QC Development
PO Box 916
Storrs, CT 06268
860-670-9068
Mark.Roberts@QCDevelopment.net

September 23, 2016

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

Notice of Exempt Modification – New Cingular Wireless PCS, LLC (AT&T) – CT2202
691 Oxford Road, Oxford, CT 06478
N 41-26-49.50
W 73-09-08.31

Dear Ms. Bachman:

AT&T currently maintains twelve (12) antennas at the 137-foot level of the existing 150-foot Monopole at 691 Oxford Road, Oxford, CT. The structure and property are owned by Crown Castle. AT&T now intends to remove three (3) Ericsson RRUS-11 and replace them with three (3) Ericsson RRUS-12. These RRUs would be installed at the 137-foot level of the tower.

This facility was approved by the Town of Oxford Planning and Zoning Commission on July 5, 2001. There were no conditions that could feasibly be violated by this modification, including the stealth design, total facility height or mounting restrictions. This modification therefore complies with the aforementioned approval.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to George R. Temple, First Selectman for the Town of Oxford, as well as the property owner and the tower owner.

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

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

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

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

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

5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.

6. The existing structure and its foundation can support the proposed loading.

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

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

Sincerely,

Mark Roberts
QC Development
Consultant for AT&T

Attachments

cc: George R. Temple - as elected official
Crown Castle - as structure and property owner (via e-mail)

Power Density

Existing Loading on Tower

Carrier	# of Channels	ERP/Ch (W)	Antenna Centerline Height (ft)	Power Density (mW/cm^2)	Freq. Band (MHz**)	Limit S (mW /cm^2)	%MPE
Other Carriers*							2.32%
AT&T GSM	2	565	137	0.0237	880	0.5867	0.40%
AT&T UMTS	1	538	137	0.0113	880	0.5867	0.19%
AT&T UMTS	2	875	137	0.0367	1900	1.0000	0.37%
AT&T LTE	1	1375	137	0.0288	734	1.0000	0.59%
AT&T LTE	4	934	137	0.0783	1900	1.0000	0.78%
Site Total							4.66%

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

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

Proposed Loading on Tower

Carrier	# of Channels	ERP/Ch (W)	Antenna Centerline Height (ft)	Power Density (mW/cm^2)	Freq. Band (MHz**)	Limit S (mW /cm^2)	%MPE
Other Carriers*							2.32%
AT&T UMTS	2	284	137	0.0119	850	0.5867	0.21%
AT&T UMTS	2	411	137	0.0172	1900	1.0000	0.17%
AT&T LTE	1	1119	137	0.0234	734	0.4893	0.48%
AT&T LTE	4	2183	137	0.1830	1900	1.0000	1.83%
Site Total							5.01%

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

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

Note: Proposed Loading may also include corrections to certain Existing Loading values

PROJECT INFORMATION

SCOPE OF WORK:	TELECOMMUNICATIONS FACILITY UPGRADE (LTE BWE 2017 UPGRADE):
SITE ADDRESS:	691 OXFORD ROAD OXFORD, CT 06478
LATITUDE:	41.446981° N 41° 26' 49.13" N
LONGITUDE:	73.152752° W 73° 9' 9.90" W
TYPE OF SITE:	MONOPOLE TOWER / INDOOR EQUIPMENT
TOWER HEIGHT:	150' ±
RAD CENTER:	138' ±
JURISDICTION:	NATIONAL, STATE & LOCAL CODES OR ORDINANCES
CURRENT USE:	TELECOMMUNICATIONS FACILITY
PROPOSED USE:	TELECOMMUNICATIONS FACILITY
NOC#	800-638-2822

SITE NUMBER: CT2202

SITE NAME: OXFORD PERRY LANE

PROJECT: LTE BWE 2017 UPGRADE

DRAWING INDEX

SHEET NO.	DESCRIPTION	REV.
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RF-1	RF-PLUMBING DIAGRAM	1
G-1	GROUNDING DETAILS	1

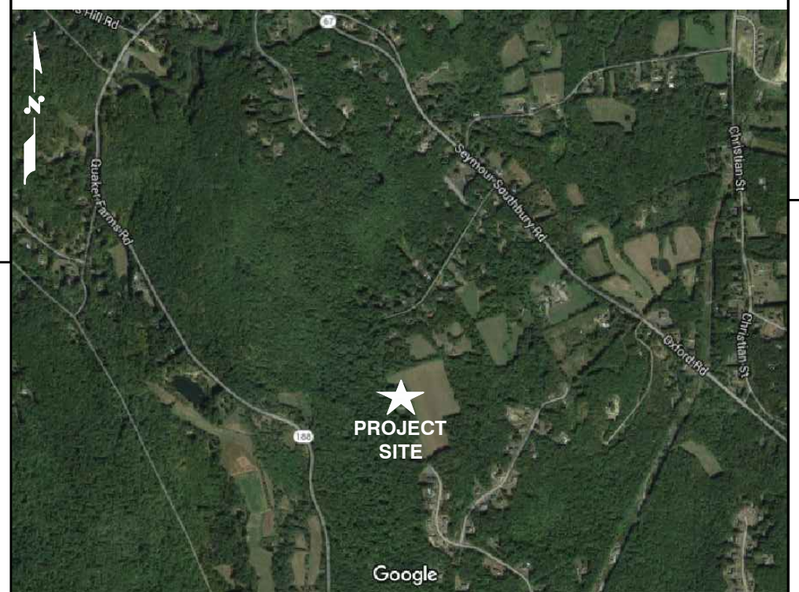
CCI SITE NUMBER: 873645

CCI SITE NAME: OXFORD

VICINITY MAP

DIRECTIONS TO SITE:

START AT 500 ENTERPRISE DR, ROCKY HILL GOING TOWARD CAPITOL BLVD GO 0.3 MI, TURN LEFT ON CAPITOL BLVD GO 0.3 MI, TURN LEFT ON WEST ST GO 0.3 MI, TURN LEFT TO TAKE RAMP ONTO I-91 S TOWARD NEW HAVEN GO 9.1 MI, TAKE EXIT #18/MERIDEN/WATERBURY ONTO I-691 W GO 8 MI, TAKE LEFT EXIT #1/WATERBURY/DANBURY ONTO I-84 W GO 16 MI, TAKE EXIT #16/SOUTHFORD GO 0.2 MI, TURN LEFT ON CT-188 GO 2.4 MI, CONTINUE ON SOUTHFORD RD(CT-67) GO 0.1 MI, CONTINUE TO FOLLOW CT-67 GO 1 MI, ARRIVE AT 691 OXFORD RD, OXFORD, ON THE RIGHT.



GENERAL NOTES

1. THIS DOCUMENT IS THE CREATION, DESIGN, PROPERTY AND COPYRIGHTED WORK OF AT&T. ANY DUPLICATION OR USE WITHOUT EXPRESS WRITTEN CONSENT IS STRICTLY PROHIBITED. DUPLICATION AND USE BY GOVERNMENT AGENCIES FOR THE PURPOSES OF CONDUCTING THEIR LAWFULLY AUTHORIZED REGULATORY AND ADMINISTRATIVE FUNCTIONS IS SPECIFICALLY ALLOWED.
2. THE FACILITY IS AN UNMANNED PRIVATE AND SECURED EQUIPMENT INSTALLATION. IT IS ONLY ACCESSED BY TRAINED TECHNICIANS FOR PERIODIC ROUTINE MAINTENANCE AND THEREFORE DOES NOT REQUIRE ANY WATER OR SANITARY SEWER SERVICE. THE FACILITY IS NOT GOVERNED BY REGULATIONS REQUIRING PUBLIC ACCESS PER ADA REQUIREMENTS.
3. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE AT&T MOBILITY REPRESENTATIVE IN WRITING OF DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

72 HOURS

CALL
BEFORE YOU DIG
CALL TOLL FREE 1-800-922-4455
OR CALL 811

UNDERGROUND SERVICE ALERT

Hudson Design Groupuc
1600 OSGOOD STREET
BUILDING 20 NORTH, SUITE 3090
N. ANDOVER, MA 01845
TEL: (978) 557-5553
FAX: (978) 336-5586

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27 NORTHWESTERN DR.
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SITE NUMBER: CT2202
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SCALE: AS SHOWN | DESIGNED BY: AT | DRAWN BY: EB

STATE OF CONNECTICUT — No. 25[illegible] — LICENSED PROFESSIONAL ENGINEER

AT&T

TITLE SHEET
(LTE BWE)

SITE NUMBER	DRAWING NUMBER	REV
2202.00	T-1	1

GROUNDING NOTES

1. THE SUBCONTRACTOR SHALL REVIEW AND INSPECT THE EXISTING FACILITY GROUNDING SYSTEM AND LIGHTNING PROTECTION SYSTEM (AS DESIGNED AND INSTALLED) FOR STRICT COMPLIANCE WITH THE NEC (AS ADOPTED BY THE AHJ), THE SITE-SPECIFIC (UL, LPI, OR NFPA) LIGHTING PROTECTION CODE, AND GENERAL COMPLIANCE WITH TELCORDIA AND TIA GROUNDING STANDARDS. THE SUBCONTRACTOR SHALL REPORT ANY VIOLATIONS OR ADVERSE FINDINGS TO THE CONTRACTOR FOR RESOLUTION.

2. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION, AND AC POWER GES'S) SHALL BE BONDED TOGETHER, AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.

3. THE SUBCONTRACTOR SHALL PERFORM IEEE FALL-OF-POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR NEW GROUND ELECTRODE SYSTEMS. THE SUBCONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS.

4. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO BTS EQUIPMENT.

5. EACH BTS CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, 6 AWG STRANDED COPPER OR LARGER FOR INDOOR BTS 2 AWG STRANDED COPPER FOR OUTDOOR BTS.

6. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.

7. APPROVED ANTIOXIDANT COATINGS (I.E., CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.

8. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO GROUND BAR.

9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.

10. MISCELLANEOUS ELECTRICAL AND NON-ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.

11. METAL CONDUIT SHALL BE MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH 6 AWS COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.

12. ALL NEW STRUCTURES WITH A FOUNDATION AND/OR FOOTING HAVING 20 FT. OR MORE OF 1/2 IN. OR GREATER ELECTRICALLY CONDUCTIVE REINFORCING STEEL MUST HAVE IT BONDED TO THE GROUND RING USING AN EXOTHERMIC WELD CONNECTION USING #2 AWG SOLID BARE TINNED COPPER GROUND WIRE, PER NEC 250.50

GENERAL NOTES

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:

   CONTRACTOR – SAI
   SUBCONTRACTOR – GENERAL CONTRACTOR (CONSTRUCTION)
   OWNER – AT&T MOBILITY

2. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING SUBCONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CONTRACTOR.

3. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. SUBCONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS, AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.

4. DRAWINGS PROVIDED HERE ARE NOT TO BE SCALED AND ARE INTENDED TO SHOW OUTLINE ONLY.

5. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.

6. "KITTING LIST" SUPPLIED WITH THE BID PACKAGE IDENTIFIES ITEMS THAT WILL BE SUPPLIED BY CONTRACTOR. ITEMS NOT INCLUDED IN THE BILL OF MATERIALS AND KITTING LIST SHALL BE SUPPLIED BY THE SUBCONTRACTOR.

7. THE SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.

8. IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE SUBCONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION SPACE FOR APPROVAL BY THE CONTRACTOR.

9. SUBCONTRACTOR SHALL DETERMINE ACTUAL ROUTING OF CONDUIT, POWER AND T1 CABLES, GROUNDING CABLES AS SHOWN ON THE POWER, GROUNDING AND TELCO PLAN DRAWING. SUBCONTRACTOR SHALL UTILIZE EXISTING TRAYS AND/OR SHALL ADD NEW TRAYS AS NECESSARY. SUBCONTRACTOR SHALL CONFIRM THE ACTUAL ROUTING WITH THE CONTRACTOR.

10. THE SUBCONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT SUBCONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.

11. SUBCONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.

12. SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.

13. ALL CONCRETE REPAIR WORK SHALL BE DONE IN ACCORDANCE WITH AMERICAN CONCRETE INSTITUTE (ACI) 301.

14. ANY NEW CONCRETE NEEDED FOR THE CONSTRUCTION SHALL BE AIR-ENTRAINED AND SHALL HAVE 4000 PSI STRENGTH AT 28 DAYS. ALL CONCRETE WORK SHALL BE DONE IN ACCORDANCE WITH ACI 318 CODE REQUIREMENTS.

15. ALL STRUCTURAL STEEL WORK SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH AISC SPECIFICATIONS. ALL STRUCTURAL STEEL SHALL BE ASTM A36 (Fy = 36 ksi) UNLESS OTHERWISE NOTED. PIPES SHALL BE ASTM A53 TYPE E (Fy = 36 ksi). ALL STEEL EXPOSED TO WEATHER SHALL BE HOT DIPPED GALVANIZED. TOUCHUP ALL SCRATCHES AND OTHER MARKS IN THE FIELD AFTER STEEL IS ERECTED USING A COMPATIBLE ZINC RICH PAINT.

16. CONSTRUCTION SHALL COMPLY WITH SPECIFICATIONS AND "GENERAL CONSTRUCTION SERVICES FOR CONSTRUCTION OF AT&T SITES."

17. SUBCONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS PRIOR TO COMMENCING ANY WORK. ALL DIMENSIONS OF EXISTING CONSTRUCTION SHOWN ON THE DRAWINGS MUST BE VERIFIED. SUBCONTRACTOR SHALL NOTIFY THE CONTRACTOR OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.

18. THE EXISTING CELL SITE IS IN FULL COMMERCIAL OPERATION. ANY CONSTRUCTION WORK BY SUBCONTRACTOR SHALL NOT DISRUPT THE EXISTING NORMAL OPERATION. ANY WORK ON EXISTING EQUIPMENT MUST BE COORDINATED WITH CONTRACTOR. ALSO, WORK SHOULD BE SCHEDULED FOR AN APPROPRIATE MAINTENANCE WINDOW USUALLY IN LOW TRAFFIC PERIODS AFTER MIDNIGHT.

19. SINCE THE CELL SITE IS ACTIVE, ALL SAFETY PRECAUTIONS MUST BE TAKEN WHEN WORKING AROUND HIGH LEVELS OF ELECTROMAGNETIC RADIATION. EQUIPMENT SHOULD BE SHUTDOWN PRIOR TO PERFORMING ANY WORK THAT COULD EXPOSE THE WORKERS TO DANGER. PERSONAL RF EXPOSURE MONITORS ARE ADVISED TO BE WORN TO ALERT OF ANY DANGEROUS EXPOSURE LEVELS.

20. APPLICABLE BUILDING CODES:
    SUBCONTRACTOR'S WORK SHALL COMPLY WITH ALL APPLICABLE NATIONAL, STATE, AND LOCAL CODES AS ADOPTED BY THE LOCAL AUTHORITY HAVING JURISDICTION (AHJ) FOR THE LOCATION. THE EDITION OF THE AHJ ADOPTED CODES AND STANDARDS IN EFFECT ON THE DATE OF CONTRACT AWARD SHALL GOVERN THE DESIGN.
    BUILDING CODE: 2003 IBC WITH 2005 CT SUPPLEMENT, + 2009 & 2013 CT AMENDMENTS
    ELECTRICAL CODE: REFER TO ELECTRICAL DRAWINGS
    LIGHTENING CODE: REFER TO ELECTRICAL DRAWINGS

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

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

    AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

    MANUAL OF STEEL CONSTRUCTION, ASD, FOURTEENTH EDITION;

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

    EQUIPMENT AND ANTENNA SUPPORTING STRUCTURES; REFER TO ELECTRICAL DRAWINGS FOR SPECIFIC ELECTRICAL STANDARDS.

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

ABBREVIATIONS

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

Hudson Design Group LLC
1600 OSGOOD STREET
BUILDING 20 NORTH, SUITE 3090
N. ANDOVER, MA 01845
TEL: (978) 557-5553
FAX: (978) 336-5586

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27 NORTHWESTERN DR.
SALEM, NH 03079

SITE NUMBER: CT2202
SITE NAME: OXFORD PERRY LANE
CCI SITE NUMBER: 873645
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SCALE: AS SHOWN | DESIGNED BY: AT | DRAWN BY: EB

STATE OF CONNECTICUT
DEREK J. CREASER
No. 28351
LICENSED PROFESSIONAL ENGINEER

AT&T

GENERAL NOTES
(LTE BWE)

SITE NUMBER	DRAWING NUMBER	REV
2202.00	GN-1	1

NOTE:

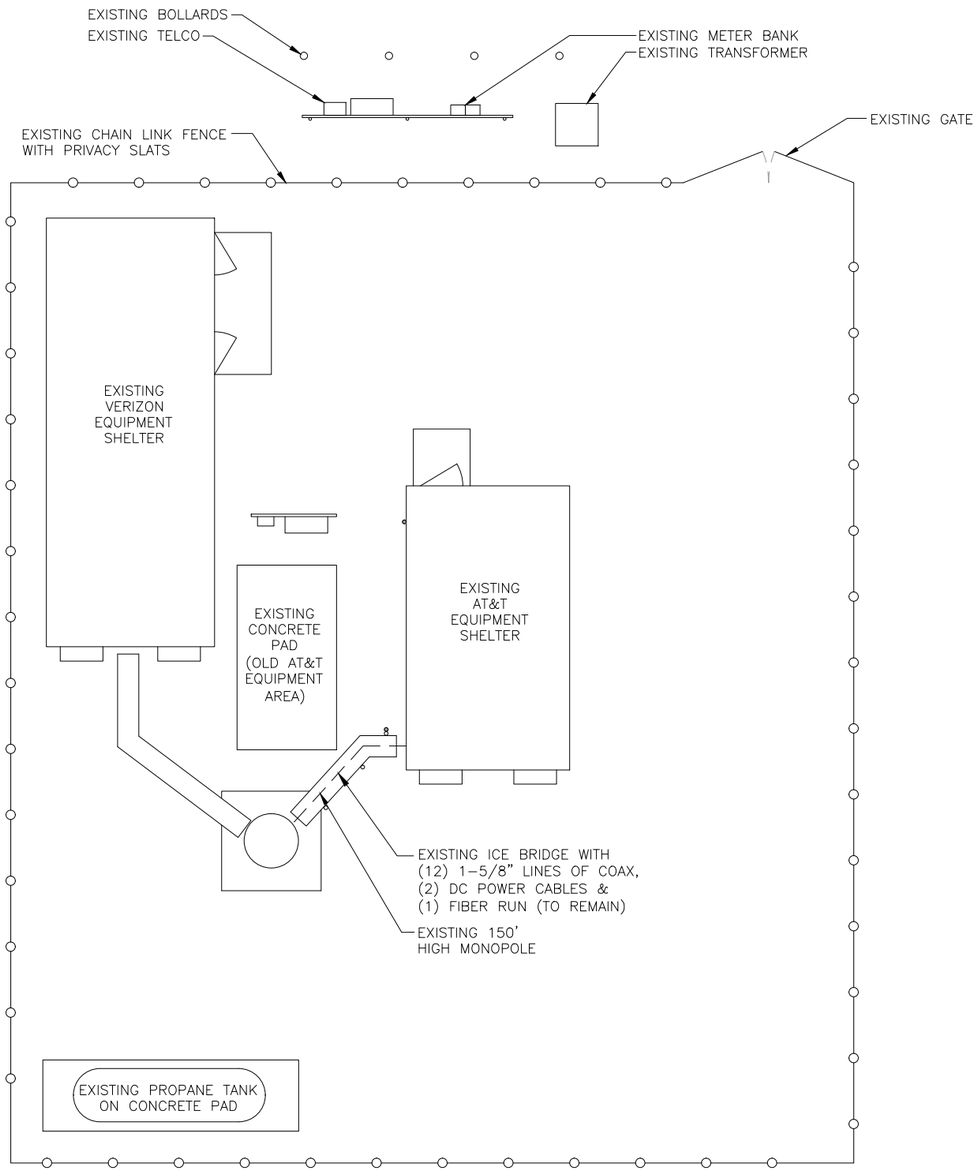
AN ANALYSIS FOR THE CAPACITY OF THE EXISTING **ANTENNA MOUNT** TO SUPPORT THE PROPOSED LOADING HAS BEEN COMPLETED BY: HUDSON DESIGN GROUP, LLC. DATED: JULY 08, 2016

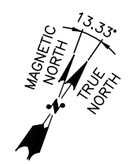
NOTE:

REFER TO STRUCTURAL ANALYSIS BY: CROWN CASTLE DATED: SEPTEMBER 14, 2016, FOR THE CAPACITY OF THE EXISTING STRUCTURES TO SUPPORT THE PROPOSED EQUIPMENT.

NOTE:

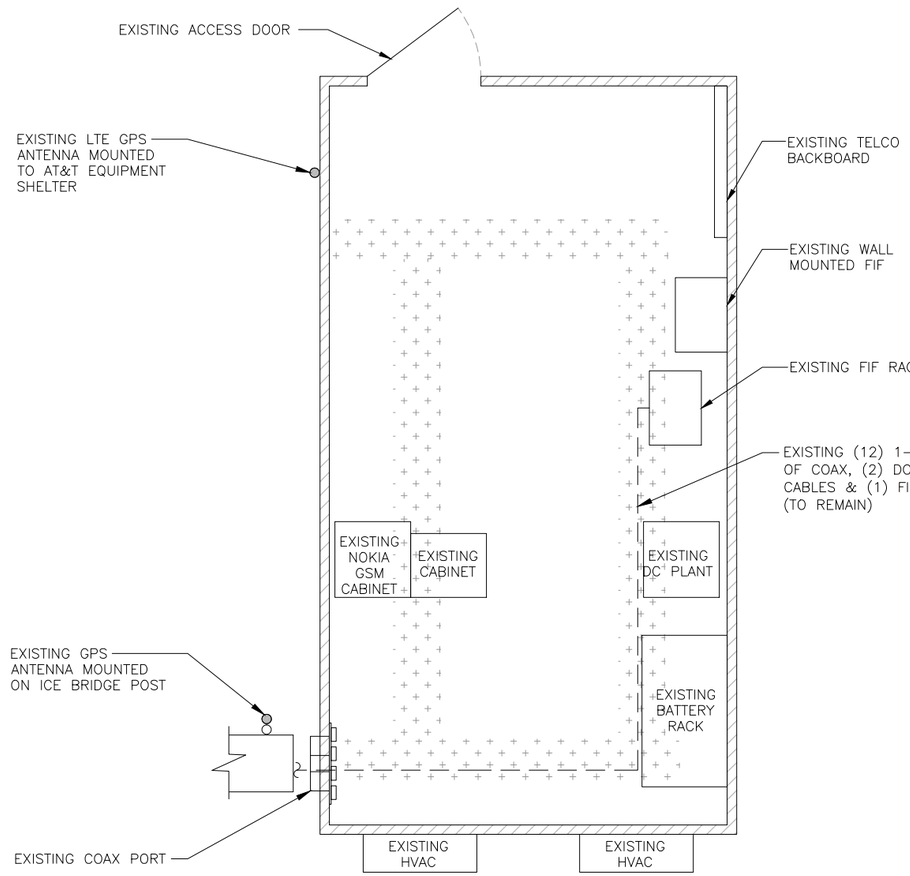
REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA CONFIGURATION.

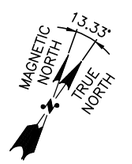




COMPOUND PLAN (1 / A-1)
22x34 SCALE: 3/16"=1'-0"
11x17 SCALE: 3/32"=1'-0"

0 2'-8" 5'-4" 10'-8" 16'-0"





EQUIPMENT PLAN (2 / A-1)
22x34 SCALE: 1/2"=1'-0"
11x17 SCALE: 1/4"=1'-0"

0 1'-0" 2'-0" 4'-0" 6'-0"

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DEREK J. CREASEY
No. 25
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AT&T

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(LTE BWE)

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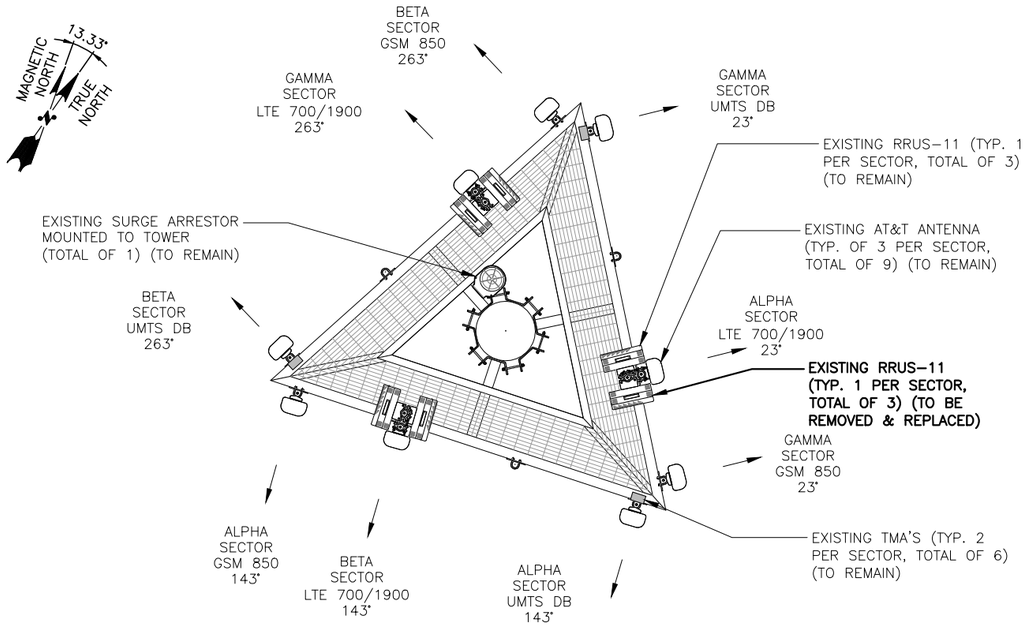
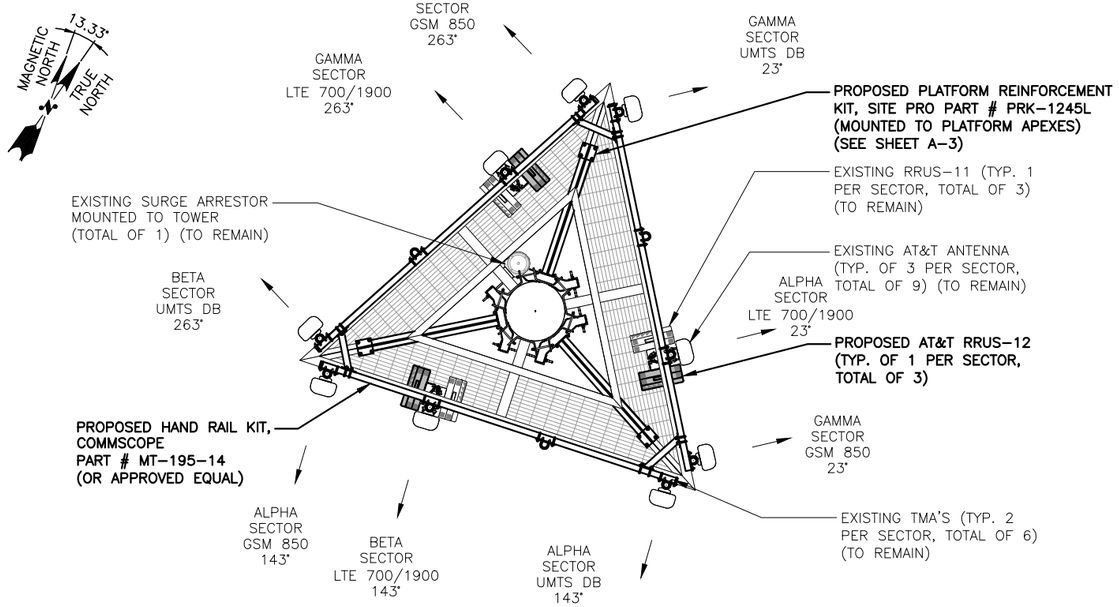


EXISTING ANTENNA PLAN (1 / A-2)
SCALE: N.T.S



PROPOSED ANTENNA PLAN (2 / A-2)
SCALE: N.T.S

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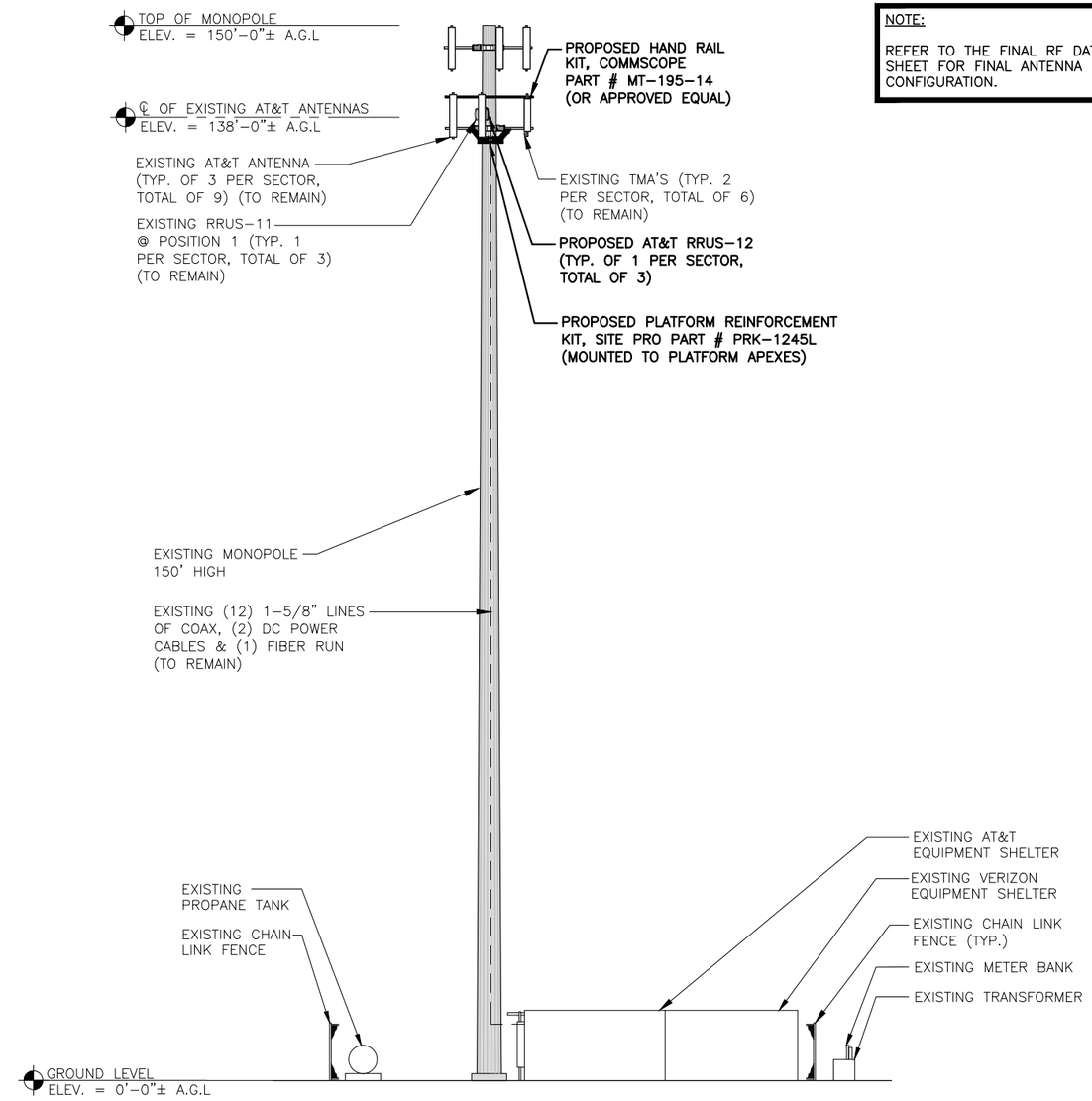

ELEVATION (3 / A-2)
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11x17 SCALE: 3/64"=1'-0"

0 5'-4" 10'-8" 21'-4" 32'-0"

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at&t
500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CT 06067

NO.	DATE	REVISIONS	BY	CHK	APP'D
1	09/23/16	ISSUED FOR CONSTRUCTION	SG	AT	DPH
A	06/16/16	ISSUED FOR REVIEW	EB	AT	DPH

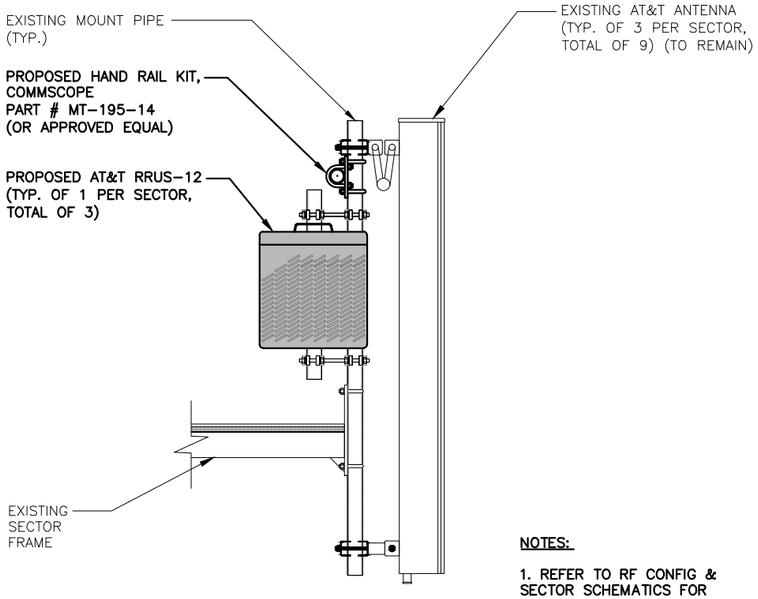
SCALE: AS SHOWN | DESIGNED BY: AT | DRAWN BY: EB

STATE OF CONNECTICUT
DEREK J. CREASEY
No. 29,854
LICENSED
PROFESSIONAL ENGINEER

AT&T

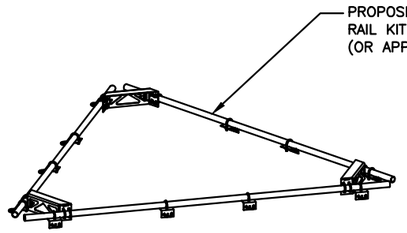
ANTENNA LAYOUTS & ELEVATION
(LTE BWE)

SITE NUMBER	DRAWING NUMBER	REV
2202.00	A-2	1

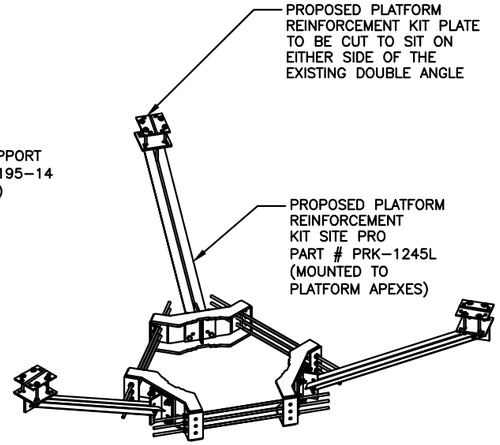


NOTES:

1. REFER TO RF CONFIG & SECTOR SCHEMATICS FOR MODEL, TYPE & QUANTITY REQUIRED PER SECTOR



PROPOSED HANDRAIL KIT (2 / A-3)
SCALE: N.T.S



PROPOSED PLATFORM REINFORCEMENT MOUNT DETAIL (3 / A-3)
SCALE: N.T.S

EXISTING ANTENNA SCHEDULE

SECTOR	MAKE	MODEL#	SIZE (INCHES)
ALPHA:	POWERWAVE	7770	55X11X5
	–	–	–
	ANDREW	SBNH-1D6565C	96.4X11.9X7.1
	KMW	AM-X-CD-16-65-00T-RET	72X11.8X5.9
BETA:	POWERWAVE	7770	55X11X5
	–	–	–
	ANDREW	SBNH-1D6565C	96.4X11.9X7.1
	KMW	AM-X-CD-16-65-00T-RET	72X11.8X5.9
GAMMA:	POWERWAVE	7770	55X11X5
	–	–	–
	ANDREW	SBNH-1D-6565C	96.4X11.9X7.1
	KMW	AM-X-CD-16-65-00T-RET	72X11.8X5.9

NOTE:

AN ANALYSIS FOR THE CAPACITY OF THE EXISTING **ANTENNA MOUNT** TO SUPPORT THE PROPOSED LOADING HAS BEEN COMPLETED BY: HUDSON DESIGN GROUP, LLC. DATED: JULY 08, 2016

NOTE:

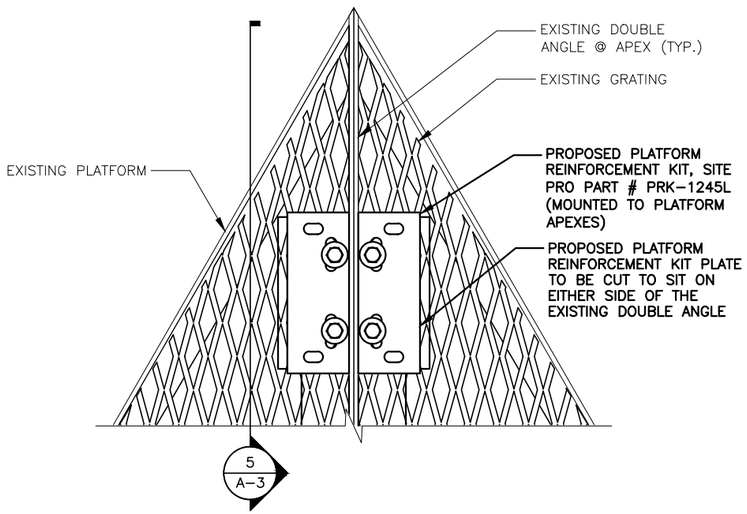
REFER TO STRUCTURAL ANALYSIS BY: CROWN CASTLE DATED: SEPTEMBER 14, 2016, FOR THE CAPACITY OF THE EXISTING STRUCTURES TO SUPPORT THE PROPOSED EQUIPMENT.

NOTE:

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

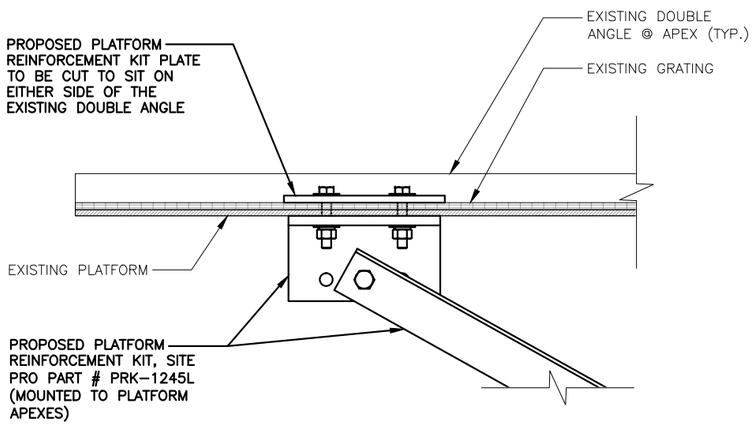
PROPOSED RRU MOUNTING DETAIL (1 / A-3)
22x34 SCALE: 1"=1'-0"
11x17 SCALE: 1/2"=1'-0"

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



PLATFORM REINFORCEMENT PLAN (4 / A-3)
22x34 SCALE: 3"=1'-0"
11x17 SCALE: 1-1/2"=1'-0"

0 0'-2" 0'-4" 0'-8" 1'-0"



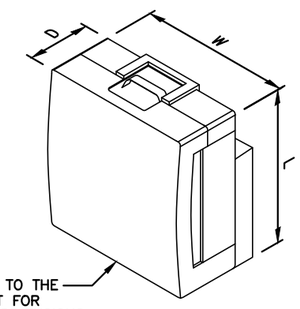
PLATFORM REINFORCEMENT ELEVATION (5 / A-3)
22x34 SCALE: 3"=1'-0"
11x17 SCALE: 1-1/2"=1'-0"

0 0'-2" 0'-4" 0'-8" 1'-0"

RRU CHART

QUANTITY	MODEL	L	W	D
3 (E)	RRUS-11	19.7"	17.0"	7.2"
3 (P)	RRUS-12	20.4"	18.5"	7.5"
–	RRUS-32	27.2"	12.1"	7.0"
–	RRUS-E2	20.4"	18.5"	7.5"
–	LTE-A2	16.4"	15.2"	3.4"

NOTE:
MOUNT PER MANUFACTURER'S SPECIFICATIONS



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

RRU DETAIL (6 / A-3)
SCALE: N.T.S

Hudson Design Group LLC
1600 OSGOOD STREET
BUILDING 20 NORTH, SUITE 3090
N. ANDOVER, MA 01845
TEL: (978) 557-5553
FAX: (978) 336-5586

SAI
27 NORTHWESTERN DR.
SALEM, NH 03079

SITE NUMBER: CT2202
SITE NAME: OXFORD PERRY LANE
CCI SITE NUMBER: 873645
691 OXFORD ROAD
OXFORD, CT 06478
NEW HAVEN COUNTY

at&t
500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CT 06067

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A	06/16/16	ISSUED FOR REVIEW	EB	AT	DPH

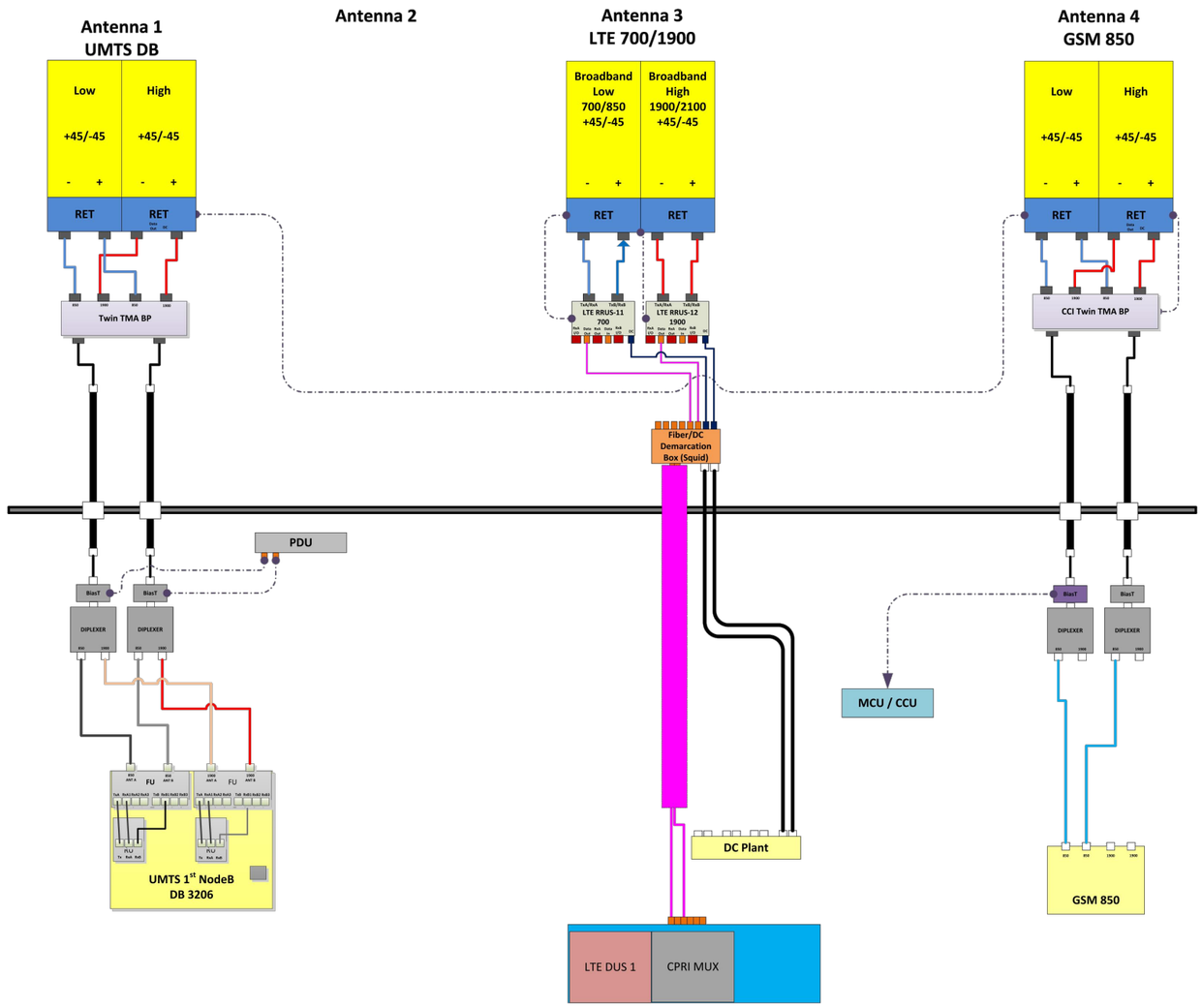
SCALE: AS SHOWN | DESIGNED BY: AT | DRAWN BY: EB

STATE OF CONNECTICUT — DEPARTMENT OF CONSUMER PROTECTION — No. 28554 — LICENSED PROFESSIONAL ENGINEER

AT&T

DETAILS
(LTE BWE)

SITE NUMBER	DRAWING NUMBER	REV
2202.00	A-3	1



RF PLUMBING DIAGRAM (1 / RF–1)
SCALE: N.T.S

NOTE:
1. CONTRACTOR TO CONFIRM ALL PARTS.
2. INSTALL ALL EQUIPMENT TO MANUFACTURER'S RECOMMENDATIONS

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

Hudson Design Group LLC
1600 OSGOOD STREET
BUILDING 20 NORTH, SUITE 3090
N. ANDOVER, MA 01845
TEL: (978) 557-5553
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SAI
27 NORTHWESTERN DR.
SALEM, NH 03079

at&t
500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CT 06067

SITE NUMBER: CT2202
SITE NAME: OXFORD PERRY LANE
CCI SITE NUMBER: 873645
691 OXFORD ROAD
OXFORD, CT 06478
NEW HAVEN COUNTY

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A	06/16/16	ISSUED FOR REVIEW	EB	AT	DPH

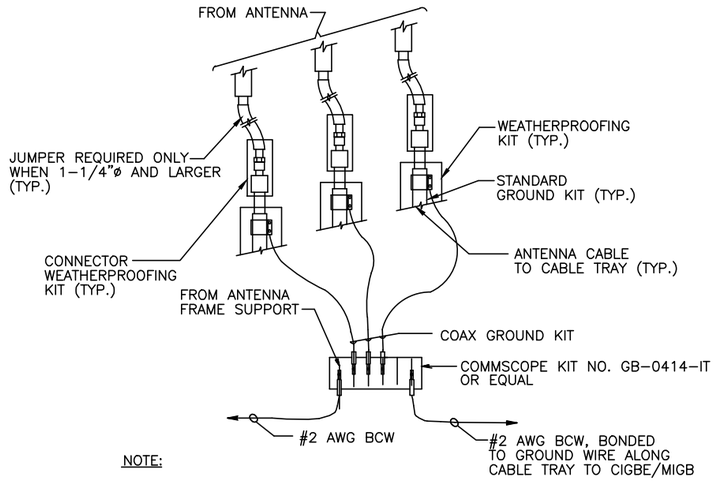
SCALE: AS SHOWN | DESIGNED BY: AT | DRAWN BY: EB

STATE OF CONNECTICUT
DEREK J. CREASEY
No. 23955
LICENSED PROFESSIONAL ENGINEER

AT&T

RF PLUMBING DIAGRAM
(LTE BWE)

SITE NUMBER	DRAWING NUMBER	REV
2202.00	RF–1	1



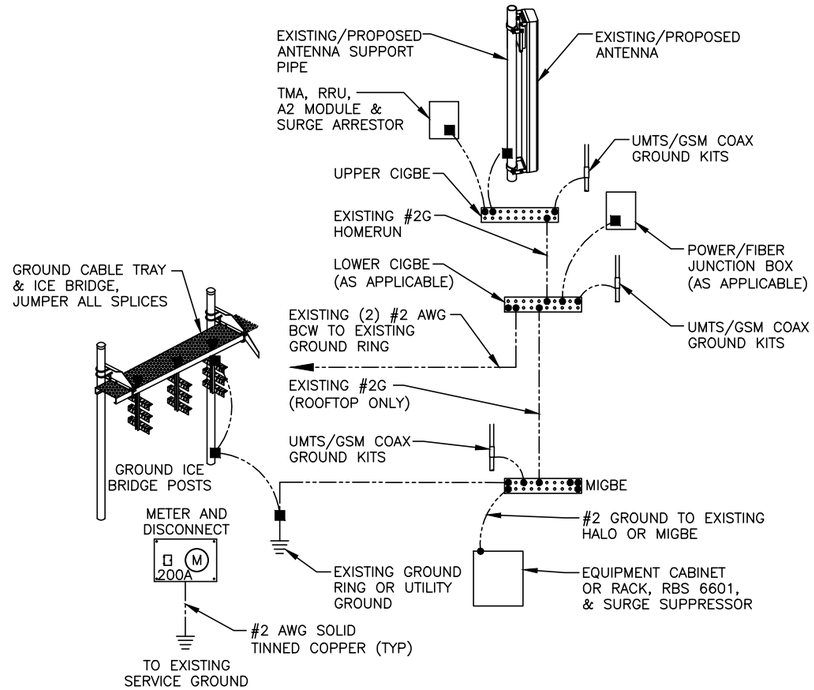
NOTE:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO CIGBE.

GROUND WIRE TO GROUND BAR CONNECTION DETAIL

SCALE: N.T.S

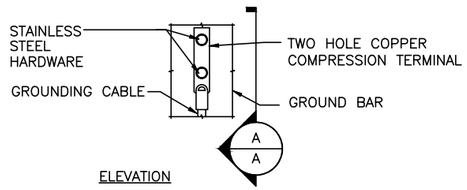
1 / G-1



GROUNDING RISER DIAGRAM

SCALE: N.T.S

2 / G-1



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

TYPICAL GROUND BAR CONNECTION DETAIL

SCALE: N.T.S

3 / G-1

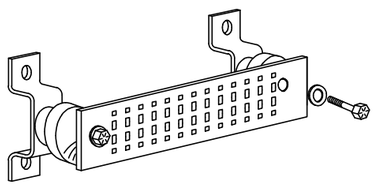
EACH GROUND CONDUCTOR TERMINATING ON ANY GROUND BAR SHALL HAVE AN IDENTIFICATION TAG ATTACHED AT EACH END THAT WILL IDENTIFY ITS ORIGIN AND DESTINATION.

SECTION "P" – SURGE PRODUCERS

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

SECTION "A" – SURGE ABSORBERS

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



GROUND BAR - DETAIL

SCALE: N.T.S

4 / G-1

Hudson Design Group LLC
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SCALE: AS SHOWN | DESIGNED BY: AT | DRAWN BY: EB

STATE OF CONNECTICUT
DEREK J. CREASEY
No. 23951
LICENSED PROFESSIONAL ENGINEER

AT&T

GROUNDING DETAILS
(LTE BWE)

SITE NUMBER	DRAWING NUMBER	REV
2202.00	G-1	1

Date: **September 14, 2016**

Ardalan Arabi
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277

Crown Castle
2000 Corporate Drive
Canonsburg, PA, 15317
724-416-2000

Subject:	**Structural Analysis Report**	
Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Carrier Site Number:	CT2202
	Carrier Site Name:	Oxford Perry Lane
Crown Castle Designation:	**Crown Castle BU Number:**	873645
	Crown Castle Site Name:	Oxford
	Crown Castle JDE Job Number:	391690
	Crown Castle Work Order Number:	1298921
	Crown Castle Application Number:	358532 Rev. 0
Engineering Firm Designation:	**Crown Castle Project Number:**	1298921
Site Data:	**691 Oxford RD, OXFORD, New Haven County, CT** **Latitude *41° 26' 49.51"*, Longitude *-73° 9' 8.316"*** **150 Foot - Monopole Tower**	

Dear Ardalan Arabi,

Crown Castle is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 1298921, in accordance with application 358532, revision 0.

The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC7: Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

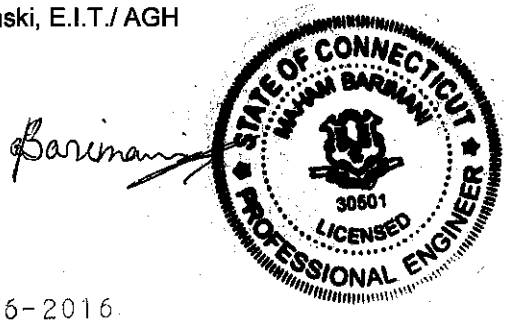
This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 125 mph converted to a nominal 3-second gust wind speed of 97 mph per Section 1609.3 and Appendix N as required for use in the TIA-222-G Standard per Exception #5 of Section 1609.1.1. Exposure Category C and Risk Category II were used in this analysis

All modifications and equipment proposed in this report shall be installed in accordance with the attached drawings for the determined available structural capacity to be effective.

We at *Crown Castle* appreciate the opportunity of providing our continuing professional services to you and Crown Castle. If you have any questions or need further assistance on this or any other projects, please give us a call.

Structural analysis prepared by: Michael Lopienski, E.I.T./ AGH

Respectfully submitted by:



Maham Barimani, P.E.
Senior Project Engineer

tnxTower Report - version 7.0.5.1

09-16-2016

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 150 ft Monopole tower designed by SUMMIT in November of 1999. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA-222-G Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a 3-second gust wind speed of 97 mph with no ice, 50 mph with 0.75 inch ice thickness and 60 mph under service loads, exposure category C.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
138.0	138.0	1	tower mounts	MT-195-14 [NA 510-1]	-	-	-
136.0	137.0	1	ericsson	RRUS 12 B2			
	136.0	2	ericsson	RRUS 12 B2			
		1	tower mounts	PRK-1245L [NA 509-3]			

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
147.0	149.0	3	alcatel lucent	RRH4X45-AWS4 B66	6	1-5/8	2
	148.0	3	alcatel lucent	RRH2X60-1900			
		3	alcatel lucent	RRH2x60-700			
		9	commscope	SBNHH-1D65B w/ Mount Pipe			
		2	rfs celwave	DB-T1-6Z-8AB-0Z			
		6	rfs celwave	FD9R6004/2C-3L	7	1-5/8	1
		6	antel	LPA-80063/6CF w/ Mount Pipe			
	147.0	1	tower mounts	Platform Mount [LP 303-1]			
136.0	138.0	4	andrew	SBNH-1D6565C w/ Mount Pipe	1 2 12 1	3/8 3/4 1-5/8 2" Conduit	1
		2	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe			
		3	powerwave technologies	7770.00 w/ Mount Pipe			
	137.0	2	ericsson	RRUS 11			
	136.0	3	communication components inc.	DTMABP7819VG12A			
		1	ericsson	RRUS 11			
		3	powerwave technologies	TT19-08BP111-001			
		1	raycap	DC6-48-60-18-8F			
		1	tower mounts	Platform Mount [LP-1201]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
		3	powerwave technologies	TT19-08BP111-001	-	-	3

Notes:
1) Existing Equipment
2) Reserved Equipment
3) Equipment to be Removed, Not Considered in this Analysis

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
147	147	12	dapa	48000 PCS Panels	-	-
137	137	12	dapa	48000 PCS Panels	-	-
127	127	12	dapa	48000 PCS Panels	-	-
117	117	12	dapa	48000 PCS Panels	-	-
107	107	12	dapa	48000 PCS Panels	-	-
97	97	12	dapa	48000 PCS Panels	-	-

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Criscuolo Shepard Associates	2134249	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Summit Manufacturing, LLC / Paul J. Ford and Company	1339630	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Summit Manufacturing, LLC / Paul J. Ford and Company	1339644	CCISITES
4-TOWER STRUCTURAL ANALYSIS REPORTS	Paul J. Ford and Company	3152876	CCISITES

3.1) Analysis Method

tnxTower (version 7.0.5.1), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.

This analysis may be affected if any assumptions are not valid or have been made in error. Crown Castle should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	150 - 110.75	Pole	TP31.38x24x0.2188	1	-9.16	1415.41	57.3	Pass
L2	110.75 - 74.75	Pole	TP37.711x30.1904x0.25	2	-14.36	1905.99	85.8	Pass
L3	74.75 - 39.5	Pole	TP43.839x36.3179x0.3125	3	-21.63	2849.32	82.5	Pass
L4	39.5 - 0	Pole	TP50.64x42.1799x0.375	4	-34.38	4066.19	78.3	Pass
							Summary	
						Pole (L2)	85.8	Pass
						Rating =	85.8	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	66.9	Pass
1	Base Plate	0	58.1	Pass
1	Base Foundation	0	49.9	Pass
1	Base Foundation Soil Interaction	0	57.4	Pass

Structure Rating (max from all components) =	85.8%

Notes:
1) See additional documentation in “Appendix C – Additional Calculations” for calculations supporting the % capacity consumed.

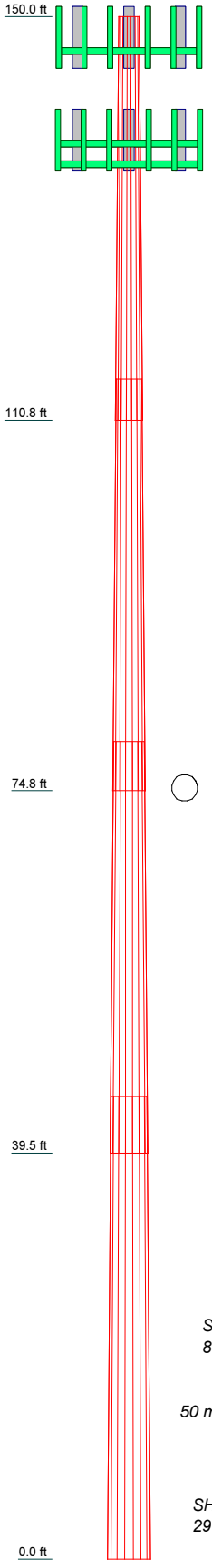
4.1) Recommendations

The tower and its foundation have sufficient capacity to carry the existing, reserved, and proposed loads. No modifications are required at this time.

APPENDIX A

TNXTOWER OUTPUT

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	39'3"	18	0.2188	4'	24.0000	31.3800	A607-65	2.5
2	40'	18	0.2500	4'9"	30.1904	37.7110		3.6
3	40'	18	0.3125	5'6"	36.3179	43.8390		5.4
4	45'	18	0.3750		42.1799	50.6400		8.4
								19.9



ALL REACTIONS ARE FACTORED

AXIAL 59 K

SHEAR 8 K *MOMENT 937 kip-ft*

TORQUE 0 kip-ft
50 mph WIND - 0.7500 in ICE

AXIAL 34 K

SHEAR 29 K *MOMENT 3254 kip-ft*

TORQUE 1 kip-ft
REACTIONS - 97 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lighting Rod 1/2" x 2'	150	(2) SBNH-1D6565C w/ Mount Pipe	136
(2) LPA-80063/6CF w/ Mount Pipe	147	(2) AM-X-CD-16-65-00T-RET w/ Mount Pipe	136
(2) LPA-80063/6CF w/ Mount Pipe	147	7770.00 w/ Mount Pipe	136
(2) LPA-80063/6CF w/ Mount Pipe	147	7770.00 w/ Mount Pipe	136
(2) FD9R6004/2C-3L	147	7770.00 w/ Mount Pipe	136
(2) FD9R6004/2C-3L	147	DC6-48-60-18-8F	136
(2) FD9R6004/2C-3L	147	DTMABP7819VG12A	136
(3) SBNHH-1D65B w/ Mount Pipe	147	DTMABP7819VG12A	136
(3) SBNHH-1D65B w/ Mount Pipe	147	DTMABP7819VG12A	136
(3) SBNHH-1D65B w/ Mount Pipe	147	RRUS 11	136
RRH4X45-AWS4 B66	147	RRUS 11	136
RRH4X45-AWS4 B66	147	RRUS 11	136
RRH4X45-AWS4 B66	147	TT19-08BP111-001	136
RRH2X60-1900	147	TT19-08BP111-001	136
RRH2X60-1900	147	TT19-08BP111-001	136
RRH2X60-1900	147	RRUS 12 B2	136
RRH2x60-700	147	RRUS 12 B2	136
RRH2x60-700	147	RRUS 12 B2	136
RRH2x60-700	147	Platform Mount [LP-1201]	136
(2) DB-T1-6Z-8AB-0Z	147	(2) SBNH-1D6565C w/ Mount Pipe	136
Platform Mount [LP 303-1]	147	Miscellaneous [NA 509-3]	136
Miscellaneous [NA 510-1]	138		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A607-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

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'
8. TOWER RATING: 85.8%

CROWN CASTLE
The Foundation for a Wireless World

Crown Castle
2000 Corporate Drive
Canonsburg, PA, 15317
Phone: (724) 416-9160
FAX:

Job: **BU# 873645**			
Project:			
Client: Crown Castle	Drawn by: MLopienski		App'd:
Code: TIA-222-G	Date: 09/15/16		Scale: NTS
Path: X:\ENG Work Area\MLopienski\WIP\873645 WO 1298921\QA-AGH\873645.eri			Dwg No. E-1

Tower Input Data

There is a pole section.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

1) Tower is located in New Haven County, Connecticut.
2) Basic wind speed of 97 mph.
3) Structure Class II.
4) Exposure Category C.
5) Topographic Category 1.
6) Crest Height 0'.
7) Nominal ice thickness of 0.7500 in.
8) Ice thickness is considered to increase with height.
9) Ice density of 56 pcf.
10) A wind speed of 50 mph is used in combination with ice.
11) Temperature drops of 50 °F.
12) Deflections calculated using a wind speed of 60 mph.
13) A non-linear (P-delta) analysis was used.
14) Pressures are calculated at each section.
15) Stress ratio used in pole design is 1.
16) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	*Elevation*	*Section Length*	*Splice Length*	*Number of Sides*	*Top Diameter*	*Bottom Diameter*	*Wall Thickness*	*Bend Radius*	*Pole Grade*
	ft	*ft*	*ft*		*in*	*in*	*in*	*in*	
L1	150'-110'9"	39'3"	4'	18	24.0000	31.3800	0.2188	0.8750	A607-65 (65 ksi)
L2	110'9"-74'9"	40'	4'9"	18	30.1904	37.7110	0.2500	1.0000	A607-65 (65 ksi)
L3	74'9"-39'6"	40'	5'6"	18	36.3179	43.8390	0.3125	1.2500	A607-65 (65 ksi)
L4	39'6"-0'	45'		18	42.1799	50.6400	0.3750	1.5000	A607-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	24.3702	16.5116	1179.7676	8.4423	12.1920	96.7657	2361.0876	8.2574	3.8390	17.55
	31.8641	21.6356	2654.2208	11.0622	15.9410	166.5024	5311.9341	10.8199	5.1379	23.487
L2	31.4198	23.7577	2690.6493	10.6288	15.3367	175.4384	5384.8389	11.8811	4.8735	19.494
	38.2928	29.7253	5270.1440	13.2987	19.1572	275.1001	10547.2226	14.8655	6.1971	24.789
L3	37.7851	35.7129	5849.2255	12.7819	18.4495	317.0396	11706.1475	17.8598	5.8420	18.694
	44.5153	43.1728	10333.6949	15.4519	22.2702	464.0142	20680.9871	21.5905	7.1657	22.93
L4	43.8805	49.7582	10986.4085	14.8407	21.4274	512.7279	21987.2732	24.8838	6.7637	18.036
	51.4212	59.8279	19097.3321	17.8441	25.7251	742.3612	38219.7930	29.9196	8.2526	22.007

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 150'-110'9"				1	1	1			
L2 110'9"-74'9"				1	1	1			
L3 74'9"-39'6"				1	1	1			
L4 39'6"-0'				1	1	1			

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
AVA7-50(1-5/8")	C	No	Inside Pole	147' - 0'	7	No Ice	0.00	0.70
						1/2" Ice	0.00	0.70
						1" Ice	0.00	0.70
AVA7-50(1-5/8")	C	No	Inside Pole	147' - 0'	5	No Ice	0.00	0.70
						1/2" Ice	0.00	0.70
						1" Ice	0.00	0.70
HB158-1-08U8-S8J18(1-5/8") *	C	No	Inside Pole	147' - 0'	1	No Ice	0.00	1.30
						1/2" Ice	0.00	1.30
						1" Ice	0.00	1.30
LCF158-50JA-A0(1-5/8")	B	No	Inside Pole	136' - 0'	12	No Ice	0.00	0.08
						1/2" Ice	0.00	0.08
						1" Ice	0.00	0.08
FB-L98B-034-XXX(3/8")	B	No	Inside Pole	136' - 0'	1	No Ice	0.00	0.06
						1/2" Ice	0.00	0.06
						1" Ice	0.00	0.06
WR-VG86ST-BRD(3/4")	B	No	Inside Pole	136' - 0'	2	No Ice	0.00	0.58
						1/2" Ice	0.00	0.58
						1" Ice	0.00	0.58
2" Rigid Conduit	B	No	Inside Pole	136' - 0'	1	No Ice	0.00	2.80
						1/2" Ice	0.00	2.80
						1" Ice	0.00	2.80

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	150'-110'9"	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.13
		C	0.000	0.000	0.000	0.000	0.35
L2	110'9"-74'9"	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.18
		C	0.000	0.000	0.000	0.000	0.35
L3	74'9"-39'6"	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.18
		C	0.000	0.000	0.000	0.000	0.34
L4	39'6"-0'	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.20
		C	0.000	0.000	0.000	0.000	0.38

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	150'-110'9"	A	1.720	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.13
		C		0.000	0.000	0.000	0.000	0.35
L2	110'9"-74'9"	A	1.663	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.18
		C		0.000	0.000	0.000	0.000	0.35
L3	74'9"-39'6"	A	1.584	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.18
		C		0.000	0.000	0.000	0.000	0.34
L4	39'6"-0'	A	1.426	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.20
		C		0.000	0.000	0.000	0.000	0.38

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	150'-110'9"	0.0000	0.0000	0.0000	0.0000
L2	110'9"-74'9"	0.0000	0.0000	0.0000	0.0000
L3	74'9"-39'6"	0.0000	0.0000	0.0000	0.0000
L4	39'6"-0'	0.0000	0.0000	0.0000	0.0000

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice

Discrete Tower Loads

Description	*Face or Leg*	*Offset Type*	*Offsets: Horz Lateral Vert* ft ft ft	*Azimuth Adjustment* °	*Placement* ft		C_AA_A *Front* ft^2	C_AA_A *Side* ft^2	*Weight* K
Lighting Rod 1/2'' x 2' *	C	None		0.0000	150'	No Ice 1/2" Ice 1" Ice	0.10 0.26 0.40	0.10 0.26 0.40	0.02 0.02 0.02
(2) LPA-80063/6CF w/ Mount Pipe	A	From Leg	4.00 0' 1'	0.0000	147'	No Ice 1/2" Ice 1" Ice	9.83 10.40 10.93	10.22 11.38 12.27	0.05 0.14 0.25
(2) LPA-80063/6CF w/ Mount Pipe	B	From Leg	4.00 0' 1'	0.0000	147'	No Ice 1/2" Ice 1" Ice	9.83 10.40 10.93	10.22 11.38 12.27	0.05 0.14 0.25
(2) LPA-80063/6CF w/ Mount Pipe	C	From Leg	4.00 0' 1'	0.0000	147'	No Ice 1/2" Ice 1" Ice	9.83 10.40 10.93	10.22 11.38 12.27	0.05 0.14 0.25
(2) FD9R6004/2C-3L	A	From Leg	4.00 0' 1'	0.0000	147'	No Ice 1/2" Ice 1" Ice	0.31 0.39 0.47	0.08 0.12 0.17	0.00 0.01 0.01
(2) FD9R6004/2C-3L	B	From Leg	4.00 0' 1'	0.0000	147'	No Ice 1/2" Ice 1" Ice	0.31 0.39 0.47	0.08 0.12 0.17	0.00 0.01 0.01
(2) FD9R6004/2C-3L	C	From Leg	4.00 0' 1'	0.0000	147'	No Ice 1/2" Ice 1" Ice	0.31 0.39 0.47	0.08 0.12 0.17	0.00 0.01 0.01
(3) SBNHH-1D65B w/ Mount Pipe	A	From Leg	4.00 0' 1'	0.0000	147'	No Ice 1/2" Ice 1" Ice	8.39 8.95 9.48	7.08 8.28 9.19	0.08 0.15 0.22
(3) SBNHH-1D65B w/ Mount Pipe	B	From Leg	4.00 0' 1'	0.0000	147'	No Ice 1/2" Ice 1" Ice	8.39 8.95 9.48	7.08 8.28 9.19	0.08 0.15 0.22
(3) SBNHH-1D65B w/ Mount Pipe	C	From Leg	4.00 0' 1'	0.0000	147'	No Ice 1/2" Ice 1" Ice	8.39 8.95 9.48	7.08 8.28 9.19	0.08 0.15 0.22
RRH4X45-AWS4 B66	A	From Leg	4.00 0' 2'	0.0000	147'	No Ice 1/2" Ice 1" Ice	2.66 2.88 3.10	1.59 1.77 1.96	0.06 0.08 0.11
RRH4X45-AWS4 B66	B	From Leg	4.00 0' 2'	0.0000	147'	No Ice 1/2" Ice 1" Ice	2.66 2.88 3.10	1.59 1.77 1.96	0.06 0.08 0.11
RRH4X45-AWS4 B66	C	From Leg	4.00 0' 2'	0.0000	147'	No Ice 1/2" Ice 1" Ice	2.66 2.88 3.10	1.59 1.77 1.96	0.06 0.08 0.11
RRH2X60-1900	A	From Leg	4.00 0' 1'	0.0000	147'	No Ice 1/2" Ice 1" Ice	1.87 2.05 2.24	1.22 1.37 1.52	0.04 0.06 0.08
RRH2X60-1900	B	From Leg	4.00 0' 1'	0.0000	147'	No Ice 1/2" Ice 1" Ice	1.87 2.05 2.24	1.22 1.37 1.52	0.04 0.06 0.08
RRH2X60-1900	C	From Leg	4.00 0' 1'	0.0000	147'	No Ice 1/2" Ice 1" Ice	1.87 2.05 2.24	1.22 1.37 1.52	0.04 0.06 0.08

Description	*Face or Leg*	*Offset Type*	*Offsets: Horz Lateral Vert* ft ft ft	*Azimuth Adjustment* °	*Placement* ft		C_AA_A *Front* ft^2	C_AA_A *Side* ft^2	*Weight* K
RRH2x60-700	A	From Leg	4.00 0' 1'	0.0000	147'	No Ice 1/2" Ice 1" Ice	3.50 3.76 4.03	1.82 2.05 2.29	0.06 0.08 0.11
RRH2x60-700	B	From Leg	4.00 0' 1'	0.0000	147'	No Ice 1/2" Ice 1" Ice	3.50 3.76 4.03	1.82 2.05 2.29	0.06 0.08 0.11
RRH2x60-700	C	From Leg	4.00 0' 1'	0.0000	147'	No Ice 1/2" Ice 1" Ice	3.50 3.76 4.03	1.82 2.05 2.29	0.06 0.08 0.11
(2) DB-T1-6Z-8AB-0Z	C	From Leg	4.00 0' 1'	0.0000	147'	No Ice 1/2" Ice 1" Ice	4.80 5.07 5.35	2.00 2.19 2.39	0.04 0.08 0.12
Platform Mount [LP 303-1]	C	None		0.0000	147'	No Ice 1/2" Ice 1" Ice	14.66 18.87 23.08	14.66 18.87 23.08	1.25 1.48 1.71
*									
(2) SBNH-1D6565C w/ Mount Pipe	A	From Leg	4.00 0' 2'	0.0000	136'	No Ice 1/2" Ice 1" Ice	11.68 12.40 13.14	9.84 11.37 12.91	0.09 0.18 0.28
(2) SBNH-1D6565C w/ Mount Pipe	B	From Leg	4.00 0' 2'	0.0000	136'	No Ice 1/2" Ice 1" Ice	11.68 12.40 13.14	9.84 11.37 12.91	0.09 0.18 0.28
(2) AM-X-CD-16-65-00T-RET w/ Mount Pipe	C	From Leg	4.00 0' 2'	0.0000	136'	No Ice 1/2" Ice 1" Ice	8.26 8.82 9.35	6.30 7.48 8.37	0.07 0.14 0.21
7770.00 w/ Mount Pipe	A	From Leg	4.00 0' 2'	0.0000	136'	No Ice 1/2" Ice 1" Ice	5.75 6.18 6.61	4.25 5.01 5.71	0.06 0.10 0.16
7770.00 w/ Mount Pipe	B	From Leg	4.00 0' 2'	0.0000	136'	No Ice 1/2" Ice 1" Ice	5.75 6.18 6.61	4.25 5.01 5.71	0.06 0.10 0.16
7770.00 w/ Mount Pipe	C	From Leg	4.00 0' 2'	0.0000	136'	No Ice 1/2" Ice 1" Ice	5.75 6.18 6.61	4.25 5.01 5.71	0.06 0.10 0.16
DC6-48-60-18-8F	A	From Leg	4.00 0' 0'	0.0000	136'	No Ice 1/2" Ice 1" Ice	0.79 1.27 1.45	0.79 1.27 1.45	0.02 0.04 0.05
DTMABP7819VG12A	A	From Leg	4.00 0' 0'	0.0000	136'	No Ice 1/2" Ice 1" Ice	0.98 1.10 1.23	0.34 0.42 0.51	0.02 0.03 0.04
DTMABP7819VG12A	B	From Leg	4.00 0' 0'	0.0000	136'	No Ice 1/2" Ice 1" Ice	0.98 1.10 1.23	0.34 0.42 0.51	0.02 0.03 0.04
DTMABP7819VG12A	C	From Leg	4.00 0' 0'	0.0000	136'	No Ice 1/2" Ice 1" Ice	0.98 1.10 1.23	0.34 0.42 0.51	0.02 0.03 0.04
RRUS 11	A	From Leg	4.00 0' 1'	0.0000	136'	No Ice 1/2" Ice 1" Ice	2.78 2.99 3.21	1.19 1.33 1.49	0.05 0.07 0.09

Description	*Face or Leg*	*Offset Type*	*Offsets: Horz Lateral Vert* *ft* *ft* *ft*	*Azimuth Adjustment* *°*	*Placement* *ft*		*C_AA_A Front* *ft^2*	*C_AA_A Side* *ft^2*	*Weight* *K*
RRUS 11	B	From Leg	4.00 0' 1'	0.0000	136'	No Ice 1/2" Ice 1" Ice	2.78 2.99 3.21	1.19 1.33 1.49	0.05 0.07 0.09
RRUS 11	C	From Leg	4.00 0' 0'	0.0000	136'	No Ice 1/2" Ice 1" Ice	2.78 2.99 3.21	1.19 1.33 1.49	0.05 0.07 0.09
TT19-08BP111-001	A	From Leg	4.00 0' 0'	0.0000	136'	No Ice 1/2" Ice 1" Ice	0.55 0.64 0.74	0.44 0.53 0.63	0.02 0.02 0.03
TT19-08BP111-001	B	From Leg	4.00 0' 0'	0.0000	136'	No Ice 1/2" Ice 1" Ice	0.55 0.64 0.74	0.44 0.53 0.63	0.02 0.02 0.03
TT19-08BP111-001	C	From Leg	4.00 0' 0'	0.0000	136'	No Ice 1/2" Ice 1" Ice	0.55 0.64 0.74	0.44 0.53 0.63	0.02 0.02 0.03
RRUS 12 B2	A	From Leg	4.00 0' 1'	0.0000	136'	No Ice 1/2" Ice 1" Ice	3.14 3.36 3.59	1.28 1.43 1.60	0.05 0.07 0.10
RRUS 12 B2	B	From Leg	4.00 0' 0'	0.0000	136'	No Ice 1/2" Ice 1" Ice	3.14 3.36 3.59	1.28 1.43 1.60	0.05 0.07 0.10
RRUS 12 B2	C	From Leg	4.00 0' 0'	0.0000	136'	No Ice 1/2" Ice 1" Ice	3.14 3.36 3.59	1.28 1.43 1.60	0.05 0.07 0.10
Platform Mount [LP-1201]	C	None		0.0000	136'	No Ice 1/2" Ice 1" Ice	23.10 26.80 30.50	23.10 26.80 30.50	2.10 2.50 2.90
Miscellaneous [NA 510-1]	C	None		0.0000	138'	No Ice 1/2" Ice 1" Ice	6.00 8.50 11.00	6.00 8.50 11.00	0.26 0.34 0.42
Miscellaneous [NA 509-3]	C	None		0.0000	136'	No Ice 1/2" Ice 1" Ice	11.84 16.96 22.08	11.84 16.96 22.08	0.28 0.30 0.32
*									
*									

Tower Pressures - No Ice

G_H = 1.100

Section Elevation *ft*	*z* *ft*	*K_z*	*q_z* *psf*	*A_G* *ft^2*	*Face*	*A_F* *ft^2*	*A_R* *ft^2*	*A_{leg}* *ft^2*	*Leg %*	*C_AA_A In Face* *ft^2*	*C_AA_A Out Face* *ft^2*
L1 150'-110'9"	129'7-29/32"	1.337	31	91.967	A	0.000	91.967	91.967	100.00	0.000	0.000
					B	0.000	91.967		100.00	0.000	0.000
					C	0.000	91.967		100.00	0.000	0.000
L2 110'9"-	92'4-	1.245	28	104.56	A	0.000	104.569	104.569	100.00	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
74'9"	3/32"			9	B	0.000	104.569		100.00	0.000	0.000
					C	0.000	104.569		100.00	0.000	0.000
L3 74'9"-39'6"	56'11-5/32"	1.124	26	120.879	A	0.000	120.879	120.879	100.00	0.000	0.000
					B	0.000	120.879		100.00	0.000	0.000
					C	0.000	120.879		100.00	0.000	0.000
L4 39'6"-0'	19'11-1/32"	0.901	21	156.851	A	0.000	156.851	156.851	100.00	0.000	0.000
					B	0.000	156.851		100.00	0.000	0.000
					C	0.000	156.851		100.00	0.000	0.000

Tower Pressure - With Ice

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 150'-110'9"	129'7-29/32"	1.337	8	1.7200	103.218	A	0.000	103.218	103.218	100.00	0.000	0.000
						B	0.000	103.218		100.00	0.000	0.000
						C	0.000	103.218		100.00	0.000	0.000
L2 110'9"-74'9"	92'4-3/32"	1.245	8	1.6626	114.889	A	0.000	114.889	114.889	100.00	0.000	0.000
						B	0.000	114.889		100.00	0.000	0.000
						C	0.000	114.889		100.00	0.000	0.000
L3 74'9"-39'6"	56'11-5/32"	1.124	7	1.5841	130.646	A	0.000	130.646	130.646	100.00	0.000	0.000
						B	0.000	130.646		100.00	0.000	0.000
						C	0.000	130.646		100.00	0.000	0.000
L4 39'6"-0'	19'11-1/32"	0.901	6	1.4262	167.279	A	0.000	167.279	167.279	100.00	0.000	0.000
						B	0.000	167.279		100.00	0.000	0.000
						C	0.000	167.279		100.00	0.000	0.000

Tower Pressure - Service

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 150'-110'9"	129'7-29/32"	1.337	10	91.967	A	0.000	91.967	91.967	100.00	0.000	0.000
					B	0.000	91.967		100.00	0.000	0.000
					C	0.000	91.967		100.00	0.000	0.000
L2 110'9"-74'9"	92'4-3/32"	1.245	10	104.569	A	0.000	104.569	104.569	100.00	0.000	0.000
					B	0.000	104.569		100.00	0.000	0.000
					C	0.000	104.569		100.00	0.000	0.000
L3 74'9"-39'6"	56'11-5/32"	1.124	9	120.879	A	0.000	120.879	120.879	100.00	0.000	0.000
					B	0.000	120.879		100.00	0.000	0.000
					C	0.000	120.879		100.00	0.000	0.000
L4 39'6"-0'	19'11-1/32"	0.901	7	156.851	A	0.000	156.851	156.851	100.00	0.000	0.000
					B	0.000	156.851		100.00	0.000	0.000
					C	0.000	156.851		100.00	0.000	0.000

Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Leg Weight	19.95					
Bracing Weight	0.00					
Total Member Self-Weight	19.95			-0.00	0.17	
Total Weight	28.67			-0.00	0.17	
Wind 0 deg - No Ice		0.07	-17.80	-1936.23	-10.12	0.37
Wind 30 deg - No Ice		9.00	-15.45	-1681.97	-982.77	0.16
Wind 60 deg - No Ice		15.52	-8.96	-977.03	-1692.03	-0.10
Wind 90 deg - No Ice		17.88	-0.07	-10.29	-1947.88	-0.33
Wind 120 deg - No Ice		15.45	8.84	959.20	-1681.74	-0.47
Wind 150 deg - No Ice		8.88	15.38	1671.67	-964.94	-0.49
Wind 180 deg - No Ice		-0.07	17.80	1936.22	10.46	-0.37
Wind 210 deg - No Ice		-9.00	15.45	1681.96	983.11	-0.16
Wind 240 deg - No Ice		-15.52	8.96	977.02	1692.38	0.10
Wind 270 deg - No Ice		-17.88	0.07	10.29	1948.22	0.33
Wind 300 deg - No Ice		-15.45	-8.84	-959.20	1682.09	0.47
Wind 330 deg - No Ice		-8.88	-15.38	-1671.68	965.28	0.49
Member Ice	11.37					
Total Weight Ice	51.80			-0.07	0.63	
Wind 0 deg - Ice		0.03	-8.21	-848.84	-3.07	0.14
Wind 30 deg - Ice		4.14	-7.12	-736.98	-429.08	0.05
Wind 60 deg - Ice		7.14	-4.12	-427.65	-739.96	-0.06
Wind 90 deg - Ice		8.23	-0.03	-3.76	-852.40	-0.15
Wind 120 deg - Ice		7.12	4.08	421.12	-736.27	-0.20
Wind 150 deg - Ice		4.10	7.09	733.15	-422.69	-0.20
Wind 180 deg - Ice		-0.03	8.21	848.71	4.32	-0.14
Wind 210 deg - Ice		-4.14	7.12	736.84	430.34	-0.05
Wind 240 deg - Ice		-7.14	4.12	427.52	741.21	0.06
Wind 270 deg - Ice		-8.23	0.03	3.63	853.65	0.15
Wind 300 deg - Ice		-7.12	-4.08	-421.26	737.52	0.20
Wind 330 deg - Ice		-4.10	-7.09	-733.28	423.94	0.20
Total Weight	28.67			-0.00	0.17	
Wind 0 deg - Service		0.02	-6.09	-662.85	-3.35	0.13
Wind 30 deg - Service		3.08	-5.29	-575.80	-336.32	0.05
Wind 60 deg - Service		5.31	-3.07	-334.48	-579.13	-0.03
Wind 90 deg - Service		6.12	-0.02	-3.53	-666.72	-0.11
Wind 120 deg - Service		5.29	3.03	328.37	-575.61	-0.16
Wind 150 deg - Service		3.04	5.27	572.27	-330.22	-0.17
Wind 180 deg - Service		-0.02	6.09	662.84	3.69	-0.13
Wind 210 deg - Service		-3.08	5.29	575.80	336.67	-0.05
Wind 240 deg - Service		-5.31	3.07	334.47	579.48	0.03
Wind 270 deg - Service		-6.12	0.02	3.52	667.06	0.11
Wind 300 deg - Service		-5.29	-3.03	-328.37	575.95	0.16
Wind 330 deg - Service		-3.04	-5.27	-572.28	330.56	0.17

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice

Comb. No.	Description
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	150 - 110.75	Pole	Max Tension	20	0.00	-0.00	0.00
			Max. Compression	26	-25.12	0.67	0.06
			Max. Mx	20	-9.17	498.60	-3.85
			Max. My	2	-9.20	-3.57	494.13
			Max. Vy	20	-18.68	498.60	-3.85
			Max. Vx	14	18.54	4.07	-494.12
			Max. Torque	13			-0.86
L2	110.75 - 74.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-32.73	0.67	0.06
			Max. Mx	20	-14.37	1215.04	-8.01
			Max. My	2	-14.39	-7.78	1205.78
			Max. Vy	20	-21.94	1215.04	-8.01
			Max. Vx	14	21.81	8.24	-1205.77
			Max. Torque	12			0.78
L3	74.75 - 39.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-42.58	0.67	0.06
			Max. Mx	20	-21.64	2028.65	-12.07
			Max. My	2	-21.65	-11.84	2014.73
			Max. Vy	20	-25.15	2028.65	-12.07
			Max. Vx	14	25.01	12.29	-2014.71
			Max. Torque	12			0.77
L4	39.5 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-58.68	0.67	0.06
			Max. Mx	20	-34.38	3244.00	-17.22
			Max. My	2	-34.38	-16.99	3224.14

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	20	-28.64	3244.00	-17.22
			Max. Vx	14	28.51	17.45	-3224.12
			Max. Torque	12			0.77

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	36	58.68	8.23	-0.03
	Max. H_x	20	34.40	28.61	-0.11
	Max. H_z	3	25.80	-0.11	28.48
	Max. M_x	2	3224.14	-0.11	28.48
	Max. M_z	8	3243.58	-28.61	0.11
	Max. Torsion	12	0.77	-14.21	-24.61
	Min. Vert	17	25.80	14.40	-24.72
	Min. H_x	9	25.80	-28.61	0.11
	Min. H_z	14	34.40	0.11	-28.48
	Min. M_x	14	-3224.12	0.11	-28.48
	Min. M_z	20	-3244.00	28.61	-0.11
	Min. Torsion	24	-0.77	14.21	24.61

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	28.67	0.00	0.00	-0.00	0.17	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	34.40	0.11	-28.48	-3224.14	-16.99	0.60
0.9 Dead+1.6 Wind 0 deg - No Ice	25.80	0.11	-28.48	-3189.54	-16.85	0.59
1.2 Dead+1.6 Wind 30 deg - No Ice	34.40	14.40	-24.72	-2800.70	-1636.59	0.26
0.9 Dead+1.6 Wind 30 deg - No Ice	25.80	14.40	-24.72	-2770.63	-1619.05	0.26
1.2 Dead+1.6 Wind 60 deg - No Ice	34.40	24.83	-14.34	-1626.90	-2817.55	-0.14
0.9 Dead+1.6 Wind 60 deg - No Ice	25.80	24.83	-14.34	-1609.42	-2787.34	-0.14
1.2 Dead+1.6 Wind 90 deg - No Ice	34.40	28.61	-0.11	-17.22	-3243.58	-0.51
0.9 Dead+1.6 Wind 90 deg - No Ice	25.80	28.61	-0.11	-17.01	-3208.80	-0.51
1.2 Dead+1.6 Wind 120 deg - No Ice	34.40	24.72	14.14	1597.16	-2800.48	-0.74
0.9 Dead+1.6 Wind 120 deg - No Ice	25.80	24.72	14.14	1580.04	-2770.47	-0.74
1.2 Dead+1.6 Wind 150 deg - No Ice	34.40	14.21	24.61	2783.63	-1606.85	-0.77
0.9 Dead+1.6 Wind 150 deg - No Ice	25.80	14.21	24.61	2753.76	-1589.67	-0.77
1.2 Dead+1.6 Wind 180 deg - No Ice	34.40	-0.11	28.48	3224.12	17.45	-0.59
0.9 Dead+1.6 Wind 180 deg - No Ice	25.80	-0.11	28.48	3189.53	17.18	-0.59
1.2 Dead+1.6 Wind 210 deg - No Ice	34.40	-14.40	24.72	2800.68	1637.04	-0.26
0.9 Dead+1.6 Wind 210 deg - No Ice	25.80	-14.40	24.72	2770.62	1619.38	-0.25
1.2 Dead+1.6 Wind 240 deg	34.40	-24.83	14.34	1626.89	2817.99	0.15

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
- No Ice 0.9 Dead+1.6 Wind 240 deg	25.80	-24.83	14.34	1609.41	2787.66	0.15
- No Ice 1.2 Dead+1.6 Wind 270 deg	34.40	-28.61	0.11	17.22	3244.00	0.51
- No Ice 0.9 Dead+1.6 Wind 270 deg	25.80	-28.61	0.11	17.01	3209.12	0.51
- No Ice 1.2 Dead+1.6 Wind 300 deg	34.40	-24.72	-14.14	-1597.15	2800.93	0.73
- No Ice 0.9 Dead+1.6 Wind 300 deg	25.80	-24.72	-14.14	-1580.03	2770.80	0.73
- No Ice 1.2 Dead+1.6 Wind 330 deg	34.40	-14.21	-24.61	-2783.62	1607.30	0.77
- No Ice 0.9 Dead+1.6 Wind 330 deg	25.80	-14.21	-24.61	-2753.76	1590.00	0.76
- No Ice 1.2 Dead+1.0 Ice+1.0 Temp	58.68	-0.00	0.00	-0.06	0.67	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	58.68	0.03	-8.21	-928.97	-3.30	0.15
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	58.68	4.14	-7.12	-806.58	-469.56	0.06
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	58.68	7.14	-4.12	-468.08	-809.79	-0.05
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	58.68	8.23	-0.03	-4.17	-932.81	-0.14
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	58.68	7.12	4.08	460.83	-805.69	-0.20
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	58.68	4.10	7.09	802.34	-462.46	-0.20
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	58.68	-0.03	8.21	928.82	4.90	-0.15
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	58.68	-4.14	7.12	806.43	471.16	-0.06
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	58.68	-7.14	4.12	467.93	811.38	0.05
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	58.68	-8.23	0.03	4.02	934.40	0.14
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	58.68	-7.12	-4.08	-460.98	807.29	0.20
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	58.68	-4.10	-7.09	-802.49	464.06	0.20
Dead+Wind 0 deg - Service	28.67	0.02	-6.09	-686.52	-3.48	0.13
Dead+Wind 30 deg - Service	28.67	3.08	-5.29	-596.38	-348.35	0.06
Dead+Wind 60 deg - Service	28.67	5.31	-3.07	-346.44	-599.84	-0.03
Dead+Wind 90 deg - Service	28.67	6.12	-0.02	-3.67	-690.54	-0.11
Dead+Wind 120 deg - Service	28.67	5.29	3.03	340.08	-596.17	-0.16
Dead+Wind 150 deg - Service	28.67	3.04	5.27	592.71	-342.01	-0.17
Dead+Wind 180 deg - Service	28.67	-0.02	6.09	686.51	3.85	-0.13
Dead+Wind 210 deg - Service	28.67	-3.08	5.29	596.37	348.72	-0.06
Dead+Wind 240 deg - Service	28.67	-5.31	3.07	346.43	600.20	0.03
Dead+Wind 270 deg - Service	28.67	-6.12	0.02	3.66	690.91	0.11
Dead+Wind 300 deg - Service	28.67	-5.29	-3.03	-340.09	596.54	0.16
Dead+Wind 330 deg - Service	28.67	-3.04	-5.27	-592.71	342.37	0.17

Solution Summary

Load Comb.	Sum of Applied Forces PX	PY	PZ	Sum of Reactions PX	PY	PZ	% Error
	K	K	K	K	K	K	

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
1	0.00	-28.67	0.00	0.00	28.67	0.00	0.000%
2	0.11	-34.40	-28.48	-0.11	34.40	28.48	0.000%
3	0.11	-25.80	-28.48	-0.11	25.80	28.48	0.000%
4	14.40	-34.40	-24.72	-14.40	34.40	24.72	0.000%
5	14.40	-25.80	-24.72	-14.40	25.80	24.72	0.000%
6	24.83	-34.40	-14.34	-24.83	34.40	14.34	0.000%
7	24.83	-25.80	-14.34	-24.83	25.80	14.34	0.000%
8	28.61	-34.40	-0.11	-28.61	34.40	0.11	0.000%
9	28.61	-25.80	-0.11	-28.61	25.80	0.11	0.000%
10	24.72	-34.40	14.14	-24.72	34.40	-14.14	0.000%
11	24.72	-25.80	14.14	-24.72	25.80	-14.14	0.000%
12	14.21	-34.40	24.61	-14.21	34.40	-24.61	0.000%
13	14.21	-25.80	24.61	-14.21	25.80	-24.61	0.000%
14	-0.11	-34.40	28.48	0.11	34.40	-28.48	0.000%
15	-0.11	-25.80	28.48	0.11	25.80	-28.48	0.000%
16	-14.40	-34.40	24.72	14.40	34.40	-24.72	0.000%
17	-14.40	-25.80	24.72	14.40	25.80	-24.72	0.000%
18	-24.83	-34.40	14.34	24.83	34.40	-14.34	0.000%
19	-24.83	-25.80	14.34	24.83	25.80	-14.34	0.000%
20	-28.61	-34.40	0.11	28.61	34.40	-0.11	0.000%
21	-28.61	-25.80	0.11	28.61	25.80	-0.11	0.000%
22	-24.72	-34.40	-14.14	24.72	34.40	14.14	0.000%
23	-24.72	-25.80	-14.14	24.72	25.80	14.14	0.000%
24	-14.21	-34.40	-24.61	14.21	34.40	24.61	0.000%
25	-14.21	-25.80	-24.61	14.21	25.80	24.61	0.000%
26	0.00	-58.68	0.00	0.00	58.68	0.00	0.000%
27	0.03	-58.68	-8.21	-0.03	58.68	8.21	0.000%
28	4.14	-58.68	-7.12	-4.14	58.68	7.12	0.000%
29	7.14	-58.68	-4.12	-7.14	58.68	4.12	0.000%
30	8.23	-58.68	-0.03	-8.23	58.68	0.03	0.000%
31	7.12	-58.68	4.08	-7.12	58.68	-4.08	0.000%
32	4.10	-58.68	7.09	-4.10	58.68	-7.09	0.000%
33	-0.03	-58.68	8.21	0.03	58.68	-8.21	0.000%
34	-4.14	-58.68	7.12	4.14	58.68	-7.12	0.000%
35	-7.14	-58.68	4.12	7.14	58.68	-4.12	0.000%
36	-8.23	-58.68	0.03	8.23	58.68	-0.03	0.000%
37	-7.12	-58.68	-4.08	7.12	58.68	4.08	0.000%
38	-4.10	-58.68	-7.09	4.10	58.68	7.09	0.000%
39	0.02	-28.67	-6.09	-0.02	28.67	6.09	0.000%
40	3.08	-28.67	-5.29	-3.08	28.67	5.29	0.000%
41	5.31	-28.67	-3.07	-5.31	28.67	3.07	0.000%
42	6.12	-28.67	-0.02	-6.12	28.67	0.02	0.000%
43	5.29	-28.67	3.03	-5.29	28.67	-3.03	0.000%
44	3.04	-28.67	5.27	-3.04	28.67	-5.27	0.000%
45	-0.02	-28.67	6.09	0.02	28.67	-6.09	0.000%
46	-3.08	-28.67	5.29	3.08	28.67	-5.29	0.000%
47	-5.31	-28.67	3.07	5.31	28.67	-3.07	0.000%
48	-6.12	-28.67	0.02	6.12	28.67	-0.02	0.000%
49	-5.29	-28.67	-3.03	5.29	28.67	3.03	0.000%
50	-3.04	-28.67	-5.27	3.04	28.67	5.27	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	5	0.00000001	0.00006786
3	Yes	4	0.00000001	0.00086469
4	Yes	6	0.00000001	0.00009675
5	Yes	5	0.00000001	0.00086154
6	Yes	6	0.00000001	0.00009663
7	Yes	5	0.00000001	0.00086021
8	Yes	5	0.00000001	0.00006436
9	Yes	4	0.00000001	0.00081935
10	Yes	6	0.00000001	0.00009399

11	Yes	5	0.00000001	0.00083681
12	Yes	6	0.00000001	0.00009648
13	Yes	5	0.00000001	0.00085988
14	Yes	4	0.00000001	0.00050537
15	Yes	4	0.00000001	0.00015742
16	Yes	6	0.00000001	0.00009592
17	Yes	5	0.00000001	0.00085394
18	Yes	6	0.00000001	0.00009615
19	Yes	5	0.00000001	0.00085572
20	Yes	4	0.00000001	0.00052243
21	Yes	4	0.00000001	0.00017067
22	Yes	6	0.00000001	0.00009651
23	Yes	5	0.00000001	0.00085990
24	Yes	6	0.00000001	0.00009393
25	Yes	5	0.00000001	0.00083646
26	Yes	4	0.00000001	0.00000312
27	Yes	5	0.00000001	0.00081159
28	Yes	6	0.00000001	0.00015736
29	Yes	6	0.00000001	0.00015766
30	Yes	5	0.00000001	0.00081466
31	Yes	6	0.00000001	0.00015356
32	Yes	6	0.00000001	0.00015496
33	Yes	5	0.00000001	0.00081113
34	Yes	6	0.00000001	0.00015771
35	Yes	6	0.00000001	0.00015793
36	Yes	5	0.00000001	0.00081737
37	Yes	6	0.00000001	0.00015609
38	Yes	6	0.00000001	0.00015416
39	Yes	4	0.00000001	0.00008563
40	Yes	4	0.00000001	0.00082245
41	Yes	4	0.00000001	0.00082127
42	Yes	4	0.00000001	0.00008285
43	Yes	4	0.00000001	0.00075942
44	Yes	4	0.00000001	0.00081366
45	Yes	4	0.00000001	0.00007383
46	Yes	4	0.00000001	0.00080598
47	Yes	4	0.00000001	0.00081219
48	Yes	4	0.00000001	0.00007194
49	Yes	4	0.00000001	0.00081786
50	Yes	4	0.00000001	0.00075881

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	150 - 110.75	26.386	47	1.5530	0.0012
L2	114.75 - 74.75	15.441	47	1.3329	0.0010
L3	79.5 - 39.5	7.145	47	0.8734	0.0004
L4	45 - 0	2.245	47	0.4580	0.0002

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
150'	Lighting Rod 1/2" x 2'	47	26.386	1.5530	0.0012	33432
147'	(2) LPA-80063/6CF w/ Mount Pipe	47	25.410	1.5398	0.0012	33432
138'	Miscellaneous [NA 510-1]	47	22.502	1.4978	0.0011	13930
136'	(2) SBNH-1D6565C w/ Mount Pipe	47	21.864	1.4875	0.0011	11940

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	150 - 110.75	123.596	18	7.2872	0.0059
L2	114.75 - 74.75	72.421	18	6.2608	0.0046
L3	79.5 - 39.5	33.543	18	4.1039	0.0020
L4	45 - 0	10.545	18	2.1516	0.0008

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
150'	Lighting Rod 1/2" x 2'	18	123.596	7.2872	0.0059	7380
147'	(2) LPA-80063/6CF w/ Mount Pipe	18	119.035	7.2260	0.0058	7380
138'	Miscellaneous [NA 510-1]	18	105.443	7.0310	0.0056	3073
136'	(2) SBNH-1D6565C w/ Mount Pipe	18	102.458	6.9831	0.0055	2633

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	150 - 110.75 (1)	TP31.38x24x0.2188	39'3"	0'	0.0	21.1135	-9.16	1415.41	0.006
L2	110.75 - 74.75 (2)	TP37.711x30.1904x0.25	40'	0'	0.0	29.0167	-14.36	1905.99	0.008
L3	74.75 - 39.5 (3)	TP43.839x36.3179x0.3125	40'	0'	0.0	42.1471	-21.63	2849.32	0.008
L4	39.5 - 0 (4)	TP50.64x42.1799x0.375	45'	0'	0.0	59.8279	-34.38	4066.19	0.008

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	150 - 110.75 (1)	TP31.38x24x0.2188	500.77	885.66	0.565	0.00	885.66	0.000
L2	110.75 - 74.75 (2)	TP37.711x30.1904x0.25	1219.61	1434.68	0.850	0.00	1434.68	0.000
L3	74.75 - 39.5 (3)	TP43.839x36.3179x0.3125	2035.56	2490.93	0.817	0.00	2490.93	0.000
L4	39.5 - 0 (4)	TP50.64x42.1799x0.375	3253.89	4204.54	0.774	0.00	4204.54	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	150 - 110.75 (1)	TP31.38x24x0.2188	18.74	707.71	0.026	0.15	1773.48	0.000
L2	110.75 - 74.75 (2)	TP37.711x30.1904x0.25	22.01	953.00	0.023	0.15	2872.87	0.000
L3	74.75 - 39.5 (3)	TP43.839x36.3179x0.3125	25.21	1424.66	0.018	0.15	4987.97	0.000
L4	39.5 - 0 (4)	TP50.64x42.1799x0.375	28.71	2033.10	0.014	0.15	8419.33	0.000

Pole Interaction Design Data

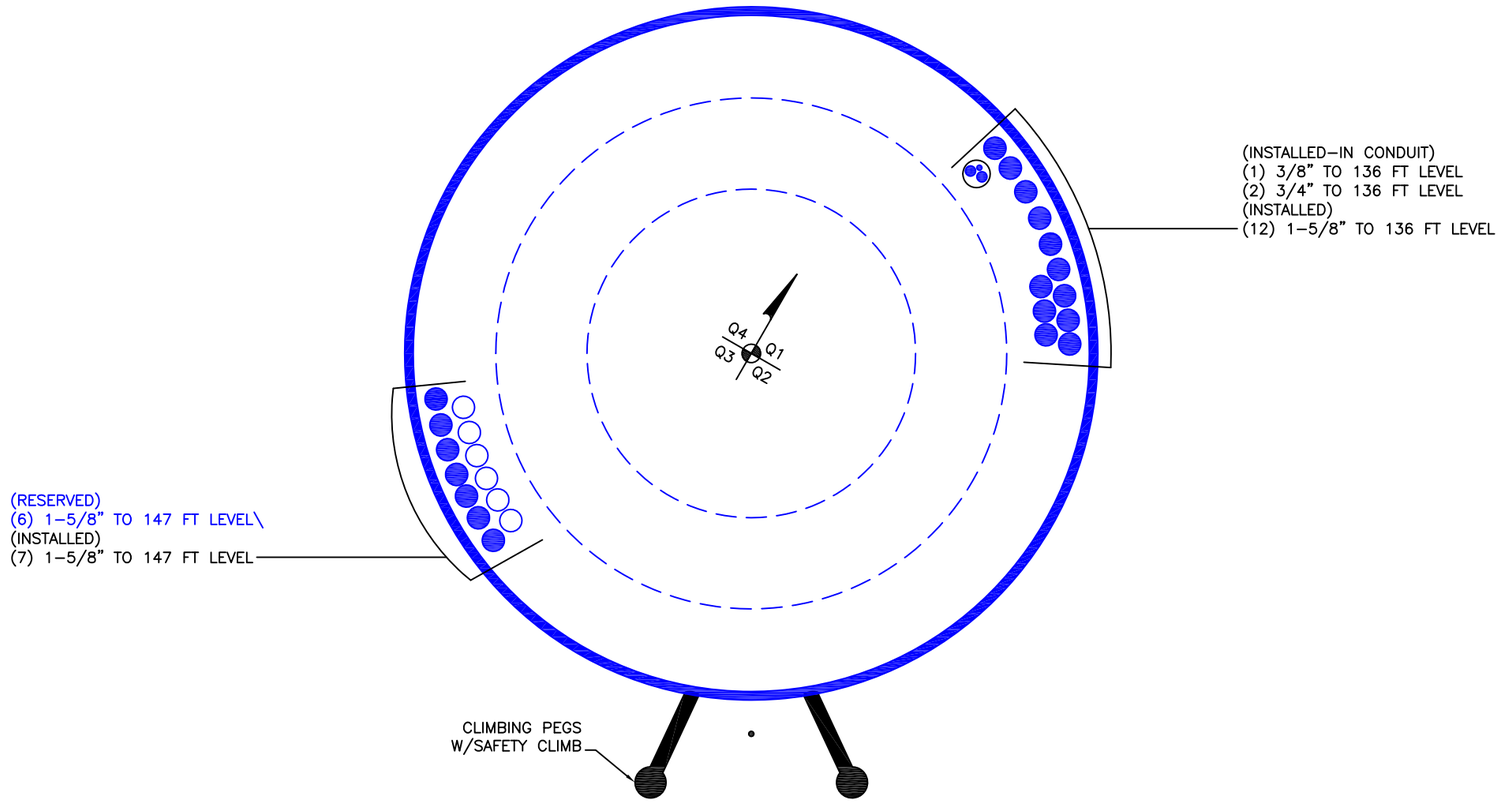
Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	150 - 110.75 (1)	0.006	0.565	0.000	0.026	0.000	0.573 ✔	1.000	4.8.2 ✔
L2	110.75 - 74.75 (2)	0.008	0.850	0.000	0.023	0.000	0.858 ✔	1.000	4.8.2 ✔
L3	74.75 - 39.5 (3)	0.008	0.817	0.000	0.018	0.000	0.825 ✔	1.000	4.8.2 ✔
L4	39.5 - 0 (4)	0.008	0.774	0.000	0.014	0.000	0.783 ✔	1.000	4.8.2 ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	150 - 110.75	Pole	TP31.38x24x0.2188	1	-9.16	1415.41	57.3	Pass
L2	110.75 - 74.75	Pole	TP37.711x30.1904x0.25	2	-14.36	1905.99	85.8	Pass
L3	74.75 - 39.5	Pole	TP43.839x36.3179x0.3125	3	-21.63	2849.32	82.5	Pass
L4	39.5 - 0	Pole	TP50.64x42.1799x0.375	4	-34.38	4066.19	78.3	Pass
							Summary	
						Pole (L2)	85.8	Pass
						RATING =	**85.8**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 873645 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

Square, Stiffened / Unstiffened Base Plate, Any Rod Material - Rev. F /G

Assumptions:
1) Rod groups at corners. Total # rods divisible by 4. Maximum total # of rods = 48 (12 per Corner).
2) Rod Spacing = Straight Center-to-Center distance between any (2) adjacent rods (same corner)
3) Clear space between bottom of leveling nut and top of concrete **not** exceeding (1)*(Rod Diameter)

Site Data

BU#: *873645*
Site Name: *Oxford*
App #: *358532 Rev. 0*

Anchor Rod Data		
Eta Factor, η	0.5	TIA G (Fig. 4-4)
Qty:	16	
Diam:	2.25	in
Rod Material:	A615-J	
Yield, Fy:	75	ksi
Strength, Fu:	100	ksi
Bolt Circle:	58	in
Anchor Spacing:	6	in

Plate Data		
W=Side:	57	in
Thick:	3	in
Grade:	55	ksi
Clip Distance:	6	in

Stiffener Data (Welding at both sides)		
Configuration:	Unstiffened	
Weld Type:		**
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:		in
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

Pole Data		
Diam:	50.64	in
Thick:	0.375	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round

Base Reactions		
TIA Revision:	G	
Factored Moment, Mu:	3254	ft-kips
Factored Axial, Pu:	34	kips
Factored Shear, Vu:	29	kips

Anchor Rod Results

TIA G --> Max Rod (Cu+ Vu/η):	174.0	Kips
Axial Design Strength, Φ*Fu*Anet:	260.0	Kips
Anchor Rod Stress Ratio:	66.9%	**Pass**

Base Plate Results — Flexural Check

Base Plate Stress:	28.8	ksi
PL Design Bending Strength, Φ*Fy:	49.5	ksi
Base Plate Stress Ratio:	58.1%	**Pass**

PL Ref. Data	
Yield Line (in):	29.97
Max PL Length:	29.97

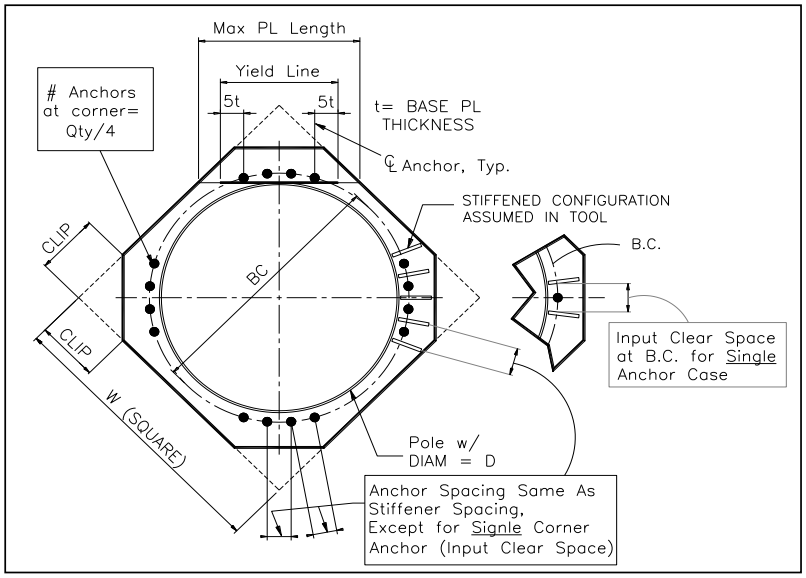
N/A - Unstiffened

Stiffener Results

Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A

Pole Results

Pole Punching Shear Check:	N/A



** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

Monopole Pier and Pad Foundation

BU # : 873645
Site Name: Oxford
App. Number: 358532 Rev. 0
TIA-222 Revision: G

Design Reactions		
Shear, **S**:	28.7	kips
Moment, **M**:	3254	ft-kips
Tower Height, **H**:	150	ft
Tower Weight, **Wt**:	34.4	kips
Base Diameter, **BD**:	4.22	ft

Foundation Dimensions		
Depth, **D**:	7	ft
Pad Width, **W**:	23.5	ft
Neglected Depth, **N**:	3.5	ft
Thickness, **T**:	3.00	ft
Pier Diameter, **Pd**:	7.00	ft
Ext. Above Grade, **E**:	0.50	ft
BP Dist. Above Pier:	3	in.
Clear Cover, **Cc**:	3.0	in

Soil Properties		
Soil Unit Weight, **γ**:	0.125	kcf
Ult. Bearing Capacity, Bc:	12.0	ksf
Angle of Friction, **Φ**:	30	deg
Cohesion, **Co**:	0.000	ksf
Passive Pressure, **Pp**:	0.000	ksf
Base Friction, **μ**:	0.30	

Material Properties		
Rebar Yield Strength, **Fy**:	60000	psi
Concrete Strength, **F'c**:	3000	psi
Concrete Unit Weight, **δc**:	0.150	kcf
Seismic Zone, **z**:	1	

Rebar Properties		
Pier Rebar Size, **Sp**:	11	
Pier Rebar Quanity, **mp**:	28	18
Pad Rebar Size, **Spad**:	10	
Pad Rebar Quanity, **mpad**:	26	8
Pier Tie Size, **St**:	4	4
Tie Quanity, **mt**:	7	5

Design Checks	Capacity/ Availability	Demand/ Limits	Check
Req'd Pier Diam.(ft)	7	5.72	**OK**
Overturning (ft-kips)	5669.66	3254.00	**57.4%**
Shear Capacity (kips)	140.31	28.70	**20.5%**
Bearing (ksf)	9.00	2.54	**28.2%**
Pad Shear - 1-way (kips)	749.85	317.32	**42.3%**
Pad Shear - 2-way (kips)	1944.15	77.70	**4.0%**
Pad Moment Capacity (k-ft)	4604.42	1094.74	**23.8%**
Pier Moment Capacity (k-ft)	6775.17	3383.15	**49.9%**

Maximum Allowable Moment of a Circular Pier

Axial Load (Negative for Compression) = -34.40 kips

Pier Properties

Concrete:

Pier Diameter = 7.0 ft

Concrete Area = 5541.8 in^2

Reinforcement:

Clear Cover = 3.00 in

Cage Diameter = 6.38 ft

Bar Size = 11

Bar Diameter = 1.41 in

Bar Area = 1.56 in^2

Number of Bars = 28

Material Properties

Concrete compressive strength = 3000 psi

Reinforcement yield strength = 60000 psi

Modulus of elasticity = 29000 ksi

Reinforcement yield strain = 0.00207

Limiting compressive strain = 0.003

Seismic Properties

Seismic Zone = 1

Minimum Area of Steel

Required area of steel = 27.71 in^2

Provided area of steel = 43.68 in^2 **OK**

Axial Loading

Load factor = 1

Reduction factor = 0.9

Factored axial load = -38.2222 kips

Neutral Axis

Distance from extreme edge to neutral axis =	15.39	in
Equivalent compression zone factor =	0.85	
Distance from extreme edge to equivalent compression zone factor =	13.08	in
Distance from centroid to neutral axis =	26.61	in

Compression Zone

Area of steel in compression zone =	10.92	in^2
Angle from centroid of pier to intersection of equivalent compression zone and edge of pier =	46.48	deg
Area of concrete in compression =	550.26	in^2
Force in concrete = 0.85 * f`c * Acc =	1403.16	kips
Total reinforcement forces =	-1364.94	kips
Factored axial load =	-38.22	kips
Force in concrete =	-1403.16	kips
Sum of the forces in concrete =	0.00	kips **OK**

Maximum Moment

First moment of the concrete area in compression about the centoid =	18834.85	in^3
Distance between centroid of concrete in compression and centroid of pier =	34.23	in
Moment of concrete in compression =	48028.86	in-kips
Total reinforcement moment =	42306.70	in-kips
Nominal moment strength of column =	90335.56	in-kips
Factored moment strength of column =	81302.00	in-kips

Maximum Allowable Moment = **6775.17** **ft-kips**

Individual Bars

Bar #	Angle from first bar (deg)	Distance to centroid (in)	Distance to neutral axis (in)	Distance to equivalent comp. zone (in)	Strain	Area of steel in compression (in^2)	Stress (ksi)	Axial force (kips)
1	0.00	0.00	-26.61	-28.92	-0.0051882	0.00	-60.00	-93.60
2	12.86	8.52	-18.09	-20.40	-0.0035269	0.00	-60.00	-93.60
3	25.71	16.62	-10.00	-12.30	-0.0019489	0.00	-56.52	-88.17
4	38.57	23.88	-2.74	-5.04	-0.0005333	0.00	-15.47	-24.13
5	51.43	29.94	3.33	1.02	0.0006488	1.56	18.82	25.38
6	64.29	34.50	7.89	5.58	0.0015383	1.56	44.61	65.62
7	77.14	37.33	10.72	8.41	0.0020905	1.56	60.00	89.62
8	90.00	38.30	11.68	9.37	0.0022777	1.56	60.00	89.62
9	102.86	37.33	10.72	8.41	0.0020905	1.56	60.00	89.62
10	115.71	34.50	7.89	5.58	0.0015383	1.56	44.61	65.62
11	128.57	29.94	3.33	1.02	0.0006488	1.56	18.82	25.38
12	141.43	23.88	-2.74	-5.04	-0.0005333	0.00	-15.47	-24.13
13	154.29	16.62	-10.00	-12.30	-0.0019489	0.00	-56.52	-88.17
14	167.14	8.52	-18.09	-20.40	-0.0035269	0.00	-60.00	-93.60
15	180.00	0.00	-26.61	-28.92	-0.0051882	0.00	-60.00	-93.60
16	192.86	-8.52	-35.13	-37.44	-0.0068496	0.00	-60.00	-93.60
17	205.71	-16.62	-43.23	-45.54	-0.0084276	0.00	-60.00	-93.60
18	218.57	-23.88	-50.49	-52.80	-0.0098432	0.00	-60.00	-93.60
19	231.43	-29.94	-56.55	-58.86	-0.0110253	0.00	-60.00	-93.60
20	244.29	-34.50	-61.11	-63.42	-0.0119148	0.00	-60.00	-93.60
21	257.14	-37.33	-63.95	-66.26	-0.012467	0.00	-60.00	-93.60
22	270.00	-38.30	-64.91	-67.22	-0.0126542	0.00	-60.00	-93.60
23	282.86	-37.33	-63.95	-66.26	-0.012467	0.00	-60.00	-93.60
24	295.71	-34.50	-61.11	-63.42	-0.0119148	0.00	-60.00	-93.60
25	308.57	-29.94	-56.55	-58.86	-0.0110253	0.00	-60.00	-93.60
26	321.43	-23.88	-50.49	-52.80	-0.0098432	0.00	-60.00	-93.60
27	334.29	-16.62	-43.23	-45.54	-0.0084276	0.00	-60.00	-93.60
28	347.14	-8.52	-35.13	-37.44	-0.0068496	0.00	-60.00	-93.60

USGS Design Maps Summary Report

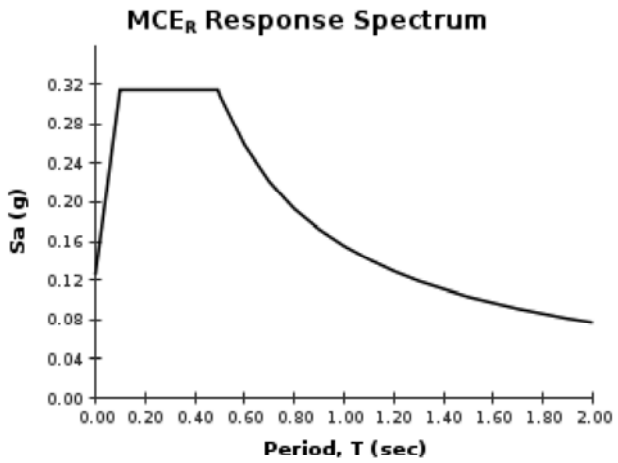
User–Specified Input

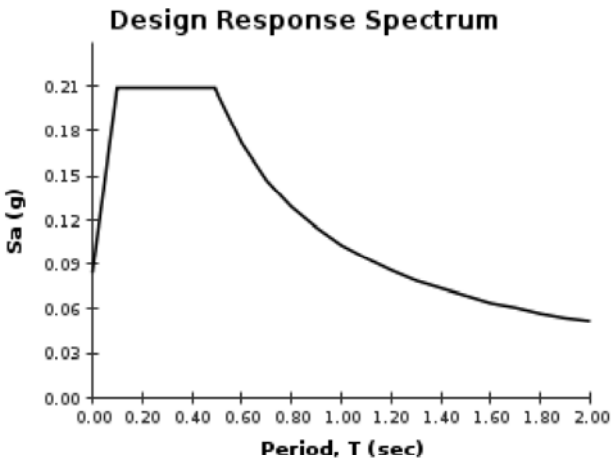
Building Code Reference Document	2012/2015 International Building Code (which utilizes USGS hazard data available in 2008)
Site Coordinates	41.44709°N, 73.15231°W
Site Soil Classification	Site Class D – "Stiff Soil"
Risk Category	I/II/III

USGS–Provided Output

S_S =	0.196 g	S_{MS} =	0.314 g	S_{DS} =	0.209 g
S_1 =	0.064 g	S_{M1} =	0.155 g	S_{D1} =	0.103 g

For information on how the SS and S1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the "2009 NEHRP" building code reference document.





CCISeismic - Design Category

Per *2012/2015 IBC*

Site BU: 873645
Work Order: 1298921
Application: 358532 Rev. 0

	Degrees	Minutes	Seconds		
Site Latitude =	41	26	49.51	41.4471	degrees
Site Longitude =	-73	9	8.32	-73.1523	degrees
Ground Supported Structure =	Yes				
Structure Class =	II				*(Table 2-1)*
Site Class =	D - Stiff Soil				*(Table 2-11)*

Spectral response acceleration short periods, S_S =	0.196	USGS Seismic Tool
Spectral response acceleration 1 s period, S_1 =	0.064	

Importance Factor, I =	1.0	*(Table 2-3)*
Acceleration-based site coefficient, F_a =	1.6	*(Table 2-12)*
Velocity-based site coefficient, F_v =	2.4	*(Table 2-13)*

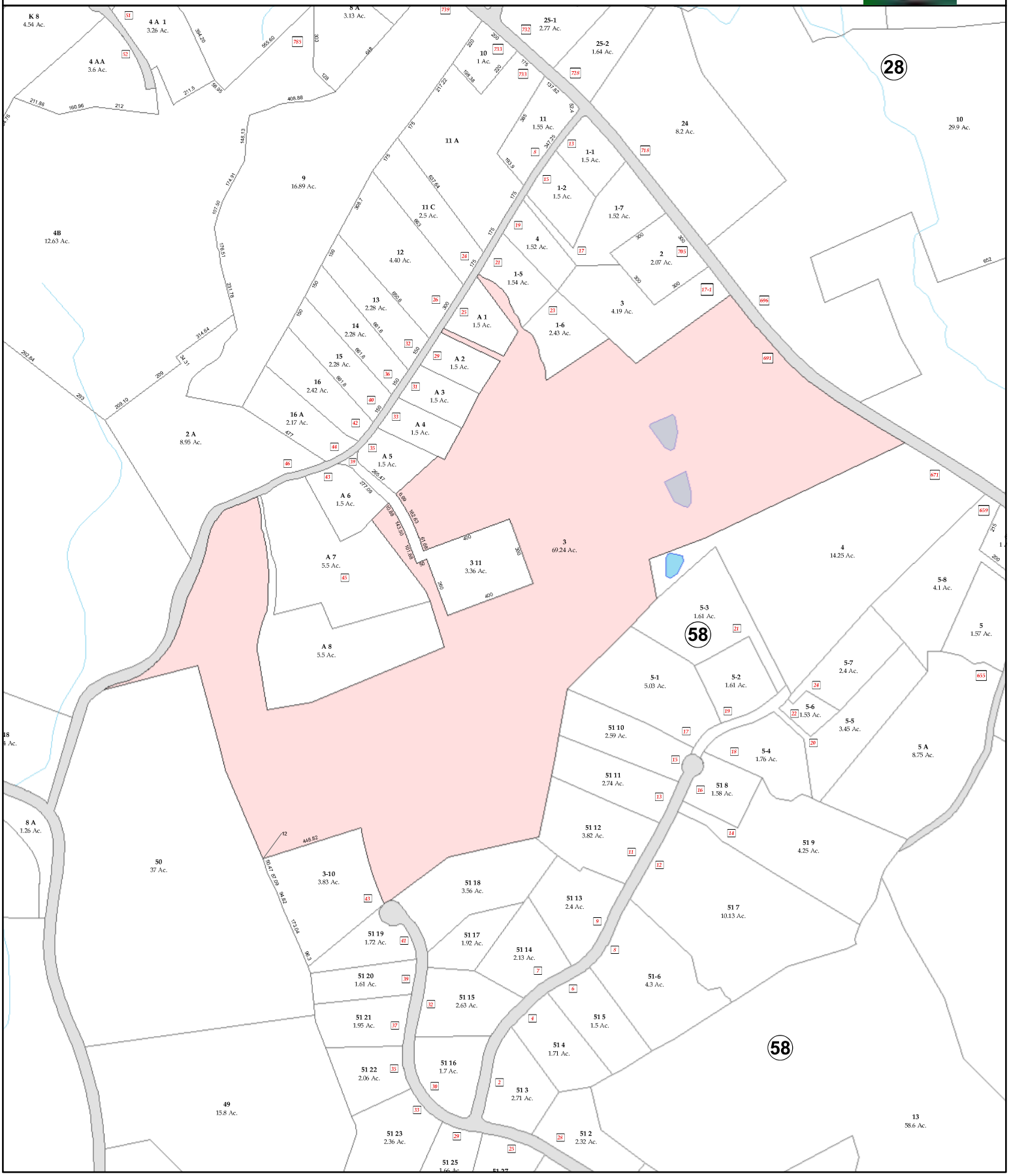
Design spectral response acceleration short period, S_{DS} =	0.209	*(2.7.6)*
Design spectral response acceleration 1 s period, S_{D1} =	0.102	*(2.7.6)*

Seismic Design Category - Short Period Response =	B	*ASCE 7-05 Table 11.6-1*
Seismic Design Category - 1s Period Response =	B	*ASCE 7-05 Table 11.6-2*

Worst Case Seismic Design Category =	B	*ASCE 7-05 Tables 11.6-1 and 6-2*

Town of Oxford, Connecticut - Assessment Parcel Map

Parcel: 19-58-3 **Location:** 691 OXFORD RD



Approximate Scale: 1 inch = 550 feet

0 280 560 840 1,120 Feet

Map Produced: December 2015

Disclaimer: This map is for informational purposes only All information is subject to verification by any user. The Town of Oxford and its mapping contractors assume no legal responsibility for the information contained herein.

the fact that Don Smith designed this 7-lot subdivision for the Town and is now reviewing his own work. The remaining six lots will need to be reviewed. It was recommended that a letter be sent to the Inland Wetlands Commission and Selectmen regarding this matter.

MOTION was made by Edwin Hellauer and seconded by Ray Reynolds approve Z-01-053 Ziat, LLC, 315 Riggs Street (Industrial Site Plan) based on map dated 1/18/01 and last revised 5/18/01 and with the following conditions:

1) Applicant and their assigns must comply with all representations made at P&Z Commission meetings or at public hearings regrading this application.
2) Prior to installation, lighting should be submitted to the ZEO for approval.
3) Vehicle directional signs stating entrance and exit are to be clearly marked and with no advertisement.
4) Compliance with Fire Marshal's letter dated 5/14/01.
5) Compliance with Oxford Driveway Ordinance as of this date.
6) Compliance with Oxford Zoning Regulations as of this date.
7) No work to begin until security is set by P&Z Engineer in a form acceptable to P&Z Counsel.
8) No material will be substituted without approval from the P&Z Commission and P&Z Engineer.
9) Landscaping plan and architectural rendering must be as presented on site plan. Any variations must be approved by the P&Z Commission.
10) Per Article 3, Section 19.1 of the Zoning Regulations, the applicant shall be responsible for rendering payment to any outside experts the Commission assigns to review this application.
11) Approval is conditioned on Inland Wetlands approval.

Reason for approval is that with the Inland Wetlands permit, this application would meet the Oxford Zoning Regulations as of this date. Alternate Scott Mackler abstained. All were in favor.

4) Z-01-066 Lars Realty/Cocchiola Paving, Inc., Roosevelt Drive. Secretary Edwin Hellauer read a letter dated 7/3/01 from Attorney Robert Uskevich in which he requests that this application be tabled until the 7/19/01 regular meeting. A letter will be sent suggesting that the applicant request an extension because after submittal of outstanding documents, this Commission will need time to have the documents reviewed by staff.

MOTION was made by Dave Robinson and seconded by Ray Reynolds to table Z-01-066 Lars Realty/Cocchiola Paving, Inc., Roosevelt Drive until the 7/19/01 regular meeting per the written request dated 7/3/01. Alternate John Barnes abstained. All were in favor.

5) Z-01-099 Integrated Wireless Services/Rich, 691 Oxford Road (S/E - Wireless Communications Facility). Chairman Robinson explained that the applicant was before the Commission earlier this evening during the public hearing. Contracted P&Z Planner Brian Miller has reviewed this application. An application was previously taken out for antennas on the existing silo at the same location. Alternate John Barnes recused himself at this point.

MOTION was made by Vincent Vizzo and seconded by Ray Reynolds to grant the waiver to the Zoning Regulations for the size of the six (6) equipment shelters for Z-01-099 Integrated Wireless Services/Rich, 691 Oxford Road. The equipment shelter for the applicant's equipment shelter will be 240 square feet in size and 10 feet in height. The maximum square footage for the remaining five (5) equipment shelters is hereby waived but is not to exceed 240 square feet and 10 feet in height. All were in favor.

MOTION was made by Dave Robinson and seconded by Edwin Hellauer to approve Z-01-099 Integrated Wireless Services/Rich, 691 Oxford Road (S/E - Wireless Telecommunications Facility) with the waiver for size of the six (6) equipment shelters based on Sheets T-1 dated 12/12/00 and last revised 5/16/01 and Sheets C-1 thru C-9 dated 12/12/00 and last revised 5/16/01 and conditioned upon compliance with Brian Miller's letter dated 6/12/01. Any representations made by the applicant or their assigns during the public hearing are to be made part of this approval.