-A1M w/ Pipe Mnt.	49	5.526	0.6146	0.0006	9527
83.00	LP Platform Mount	49	5.396	0.6086	0.0006	9366
51.00	GPS Antenna (KS24019-L112A) & Mount	49	2.036	0.3711	0.0003	6074

Base Plate Design Data

Plate Thickness	Number of Anchor Bolts	Anchor Bolt Size	Actual Allowable Ratio Bolt Tension K	Actual Allowable Ratio Concrete Stress ksi	Actual Allowable Ratio Plate Stress ksi	Actual Allowable Ratio Stiffener Stress ksi	Controlling Condition	Critical Ratio
in		in						
2.2500	20	2.2500	93.55	1.735	41.520		Plate	0.77
			223.65	4.080	54.000			
			0.42	0.43	0.77			

Compression Checks

Pole Design Data

Section No.	Elevation	Size	L	L _v	KI/r	A	P _u	φP _{cr}	Ratio P _u /φP _{cr}
	ft		ft	ft		in ²	K	K	
L1	120 - 84.72 (1)	TP32.5458x24.09x0.375	35.28	0.00	0.0	36.9876	-14.33	2747.99	0.005
L2	84.72 - 41.63 (2)	TP42.0347x30.7005x0.4375	47.66	0.00	0.0	55.8608	-28.84	4150.18	0.007
L3	41.63 - 0 (3)	TP51x39.7899x0.5	47.39	0.00	0.0	80.1435	-47.30	5940.26	0.008

Pole Bending Design Data

Section No.	Elevation	Size	M _{ux}	φM _{ux}	Ratio M _{ux} /φM _{ux}	M _{uy}	φM _{uy}	Ratio M _{uy} /φM _{uy}
	ft		kip-ft	kip-ft		kip-ft	kip-ft	
L1	120 - 84.72 (1)	TP32.5458x24.09x0.375	452.13	1748.71	0.259	0.00	1748.71	0.000
L2	84.72 - 41.63 (2)	TP42.0347x30.7005x0.4375	1584.97	3422.81	0.463	0.00	3422.81	0.000
L3	41.63 - 0 (3)	TP51x39.7899x0.5	3099.18	6156.17	0.503	0.00	6156.17	0.000

tnxTower Malouf Engineering Intl., Inc. 17950 Preston Road, Suite #720 Dallas, TX 75252 Phone: (972) 783-2578 FAX: (972) 783-2583	Job 120 FT MP, North Haven South Site CT5107	Page 6 of 6
	Project CT05943M-19V0	Date 15:34:22 12/03/19
	Client VRG / AT&T	Designed by Luan Nguyen

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_c K	ϕV_n K	Ratio $\frac{V_c}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	120 - 84.72 (1)	TP32.5458x24.09x0.375	21.13	1374.00	0.015	0.59	3508.04	0.000
L2	84.72 - 41.63 (2)	TP42.0347x30.7005x0.4375	29.81	2075.09	0.014	0.89	6865.22	0.000
L3	41.63 - 0 (3)	TP51x39.7899x0.5	33.85	2970.13	0.011	1.24	12345.75	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	120 - 84.72 (1)	0.005	0.259	0.000	0.015	0.000	0.264	1.000	4.8.2 ✓
L2	84.72 - 41.63 (2)	0.007	0.463	0.000	0.014	0.000	0.470	1.000	4.8.2 ✓
L3	41.63 - 0 (3)	0.008	0.503	0.000	0.011	0.000	0.512	1.000	4.8.2 ✓

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	σP_{allow} K	% Capacity	Pass Fail
L1	120 - 84.72	Pole	TP32.5458x24.09x0.375	1	-14.33	2747.99	26.4	Pass
L2	84.72 - 41.63	Pole	TP42.0347x30.7005x0.4375	2	-28.84	4150.18	47.0	Pass
L3	41.63 - 0	Pole	TP51x39.7899x0.5	3	-47.30	5940.26	51.2	Pass
Summary								
Pole (L3)							51.2	Pass
Base Plate							76.9	Pass
RATING =							76.9	Pass

APPENDIX 2 – SOURCE / CHANGED CONDITION



From: Vertical Resources Group <mnobre@verticalresourcesgrp.com>

Sent: Thursday, November 7, 2019 9:22 AM

To: Mark Malouf <mmalouf@maloufengineering.com>

Cc: MEI Admin <execadmin@maloufengineering.com>

Subject: RE: SA Quotes - AT&T CT5107

Dropbox link to the last pics we took is below.

<https://www.dropbox.com/sh/s8ee3lxiwy0n06b/AAB9cvCaoLpDOI2-ahPPyKYya?dl=0>

Proposed AT&T changes are as follows:

EXISTING TO REMAIN:

121' (3) Powerwave 7770 (UMTS850 pos #1)

121' (3) CCI OPA65RLCUUH6 (LTEPCS/700de pos #2)

121' (3) Kathrein 800-10966 (LTE700b14/AWS pos #3)

121' (3) Kathrein 800-10966 (LTE700bc/WCS/850 pos #4)

121' (6) LGP21401 (UMTS850 TMA pos #1)

121' (6) CCI TPX070821 (LTE700de pos#2)

121' (3) RRUS8843 (LTEPCS/AWS pos#2)

121' (3) RRUS4478b14 (LTE700b14 pos #3)

121' (3) RRUS4449 (LTE700bc/850 pos #4)

121' (3) RRUS32b30 (LTEWCS pos #4)

121' Raycap Surge Arrestors (2) DC64860188F (1) DC6486008F

0-121' (12) Coaxial Cables 1.625"

0-121' (2) Fiber trunks, (6) DC trunks

PROPOSED NEW:

121' (3) Sirius XM ionM23 SDARS radio (SXM pos#4)

121' (3) Commscope CBC23SR-43 (LTEWCS/SXM combiner pos#4)

121' Raycap Surge Arrestor (1) DC64860188CEV

Miguel Nobre

Vertical Resources Group

23 MidState Dr., #210

Auburn, MA 01501

P: 508-981-9590

F: 508-519-8939

Section 5 - E-911 INFORMATION - existing

SECTION	SECTION NAME	MAP ID	SECT PHASE	IMP/DEV (REQUIRED)	LINE REQUIRED	DATE LINE PH1	DATE LINE PH2
SECTION A	E-911			INTFACD, NAME	U		
SECTION B				INTFACD, NAME	U		
SECTION C				INTFACD, NAME	U		
SECTION D							
SECTION E							
SECTION F							
Other							

Section 5 - E-911 INFORMATION - final

SECTION	SECTION NAME	MAP ID	SECT PHASE	IMP/DEV (REQUIRED)	LINE REQUIRED	DATE LINE PH1	DATE LINE PH2
SECTION A	E-911			INTFACD, NAME	U		
SECTION B				INTFACD, NAME	U		
SECTION C				INTFACD, NAME	U		
SECTION D							
SECTION E							
SECTION F							
Other							

POINT #	POINT NAME	POINT TYPE	POINT CLASS	POINT CODE	POINT VALUE	POINT UNIT	POINT DIMENSION	POINT DATE	POINT STATUS	POINT NOTES	POINT ID
AUTUMN POINTS A	POINT 1 (2027) WCA.6.5	PLAN OF PL_3_F	PLAN OF PL_3_F	178 700	160	2	TOP	16			2027 A 13
	POINT 2 (2028) WCA.6.4	PLAN OF PL_3_F	PLAN OF PL_3_F	178 600	160	2	TOP	16			2027 B 14
AUTUMN POINTS B	POINT 1 (2027) WCA.6.1	PLAN OF PL_3_F	PLAN OF PL_3_F	178 770	170	2	TOP	16			1473 2000
	POINT 2 (2027) WCA.6.2	PLAN OF PL_3_F	PLAN OF PL_3_F	178 680	160	2	TOP	16			1500
	POINT 3 (2027) WCA.6.3	PLAN OF PL_3_F	PLAN OF PL_3_F	178 760	160	2	TOP	16			1500 2000
	POINT 4 (2027) WCA.6.4	PLAN OF PL_3_F	PLAN OF PL_3_F	178 600	160	2	TOP	16			1500

