Centek Engineering, Inc.
3-2 North Branford Road
Branford, Connecticut 06405
Phone: (203) 488-0580
Fax: (203) 488-8587

Steven L. Levine
Real Estate Consultant

HAND DELIVERED

February 23, 2016

Attorney Melanie Bachman
Acting Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, Connecticut 06051

Re: New Cingular Wireless PCS, LLC notice of intent to modify an existing telecommunications facility located at 231 Kettletown Road, Southbury

Dear Ms. Bachman:

In order to accommodate technological changes, implement Uniform Mobile Telecommunications System ("UMTS") and/or Long Term Evolution ("LTE") capabilities, and enhance system performance in the State of Connecticut, New Cingular Wireless PCS, LLC ("AT&T") plans to modify the equipment configurations at many of its existing cell sites. Please accept this letter and attachments as notification, pursuant to R.C.S.A. Section 16-50j-73, of construction which constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2). In compliance with R.C.S.A. Section 16-50j-73, copies of this letter are being sent to the chief elected official of the municipality in which the affected cell site is located, the property owner of record, and the tower owner or operator.

UMTS technology offers services to mobile computer and phone users anywhere in the world. Based on the Global System for Mobile ("GSM") communication standard, UMTS is the planned worldwide standard for mobile users. UMTS, fully implemented, gives computer and phone users high-speed access to the Internet as they travel. They have the same capabilities even when they roam, through both terrestrial wireless and satellite transmissions.

LTE is a high-performance air interface for cellular mobile communications. It is designed to increase the capacity and speed of mobile telephone networks.

Attached is a summary of the planned modifications, including power density calculations reflecting the change in AT&T's operations at the site. Also included is documentation of the structural sufficiency of the tower to accommodate the revised antenna configuration.

The changes to the facility do not constitute modifications as defined in Connecticut General Statutes ("C.G.S.") Section 16-50i(d) because the general physical and environmental characteristics of the site will not be significantly changed or altered. Rather, the planned changes to the facility fall squarely within those activities explicitly provided for in R.C.S.A. Section 16-50j-72(b)(2).

1. The height of the overall structure will not increase.

2. The proposed changes will not extend the site boundaries.

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

4. The changes will not add radio frequency sending or receiving capability which increases the total radio frequency electromagnetic radiation power density measured at the site boundary to or above the standards adopted by the Federal Communications Commission pursuant to Section 704 of the Telecommunications Act of 1996, as amended, and the State Department of Energy and Environmental Protection, pursuant to Section 22a-162 of the Connecticut General Statutes.

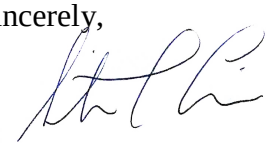
5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.

6. The proposed changes will not impair the structural integrity of the facility, as determined in a certification provided by a professional engineer licensed in Connecticut.

For the foregoing reasons, AT&T respectfully submits that the proposed changes at the referenced site constitute exempt modifications under R.C.S.A. Section 16-50j-72(b)(2).

Please feel free to call me at (860) 830-0380 with questions concerning this matter. Thank you for your consideration.

Sincerely,



Steven L. Levine
Real Estate Consultant

cc: TownCEO – Jeff Manville, 1st Selectman, Town of Southbury
Property Owner of Record – Jeff Manville, 1st Selectman, Town of Southbury
Tower Owner / Operator – Phoenix Tower International (by email)

Attachments

NEW CINGULAR WIRELESS PCS, LLC
Equipment Modification

231 Kettletown Road, Southbury, CT
Geographic Coordinates: N 41-28-28 W 73-12-30
Site Number 2086
Prior Decisions: Exempt Modifications 12/99, 9/02, 10/10, and 7/12

Tower Owner/Manager: Phoenix Towers International

Land Owner of Record: Town of Southbury

Original Permitting: The 231 Kettletown Road structure was approved on February 2, 1999 by the Southbury Zoning Board of Appeals under Omnipoint application #783. The ZBA approval was modified on April 1, 1999 to enlarge the size of the fenced compound. A Zoning Permit was issued on April 12, 1999. (See the attached zoning documents.) No approval conditions in these documents will be violated by the proposed equipment modifications.

Lease Area: The attached site plan excerpt from Omnipoint's 1999 construction drawings shows the facility as approved by the Southbury ZBA. The attached site plan from TS-SCLP-130-991105 illustrates the facility later in 1999 when AT&T's predecessor SCLP co-located. Comparison of these prior drawings with the proposed Construction Drawings, attached, confirms that all proposed equipment modifications will occur either on the existing tower structure or within AT&T's existing equipment shelter. Accordingly, the proposed modifications will not extend either AT&T's lease area or the overall site boundaries.

Equipment configuration: 195-ft. Monopole

Current and/or approved:
Pirod 13-ft. low profile platform @ 185 ft a.g.l.
Six PowerWave 7770 antennas @ 185 ft c.l.
Two KMW AM-X-CD-16-65 antennas @ 185 ft c.l.
One PowerWave P65-17-XLH-RR antenna @ 185 ft c.l.
Six PowerWave TMA's and six diplexers @ 185 ft
One Raycap DC6-48-60-18-8F @ 185 ft
Six RRUS-11 remote radio heads @ 185 ft
Twelve runs 1 ¼ inch coax
One fiber cable and two DC control cables
Equipment Shelter

Planned Modifications:
Remove three PowerWave 7770 antennas.
Remove three TMA's and all six diplexers.
Remove one fiber cable.
Install two Quintel QS66512-3 antennas @ 185 ft c.l.
Install one CCI TPA-65R-LCUUUU-H8 antenna @ 185 ft c.l.
Install six CCI triplexers @ 185 ft.
Install one additional Raycap DC6-48-60-18-8F @ 185 ft.
Install three RRUS-32 remote radio heads @ 185 ft.
Install two fiber cables and two DC control cables.

Power Density:

Worst-case calculations with 10 dB reduction for existing wireless operations at the site indicate a radio frequency electromagnetic radiation power density, measured at six feet above ground level beside the tower, of approximately 3.8 % of the standard adopted by the FCC. As depicted in the second table below, the total radio frequency electromagnetic radiation power density following proposed modifications would be approximately 3.4 % of the standard.

Existing

Company	Frequency (MHz)	Centerline Ht (feet)	Number of Channels	Power Per Channel (Watts)	Power Density (mW/cm^2)	Standard Limits (mW/cm^2)	Percent of Limit
Other Users *							2.67
AT&T LTE	734	185	1	1615	0.0181	0.4893	0.37
AT&T UMTS	880	185	2	565	0.0127	0.5867	0.22
AT&T UMTS	1900	185	2	875	0.0196	1.0000	0.20
AT&T GSM	880	185	1	283	0.0032	0.5867	0.05
AT&T GSM	1900	185	4	525	0.0236	1.0000	0.24
Total							**3.75%**

***** Per CSC records.

Proposed

Company	Frequency (MHz)	Antenna (Total for all sectors)	Centerline Ht (feet)	Number of Channels	Power Per Channel (Watts)	Power Density (mW/cm^2)	Standard Limits (mW/cm^2)	Percent of Limit
Other Users *								2.67
AT&T LTE	740	KMW 2 antennas PW P65-17 1 antenna	185	2	500	0.0112	0.4933	0.23
AT&T LTE	1900	KMW 2 antennas PW P65-17 1 antenna	185	2	500	0.0112	1.0000	0.11
AT&T LTE	2300	Quintel 2 antennas CCI TPA 1 antenna	185	2	500	0.0112	1.0000	0.11
AT&T UMTS	880	PW 7770 3 antennas	185	1	500	0.0056	0.5867	0.10
AT&T UMTS	1900	PW 7770 3 antennas	185	2	500	0.0112	1.0000	0.11
AT&T GSM	880	Quintel 2 antennas CCI TPA 1 antenna	185	1	296	0.0033	0.5867	0.06
Total								**3.39%**

***** Per CSC records

Structural information:

The attached structural analysis (Phoenix Tower International, 2/9/16) demonstrates that the tower and foundation have adequate structural capacity to accommodate the proposed equipment modifications.

TOWN OF SOUTHBURY
ZONING COMMISSION
501 Main Street South
Southbury, Connecticut 06488
(203) 264-0606 - ext. 257
FAX: (203) 264-9762

Zoning Documents

Zoning Permit

Permit Number	3026	*Issue Date*	4/12/99
Permission is granted to	TOWN OF SOUTHBURY		
To build	Monopole		
Address	Kettletown Rd. Southbury Recycling Station	*Lot*	3
		Zoning Fee:	$25.00

This permit is granted subject to compliance with the state law of Connecticut and zoning and building ordinances of the Town of Southbury.

Zoning Enforcement Officer

NOTE: As of March 11, 1985, on completion of the foundations, a certified plot plan will be required and filed in the zoning department (as built).

Z/B/A

TOWN OF SOUTHBURY
ZONING BOARD OF APPEALS
February 2, 1999

At the Regular Meeting on February 2, 1999 the following motion was unanimously approved.

Peirce Behardt motioned to approve the request from Omnipoint Application # 763 for a variance of Section Schedule B 6 of the Zoning Regulations, relating to Height Requirements with all of the changes set forth by the Zoning Board of Appeals as to permit construction of a monopole telecommunications tower for PCS coverage.

I hereby move that the application of the Omnipoint communications, Inc. dated August 14, 1998 seeking a variance to construct a 199 foot monopole, and an associated equipment cabinet for use as a PCS communications facility on parcel of land to be leased from the town of Southbury on Kettletown Road adjacent to the existing recycling facility in the R-60 zone, as requested in said application and as shown on the site plan submitted therewith, be granted subject to the following conditions:

1. The monopole and equipment cabinet will be completely surrounded by and eight-foot high, chain link, security fence (30' x 30') topped with barbed wire.
2. Omnipoint will obtain access to the site by means of a proposed road leading from Kettletown Road as shown on the site plan submitted with its application.
3. An Omnipoint employee will visit the site as least once a month for equipment checks and routine maintenance.
4. There is no requirement for water supply or sewerage or solid waste disposal.
5. No lights will be mounted on the monopole
6. The monopole shall be able to support at least four (4) additional carriers and shall have a non-reflecting galvanized finish.

7. All utilities proposed to serve the site shall be installed underground unless otherwise approved by the Board
8. All generators or other equipment if any installed at the site shall comply with all state and local noise regulations.
9. The monopole may not be used to exhibit any signage or advertising.
10. The design of the monopole and associated base station equipment shall comply with standards promulgated by the Federal communications commission for non-ionizing electromagnetic emissions.
11. There will be no blasting on the site.
12. All trucks entering or exiting the site must be driven in or out nose first. Backing into or out of the site is not permitted.
13. There will be no climbing rungs/apparatus for the first 25 feet on the pole from the ground. The service technician will remove any temporary apparatus when they leave the site.
14. Prior to the issuance of any zoning permit for the project or parts thereof, a pre-construction conference shall be held at the Southbury Town Hall between the applicant and its representatives and the Zoning Enforcement Officer, the Building Inspector, the Town Engineer, the Highway Foreman and other appropriate representatives of the town to coordinate all facets of all activity associated with the construction of the monopole and its accessory facilities.
15. Omnipoint will coordinate its construction schedule with the Region 15 Board of Education so that no construction vehicles will use Kettletown Road while said road is being utilized or scheduled to be utilized by school buses.
16. If the monopole is not in use for twelve consecutive months Omnipoint or its successors and assigns shall remove it. This removal shall occur within ninety days of the end of such twelve-month period. Upon removal the site shall be restored to its previous appearance and where appropriate re-vegetated to blend with the surrounding area.

17. Other Wireless Communication carriers may be offered co-location if antenna upon the monopole at reasonable rates and upon reasonable conditions set by the owners.

1.The monopole and equipment cabinet will be completely surrounded by and eight-foot high, chain link, security fence (30' x 30') topped with barbed wire.
2.Omnipoint will obtain access to the site by means of a proposed road leading from Kettletown Road as shown on the site plan submitted with its application.
3.An Omnipoint employee will visit the site as least once a month for equipment checks and routine maintenance.
4.There is no requirement for water supply or sewerage or solid waste disposal.
5.No lights will be mounted on the monopole
6.The monopole shall be able to support at least four (4) additional carriers and shall have a non-reflecting galvanized finish.
7.All utilities proposed to serve the site shall be installed underground unless otherwise approved by the Board
8.All generators or other equipment if any installed at the site shall comply with all state and local noise regulations.
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17.Other Wireless Communication carriers may be offered co-location if antenna upon the monopole at reasonable rates and upon reasonable conditions set by the owners.

18.Mature planting of at least 6 feet high to screen the equipment along with a fence must be put in place

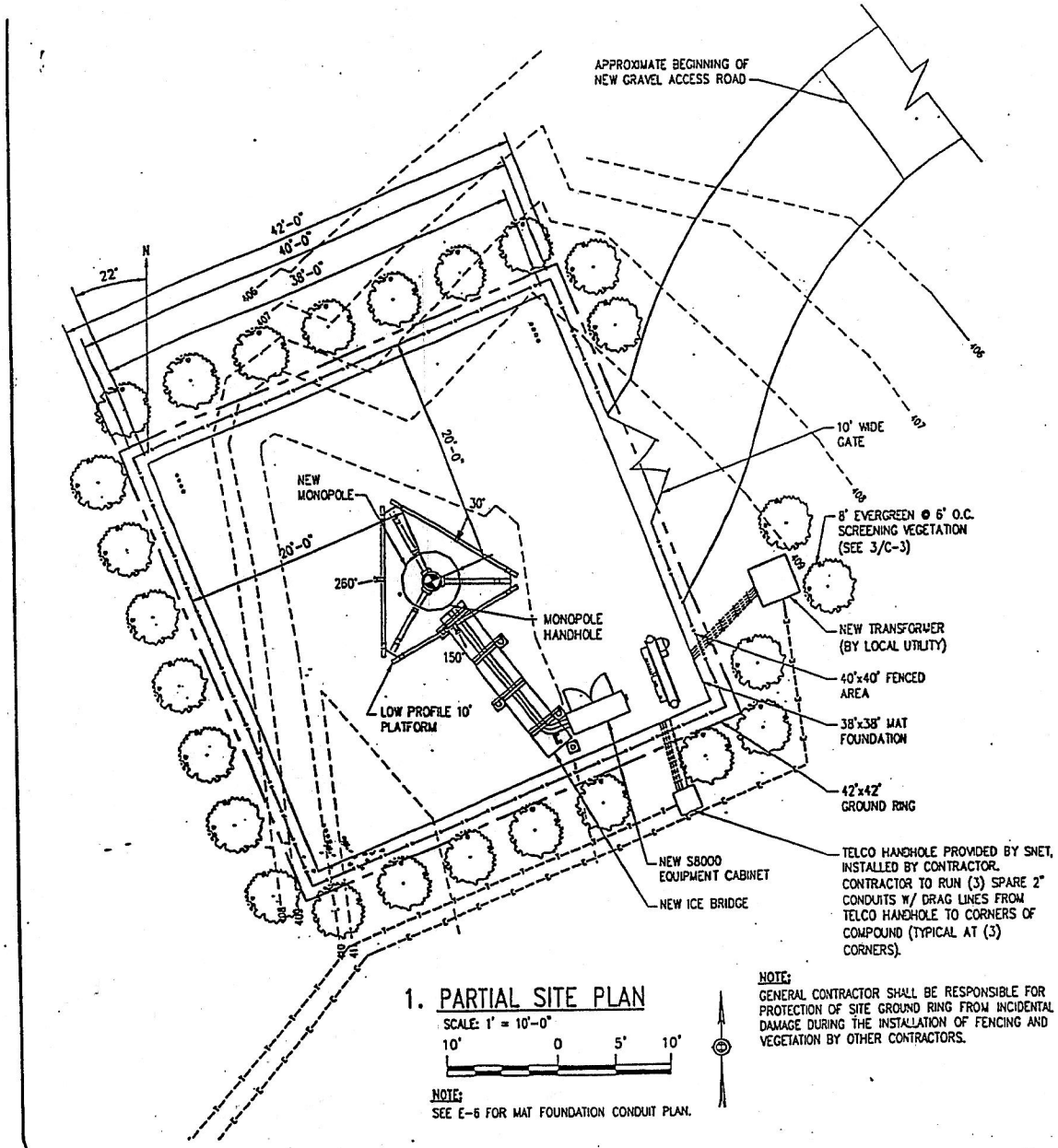
ZBA

MOTION

I HEREBY MOVE THAT the request of Omnipoint Communications, Inc. dated April 1, 1999 that it be permitted to increase the ground area for its proposed 199 foot monopole and associated equipment cabinet from an area of 30' X 30' to an area of 40' X 40' for use as a PCS communications facility on a parcel of land to be leased from the Town of Southbury on Kettletown Road adjacent to the existing recycling facility in the R-60 zone as shown on its revised site plan submitted therewith, dated 3/25/99, be granted subject to all of the conditions set forth in the vote of the Board adopted at its meeting of February 2, 1999 granting the applications of Omnipoint Communications, Inc. for a variance and a special exception for the structures and facilities set forth therein with the exception that the monopole and equipment cabinet will be completely surrounded by an 8-ft. high, chain link, security fence (40' X 40') topped with barbed wire.

In granting the request of Omnipoint Communications, Inc., the Board finds that the requested modification does not affect the fundamental character of the variance and special exception granted to Omnipoint Communications, Inc. by the Board at its meeting of February 2, 1999.

Omnipoint Site Plan
1999
As Zoned



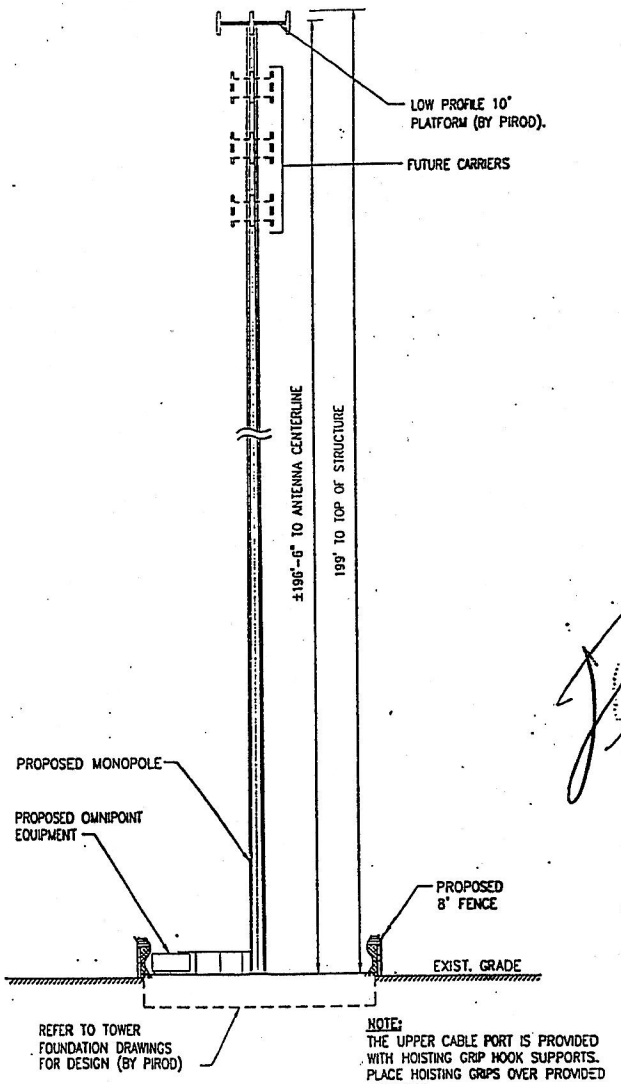
1. PARTIAL SITE PLAN

SCALE: 1" = 10'-0"

10' 0 5' 10'

NOTE:
SEE E-6 FOR MAT FOUNDATION CONDUIT PLAN.

NOTE:
GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTION OF SITE GROUND RING FROM INCIDENTAL DAMAGE DURING THE INSTALLATION OF FENCING AND VEGETATION BY OTHER CONTRACTORS.



NOTE:
THE UPPER CABLE PORT IS PROVIDED WITH HOISTING GRIP HOOK SUPPORTS. PLACE HOISTING GRIPS OVER PROVIDED SUPPORTS.

2. PARTIAL SITE ELEVATION

SCALE: 1" = 20'

20' 0 10' 20'

OMNIPOINT

CT-11-126-F

SOUTHBURY RECYCLING FACILITY
KETTLETOWN, RD
SOUTHBURY, CT

TECHSTAR Communications, Inc.
8403 COLESVILLE ROAD 10TH FLOOR
SILVER SPRING, MD 20910
PHONE: (301) 562-5400
FAX: (301) 562-5410

APPROVALS:

CONSTRUCTION DATE

RF DATE

SAC DATE

PROFESSIONAL ENGINEER:
FRANK SMITH
CT #00020738

REVISIONS		
NO.	DESCRIPTION	DATE
1	REVISION	10/05/98
2	MAT FOUNDATION	03/25/99

ISSUED FOR CONSTRUCTION

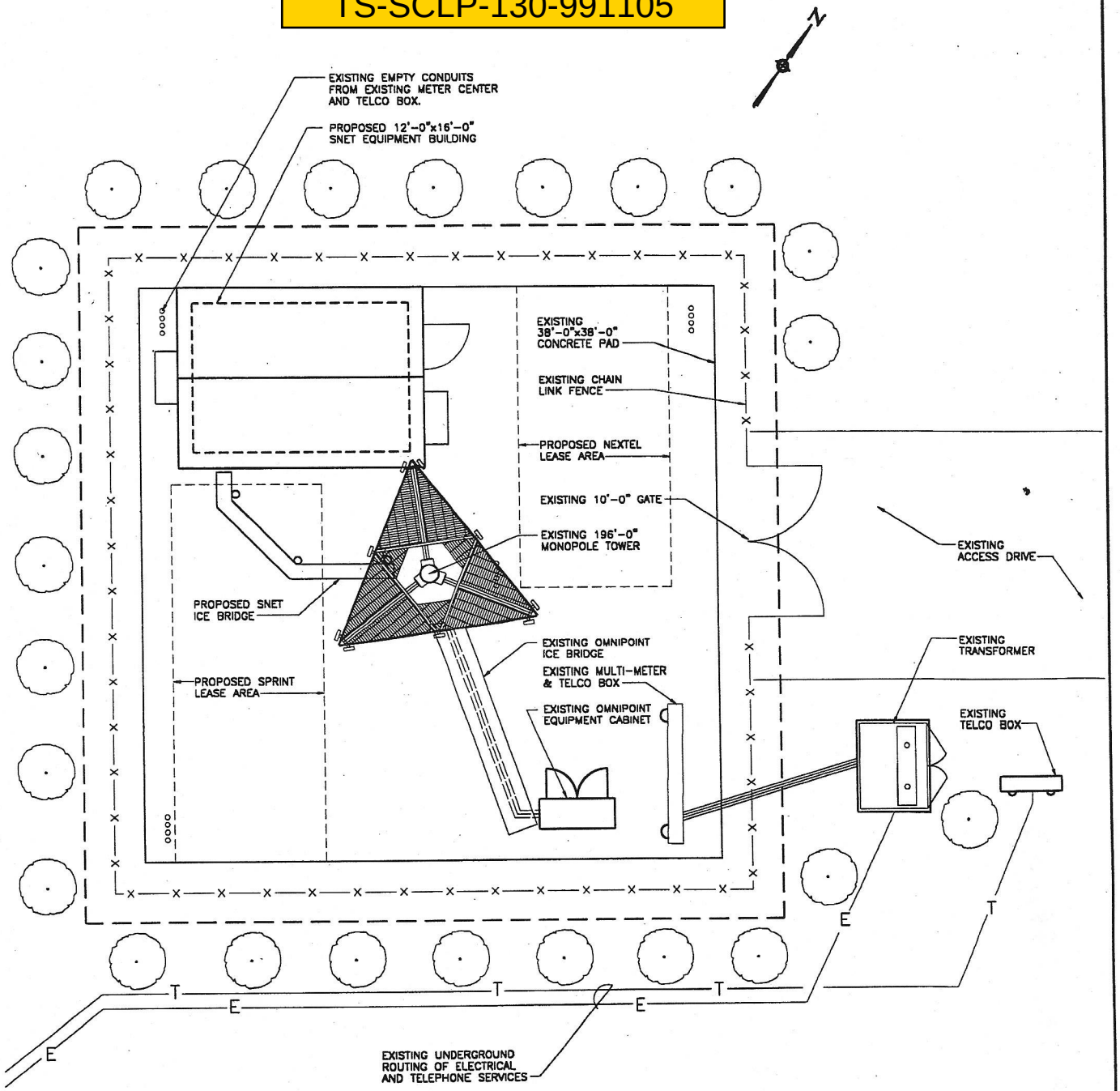
SHEET TITLE
PARTIAL SITE PLAN AND PARTIAL ELEVATION

SHEET NO.
C-2

ISSUE DATE
08/18/98

Last edited: 03/25/99 14:49

AT&T (SCLP) Site Plan
1999
TS-SCLP-130-991105



1 / L-1 **COMPOUND PLAN**
SCALE: 1" = 10'-0"

SITE ID NO:			
Designed by:			
Drawn by: JCF			
Checked by:			
Approved by:			

URS Greiner Woodward Clyde
A-E-S
500 ENTERPRISE DRIVE
ROCKY HILL, CONNECTICUT
1-(860)-529-8882

SPRINGWICH CELLULAR
LIMITED PARTNERSHIP
WIRELESS COMMUNICATIONS FACILITY

SITE ADDRESS: SOUTHBURY RECYCLING
KETTELTOWN ROAD
SOUTHBURY, CONNECTICUT

REV.	DATE:	DESCRIPTION

Scale: AS NOTED | Date: 08/23/99
Job No.F301804.33 | File No.

Dwg. No. L-1

Dwg. 1 of 2

PROJECT INFORMATION

SCOPE OF WORK	UNMANNED COMMUNICATIONS FACILITY MODIFICATIONS INCLUDING THE REPLACEMENT OF THREE EXISTING GSM PANELS WITH NEW QUINTEL/CCI LTE ANTENNAS AND THE ADDITION OF THREE RRUS-32 UNITS, ONE SURGE ARRESTOR WITH NEW 2 DC TRUNKS, 1 FIBER TRUNK
SITE NUMBER:	CT2086
SITE NAME:	SOUTHBURY – KETTLETOWN ROAD
SITE ADDRESS:	231 KETTLETOWN ROAD SOUTHBURY, CT 06488
PROPERTY OWNER:	TOWN OF SOUTHBURY TOWN RECYCLING TRANSFER STATION 231 KETTLETOWN ROAD SOUTHBURY, CT 06488
APPLICANT:	AT&T WIRELESS 550 COCHITUATE RD SUITES 13 & 14 FRAMINGHAM, MA 01701
CONTACT:	TEL 866-915-5600
COORDINATES	LAT. N41° 28' 16.3" LONG. W73° 12' 19.9"
GROUND LEVEL:	±419'
DEED REFERENCE:	N/A
SITE PARCEL NO.:	N/A
CURRENT ZONING:	N/A
HORIZONTAL DATUM:	(NAD) 1983

at&t Mobility

AT&T SITE NUMBER: CT2086
AT&T SITE NAME: SOUTHBURY KETTLETOWN ROAD
PTI SITE NAME & #: KETTLETON / US-CT-1002

DRAWING INDEX

DIG SAFE 1-888-DIG-SAFE

AT LEAST 72 HOURS PRIOR TO DIGGING, THE CONTRACTOR IS REQUIRED TO CALL DIG SAFE AT 1-888-DIG-SAFE

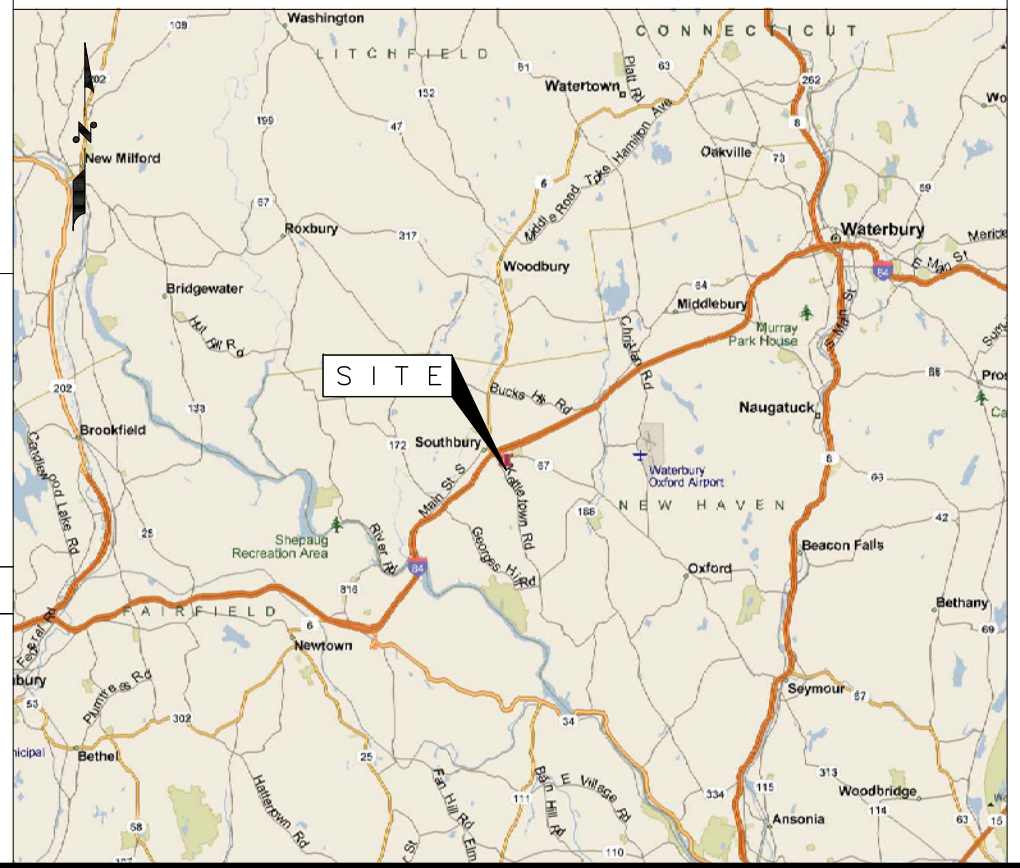
CONTACT & UTILITY INFORMATION

CONTACT	CONTACT	COMPANY	PHONE NO.
ENGINEERING:	MIGUEL NOBRE	VRG	(508) 981-9590
SITE ACQUISITION:	WARREN KELLEHER	SAI	(603) 421-0470
CONSTRUCTION:	T.B.D.	SAI	(603) 421-0470
UTILITIES			
POWER:	WORK REQUEST GROUP	NATIONAL GRID	(800) 375-7405
TELCO:	.	VERIZON	(800) 941-9900

LOCATION MAP

DIRECTIONS: FROM FRAMINGHAM PROCEED WEST ON I-90 TO EXIT 9. PROCEED SOUTHWEST ON I-84. TAKE I-84 WEST TO EXIT 15. LEFT AT END OF RAMP. RIGHT AT 2nd LIGHT, KETTLETOWN ROAD GO UPHILL TO SOUTHBURY RECYCLING CENTER LANDFILL ON LEFT OMNI POINT LOCK 6664 FOLLOW AROUND TO TOWER SAME COMBO ON THE GATE.

SITE ACCESS: LOCKED GATE



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 BUILDING CODE LATEST EDITION

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, ASD, 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.

VRG
VERTICAL RESOURCES GRP.
489 Washington Street
Auburn, MA 01501
Tel. (508) 981- 9590
Fax (508) 519 – 8939
mnobre@verticalresourcesgrp.com

SAI communications
27 NORTHWESTERN DRIVE
SALEM, NH 03079
Tel. (603) 421- 0470
Fax (603) 421 - 0471

SITE NUMBER: CT2086
SITE NAME: SOUTHBURY KETTLETOWN RD.

231 KETTLETOWN ROAD
SOUTHBURY, MA 06488
NEW HAVEN COUNTY

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

NO.	DATE	REVISION	BY	CHK	APP'D
3	02/17/16	GENERAL REVISIONS	G.A.M.		
2	01/08/16	FOR PERMIT APPLICATION	G.A.M.		
1	12/03/15	GENERAL REVISIONS	G.A.M.		
0	11/17/15	FOR REVIEW	G.A.M.		

SCALE | DESIGNED BY: M.N. | DRAWN BY: G.A.M.

STATE OF CONNECTICUT JAMES P. STRONE No. 8657 REGISTERED PROFESSIONAL ENGINEER

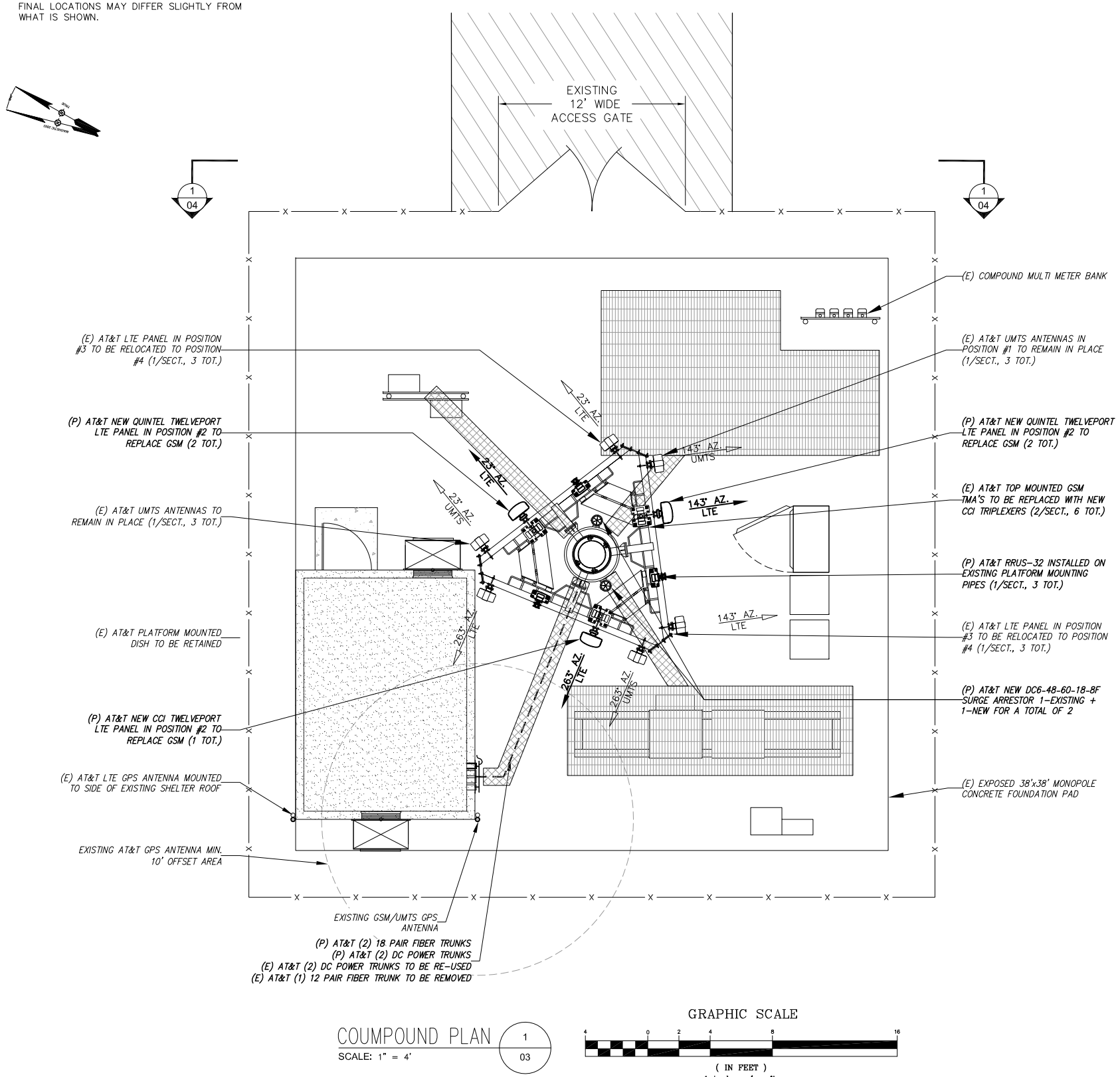
AT&T MOBILITY

TITLE SHEET

JOB NUMBER	DRAWING NUMBER	REV
50-145	01	3

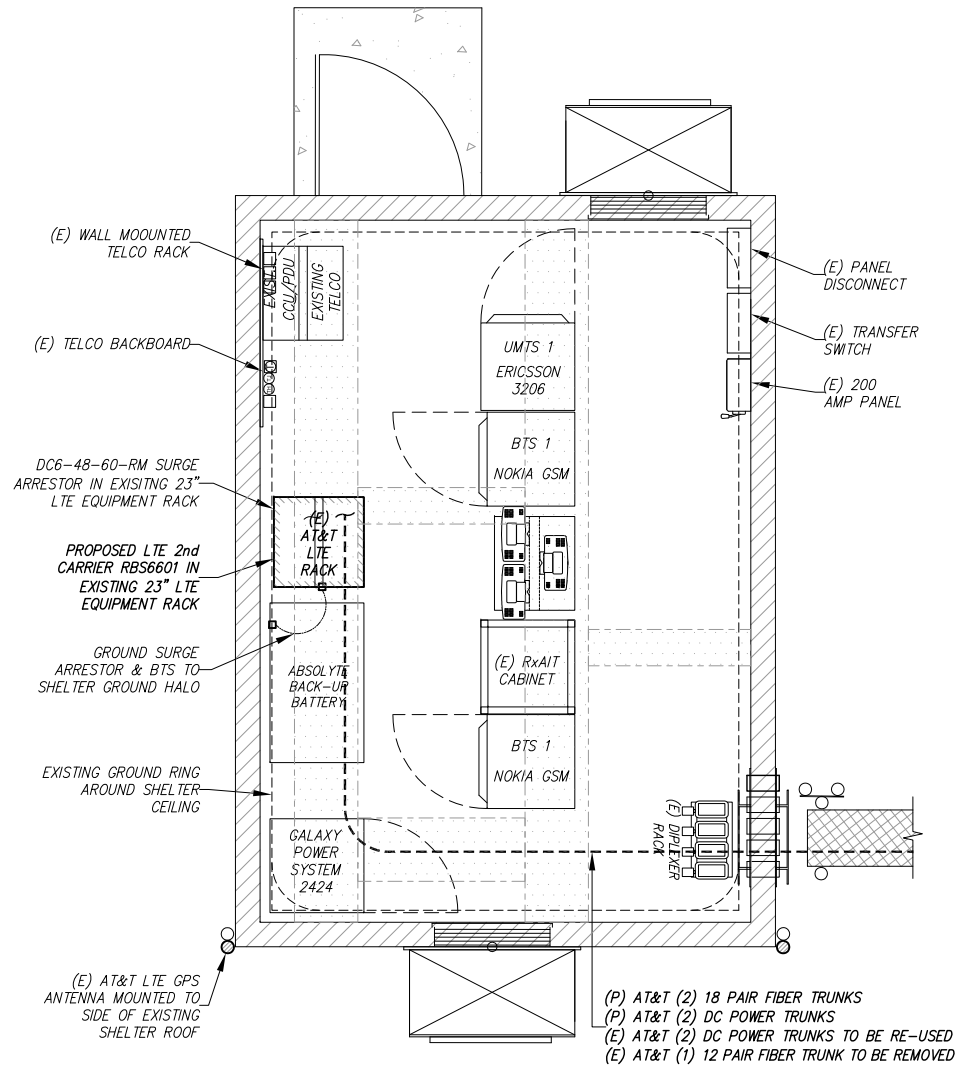
GENERAL NOTES

1. THE TYPE, DIMENSIONS, MOUNTING HARDWARE, AND THE POSITIONS OF ALL EQUIPMENT IN THE COMPOUND ARE SHOWN IN ILLUSTRATIVE FASHION. THESE DRAWINGS ARE NOT INTENDED FOR CONSTRUCTION. ACTUAL HARDWARE DETAILS AND FINAL LOCATIONS MAY DIFFER SLIGHTLY FROM WHAT IS SHOWN.
2. THE CELLULAR INSTALLATION IS AN UNMANNED PRIVATE AND SECURED COMPOUND. 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. CONSTRUCTION, MAINTENANCE & OPERATION OF PROPOSED TOWER FACILITY WILL BE HELD IN ACCORDANCE WITH ALL APPLICABLE LOCAL, STATE & FEDERAL REGULATIONS AND GUIDELINES.



COUMPOUND PLAN 1/03
SCALE: 1" = 4'

GRAPHIC SCALE
4 0 2 4 8 16
(IN FEET)
1 inch = 4 ft.



EQUIPMENT PLAN 2/03
SCALE: 1" = 2'

VRG
VERTICAL RESOURCES GRP.
489 Washington Street
Auburn, MA 01501
Tel. (508) 981- 9590
Fax (508) 519 - 8939
mnobre@verticalresourcesgrp.com

SAI communications
27 NORTHWESTERN DRIVE
SALEM, NH 03079
Tel. (603) 421- 0470
Fax (603) 421 - 0471

SITE NUMBER: CT2086
SITE NAME: SOUTHBURY KETTLETOWN RD.
231 KETTLETOWN ROAD
SOUTHBURY, MA 06488
NEW HAVEN COUNTY

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

NO.	DATE	REVISION	BY	CHK	APP'D
3	02/17/16	GENERAL REVISIONS	G.A.M.		
2	01/08/16	FOR PERMIT APPLICATION	G.A.M.		
1	12/03/15	GENERAL REVISIONS	G.A.M.		
0	11/17/15	FOR REVIEW	G.A.M.		

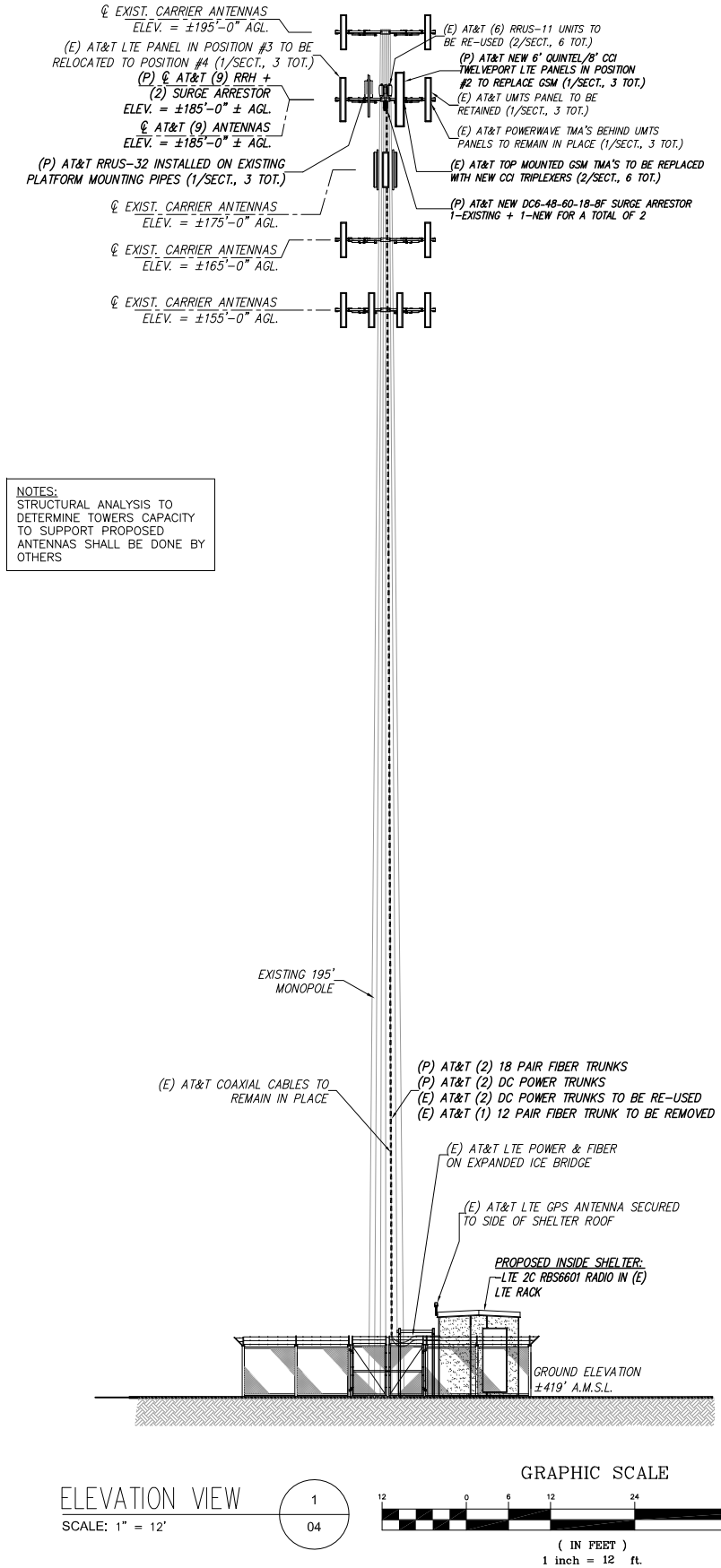
SCALE | DESIGNED BY: M.N. | DRAWN BY: G.A.M.

STATE OF CONNECTICUT JAMES P. STROME No. 8657 REGISTERED PROFESSIONAL ENGINEER

AT&T MOBILITY

SITE PLAN & EQUIPMENT PLAN

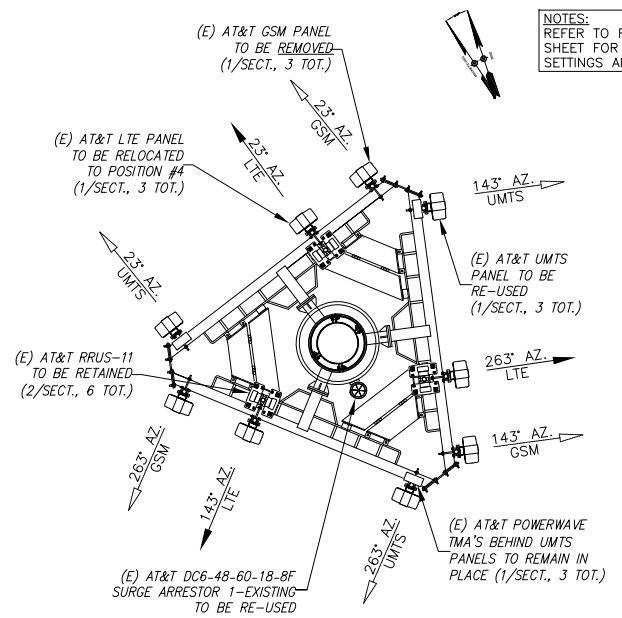
JOB NUMBER	DRAWING NUMBER	REV
50-145	03	3



NOTES:
STRUCTURAL ANALYSIS TO DETERMINE TOWERS CAPACITY TO SUPPORT PROPOSED ANTENNAS SHALL BE DONE BY OTHERS

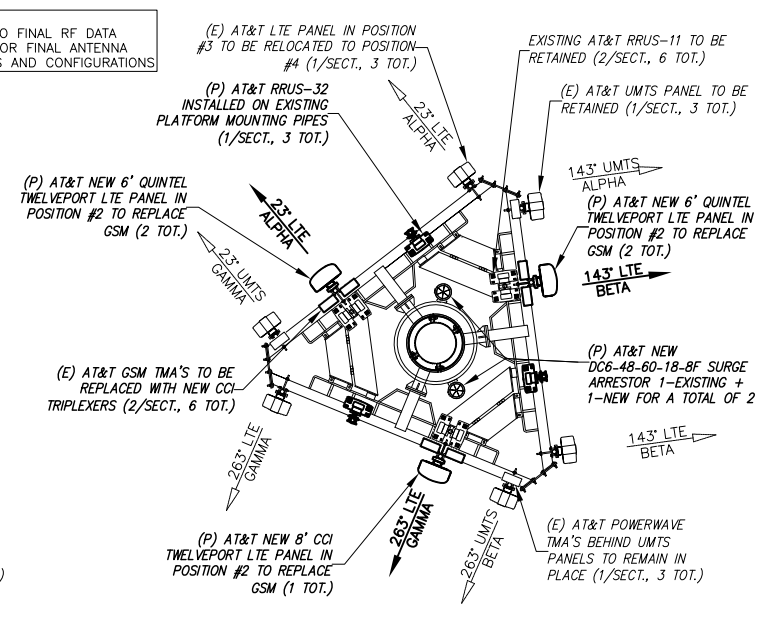
ELEVATION VIEW
SCALE: 1" = 12'
1 / 04

GRAPHIC SCALE
12 0 6 12 24 48
(IN FEET)
1 inch = 12 ft.



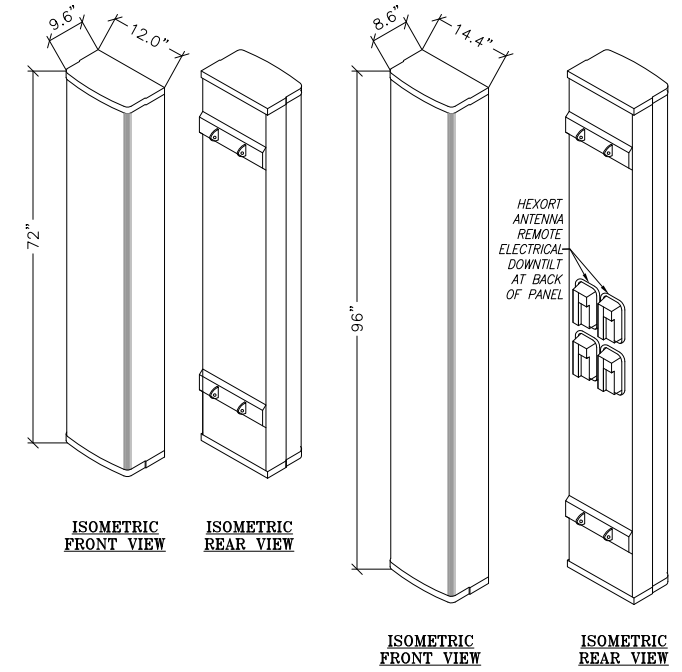
EXISTING

NOTES:
REFER TO FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS AND CONFIGURATIONS

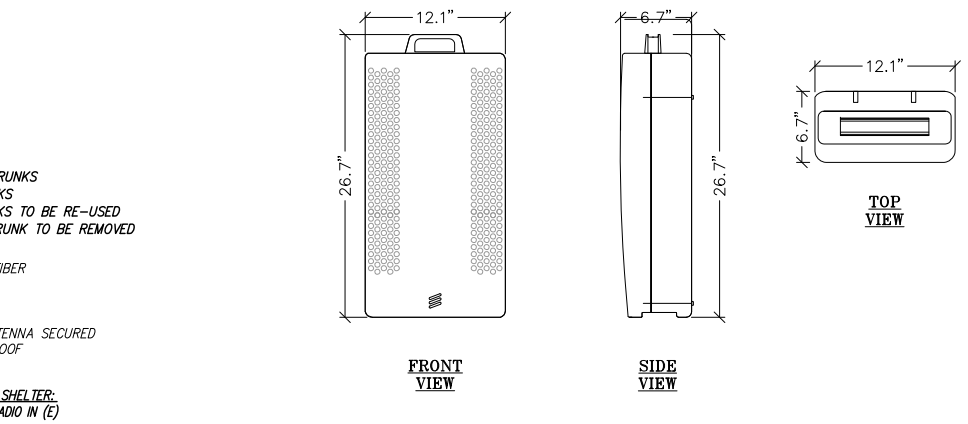


PROPOSED

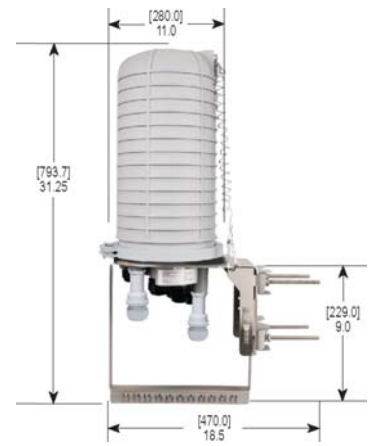
ANTENNA MOUNTING PLAN VIEW
SCALE: N.T.S.
2 / 04



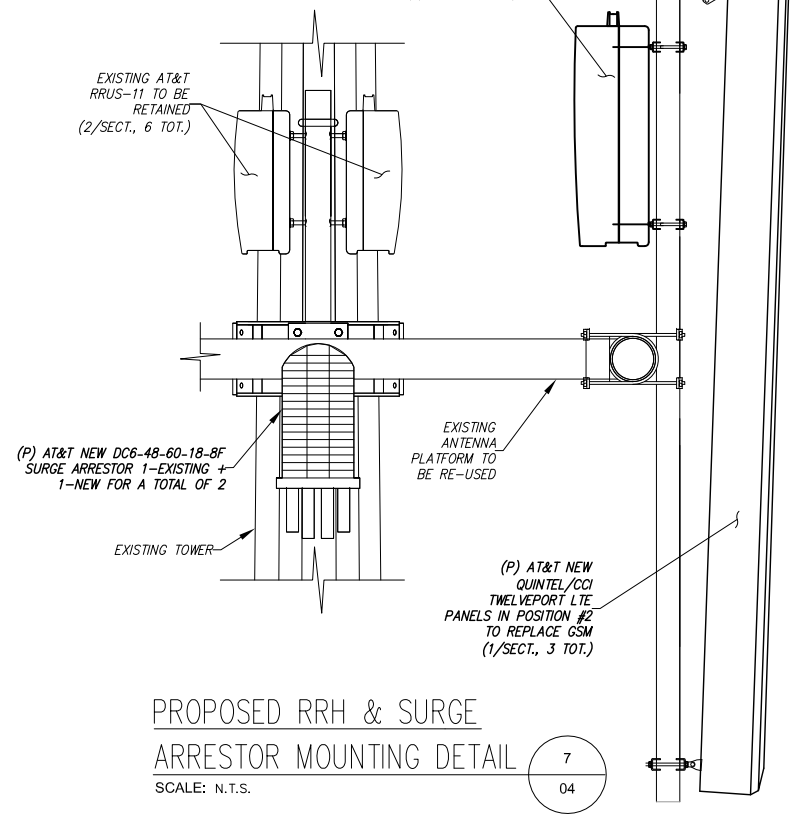
TWELVEPORT ANTENNA & RET DETAIL
SCALE: N.T.S.
3 / 04



PROPOSED ERICSSON DUAL PA RRH
SCALE: N.T.S.
6 / 04



RAYCAP SURGE SUPPRESSOR DC64860188F
SCALE: N.T.S.
4 / 04



PROPOSED RRH & SURGE ARRESTOR MOUNTING DETAIL
SCALE: N.T.S.
7 / 04

VRG
VERTICAL RESOURCES GRP.
489 Washington Street
Auburn, MA 01501
Tel. (508) 981- 9590
Fax (508) 519 - 8939
mnobre@verticalresourcesgrp.com

SAI communications
27 NORTHWESTERN DRIVE
SALEM, NH 03079
Tel. (603) 421- 0470
Fax (603) 421 - 0471

SITE NUMBER: CT2086
SITE NAME: SOUTHBURY KETTLETOWN RD.
231 KETTLETOWN ROAD
SOUTHBURY, MA 06488
NEW HAVEN COUNTY

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

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SCALE | DESIGNED BY: M.N. | DRAWN BY: G.A.M.

STATE OF CONNECTICUT JAMES P. STROHE No. 8657 REGISTERED PROFESSIONAL ENGINEER

AT&T MOBILITY

ELEVATION VIEW & ANTENNA LAYOUT

JOB NUMBER	DRAWING NUMBER	REV.
50-145	04	3

Phoenix Tower International
1001 Yamato Road, Suite 311
Boca Raton, FL. 33431
(610) 357-8763

GPD Engineering and Architecture
Professional Corporation

Christopher Scheks
520 South Main St, Suite 2531
Akron OH, 44311
(614) 588-8973
cscheks@gpdgroup.com

GPD# 2016702.36
February 9, 2016

STRUCTURAL ANALYSIS REPORT

AT&T DESIGNATION:	**Site Number:**	**CT2086**
	Site Name:	**SOUTHBURY KETTLETOWN ROAD**
	AT&T Project:	**Network Modification**
ANALYSIS CRITERIA:	**Codes:**	**TIA/EIA-222-F, 2006 IBC & 2005 CTBC w/2009 Amendments** **85-mph fastest-mile with 0" ice** **28-mph fastest-mile with 3/4" ice**
SITE DATA:		**231 Kettleton Rd, Southbury, CT 06488, New Haven County** **Latitude 41° 28' 16.27" N, Longitude 73° 12' 19.998" W** **196' Modified Pirod Monopole**

Mr. David Rodriguez,

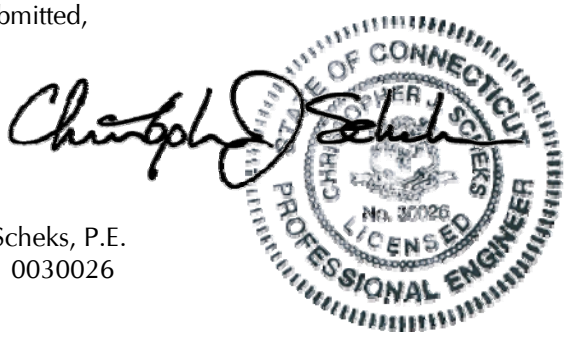
GPD is pleased to submit this Structural Analysis Report to determine the structural integrity of the aforementioned tower. The purpose of the analysis is to determine the suitability of the tower with the existing and proposed loading configuration detailed in the analysis report.

Analysis Results

Tower Stress Level with Proposed Equipment:	99.3%	Pass
Foundation Ratio with Proposed Equipment:	75.5%	Pass

We at GPD appreciate the opportunity of providing our continuing professional services to you and Phoenix Tower International. If you have any questions or need further assistance on this or any other projects please do not hesitate to call.

Respectfully submitted,



Christopher J. Scheks, P.E.
Connecticut #: 0030026

SUMMARY & RESULTS

The purpose of this analysis was to verify whether the existing modified structure is capable of carrying the proposed loading configuration as specified by AT&T Mobility to Phoenix Tower International. This report was commissioned by Mr. David Rodriguez of Phoenix Tower International.

Modifications designed by GPD (Project #: 2010293.91, dated 9/14/10) have been considered in this analysis. Modifications included the installation of stiffener plates across flange connections at 20' and 40'.

Modifications designed by GPD (Project #: 2013792.15 Rev 1, dated 10/1/13) have been considered in this analysis. Modifications consisted of reinforcing the pole from 0'-139', adding stiffener plates across the flanges from 20'-120', adding additional anchor rods, and installing a foundation collar with piles to the existing foundation.

The proposed coax shall be installed internal to the monopole in order for the results of this analysis to be valid.

TOWER SUMMARY AND RESULTS

Member	Capacity	Results
Monopole	87.2%	Pass
Anchor Rods	74.3%	Pass
Base Plate	99.3%	Pass
Flange Bridge Stiffeners	97.4%	Pass
Flange Bolts	82.6%	Pass
Flange Plate	96.2%	Pass
Foundation	75.5%	Pass

ANALYSIS METHOD

tnxTower (Version 6.1.4.1), a commercially available software program, was used to create a three-dimensional model of the tower and calculate primary member stresses for various dead, live, wind, and ice load cases. Selected output from the analysis is included in Appendix B. The following table details the information provided to complete this structural analysis. This analysis is solely based on this information and is being completed without the benefit of a detailed site visit.

DOCUMENTS PROVIDED

Document	Remarks	Source
Structural Analysis Worksheet	Phoenix Tower International Application, dated 2/2/2016	PTI
Tower Design	PiROD, File #: A-115080, dated 3/26/1999	GPD
Foundation Design	PiROD, File #: A-115080, dated 3/26/1999	GPD
Geotechnical Report	Dr. Clarence Welti, dated 10/7/1998	GPD
Modification Drawings	GPD Project #: 2010293.91, dated 9/14/2010	GPD
Modification Drawings	GPD Project #: 2013792.15 Rev. 1, dated 10/1/2013	GPD
Previous Structural Analysis	GPD Project #: 2014790.88, dated 8/12/2014	GPD

ASSUMPTIONS

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

1. The tower shaft sizes and shapes are considered accurate as supplied. The material grade is as per data supplied and/or as assumed and as stated in the materials section.
2. The antenna configuration is as supplied and/or as modeled in the analysis. It is assumed to be complete and accurate. All antennas, mounts, coax and waveguides are assumed to be properly installed and supported as per manufacturer requirements.
3. Some assumptions are made regarding antennas and mount sizes and their projected areas based on best interpretation of data supplied and of best knowledge of antenna type and industry practice.
4. All mounts, if applicable, are considered adequate to support the loading. No actual analysis of the mount(s) is performed. This analysis is limited to analyzing the tower only.
5. The soil parameters are as per data supplied or as assumed and stated in the calculations.
6. Foundations are properly designed and constructed to resist the original design loads indicated in the documents provided.
7. The tower and structures have been properly maintained in accordance with TIA Standards and/or with manufacturer's specifications.
8. All welds and connections are assumed to develop at least the member capacity unless determined otherwise and explicitly stated in this report.
9. All prior structural modifications are assumed to be as per data supplied/available and to have been properly installed.
10. Loading interpreted from photos is accurate to $\pm 5'$ AGL, antenna size accurate to ± 3.3 sf, and coax equal to the number of existing antennas without reserve.
11. The locations of the coax are assumed. If the coax layout differs in the field, contact the engineer immediately. See Appendix C for the coax layout
12. The proposed coax shall be installed internal to the monopole in order for the results of this analysis to be valid.
13. All existing loading was obtained from the most recent structural analysis by GPD (Project #: 2014790.88, dated 8/12/2014) and is assumed to be accurate.
14. The proposed loading is taken from the provided revised Collocation Application from Phoenix Tower (Site #: US-CT-1002, dated 2/2/16), and is assumed to be accurate.
15. Appurtenance azimuths have not been provided and have been assumed.

If any of these assumptions are not valid or have been made in error, this analysis may be affected, and GPD should be allowed to review any new information to determine its effect on the structural integrity of the tower.

DISCLAIMER OF WARRANTIES

GPD has not performed a site visit to the tower to verify the member sizes or antenna/coax loading. If the existing conditions are not as represented on the tower elevation contained in this report, we should be contacted immediately to evaluate the significance of the discrepancy. This is not a condition assessment of the tower or foundation. This report does not replace a full tower inspection. The tower and foundations are assumed to have been properly fabricated, erected, maintained, in good condition, twist free, and plumb.

The engineering services rendered by GPD in connection with this Structural Analysis are limited to a computer analysis of the tower structure and theoretical capacity of its main structural members. No allowance was made for any damaged, bent, missing, loose, or rusted members (above and below ground). No allowance was made for loose bolts or cracked welds.

This analysis is limited to the designated maximum wind and seismic conditions per the governing tower standards and code. Wind forces resulting in tower vibrations near the structure's resonant frequencies were not considered in this analysis and are outside the scope of this analysis. Lateral loading from any dynamic response was not evaluated under a time-domain based fatigue analysis.

GPD does not analyze the fabrication of the structure (including welding). It is not possible to have all the very detailed information needed to perform a thorough analysis of every structural sub-component and connection of an existing tower. GPD provides a limited scope of service in that we cannot verify the adequacy of every weld, plate connection detail, etc. The purpose of this report is to assess the capability of adding appurtenances usually accompanied by transmission lines to the structure.

It is the owner's responsibility to determine the amount of ice accumulation in excess of the code specified amount, if any, that should be considered in the structural analysis.

The attached sketches are a schematic representation of the analyzed tower. If any material is fabricated from these sketches, the contractor shall be responsible for field verifying the existing conditions, proper fit, and clearance in the field. Any mentions of structural modifications are reasonable estimates and should not be used as a precise construction document. Precise modification drawings are obtainable from GPD, but are beyond the scope of this report.

Miscellaneous items such as antenna mounts, etc., have not been designed or detailed as a part of our work. We recommend that material of adequate size and strength be purchased from a reputable tower manufacturer.

Towers are designed to carry gravity, wind, and ice loads. All members, legs, diagonals, struts, and redundant members provide structural stability to the tower with little redundancy. Absence or removal of a member can trigger catastrophic failure unless a substitute is provided before any removal. Legs carry axial loads and derive their strength from shorter unbraced lengths by the presence of redundant members and their connection to the diagonals with bolts or welds. If the bolts or welds are removed without providing any substitute to the frame, the leg is subjected to a higher unbraced length that immediately reduces its load carrying capacity. If a diagonal is also removed in addition to the connection, the unbraced length of the leg is greatly increased, jeopardizing its load carrying capacity. Failure of one leg can result in a tower collapse because there is no redundancy. Redundant members and diagonals are critical to the stability of the tower.

GPD makes no warranties, expressed and/or implied, in connection with this report and disclaims any liability arising from material, fabrication, and erection of this tower. GPD will not be responsible whatsoever for, or on account of, consequential or incidental damages sustained by any person, firm, or organization as a result of any data or conclusions contained in this report. The maximum liability of GPD pursuant to this report will be limited to the total fee received for preparation of this report.

Tower Analysis Summary Form

General Info

Site Name	SOUTHBURY KETTLETOWN ROAD
Site Number	CT2086
Proposed Carrier	AT&T Mobility
Date of Analysis	February 9, 2016
Company Performing Analysis	GPD

The information contained in this summary report is not to be used independently from the PE stamped tower analysis.

Tower Info	Description	Date
Tower Type (G, SST, MP)	MP	
Tower Height (top of steel AGL)	196'	
Tower Manufacturer	PiROD	
Tower Model	n/a	
Tower Design	PiROD, File #: A-115080	3/26/1999
Foundation Design	PiROD, File #: A-115080	3/26/1999
Geotech Report	Dr. Clarence Welti	10/7/1998
Modification Drawings	GPD Project #: 2010293.91	9/14/2010
Modification Drawings	GPD Project #: 2013792.15 Rev. 1	10/1/2013
Previous Structural Analysis	GPD Project #: 2014790.88	8/12/2014
Foundation Mapping	n/a	

Design Parameters

Design Code Used	TIA/EIA-222-F, 2006 IBC 2005 CTBC w/2009 Amendments
Location of Tower (County, State)	New Haven, CT
Basic Wind Speed (mph)	85 (fastest-mile)
Ice Thickness (in)	0.75
Structure Classification (I, II, III)	
Exposure Category (B, C, D)	
Topographic Category (1 to 5)	

Analysis Results (% Maximum Usage)

Existing/Reserved + Proposed Condition	
Tower (%)	87.2%
Tower Base (%)	99.3%
Foundation (%)	75.5%
Foundation Adequate?	Yes

Modifications designed by GPD (Project #: 2010293.91, dated 9/14/10) have been considered in this analysis.

Modifications designed by GPD (Project #: 2013792.15, dated 7/29/13) have been considered in this analysis.

Steel Yield Strength (ksi)

Pole	42
Flange Plate	36
Flange Bolts	A325
Base Plate	36
Anchor Rods	A354-BD

Existing / Reserved Loading

Antenna								Mount			Transmission Line			
Antenna Owner	Mount Height (ft)	Antenna CL (ft)	Quantity	Type	Manufacturer	Model	Azimuth	Quantity	Manufacturer	Type	Quantity	Model	Size	Attachment Internal/External
T-Mobile	195	195	3	Panel	Andrew	RR90-17-02DP	350/110/230	1	Unknown	LP Platform	12	Unknown	1-5/8"	Internal
T-Mobile	195	195	3	Panel	Commscope	LNX-6515DS-VTM	350/110/230			on the same mount	1	Hybrid	1-5/8"	Internal
T-Mobile	195	195	3	Panel	Ericsson	AIR 33	350/110/230			on the same mount				
T-Mobile	195	195	3	TMA	Ericsson	KRY112 71				on the same mount				
T-Mobile	195	195	1	Surge	Raycap	DC4-48-60-8-20F				on the same mount				
AT&T Mobility	185	185	3	Panel	Powerwave	7770	23/143/263	1	Unknown	LP Platform	12	Unknown	1-1/4"	Internal
AT&T Mobility	185	185	2	Panel	KMW	AM-X-CD-16-65-00T RET	143/263			on the same mount	2	DC Cable	3/4"	Internal
AT&T Mobility	185	185	1	Panel	Powerwave	P65-17-XLH-RR	23			on the same mount	1	Fiber Cable	1.496"	Internal
AT&T Mobility	185	185	6	TMA	Powerwave	TT19-08B9111-001				on the same mount				
AT&T Mobility	185	185	6	Diplexer	Powerwave	LGP21901				on the same mount				
AT&T Mobility	185	185	6	RRU	Ericsson	RRUS-11				Flush mounted				
AT&T Mobility	185	185	1	Surge	Raycap	DC6-48-60-18-8F				on the same mount				
Pocket	175	175	3	Panel	RFS	APXV18-206517S-C	350/110/230			Flush Mounted	6	Unknown	1-5/8"	External
Sprint	165	165	9	Panel	Decibel	DB980E (90E-M)	350/110/230	1	Unknown	LP Platform	12	Unknown	1-5/8"	Internal
Verizon Wireless	155	155	6	Panel	Commscope	HBXX 6516DS	0/120/240	1	Unknown	LP Platform	12	Unknown	1-5/8"	External
Verizon Wireless	155	155	2	Panel	Swedcom	SLCP2X6014	240			on the existing mount				
Verizon Wireless	155	155	4	Panel	Amphenol	BXA 70063/4CF	0/120			on the existing mount				
Verizon Wireless	155	155	6	Diplexers	Amphenol	DPX 021				on the existing mount				
Verizon Wireless	155	155	6	Diplexers	RFS	FD9R6004/2C-3L				on the existing mount				
T-Mobile	91	91	1	Dish	Unknown	2' MW Dish		1	Unknown	MW Collar Mount	1	Unknown	1-5/8"	Internal
Sprint	75	75	1	Panel	Pctel	TMG-HR-26N GPS		1	Unknown	Pipe Mount	1	Unknown	7/8"	External

Note: (3) TT19-08B9111-011 TMAs and (6) LGP21901 Diplexers at 185' shall be removed prior to the installation of the proposed loading. The remaining existing equipment shall be reused.

Proposed Loading

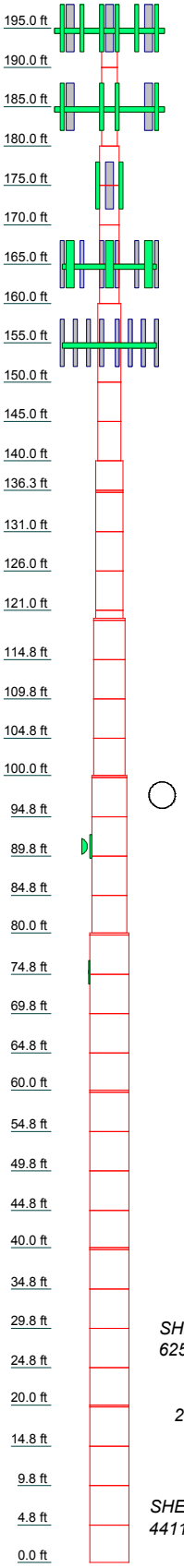
Antenna								Mount			Transmission Line			
Antenna Owner	Mount Height (ft)	Antenna CL (ft)	Quantity	Type	Manufacturer	Model	Azimuth	Quantity	Manufacturer	Type	Quantity	Model	Size	Attachment Internal/External
AT&T Mobility	185	185	2	Panel	Quintel	QS66512-3	143/263			on the existing mount	2	DC Power	3/4"	Internal
AT&T Mobility	185	185	1	Panel	CCI	TPA-65R-LCUUUU-H8	23			on the existing mount	1	Fiber	1.496	Internal
AT&T Mobility	185	185	3	RRU	Ericsson	RRUS-32				on the existing mount				
AT&T Mobility	185	185	6	Triplexers	CCI	TPX070821				on the existing mount				
AT&T Mobility	185	185	1	Surge	Raycap	DC6-48-60-18-8F				on the existing mount				

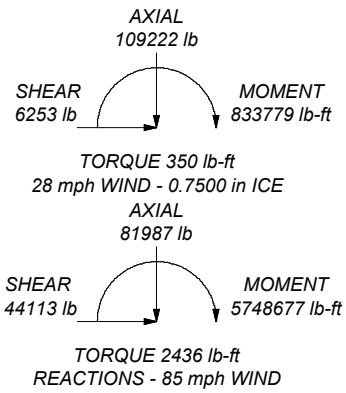
Note: The proposed coax shall be installed internal to the monopole in order for the results of this analysis to be valid.

Future Loading

Antenna								Mount			Transmission Line			
Antenna Owner	Mount Height (ft)	Antenna CL (ft)	Quantity	Type	Manufacturer	Model	Azimuth	Quantity	Manufacturer	Type	Quantity	Model	Size	Attachment Internal/External

Section	Size	Length (ft)	Grade	Weight (lb)
1	P60x0.375	5.00	A53-B-42	473.5
2	P60x0.375	5.00		473.5
3	P60x0.375	5.00		473.5
4	P60x0.375	5.00		593.8
5	P60x0.375	5.00		593.8
6	P60x0.375	5.00		593.8
7	P60x0.375	5.00		593.8
8	P60x0.375	5.00		714.1
9	P60x0.375	5.00		714.1
10	P60x0.375	5.00		714.1
11	P60x0.375	5.00		714.1
12	P60x0.375	3.75		325.8
13	P60x0.375	5.00		434.4
14	P60x0.375	5.00		712.9
15	P60x0.542	5.00		712.9
16	P60x0.542	5.00		712.9
17	P60x0.542	5.00		712.9
18	P60x0.542	5.00		1414.0
19	P60x0.542	5.00		1414.0
20	P60x0.542	5.00		1414.0
21	P60x0.542	5.00		1414.0
22	P60x0.542	3.75		1343.3
23	P60x0.542	5.00		1414.0
24	P60x0.542	5.00		2153.4
25	P60x0.542	5.00		2153.4
26	P60x0.542	5.00		2153.4
27	P60x0.542	3.75		1657.5
28	P60x0.542	5.00		2153.4
29	P60x0.542	5.00		2165.4
30	P60x0.542	5.00		2165.4
31	P60x0.542	5.00		2165.4
32	P60x0.542	3.75		1624.1
33	P60x0.542	5.00		2165.4
34	P60x0.542	5.00		2049.5
35	P60x0.542	5.00		2049.5
36	P60x0.542	5.00		2049.5
37	P60x0.542	3.75		1537.1
38	P60x0.542	5.00		2049.5
39	P60x0.542	5.00		2442.9
40	P60x0.760	5.00		2442.9
41	P60x0.760	5.00		2442.9
42	P60x0.760	3.75		1832.2
43	P60x0.760	5.00		2442.9
44	P60x0.760	5.00		2442.9
45	P60x0.760	5.00		2442.9
46	P60x0.760	5.00		2442.9
47	P60x0.760	4.75		2320.8
				57634.8





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
1' Pirod Top Hat	195.5	PiROD 13' Low Profile Platform (Monopole)	185
AIR 33 w/ Mount Pipe	195	APXV18-206517S-C w/ Mount Pipe	175
AIR 33 w/ Mount Pipe	195	APXV18-206517S-C w/ Mount Pipe	175
AIR 33 w/ Mount Pipe	195	APXV18-206517S-C w/ Mount Pipe	175
RR90-17-02DP w/ Mount Pipe	195	Valmont Light Duty Tri-Bracket (1)	175
RR90-17-02DP w/ Mount Pipe	195	(3) DB980E (90E-M) w/ Mount Pipe	165
RR90-17-02DP w/ Mount Pipe	195	(3) DB980E (90E-M) w/ Mount Pipe	165
LNX-6515DS-VTM w/ mount pipe	195	(3) DB980E (90E-M) w/ Mount Pipe	165
LNX-6515DS-VTM w/ mount pipe	195	MTS 12.5' LP Platform	165
LNX-6515DS-VTM w/ mount pipe	195	(2) HBXX-6516DS w/Mount Pipe	155
KRY 112 71	195	(2) HBXX-6516DS w/Mount Pipe	155
KRY 112 71	195	(2) HBXX-6516DS w/Mount Pipe	155
KRY 112 71	195	(2) BXA-70063-4CF-EDIN-6 w/ Mount Pipe	155
DC4-48-60-8-20F	195	(2) BXA-70063-4CF-EDIN-6 w/ Mount Pipe	155
Pirod 16.5' LP Platform	195	(2) SLCP2x6014 w/ Mount Pipe	155
7770.00 w/ 6' Mount Pipe	185	(2) FD9R6004/2C-3L	155
7770.00 w/ 6' Mount Pipe	185	(2) FD9R6004/2C-3L	155
7770.00 w/ 6' Mount Pipe	185	(2) FD9R6004/2C-3L	155
P65-17-XLH-RR w/ Mount Pipe	185	(2) DPX 021 Diplexer	155
AM-X-CD-16-65-00T-RET w/ 2" x 54" mount pipe	185	(2) DPX 021 Diplexer	155
AM-X-CD-17-65-00T-RET w/ Mount Pipe	185	(2) DPX 021 Diplexer	155
TPA-65R-LCUUUU-H8 w/ Mount Pipe	185	PiROD 15' Low Profile Platform (Monopole)	155
QS66512-3 w/ Mount Pipe	185	Bridge Stiffener (3.25 sq ft)	120
QS66512-3 w/ Mount Pipe	185	Bridge Stiffener (3.25 sq ft)	120
TT19-08BP111-001	185	Bridge Stiffener (3.25 sq ft)	120
TT19-08BP111-001	185	Bridge Stiffener (3.25 sq ft)	100
TT19-08BP111-001	185	Bridge Stiffener (3.25 sq ft)	100
(2) TPX-070821	185	Bridge Stiffener (3.25 sq ft)	100
(2) TPX-070821	185	Pipe Mount 3'x4.5"	91
(2) TPX-070821	185	2' MW	91
(2) RRUS-11	185	Bridge Stiffener (3.25 sq ft)	80
(2) RRUS-11	185	Bridge Stiffener (3.25 sq ft)	80
(2) RRUS-11	185	Bridge Stiffener (3.25 sq ft)	80
RRUS-32	185	GPS-TMG-HR-26N	75
RRUS-32	185	Pipe Mount 3'x4.5"	75
RRUS-32	185		
DC6-48-60-18-8F Surge Suppression Unit	185		
DC6-48-60-18-8F Surge Suppression Unit	185		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A53-B-42	42 ksi	63 ksi			

TOWER DESIGN NOTES

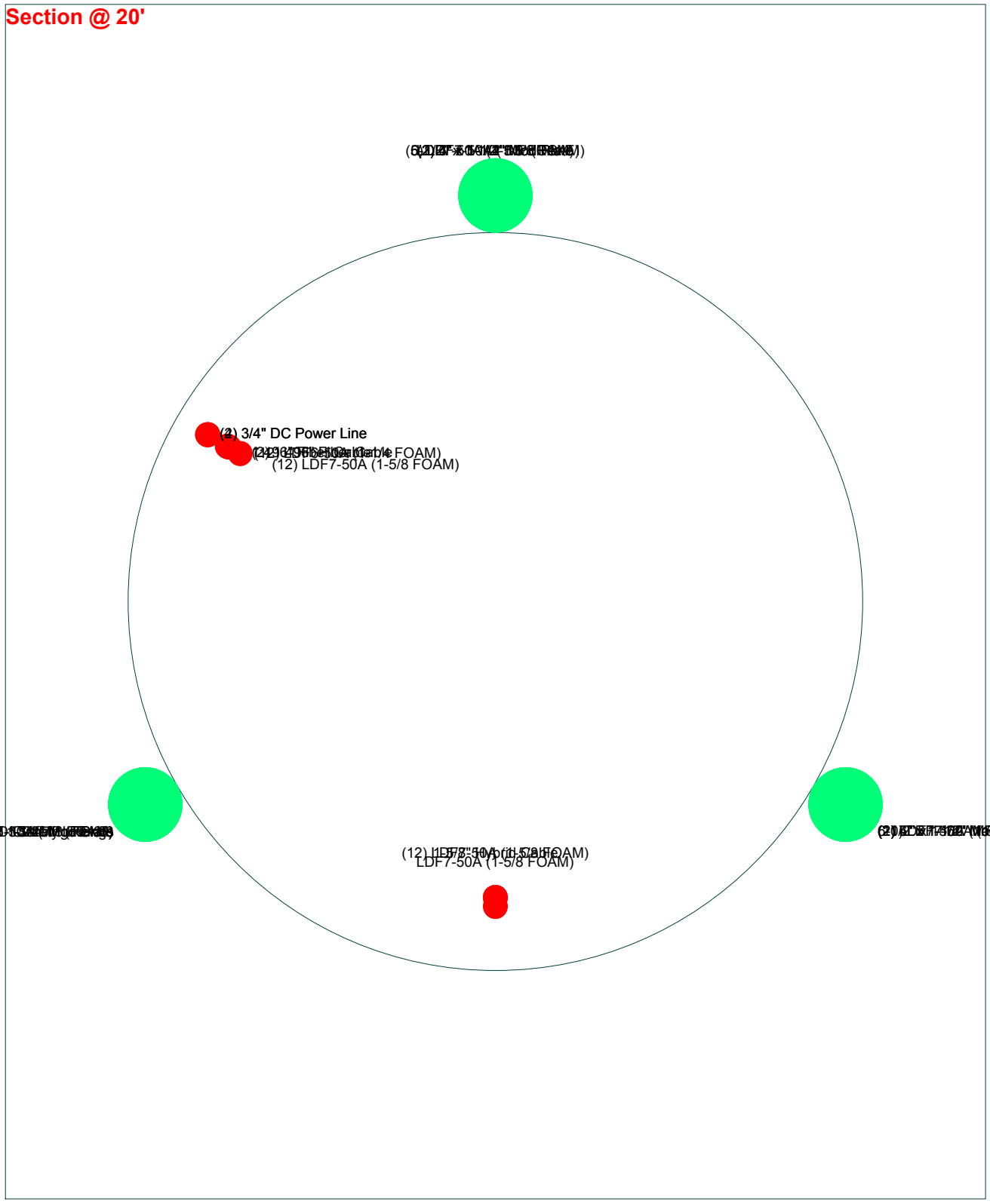
1. Tower is located in New Haven County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 28 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 87.2%

GPD
520 South Main Street, Suite 2531
Akron, OH 44311
Phone: (330) 572-2100
FAX: (330) 572-2101

Job: CT2086 SOUTHBURY KETTLETOWN ROAD			
Project: 2016702.36			
Client: Phoenix Tower International	Drawn by: twillman	App'd:	
Code: TIA/EIA-222-F	Date: 02/09/16	Scale: NTS	
Path: O:\2016\2016702\36 Phoenix Tower SA\TNX\Modified TNX.eri		Dwg No. E-1	

Feed Line Plan
20'

Round Flat App In Face App Out Face



GPD
520 South Main Street, Suite 2531
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Job: ***CT2086 SOUTHBURY KETTLETOWN ROAD***			
Project: ***2016702.36***			
Client: Phoenix Tower International	Drawn by: twillman		App'd:
Code: TIA/EIA-222-F	Date: 02/09/16		Scale: NTS
Path: O:\2016\2016702\36 Phoenix Tower SA\TNX\Modified TNX.eri			Dwg No. E-7

Centek Engineering, Inc.
3-2 North Branford Road
Branford, Connecticut 06405
Phone: (203) 488-0580
Fax: (203) 488-8587

Steven L. Levine
Real Estate Consultant

February 23, 2016

Honorable Jeff Manville
1st Selectman. Town of Southbury
Southbury Town Hall 501 Main Street South
Southbury, CT 06488

Re: Existing Telecommunications Facility – 231 Kettletown Road, Southbury

Dear Mr. Manville:

In order to accommodate technological changes, implement Uniform Mobile Telecommunications System ("UMTS") and Long Term Evolution ("LTE") capabilities, and enhance system performance in the State of Connecticut, New Cingular Wireless PCS, LLC ("AT&T") will be changing its equipment configuration at certain cell sites.

As required by Regulations of Connecticut State Agencies ("R.C.S.A.") Section 16-50j-73, the Connecticut Siting Council has been notified of the changes and will review AT&T's proposal. Please accept this letter as notification under Section 16-50j-73 of construction which constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2).

The enclosed Notice fully sets forth the AT&T proposal. However, if you have any questions or require any further information on the plans for the site or the Siting Council's procedures, please contact the undersigned at 860-830-0380 or Ms. Melanie Bachman, Acting Executive Director, Connecticut Siting Council at (860) 827-2935.

Sincerely,

Steven L. Levine
Real Estate Consultant

Enclosure

Phoenix Tower International
1001 Yamato Road, Suite 311
Boca Raton, FL. 33431
(610) 357-8763

GPD Engineering and Architecture
Professional Corporation

Christopher Scheks
520 South Main St, Suite 2531
Akron OH, 44311
(614) 588-8973
cscheks@gpdgroup.com

GPD# 2016702.36
February 9, 2016

STRUCTURAL ANALYSIS REPORT

AT&T DESIGNATION:	**Site Number:**	**CT2086**
	Site Name:	**SOUTHBURY KETTLETOWN ROAD**
	AT&T Project:	**Network Modification**
ANALYSIS CRITERIA:	**Codes:**	**TIA/EIA-222-F, 2006 IBC & 2005 CTBC w/2009 Amendments** **85-mph fastest-mile with 0" ice** **28-mph fastest-mile with 3/4" ice**
SITE DATA:		**231 Kettleton Rd, Southbury, CT 06488, New Haven County** **Latitude 41° 28' 16.27" N, Longitude 73° 12' 19.998" W** **196' Modified Pirod Monopole**

Mr. David Rodriguez,

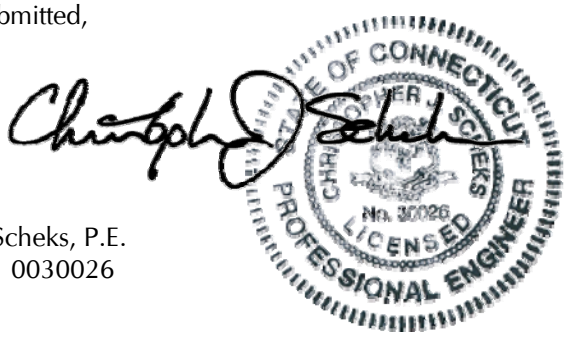
GPD is pleased to submit this Structural Analysis Report to determine the structural integrity of the aforementioned tower. The purpose of the analysis is to determine the suitability of the tower with the existing and proposed loading configuration detailed in the analysis report.

Analysis Results

Tower Stress Level with Proposed Equipment:	99.3%	Pass
Foundation Ratio with Proposed Equipment:	75.5%	Pass

We at GPD appreciate the opportunity of providing our continuing professional services to you and Phoenix Tower International. If you have any questions or need further assistance on this or any other projects please do not hesitate to call.

Respectfully submitted,



Christopher J. Scheks, P.E.
Connecticut #: 0030026

SUMMARY & RESULTS

The purpose of this analysis was to verify whether the existing modified structure is capable of carrying the proposed loading configuration as specified by AT&T Mobility to Phoenix Tower International. This report was commissioned by Mr. David Rodriguez of Phoenix Tower International.

Modifications designed by GPD (Project #: 2010293.91, dated 9/14/10) have been considered in this analysis. Modifications included the installation of stiffener plates across flange connections at 20' and 40'.

Modifications designed by GPD (Project #: 2013792.15 Rev 1, dated 10/1/13) have been considered in this analysis. Modifications consisted of reinforcing the pole from 0'-139', adding stiffener plates across the flanges from 20'-120', adding additional anchor rods, and installing a foundation collar with piles to the existing foundation.

The proposed coax shall be installed internal to the monopole in order for the results of this analysis to be valid.

TOWER SUMMARY AND RESULTS

Member	Capacity	Results
Monopole	87.2%	Pass
Anchor Rods	74.3%	Pass
Base Plate	99.3%	Pass
Flange Bridge Stiffeners	97.4%	Pass
Flange Bolts	82.6%	Pass
Flange Plate	96.2%	Pass
Foundation	75.5%	Pass

ANALYSIS METHOD

tnxTower (Version 6.1.4.1), a commercially available software program, was used to create a three-dimensional model of the tower and calculate primary member stresses for various dead, live, wind, and ice load cases. Selected output from the analysis is included in Appendix B. The following table details the information provided to complete this structural analysis. This analysis is solely based on this information and is being completed without the benefit of a detailed site visit.

DOCUMENTS PROVIDED

Document	Remarks	Source
Structural Analysis Worksheet	Phoenix Tower International Application, dated 2/2/2016	PTI
Tower Design	PiROD, File #: A-115080, dated 3/26/1999	GPD
Foundation Design	PiROD, File #: A-115080, dated 3/26/1999	GPD
Geotechnical Report	Dr. Clarence Welti, dated 10/7/1998	GPD
Modification Drawings	GPD Project #: 2010293.91, dated 9/14/2010	GPD
Modification Drawings	GPD Project #: 2013792.15 Rev. 1, dated 10/1/2013	GPD
Previous Structural Analysis	GPD Project #: 2014790.88, dated 8/12/2014	GPD

ASSUMPTIONS

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

1. The tower shaft sizes and shapes are considered accurate as supplied. The material grade is as per data supplied and/or as assumed and as stated in the materials section.
2. The antenna configuration is as supplied and/or as modeled in the analysis. It is assumed to be complete and accurate. All antennas, mounts, coax and waveguides are assumed to be properly installed and supported as per manufacturer requirements.
3. Some assumptions are made regarding antennas and mount sizes and their projected areas based on best interpretation of data supplied and of best knowledge of antenna type and industry practice.
4. All mounts, if applicable, are considered adequate to support the loading. No actual analysis of the mount(s) is performed. This analysis is limited to analyzing the tower only.
5. The soil parameters are as per data supplied or as assumed and stated in the calculations.
6. Foundations are properly designed and constructed to resist the original design loads indicated in the documents provided.
7. The tower and structures have been properly maintained in accordance with TIA Standards and/or with manufacturer's specifications.
8. All welds and connections are assumed to develop at least the member capacity unless determined otherwise and explicitly stated in this report.
9. All prior structural modifications are assumed to be as per data supplied/available and to have been properly installed.
10. Loading interpreted from photos is accurate to $\pm 5'$ AGL, antenna size accurate to ± 3.3 sf, and coax equal to the number of existing antennas without reserve.
11. The locations of the coax are assumed. If the coax layout differs in the field, contact the engineer immediately. See Appendix C for the coax layout
12. The proposed coax shall be installed internal to the monopole in order for the results of this analysis to be valid.
13. All existing loading was obtained from the most recent structural analysis by GPD (Project #: 2014790.88, dated 8/12/2014) and is assumed to be accurate.
14. The proposed loading is taken from the provided revised Collocation Application from Phoenix Tower (Site #: US-CT-1002, dated 2/2/16), and is assumed to be accurate.
15. Appurtenance azimuths have not been provided and have been assumed.

If any of these assumptions are not valid or have been made in error, this analysis may be affected, and GPD should be allowed to review any new information to determine its effect on the structural integrity of the tower.

DISCLAIMER OF WARRANTIES

GPD has not performed a site visit to the tower to verify the member sizes or antenna/coax loading. If the existing conditions are not as represented on the tower elevation contained in this report, we should be contacted immediately to evaluate the significance of the discrepancy. This is not a condition assessment of the tower or foundation. This report does not replace a full tower inspection. The tower and foundations are assumed to have been properly fabricated, erected, maintained, in good condition, twist free, and plumb.

The engineering services rendered by GPD in connection with this Structural Analysis are limited to a computer analysis of the tower structure and theoretical capacity of its main structural members. No allowance was made for any damaged, bent, missing, loose, or rusted members (above and below ground). No allowance was made for loose bolts or cracked welds.

This analysis is limited to the designated maximum wind and seismic conditions per the governing tower standards and code. Wind forces resulting in tower vibrations near the structure's resonant frequencies were not considered in this analysis and are outside the scope of this analysis. Lateral loading from any dynamic response was not evaluated under a time-domain based fatigue analysis.

GPD does not analyze the fabrication of the structure (including welding). It is not possible to have all the very detailed information needed to perform a thorough analysis of every structural sub-component and connection of an existing tower. GPD provides a limited scope of service in that we cannot verify the adequacy of every weld, plate connection detail, etc. The purpose of this report is to assess the capability of adding appurtenances usually accompanied by transmission lines to the structure.

It is the owner's responsibility to determine the amount of ice accumulation in excess of the code specified amount, if any, that should be considered in the structural analysis.

The attached sketches are a schematic representation of the analyzed tower. If any material is fabricated from these sketches, the contractor shall be responsible for field verifying the existing conditions, proper fit, and clearance in the field. Any mentions of structural modifications are reasonable estimates and should not be used as a precise construction document. Precise modification drawings are obtainable from GPD, but are beyond the scope of this report.

Miscellaneous items such as antenna mounts, etc., have not been designed or detailed as a part of our work. We recommend that material of adequate size and strength be purchased from a reputable tower manufacturer.

Towers are designed to carry gravity, wind, and ice loads. All members, legs, diagonals, struts, and redundant members provide structural stability to the tower with little redundancy. Absence or removal of a member can trigger catastrophic failure unless a substitute is provided before any removal. Legs carry axial loads and derive their strength from shorter unbraced lengths by the presence of redundant members and their connection to the diagonals with bolts or welds. If the bolts or welds are removed without providing any substitute to the frame, the leg is subjected to a higher unbraced length that immediately reduces its load carrying capacity. If a diagonal is also removed in addition to the connection, the unbraced length of the leg is greatly increased, jeopardizing its load carrying capacity. Failure of one leg can result in a tower collapse because there is no redundancy. Redundant members and diagonals are critical to the stability of the tower.

GPD makes no warranties, expressed and/or implied, in connection with this report and disclaims any liability arising from material, fabrication, and erection of this tower. GPD will not be responsible whatsoever for, or on account of, consequential or incidental damages sustained by any person, firm, or organization as a result of any data or conclusions contained in this report. The maximum liability of GPD pursuant to this report will be limited to the total fee received for preparation of this report.

APPENDIX A

Tower Analysis Summary Form

Tower Analysis Summary Form

General Info

Site Name	SOUTHBURY KETTLETOWN ROAD
Site Number	CT2086
Proposed Carrier	AT&T Mobility
Date of Analysis	February 9, 2016
Company Performing Analysis	GPD

The information contained in this summary report is not to be used independently from the PE stamped tower analysis.

Tower Info	Description	Date
Tower Type (G, SST, MP)	MP	
Tower Height (top of steel AGL)	196'	
Tower Manufacturer	PiROD	
Tower Model	n/a	
Tower Design	PiROD, File #: A-115080	3/26/1999
Foundation Design	PiROD, File #: A-115080	3/26/1999
Geotech Report	Dr. Clarence Welti	10/7/1998
Modification Drawings	GPD Project #: 2010293.91	9/14/2010
Modification Drawings	GPD Project #: 2013792.15 Rev. 1	10/1/2013
Previous Structural Analysis	GPD Project #: 2014790.88	8/12/2014
Foundation Mapping	n/a	

Design Parameters

Design Code Used	TIA/EIA-222-F, 2006 IBC 2005 CTBC w/2009 Amendments
Location of Tower (County, State)	New Haven, CT
Basic Wind Speed (mph)	85 (fastest-mile)
Ice Thickness (in)	0.75
Structure Classification (I, II, III)	
Exposure Category (B, C, D)	
Topographic Category (1 to 5)	

Analysis Results (% Maximum Usage)

Existing/Reserved + Proposed Condition	
Tower (%)	87.2%
Tower Base (%)	99.3%
Foundation (%)	75.5%
Foundation Adequate?	Yes

Steel Yield Strength (ksi)

Pole	42
Flange Plate	36
Flange Bolts	A325
Base Plate	36
Anchor Rods	A354-BD

Modifications designed by GPD (Project #: 2010293.91, dated 9/14/10) have been considered in this analysis.

Modifications designed by GPD (Project #: 2013792.15, dated 7/29/13) have been considered in this analysis.

Existing / Reserved Loading

Antenna								Mount			Transmission Line			
Antenna Owner	Mount Height (ft)	Antenna CL (ft)	Quantity	Type	Manufacturer	Model	Azimuth	Quantity	Manufacturer	Type	Quantity	Model	Size	Attachment Internal/External
T-Mobile	195	195	3	Panel	Andrew	RR90-17-02DP	350/110/230	1	Unknown	LP Platform	12	Unknown	1-5/8"	Internal
T-Mobile	195	195	3	Panel	Commscope	LNX-6515DS-VTM	350/110/230			on the same mount	1	Hybrid	1-5/8"	Internal
T-Mobile	195	195	3	Panel	Ericsson	AIR 33	350/110/230			on the same mount				
T-Mobile	195	195	3	TMA	Ericsson	KRY112 71				on the same mount				
T-Mobile	195	195	1	Surge	Raycap	DC4-48-60-8-20F				on the same mount				
AT&T Mobility	185	185	3	Panel	Powerwave	7770	23/143/263	1	Unknown	LP Platform	12	Unknown	1-1/4"	Internal
AT&T Mobility	185	185	2	Panel	KMW	AM-X-CD-16-65-00T RET	143/263			on the same mount	2	DC Cable	3/4"	Internal
AT&T Mobility	185	185	1	Panel	Powerwave	P65-17-XLH-RR	23			on the same mount	1	Fiber Cable	1.496"	Internal
AT&T Mobility	185	185	6	TMA	Powerwave	TT19-08B9111-001				on the same mount				
AT&T Mobility	185	185	6	Diplexer	Powerwave	LGP21901				on the same mount				
AT&T Mobility	185	185	6	RRU	Ericsson	RRUS-11				Flush mounted				
AT&T Mobility	185	185	1	Surge	Raycap	DC6-48-60-18-8F				on the same mount				
Pocket	175	175	3	Panel	RFS	APXV18-206517S-C	350/110/230			Flush Mounted	6	Unknown	1-5/8"	External
Sprint	165	165	9	Panel	Decibel	DB980E (90E-M)	350/110/230	1	Unknown	LP Platform	12	Unknown	1-5/8"	Internal
Verizon Wireless	155	155	6	Panel	Commscope	HBXX 6516DS	0/120/240	1	Unknown	LP Platform	12	Unknown	1-5/8"	External
Verizon Wireless	155	155	2	Panel	Swedcom	SLCP2X6014	240			on the existing mount				
Verizon Wireless	155	155	4	Panel	Amphenol	BXA 70063/4CF	0/120			on the existing mount				
Verizon Wireless	155	155	6	Diplexers	Amphenol	DPX 021				on the existing mount				
Verizon Wireless	155	155	6	Diplexers	RFS	FD9R6004/2C-3L				on the existing mount				
T-Mobile	91	91	1	Dish	Unknown	2' MW Dish		1	Unknown	MW Collar Mount	1	Unknown	1-5/8"	Internal
Sprint	75	75	1	Panel	Pctel	TMG-HR-26N GPS		1	Unknown	Pipe Mount	1	Unknown	7/8"	External

Note: (3) TT19-08B9111-011 TMAs and (6) LGP21901 Diplexers at 185' shall be removed prior to the installation of the proposed loading. The remaining existing equipment shall be reused.

Proposed Loading

Antenna								Mount			Transmission Line			
Antenna Owner	Mount Height (ft)	Antenna CL (ft)	Quantity	Type	Manufacturer	Model	Azimuth	Quantity	Manufacturer	Type	Quantity	Model	Size	Attachment Internal/External
AT&T Mobility	185	185	2	Panel	Quintel	QS66512-3	143/263			on the existing mount	2	DC Power	3/4"	Internal
AT&T Mobility	185	185	1	Panel	CCI	TPA-65R-LCUUUU-H8	23			on the existing mount	1	Fiber	1.496	Internal
AT&T Mobility	185	185	3	RRU	Ericsson	RRUS-32				on the existing mount				
AT&T Mobility	185	185	6	Triplexers	CCI	TPX070821				on the existing mount				
AT&T Mobility	185	185	1	Surge	Raycap	DC6-48-60-18-8F				on the existing mount				

Note: The proposed coax shall be installed internal to the monopole in order for the results of this analysis to be valid.

Future Loading

Antenna								Mount			Transmission Line			
Antenna Owner	Mount Height (ft)	Antenna CL (ft)	Quantity	Type	Manufacturer	Model	Azimuth	Quantity	Manufacturer	Type	Quantity	Model	Size	Attachment Internal/External

APPENDIX B

tnxTower Output File

Tower Input Data

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

Tower is located in New Haven County, Connecticut.
Basic wind speed of 85 mph.
Nominal ice thickness of 0.7500 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 28 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.333.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Feed Line/Linear Appurtenances - Entered As Area

Description	*Face or Leg*	*Allow Shield*	*Component Type*	*Placement* *ft*	*Total Number*		C_AA_A *ft²/ft*	*Weight* *plf*
PiROD Climbing Rungs	C	No	CaAa (Out Of Face)	195.00 - 8.00	1	No Ice	0.05	3.80
						1/2" Ice	0.13	5.44
						1" Ice	0.20	7.08
						2" Ice	0.36	10.36
						4" Ice	0.67	16.92
Safety Line 3/8	C	No	CaAa (Out Of Face)	195.00 - 8.00	1	No Ice	0.04	0.22
						1/2" Ice	0.14	0.75
						1" Ice	0.24	1.28
						2" Ice	0.44	2.34
						4" Ice	0.84	4.46
LDF7-50A (1-5/8 FOAM)	C	No	Inside Pole	195.00 - 8.00	12	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
1-5/8" Hybrid Cable	C	No	Inside Pole	195.00 - 8.00	1	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
LDF6-50A (1-1/4 FOAM)	A	No	Inside Pole	185.00 - 8.00	12	No Ice	0.00	0.66
						1/2" Ice	0.00	0.66
						1" Ice	0.00	0.66
						2" Ice	0.00	0.66
						4" Ice	0.00	0.66
1.496" Fiber Cable	A	No	Inside Pole	185.00 - 8.00	2	No Ice	0.00	0.80
						1/2" Ice	0.00	0.80
						1" Ice	0.00	0.80
						2" Ice	0.00	0.80
						4" Ice	0.00	0.80
3/4" DC Power Line	A	No	Inside Pole	185.00 - 8.00	4	No Ice	0.00	0.33
						1/2" Ice	0.00	0.33

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
						1" Ice	0.00	0.33
						2" Ice	0.00	0.33
						4" Ice	0.00	0.33
LDF7-50A (1-5/8 FOAM)	A	No	CaAa (Out Of Face)	175.00 - 8.00	1	No Ice	0.20	0.82
						1/2" Ice	0.30	2.33
						1" Ice	0.40	4.46
						2" Ice	0.60	10.54
						4" Ice	1.00	30.04
LDF7-50A (1-5/8 FOAM)	A	No	CaAa (Out Of Face)	175.00 - 8.00	5	No Ice	0.00	0.82
						1/2" Ice	0.00	2.33
						1" Ice	0.00	4.46
						2" Ice	0.00	10.54
						4" Ice	0.00	30.04
LDF7-50A (1-5/8 FOAM)	A	No	Inside Pole	165.00 - 8.00	12	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
LDF7-50A (1-5/8 FOAM)	B	No	CaAa (Out Of Face)	155.00 - 8.00	2	No Ice	0.20	0.82
						1/2" Ice	0.30	2.33
						1" Ice	0.40	4.46
						2" Ice	0.60	10.54
						4" Ice	1.00	30.04
LDF7-50A (1-5/8 FOAM)	B	No	CaAa (Out Of Face)	155.00 - 8.00	10	No Ice	0.00	0.82
						1/2" Ice	0.00	2.33
						1" Ice	0.00	4.46
						2" Ice	0.00	10.54
						4" Ice	0.00	30.04
LDF7-50A (1-5/8 FOAM)	C	No	Inside Pole	91.00 - 8.00	1	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
LDF5-50A (7/8 FOAM)	C	No	CaAa (Out Of Face)	75.00 - 8.00	1	No Ice	0.00	0.33
						1/2" Ice	0.00	1.30
						1" Ice	0.00	2.88
						2" Ice	0.00	7.88
						4" Ice	0.00	25.20
4" x 1-1/4" Mod Plate	A	No	CaAa (Out Of Face)	22.00 - 18.00	2	No Ice	0.00	17.01
						1/2" Ice	0.00	18.19
						1" Ice	0.00	19.71
						2" Ice	0.00	23.80
						4" Ice	0.00	36.11
4" x 1-1/4" Mod Plate	B	No	CaAa (Out Of Face)	22.00 - 18.00	2	No Ice	0.00	17.01
						1/2" Ice	0.00	18.19
						1" Ice	0.00	19.71
						2" Ice	0.00	23.80
						4" Ice	0.00	36.11
4" x 1-1/4" Mod Plate	C	No	CaAa (Out Of Face)	22.00 - 18.00	2	No Ice	0.00	17.01
						1/2" Ice	0.00	18.19
						1" Ice	0.00	19.71
						2" Ice	0.00	23.80
						4" Ice	0.00	36.11
4" x 1-1/4" Mod Plate	A	No	CaAa (Out Of Face)	42.00 - 38.00	2	No Ice	0.00	17.01
						1/2" Ice	0.00	18.19
						1" Ice	0.00	19.71
						2" Ice	0.00	23.80
						4" Ice	0.00	36.11
4" x 1-1/4" Mod Plate	B	No	CaAa (Out Of Face)	42.00 - 38.00	2	No Ice	0.00	17.01
						1/2" Ice	0.00	18.19
						1" Ice	0.00	19.71

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
						2" Ice	0.00	23.80
						4" Ice	0.00	36.11
4" x 1-1/4" Mod Plate	C	No	CaAa (Out Of Face)	42.00 - 38.00	2	No Ice	0.00	17.01
						1/2" Ice	0.00	18.19
						1" Ice	0.00	19.71
						2" Ice	0.00	23.80
						4" Ice	0.00	36.11
6" x 1-1/2" Mod Plate	A	No	CaAa (Out Of Face)	24.00 - 16.00	2	No Ice	0.00	30.63
						1/2" Ice	0.00	32.57
						1" Ice	0.00	34.51
						2" Ice	0.00	38.40
						4" Ice	0.00	46.18
6" x 1-1/2" Mod Plate	B	No	CaAa (Out Of Face)	24.00 - 16.00	2	No Ice	0.00	30.63
						1/2" Ice	0.00	32.57
						1" Ice	0.00	34.51
						2" Ice	0.00	38.40
						4" Ice	0.00	46.18
6" x 1-1/2" Mod Plate	C	No	CaAa (Out Of Face)	24.00 - 16.00	2	No Ice	0.00	30.63
						1/2" Ice	0.00	32.57
						1" Ice	0.00	34.51
						2" Ice	0.00	38.40
						4" Ice	0.00	46.18
6" x 1-1/2" Mod Plate	A	No	CaAa (Out Of Face)	44.00 - 36.00	2	No Ice	0.00	30.63
						1/2" Ice	0.00	32.57
						1" Ice	0.00	34.51
						2" Ice	0.00	38.40
						4" Ice	0.00	46.18
6" x 1-1/2" Mod Plate	B	No	CaAa (Out Of Face)	44.00 - 36.00	2	No Ice	0.00	30.63
						1/2" Ice	0.00	32.57
						1" Ice	0.00	34.51
						2" Ice	0.00	38.40
						4" Ice	0.00	46.18
6" x 1-1/2" Mod Plate	C	No	CaAa (Out Of Face)	44.00 - 36.00	2	No Ice	0.00	30.63
						1/2" Ice	0.00	32.57
						1" Ice	0.00	34.51
						2" Ice	0.00	38.40
						4" Ice	0.00	46.18
6" x 1-1/2" Mod Plate	A	No	CaAa (Out Of Face)	64.00 - 56.00	2	No Ice	0.00	30.63
						1/2" Ice	0.00	32.57
						1" Ice	0.00	34.51
						2" Ice	0.00	38.40
						4" Ice	0.00	46.18
6" x 1-1/2" Mod Plate	B	No	CaAa (Out Of Face)	64.00 - 56.00	2	No Ice	0.00	30.63
						1/2" Ice	0.00	32.57
						1" Ice	0.00	34.51
						2" Ice	0.00	38.40
						4" Ice	0.00	46.18
6" x 1-1/2" Mod Plate	C	No	CaAa (Out Of Face)	64.00 - 56.00	2	No Ice	0.00	30.63
						1/2" Ice	0.00	32.57
						1" Ice	0.00	34.51
						2" Ice	0.00	38.40
						4" Ice	0.00	46.18
6-1/2" x 1-1/2" MP (Rev F)	A	No	CaAa (Out Of Face)	139.00 - 0.00	1	No Ice	0.21	0.00
						1/2" Ice	0.32	0.00
						1" Ice	0.43	0.00
						2" Ice	0.65	0.00
						4" Ice	1.10	0.00
6-1/2" x 1-1/2" MP (Rev F)	B	No	CaAa (Out Of Face)	139.00 - 0.00	1	No Ice	0.21	0.00
						1/2" Ice	0.32	0.00
						1" Ice	0.43	0.00
						2" Ice	0.65	0.00

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
6-1/2" x 1-1/2" MP (Rev F)	C	No	CaAa (Out Of Face)	139.00 - 0.00	1	4" Ice No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.10 0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00 0.00

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
Pirod 16.5' LP Platform	C	None		0.0000	195.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	20.80 28.10 35.40 50.00 79.20	20.80 28.10 35.40 50.00 79.20	1800.00 2066.00 2332.00 2864.00 3928.00
AIR 33 w/ Mount Pipe	A	From Centroid-Leg	4.00 0.00 0.00	-10.0000	195.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.13 7.93 8.66 10.00 12.84	6.42 7.65 8.74 10.60 14.54	137.70 200.64 270.70 436.13 905.76
AIR 33 w/ Mount Pipe	B	From Centroid-Leg	4.00 0.00 0.00	-10.0000	195.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.13 7.93 8.66 10.00 12.84	6.42 7.65 8.74 10.60 14.54	137.70 200.64 270.70 436.13 905.76
AIR 33 w/ Mount Pipe	C	From Centroid-Leg	4.00 0.00 0.00	-10.0000	195.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.13 7.93 8.66 10.00 12.84	6.42 7.65 8.74 10.60 14.54	137.70 200.64 270.70 436.13 905.76
RR90-17-02DP w/ Mount Pipe	A	From Centroid-Leg	4.00 0.00 0.00	-10.0000	195.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.59 5.09 5.58 6.59 8.73	3.34 4.11 4.81 6.25 9.33	30.00 71.72 115.40 224.31 557.78
RR90-17-02DP w/ Mount Pipe	B	From Centroid-Leg	4.00 0.00 0.00	-10.0000	195.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.59 5.09 5.58 6.59 8.73	3.34 4.11 4.81 6.25 9.33	30.00 71.72 115.40 224.31 557.78
RR90-17-02DP w/ Mount Pipe	C	From Centroid-Leg	4.00 0.00 0.00	-10.0000	195.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.59 5.09 5.58 6.59 8.73	3.34 4.11 4.81 6.25 9.33	30.00 71.72 115.40 224.31 557.78
LNX-6515DS-VTM w/ mount pipe	A	From Centroid-Leg	4.00 0.00 0.00	-10.0000	195.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.43 12.05 12.67 14.02 17.03	9.35 10.67 11.70 13.80 18.21	75.82 160.12 253.96 473.92 1076.96
LNX-6515DS-VTM w/ mount pipe	B	From Centroid-Leg	4.00 0.00 0.00	-10.0000	195.00	No Ice 1/2" Ice 1" Ice	11.43 12.05 12.67	9.35 10.67 11.70	75.82 160.12 253.96

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
						2" Ice	14.02	13.80	473.92
						4" Ice	17.03	18.21	1076.96
LNX-6515DS-VTM w/ mount pipe	C	From Centroid-Leg	4.00 0.00 0.00	-10.0000	195.00	No Ice	11.43	9.35	75.82
						1/2" Ice	12.05	10.67	160.12
						1" Ice	12.67	11.70	253.96
						2" Ice	14.02	13.80	473.92
						4" Ice	17.03	18.21	1076.96
KRY 112 71	A	From Centroid-Leg	4.00 0.00 0.00	-10.0000	195.00	No Ice	0.68	0.45	13.20
						1/2" Ice	0.80	0.56	18.38
						1" Ice	0.93	0.68	25.16
						2" Ice	1.22	0.94	44.33
						4" Ice	1.90	1.57	110.52
KRY 112 71	B	From Centroid-Leg	4.00 0.00 0.00	-10.0000	195.00	No Ice	0.68	0.45	13.20
						1/2" Ice	0.80	0.56	18.38
						1" Ice	0.93	0.68	25.16
						2" Ice	1.22	0.94	44.33
						4" Ice	1.90	1.57	110.52
KRY 112 71	C	From Centroid-Leg	4.00 0.00 0.00	-10.0000	195.00	No Ice	0.68	0.45	13.20
						1/2" Ice	0.80	0.56	18.38
						1" Ice	0.93	0.68	25.16
						2" Ice	1.22	0.94	44.33
						4" Ice	1.90	1.57	110.52
DC4-48-60-8-20F	A	From Centroid-Leg	4.00 0.00 0.00	-10.0000	195.00	No Ice	1.67	0.69	9.00
						1/2" Ice	1.85	0.81	20.06
						1" Ice	2.03	0.95	33.36
						2" Ice	2.42	1.24	67.43
						4" Ice	3.31	1.94	170.93
PiROD 13' Low Profile Platform (Monopole)	C	None		0.0000	185.00	No Ice	15.70	15.70	1300.00
						1/2" Ice	20.10	20.10	1765.00
						1" Ice	24.50	24.50	2230.00
						2" Ice	33.30	33.30	3160.00
						4" Ice	50.90	50.90	5020.00
7770.00 w/ 6' Mount Pipe	A	From Centroid-Leg	4.00 0.00 0.00	23.0000	185.00	No Ice	6.22	4.35	60.90
						1/2" Ice	6.77	5.20	109.42
						1" Ice	7.30	5.92	164.42
						2" Ice	8.38	7.41	297.10
						4" Ice	10.69	10.76	683.83
7770.00 w/ 6' Mount Pipe	B	From Centroid-Leg	4.00 0.00 0.00	23.0000	185.00	No Ice	6.22	4.35	60.90
						1/2" Ice	6.77	5.20	109.42
						1" Ice	7.30	5.92	164.42
						2" Ice	8.38	7.41	297.10
						4" Ice	10.69	10.76	683.83
7770.00 w/ 6' Mount Pipe	C	From Centroid-Leg	4.00 0.00 0.00	23.0000	185.00	No Ice	6.22	4.35	60.90
						1/2" Ice	6.77	5.20	109.42
						1" Ice	7.30	5.92	164.42
						2" Ice	8.38	7.41	297.10
						4" Ice	10.69	10.76	683.83
P65-17-XLH-RR w/ Mount Pipe	A	From Centroid-Leg	4.00 0.00 0.00	23.0000	185.00	No Ice	11.47	8.70	99.20
						1/2" Ice	12.08	10.11	182.36
						1" Ice	12.71	11.38	275.18
						2" Ice	14.07	13.58	493.82
						4" Ice	17.08	18.18	1100.49
AM-X-CD-16-65-00T-RET w/ 2" x 54" mount pipe	B	From Centroid-Leg	4.00 0.00 0.00	23.0000	185.00	No Ice	8.26	5.67	64.93
						1/2" Ice	8.81	6.39	123.40
						1" Ice	9.36	7.12	189.26
						2" Ice	10.50	8.65	345.85
						4" Ice	12.88	12.02	784.00

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
AM-X-CD-17-65-00T-RET w/ Mount Pipe	C	From Centroid-Leg	4.00 0.00 0.00	23.0000	185.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.31 11.93 12.55 13.88 16.88	9.10 10.52 11.60 13.80 18.41	105.82 192.08 289.03 512.59 1127.58
TPA-65R-LCUUUU-H8 w/ Mount Pipe	A	From Centroid-Leg	4.00 0.00 0.00	23.0000	185.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	13.68 14.50 15.33 16.94 20.27	10.96 12.49 14.04 16.39 21.28	114.45 217.61 330.97 592.60 1296.46
QS66512-3 w/ Mount Pipe	B	From Centroid-Leg	4.00 0.00 0.00	23.0000	185.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.40 8.95 9.51 10.65 13.03	8.17 9.13 10.02 11.89 15.85	126.90 199.71 280.45 469.01 984.98
QS66512-3 w/ Mount Pipe	C	From Centroid-Leg	4.00 0.00 0.00	23.0000	185.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.40 8.95 9.51 10.65 13.03	8.17 9.13 10.02 11.89 15.85	126.90 199.71 280.45 469.01 984.98
TT19-08BP111-001	A	From Centroid-Leg	4.00 0.00 0.00	23.0000	185.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.64 0.76 0.88 1.14 1.78	0.52 0.62 0.74 0.99 1.59	16.00 21.80 29.22 49.70 118.66
TT19-08BP111-001	B	From Centroid-Leg	4.00 0.00 0.00	23.0000	185.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.64 0.76 0.88 1.14 1.78	0.52 0.62 0.74 0.99 1.59	16.00 21.80 29.22 49.70 118.66
TT19-08BP111-001	C	From Centroid-Leg	4.00 0.00 0.00	23.0000	185.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.64 0.76 0.88 1.14 1.78	0.52 0.62 0.74 0.99 1.59	16.00 21.80 29.22 49.70 118.66
(2) TPX-070821	A	From Centroid-Leg	4.00 0.00 0.00	23.0000	185.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.55 0.65 0.76 1.02 1.63	0.12 0.17 0.24 0.39 0.80	7.50 10.95 15.73 30.07 83.26
(2) TPX-070821	B	From Centroid-Leg	4.00 0.00 0.00	23.0000	185.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.55 0.65 0.76 1.02 1.63	0.12 0.17 0.24 0.39 0.80	7.50 10.95 15.73 30.07 83.26
(2) TPX-070821	C	From Centroid-Leg	4.00 0.00 0.00	23.0000	185.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.55 0.65 0.76 1.02 1.63	0.12 0.17 0.24 0.39 0.80	7.50 10.95 15.73 30.07 83.26
(2) RRUS-11	A	From Centroid-Leg	4.00 0.00 0.00	23.0000	185.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.25 3.49 3.74 4.27 5.43	1.37 1.55 1.74 2.14 3.04	47.62 68.42 92.25 149.81 309.89
(2) RRUS-11	B	From Centroid-Le	4.00 0.00	23.0000	185.00	No Ice 1/2" Ice	3.25 3.49	1.37 1.55	47.62 68.42

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
		g	0.00			1" Ice	3.74	1.74	92.25
						2" Ice	4.27	2.14	149.81
						4" Ice	5.43	3.04	309.89
(2) RRUS-11	C	From Centroid-Le g	4.00 0.00 0.00	23.0000	185.00	No Ice 1/2" Ice 1" Ice	3.25 3.49 3.74	1.37 1.55 1.74	47.62 68.42 92.25
						2" Ice	4.27	2.14	149.81
						4" Ice	5.43	3.04	309.89
RRUS-32	A	From Centroid-Le g	4.00 0.00 0.00	23.0000	185.00	No Ice 1/2" Ice 1" Ice	3.87 4.15 4.44	2.76 3.02 3.29	77.00 104.93 136.47
						2" Ice	5.06	3.85	211.15
						4" Ice	6.38	5.08	412.40
RRUS-32	B	From Centroid-Le g	4.00 0.00 0.00	23.0000	185.00	No Ice 1/2" Ice 1" Ice	3.87 4.15 4.44	2.76 3.02 3.29	77.00 104.93 136.47
						2" Ice	5.06	3.85	211.15
						4" Ice	6.38	5.08	412.40
RRUS-32	C	From Centroid-Le g	4.00 0.00 0.00	23.0000	185.00	No Ice 1/2" Ice 1" Ice	3.87 4.15 4.44	2.76 3.02 3.29	77.00 104.93 136.47
						2" Ice	5.06	3.85	211.15
						4" Ice	6.38	5.08	412.40
DC6-48-60-18-8F Surge Suppression Unit	C	From Centroid-Le g	4.00 0.00 0.00	23.0000	185.00	No Ice 1/2" Ice 1" Ice	1.47 1.67 1.88	1.47 1.67 1.88	18.90 36.62 56.82
						2" Ice	2.33	2.33	105.34
						4" Ice	3.38	3.38	239.02
DC6-48-60-18-8F Surge Suppression Unit	B	From Centroid-Le g	4.00 0.00 0.00	23.0000	185.00	No Ice 1/2" Ice 1" Ice	1.47 1.67 1.88	1.47 1.67 1.88	18.90 36.62 56.82
						2" Ice	2.33	2.33	105.34
						4" Ice	3.38	3.38	239.02
Valmont Light Duty Tri-Bracket (1)	C	None		0.0000	175.00	No Ice 1/2" Ice 1" Ice	1.76 2.08 2.40	1.76 2.08 2.40	54.00 70.00 86.00
						2" Ice	3.04	3.04	118.00
						4" Ice	4.32	4.32	182.00
APXV18-206517S-C w/ Mount Pipe	A	From Leg	0.50 0.00 0.00	-10.0000	175.00	No Ice 1/2" Ice 1" Ice	5.17 5.62 6.08	4.46 5.39 6.20	48.30 90.79 140.46
						2" Ice	7.02	7.87	264.62
						4" Ice	9.12	11.40	642.82
APXV18-206517S-C w/ Mount Pipe	B	From Leg	0.50 0.00 0.00	-10.0000	175.00	No Ice 1/2" Ice 1" Ice	5.17 5.62 6.08	4.46 5.39 6.20	48.30 90.79 140.46
						2" Ice	7.02	7.87	264.62
						4" Ice	9.12	11.40	642.82
APXV18-206517S-C w/ Mount Pipe	C	From Leg	0.50 0.00 0.00	-10.0000	175.00	No Ice 1/2" Ice 1" Ice	5.17 5.62 6.08	4.46 5.39 6.20	48.30 90.79 140.46
						2" Ice	7.02	7.87	264.62
						4" Ice	9.12	11.40	642.82
MTS 12.5' LP Platform	C	None		0.0000	165.00	No Ice 1/2" Ice 1" Ice	14.66 18.87 23.08	14.66 18.87 23.08	1250.00 1481.33 1712.66
						2" Ice	31.50	31.50	2175.32

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
						4" Ice	48.34	48.34	3100.64
(3) DB980E (90E-M) w/ Mount Pipe	A	From Centroid-Face	4.00 0.00 0.00	-10.0000	165.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.04 4.50 4.95 5.87 8.05	3.62 4.48 5.22 6.74 10.00	30.40 66.41 108.76 215.75 549.44
(3) DB980E (90E-M) w/ Mount Pipe	B	From Centroid-Face	4.00 0.00 0.00	-10.0000	165.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.04 4.50 4.95 5.87 8.05	3.62 4.48 5.22 6.74 10.00	30.40 66.41 108.76 215.75 549.44
(3) DB980E (90E-M) w/ Mount Pipe	C	From Centroid-Face	4.00 0.00 0.00	-10.0000	165.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.04 4.50 4.95 5.87 8.05	3.62 4.48 5.22 6.74 10.00	30.40 66.41 108.76 215.75 549.44
PiROD 15' Low Profile Platform (Monopole)	C	None		0.0000	155.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	17.30 22.10 26.90 36.50 55.70	17.30 22.10 26.90 36.50 55.70	1500.00 2030.00 2560.00 3620.00 5740.00
(2) HBXX-6516DS w/Mount Pipe	A	From Centroid-Face	4.00 0.00 0.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.24 6.74 7.24 8.27 10.46	4.59 5.31 6.02 7.53 10.75	50.00 100.58 156.76 291.02 676.01
(2) HBXX-6516DS w/Mount Pipe	B	From Centroid-Face	4.00 0.00 0.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.24 6.74 7.24 8.27 10.46	4.59 5.31 6.02 7.53 10.75	50.00 100.58 156.76 291.02 676.01
(2) HBXX-6516DS w/Mount Pipe	B	From Centroid-Face	4.00 0.00 0.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.24 6.74 7.24 8.27 10.46	4.59 5.31 6.02 7.53 10.75	50.00 100.58 156.76 291.02 676.01
(2) BXA-70063-4CF-EDIN-6 w/ Mount Pipe	C	From Centroid-Face	4.00 0.00 0.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.40 5.84 6.30 7.24 9.26	3.69 4.29 4.91 6.26 9.29	27.97 70.30 118.42 234.95 576.11
(2) BXA-70063-4CF-EDIN-6 w/ Mount Pipe	C	From Centroid-Face	4.00 0.00 0.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.40 5.84 6.30 7.24 9.26	3.69 4.29 4.91 6.26 9.29	27.97 70.30 118.42 234.95 576.11
(2) SLCP2x6014 w/ Mount Pipe	C	From Centroid-Face	4.00 0.00 0.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.21 7.65 8.10 9.02 10.96	6.66 7.35 8.06 9.52 12.78	36.12 98.37 167.23 327.48 763.21
(2) FD9R6004/2C-3L	A	From Centroid-Face	4.00 0.00 0.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.37 0.45 0.54 0.75 1.28	0.08 0.14 0.20 0.34 0.74	3.10 5.40 8.79 19.61 62.87
(2) FD9R6004/2C-3L	B	From	4.00	0.0000	155.00	No Ice	0.37	0.08	3.10

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
		Centroid-Face	0.00 0.00			1/2" Ice 1" Ice	0.45 0.54	0.14 0.20	5.40 8.79
						2" Ice 4" Ice	0.75 1.28	0.34 0.74	19.61 62.87
(2) FD9R6004/2C-3L	C	From Centroid-Face	4.00 0.00 0.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.37 0.45 0.54 0.75 1.28	0.08 0.14 0.20 0.34 0.74	3.10 5.40 8.79 19.61 62.87
(2) DPX 021 Diplexer	A	From Centroid-Face	4.00 0.00 0.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.41 0.50 0.59 0.81 1.36	0.17 0.24 0.31 0.48 0.92	10.00 13.18 17.58 30.87 80.78
(2) DPX 021 Diplexer	B	From Centroid-Face	4.00 0.00 0.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.41 0.50 0.59 0.81 1.36	0.17 0.24 0.31 0.48 0.92	10.00 13.18 17.58 30.87 80.78
(2) DPX 021 Diplexer	C	From Centroid-Face	4.00 0.00 0.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.41 0.50 0.59 0.81 1.36	0.17 0.24 0.31 0.48 0.92	10.00 13.18 17.58 30.87 80.78
Pipe Mount 3'x4.5"	C	From Leg	0.50 0.00 0.00	0.0000	91.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.93 1.13 1.37 1.89 3.06	0.93 1.13 1.37 1.89 3.06	32.40 42.33 54.71 87.40 188.83
GPS-TMG-HR-26N	C	From Leg	0.50 0.00 0.00	0.0000	75.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.16 0.21 0.28 0.44 0.86	0.16 0.21 0.28 0.44 0.86	0.60 2.37 5.07 14.06 51.79
Pipe Mount 3'x4.5"	C	From Leg	0.50 0.00 0.00	0.0000	75.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.93 1.13 1.37 1.89 3.06	0.93 1.13 1.37 1.89 3.06	32.40 42.33 54.71 87.40 188.83
Bridge Stiffener (3.25 sq ft)	A	From Leg	0.50 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.25 3.60 3.94 4.72 6.47	0.74 1.25 1.73 2.39 3.81	130.00 146.99 165.39 215.30 372.96
Bridge Stiffener (3.25 sq ft)	B	From Leg	0.50 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.25 3.60 3.94 4.72 6.47	0.74 1.25 1.73 2.39 3.81	130.00 146.99 165.39 215.30 372.96
Bridge Stiffener (3.25 sq ft)	C	From Leg	0.50 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.25 3.60 3.94 4.72 6.47	0.74 1.25 1.73 2.39 3.81	130.00 146.99 165.39 215.30 372.96
Bridge Stiffener (3.25 sq ft)	A	From Leg	0.50 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice	3.25 3.60 3.94	0.74 1.25 1.73	130.00 146.99 165.39

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
						2" Ice	4.72	2.39	215.30
						4" Ice	6.47	3.81	372.96
Bridge Stiffener (3.25 sq ft)	B	From Leg	0.50 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.25 3.60 3.94 4.72 6.47	0.74 1.25 1.73 2.39 3.81	130.00 146.99 165.39 215.30 372.96
Bridge Stiffener (3.25 sq ft)	C	From Leg	0.50 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.25 3.60 3.94 4.72 6.47	0.74 1.25 1.73 2.39 3.81	130.00 146.99 165.39 215.30 372.96
Bridge Stiffener (3.25 sq ft)	A	From Leg	0.50 0.00 0.00	0.0000	80.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.25 3.60 3.94 4.72 6.47	0.74 1.25 1.73 2.39 3.81	130.00 146.99 165.39 215.30 372.96
Bridge Stiffener (3.25 sq ft)	B	From Leg	0.50 0.00 0.00	0.0000	80.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.25 3.60 3.94 4.72 6.47	0.74 1.25 1.73 2.39 3.81	130.00 146.99 165.39 215.30 372.96
Bridge Stiffener (3.25 sq ft)	C	From Leg	0.50 0.00 0.00	0.0000	80.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.25 3.60 3.94 4.72 6.47	0.74 1.25 1.73 2.39 3.81	130.00 146.99 165.39 215.30 372.96
1' Pirod Top Hat	C	None		0.0000	195.50	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.20 1.37 1.56 1.96 2.89	1.20 1.37 1.56 1.96 2.89	150.00 170.49 193.57 248.15 395.16

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight lb
2' MW	C	Paraboloid w/o Radome	From Leg	1.00 0.00 0.00	0.0000		91.00	2.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.14 3.41 3.68 4.21 5.28	40.00 67.13 97.32 167.47 351.13

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
195.50	1' Pirod Top Hat	28	28.405	1.3090	0.0007	45084
195.00	Pirod 16.5' LP Platform	28	28.405	1.3090	0.0007	45084
185.00	PiROD 13' Low Profile Platform (Monopole)	28	25.674	1.2963	0.0008	19860
175.00	Valmont Light Duty Tri-Bracket (1)	28	23.001	1.2574	0.0012	12803
165.00	MTS 12.5' LP Platform	28	20.427	1.1952	0.0015	7095
155.00	PiROD 15' Low Profile Platform (Monopole)	28	18.012	1.1170	0.0018	7923
120.00	Bridge Stiffener (3.25 sq ft)	28	10.927	0.8348	0.0008	8691
100.00	Bridge Stiffener (3.25 sq ft)	28	7.692	0.7020	0.0006	8476
91.00	2' MW	28	6.420	0.6466	0.0005	8715
80.00	Bridge Stiffener (3.25 sq ft)	28	5.018	0.5684	0.0004	8556
75.00	GPS-TMG-HR-26N	28	4.438	0.5386	0.0004	9298

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$SF*P_{allow}$ lb	% Capacity	Pass Fail
L1	195 - 190	Pole	P24x0.375	1	-2944.55	934939.50	5.3	Pass
L2	190 - 185	Pole	P24x0.375	2	-3471.42	934939.50	10.7	Pass
L3	185 - 180	Pole	P24x0.375	3	-6425.92	934939.50	23.2	Pass
L4	180 - 175	Pole	P30x0.375	4	-7132.34	1166569.57	25.1	Pass
L5	175 - 170	Pole	P30x0.375	5	-8013.65	1166569.57	34.8	Pass
L6	170 - 165	Pole	P30x0.375	6	-8756.05	1166569.57	44.7	Pass
L7	165 - 160	Pole	P30x0.375	7	-10936.50	1166569.57	57.0	Pass
L8	160 - 155	Pole	P36x0.375	8	-11851.90	1325677.78	50.9	Pass
L9	155 - 150	Pole	P36x0.375	9	-14648.90	1325677.78	62.7	Pass
L10	150 - 145	Pole	P36x0.375	10	-15636.20	1325677.78	74.7	Pass
L11	145 - 140	Pole	P36x0.375	11	-16637.20	1325677.78	86.9	Pass
L12	140 - 136.25	Pole	P42x0.375	12	-17462.10	1484548.71	73.7	Pass
L13	136.25 - 136	Pole	P42x0.61	13	-17544.80	2664440.28	*	Pass
L14	136 - 131	Pole	P42x0.61	14	-19086.10	2664440.28	*	Pass
L15	131 - 126	Pole	P42x0.61	15	-20637.40	2664440.28	*	Pass
L16	126 - 121	Pole	P42x0.61	16	-22195.40	2664440.28	*	Pass
L17	121 - 120	Pole	P42x0.61	17	-22508.20	2664440.28	*	Pass
L18	120 - 119.75	Pole	P48x0.575	18	-22974.20	2824120.34	*	Pass
L19	119.75 - 114.75	Pole	P48x0.575	19	-24642.50	2824120.34	*	Pass
L20	114.75 - 109.75	Pole	P48x0.575	20	-26320.50	2824120.34	*	Pass
L21	109.75 - 104.75	Pole	P48x0.575	21	-28005.90	2824120.34	*	Pass
L22	104.75 - 100	Pole	P48x0.575	22	-29613.10	2824120.34	*	Pass
L23	100 - 99.75	Pole	P54x0.55	23	-30089.70	2898315.12	*	Pass
L24	99.75 - 94.75	Pole	P54x0.55	24	-31889.10	2898315.12	*	Pass
L25	94.75 - 89.75	Pole	P54x0.55	25	-33766.90	2898315.12	*	Pass
L26	89.75 - 84.75	Pole	P54x0.55	26	-35585.20	2898315.12	*	Pass
L27	84.75 - 80	Pole	P54x0.55	27	-37320.60	2898315.12	*	Pass
L28	80 - 79.75	Pole	P60x0.53	28	-37806.80	2989359.02	*	Pass
L29	79.75 - 74.75	Pole	P60x0.53	29	-39772.90	2989359.02	*	Pass
L30	74.75 - 69.75	Pole	P60x0.53	30	-41719.00	2989359.02	*	Pass
L31	69.75 - 64.75	Pole	P60x0.53	31	-43671.80	2989359.02	*	Pass
L32	64.75 - 60	Pole	P60x0.53	32	-46266.90	2989359.02	*	Pass
L33	60 - 59.75	Pole	P60x0.655	33	-46436.90	3911128.48	*	Pass
L34	59.75 - 54.75	Pole	P60x0.655	34	-49469.90	3911128.48	*	Pass
L35	54.75 - 49.75	Pole	P60x0.655	35	-51824.30	3911128.48	*	Pass
L36	49.75 - 44.75	Pole	P60x0.655	36	-54185.10	3911128.48	*	Pass
L37	44.75 - 40	Pole	P60x0.655	37	-57371.30	3911128.48	*	Pass
L38	40 - 39.75	Pole	P60x0.78	38	-57587.70	4874647.50	*	Pass

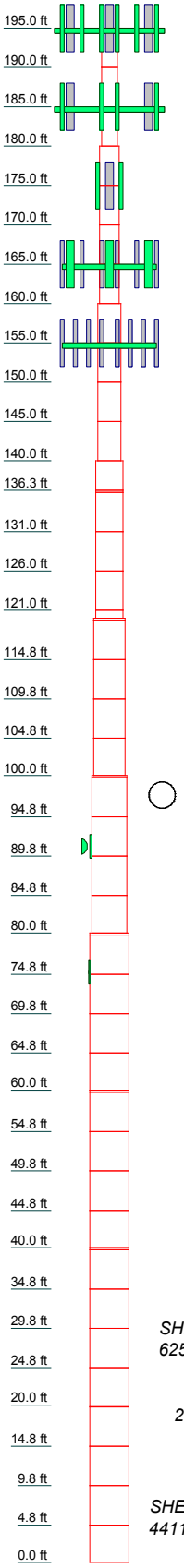
Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	SF*P_{allow} lb	% Capacity	Pass Fail
L39	39.75 - 34.75	Pole	P60x0.78	39	-61205.40	4874647.50	*	Pass
L40	34.75 - 29.75	Pole	P60x0.78	40	-63966.00	4874647.50	*	Pass
L41	29.75 - 24.75	Pole	P60x0.78	41	-66731.90	4874647.50	*	Pass
L42	24.75 - 20	Pole	P60x0.78	42	-70302.40	4874647.50	*	Pass
L43	20 - 19.75	Pole	P60x0.78	43	-70520.10	4874647.50	*	Pass
L44	19.75 - 14.75	Pole	P60x0.78	44	-74159.10	4874647.50	*	Pass
L45	14.75 - 9.75	Pole	P60x0.78	45	-76942.30	4874647.50	*	Pass
L46	9.75 - 4.75	Pole	P60x0.78	46	-79565.00	4874647.50	*	Pass
L47	4.75 - 0	Pole	P60x0.78	47	-81974.90	4874647.50	*	Pass

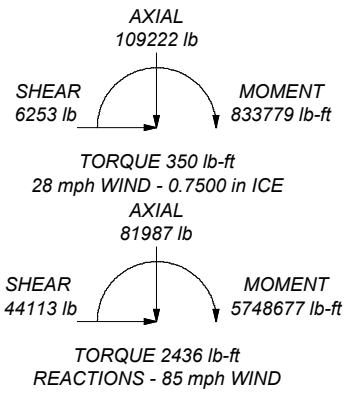
Summary	ELC:	Proposed
Pole (L32)	91.1	Pass
Rating =	91.1	Pass

APPENDIX C

Tower Elevation Drawing & Shaft Reinforcement

Section	Size	Length (ft)	Grade	Weight (lb)
1	P60x0.375	5.00	A53-B-42	473.5
2	P60x0.375	5.00		473.5
3	P60x0.375	5.00		473.5
4	P60x0.375	5.00		593.8
5	P60x0.375	5.00		593.8
6	P60x0.375	5.00		593.8
7	P60x0.375	5.00		593.8
8	P60x0.375	5.00		714.1
9	P60x0.375	5.00		714.1
10	P60x0.375	5.00		714.1
11	P60x0.375	5.00		714.1
12	P60x0.375	3.75		325.8
13	P60x0.375	5.00		434.4
14	P60x0.375	5.00		712.9
15	P60x0.542	5.00		712.9
16	P60x0.542	5.00		712.9
17	P60x0.542	5.00		712.9
18	P60x0.542	5.00		1414.0
19	P60x0.542	5.00		1414.0
20	P60x0.542	5.00		1414.0
21	P60x0.542	5.00		1414.0
22	P60x0.542	3.75		1343.3
23	P60x0.542	5.00		1414.0
24	P60x0.542	5.00		2153.4
25	P60x0.542	5.00		2153.4
26	P60x0.542	5.00		2153.4
27	P60x0.542	3.75		1657.5
28	P60x0.542	5.00		2153.4
29	P60x0.542	5.00		2165.4
30	P60x0.542	5.00		2165.4
31	P60x0.542	5.00		2165.4
32	P60x0.542	3.75		1624.1
33	P60x0.542	5.00		2165.4
34	P60x0.542	5.00		2049.5
35	P60x0.542	5.00		2049.5
36	P60x0.542	5.00		2049.5
37	P60x0.542	3.75		1537.1
38	P60x0.542	5.00		2049.5
39	P60x0.542	5.00		2442.9
40	P60x0.760	5.00		2442.9
41	P60x0.760	5.00		2442.9
42	P60x0.760	3.75		1832.2
43	P60x0.760	5.00		2442.9
44	P60x0.760	5.00		2442.9
45	P60x0.760	5.00		2442.9
46	P60x0.760	5.00		2442.9
47	P60x0.760	4.75		2320.8
				57634.8





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
1' Pirod Top Hat	195.5	PiROD 13' Low Profile Platform (Monopole)	185
AIR 33 w/ Mount Pipe	195	APXV18-206517S-C w/ Mount Pipe	175
AIR 33 w/ Mount Pipe	195	APXV18-206517S-C w/ Mount Pipe	175
AIR 33 w/ Mount Pipe	195	APXV18-206517S-C w/ Mount Pipe	175
RR90-17-02DP w/ Mount Pipe	195	Valmont Light Duty Tri-Bracket (1)	175
RR90-17-02DP w/ Mount Pipe	195	(3) DB980E (90E-M) w/ Mount Pipe	165
RR90-17-02DP w/ Mount Pipe	195	(3) DB980E (90E-M) w/ Mount Pipe	165
LNX-6515DS-VTM w/ mount pipe	195	(3) DB980E (90E-M) w/ Mount Pipe	165
LNX-6515DS-VTM w/ mount pipe	195	MTS 12.5' LP Platform	165
LNX-6515DS-VTM w/ mount pipe	195	(2) HBXX-6516DS w/Mount Pipe	155
KRY 112 71	195	(2) HBXX-6516DS w/Mount Pipe	155
KRY 112 71	195	(2) HBXX-6516DS w/Mount Pipe	155
KRY 112 71	195	(2) BXA-70063-4CF-EDIN-6 w/ Mount Pipe	155
DC4-48-60-8-20F	195	(2) BXA-70063-4CF-EDIN-6 w/ Mount Pipe	155
Pirod 16.5' LP Platform	195	(2) SLCP2x6014 w/ Mount Pipe	155
7770.00 w/ 6' Mount Pipe	185	(2) FD9R6004/2C-3L	155
7770.00 w/ 6' Mount Pipe	185	(2) FD9R6004/2C-3L	155
7770.00 w/ 6' Mount Pipe	185	(2) FD9R6004/2C-3L	155
P65-17-XLH-RR w/ Mount Pipe	185	(2) DPX 021 Diplexer	155
AM-X-CD-16-65-00T-RET w/ 2" x 54" mount pipe	185	(2) DPX 021 Diplexer	155
AM-X-CD-17-65-00T-RET w/ Mount Pipe	185	(2) DPX 021 Diplexer	155
TPA-65R-LCUUUU-H8 w/ Mount Pipe	185	PiROD 15' Low Profile Platform (Monopole)	155
QS66512-3 w/ Mount Pipe	185	Bridge Stiffener (3.25 sq ft)	120
QS66512-3 w/ Mount Pipe	185	Bridge Stiffener (3.25 sq ft)	120
TT19-08BP111-001	185	Bridge Stiffener (3.25 sq ft)	120
TT19-08BP111-001	185	Bridge Stiffener (3.25 sq ft)	100
TT19-08BP111-001	185	Bridge Stiffener (3.25 sq ft)	100
(2) TPX-070821	185	Bridge Stiffener (3.25 sq ft)	100
(2) TPX-070821	185	Pipe Mount 3'x4.5"	91
(2) TPX-070821	185	2' MW	91
(2) RRUS-11	185	Bridge Stiffener (3.25 sq ft)	80
(2) RRUS-11	185	Bridge Stiffener (3.25 sq ft)	80
(2) RRUS-11	185	Bridge Stiffener (3.25 sq ft)	80
RRUS-32	185	GPS-TMG-HR-26N	75
RRUS-32	185	Pipe Mount 3'x4.5"	75
RRUS-32	185		
DC6-48-60-18-8F Surge Suppression Unit	185		
DC6-48-60-18-8F Surge Suppression Unit	185		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A53-B-42	42 ksi	63 ksi			

TOWER DESIGN NOTES

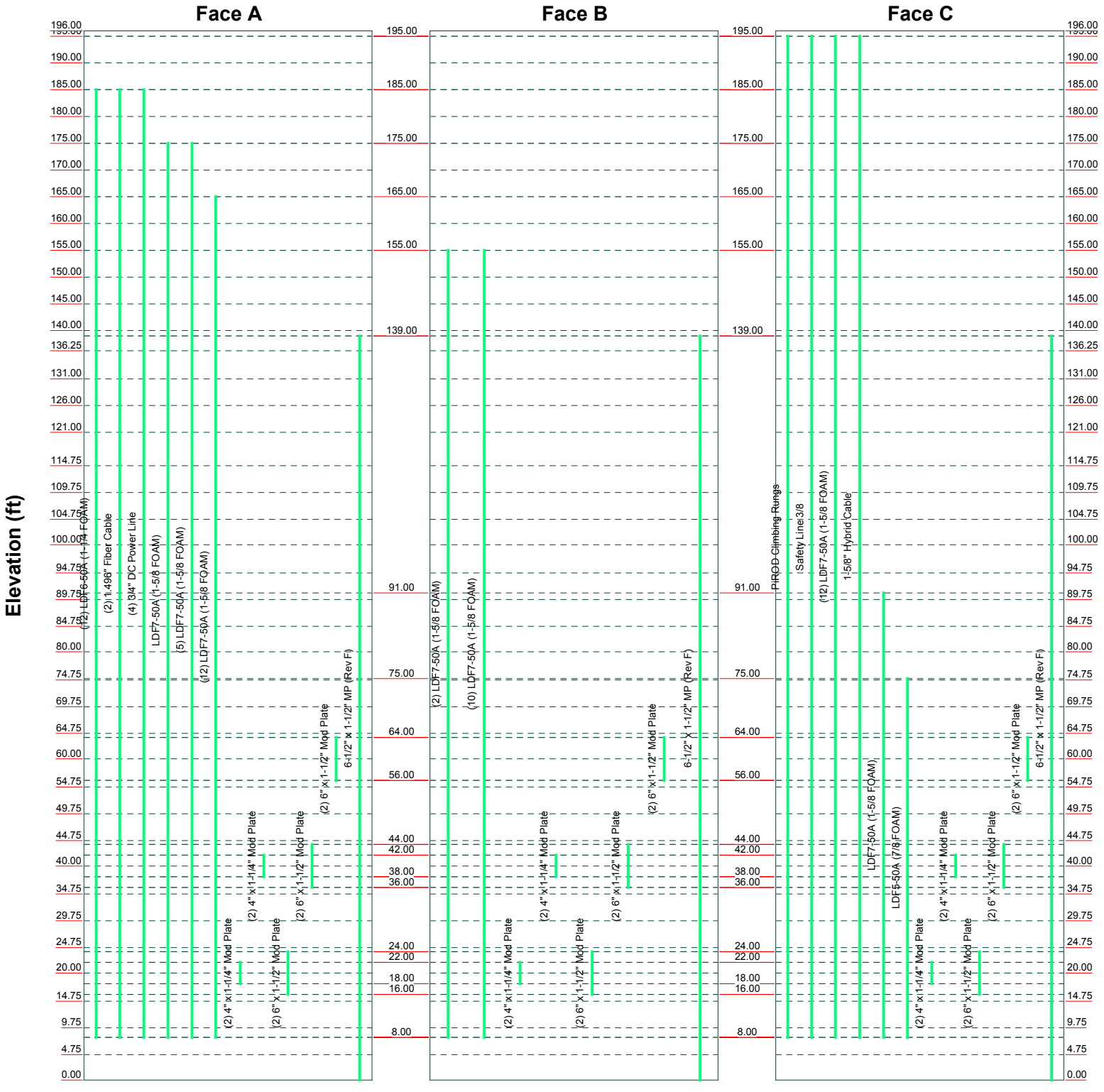
1. Tower is located in New Haven County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 28 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 87.2%

GPD
520 South Main Street, Suite 2531
Akron, OH 44311
Phone: (330) 572-2100
FAX: (330) 572-2101

Job: CT2086 SOUTHBURY KETTLETOWN ROAD			
Project: 2016702.36			
Client: Phoenix Tower International	Drawn by: twillman	App'd:	
Code: TIA/EIA-222-F	Date: 02/09/16	Scale: NTS	
Path: O:\2016\2016702\36 Phoenix Tower SA\TNX\Modified TNX.eri		Dwg No. E-1	

Feed Line Distribution Chart
0' - 196'

Round | Flat | App In Face | App Out Face | Truss Leg



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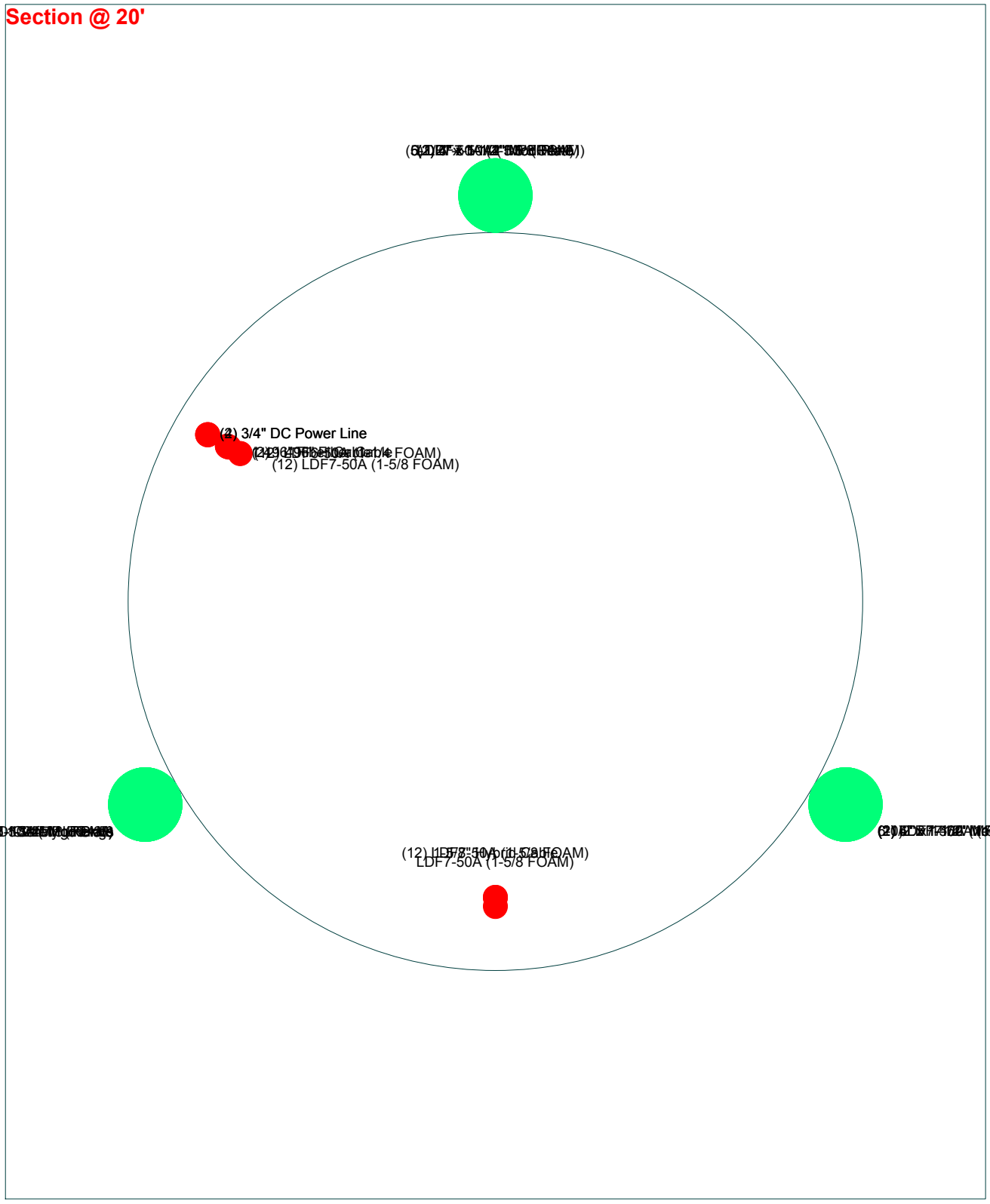
Client: Phoenix Tower International	Drawn by: twillman		App'd:
Code: TIA/EIA-222-F	Date: 02/09/16		Scale: NTS
Path: O:\2016\2016702\36 Phoenix Tower SA\TNX\Modified TNX.eri			Dwg No. E-7

Feed Line Plan
20'

Round Flat App In Face App Out Face



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Project: ***2016702.36***			
Client: Phoenix Tower International	Drawn by: twillman		App'd:
Code: TIA/EIA-222-F	Date: 02/09/16		Scale: NTS
Path: O:\2016\2016702\36 Phoenix Tower SA\TNX\Modified TNX.eri			Dwg No. E-7

Additional Calculations

CCIpole

per TIA-222- G

Site BU: _____

Work Order: _____

CROWN CASTLE

Pole Geometry

	Pole Height Above Base (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Bend Radius (in)	Pole Material
1	195	15		0	24	24	0.375	n/a	A53-B-42
2	180	20		0	30.00	30	0.375	n/a	A53-B-42
3	160	20		0	36.00	36	0.375	n/a	A53-B-42
4	140	20		0	42.00	42	0.375	n/a	A53-B-42
5	120	20		0	48.00	48	0.375	n/a	A53-B-42
6	100	20		0	54.00	54	0.375	n/a	A53-B-42
7	80	20		0	60.00	60	0.375	n/a	A53-B-42
8	60	20		0	60.00	60	0.5	n/a	A53-B-42
9	40	20		0	60.00	60	0.625	n/a	A53-B-42
10	20	20		0	60.00	60	0.625	n/a	A53-B-42

20 0 60 0.6 A53-B-42

Reinforcement Configuration

	Bottom Effective Elevation (ft)	Top Effective Elevation (ft)	Type	Model	Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	0	20	plate	MP 6-1/2x1-1/2	3	0	120	240															
2	20	40	plate	MP 6-1/2x1-1/2	3	0	120	240															
3	40	60	plate	MP 6-1/2x1-1/2	3	0	120	240															
4	60	80	plate	MP 6-1/2x1-1/2	3	0	120	240															
5	80	100	plate	MP 6-1/2x1-1/2	3	0	120	240															
6	100	120	plate	MP 6-1/2x1-1/2	3	0	120	240															
7	120	136.25	plate	MP 6-1/2x1-1/2	3	0	120	240															
8																							
9																							
10																							

Reinforcement Details

	B (in)	H (in)	Gross Area (in^2)	Pole Face to Centroid (in)	Bottom Termination Length (in)	Top Termination Length (in)	L_u (in)	Net Area (in^2)	Bolt Hole Size (in)	Reinforcement Material
1	6	1.5	9	0.75	33.000	33.000	18.000	7.125	1.1875	A572-50
2	6	1.5	9	0.75	33.000	33.000	18.000	7.125	1.1875	A572-50
3	6	1.5	9	0.75	33.000	33.000	18.000	7.125	1.1875	A572-50
4	6	1.5	9	0.75	33.000	33.000	18.000	7.125	1.1875	A572-50
5	6	1.5	9	0.75	33.000	33.000	18.000	7.125	1.1875	A572-50
6	6	1.5	9	0.75	33.000	33.000	18.000	7.125	1.1875	A572-50
7	6	1.5	9	0.75	33.000	33.000	18.000	7.125	1.1875	A572-50

TNX Geometry Input

Increment (ft): 5

	Section Height (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Tapered Pole Grade	Weight Multiplier
1	195 - 190	5		0	24.000	24.000	0.375	A53-B-42	1.000
2	190 - 185	5		0	24.000	24.000	0.375	A53-B-42	1.000
3	185 - 180	5	0	0	24.000	24.000	0.375	A53-B-42	1.000
4	180 - 175	5		0	30.000	30.000	0.375	A53-B-42	1.000
5	175 - 170	5		0	30.000	30.000	0.375	A53-B-42	1.000
6	170 - 165	5		0	30.000	30.000	0.375	A53-B-42	1.000
7	165 - 160	5	0	0	30.000	30.000	0.375	A53-B-42	1.000
8	160 - 155	5		0	36.000	36.000	0.375	A53-B-42	1.000
9	155 - 150	5		0	36.000	36.000	0.375	A53-B-42	1.000
10	150 - 145	5		0	36.000	36.000	0.375	A53-B-42	1.000
11	145 - 140	5	0	0	36.000	36.000	0.375	A53-B-42	1.000
12	140 - 136.25	3.75		0	42.000	42.000	0.375	A53-B-42	1.000
13	136.25 - 136	0.25		0	42.000	42.000	0.61	A53-B-42	0.959
14	136 - 131	5		0	42.000	42.000	0.61	A53-B-42	0.959
15	131 - 126	5		0	42.000	42.000	0.61	A53-B-42	0.959
16	126 - 121	5		0	42.000	42.000	0.61	A53-B-42	0.959
17	121 - 120	1	0	0	42.000	42.000	0.61	A53-B-42	0.959
18	120 - 119.75	0.25		0	48.000	48.000	0.575	A53-B-42	0.970
19	119.75 - 114.75	5		0	48.000	48.000	0.575	A53-B-42	0.970
20	114.75 - 109.75	5		0	48.000	48.000	0.575	A53-B-42	0.970
21	109.75 - 104.75	5		0	48.000	48.000	0.575	A53-B-42	0.970
22	104.75 - 100	4.75	0	0	48.000	48.000	0.575	A53-B-42	0.970
23	100 - 99.75	0.25		0	54.000	54.000	0.55	A53-B-42	0.976
24	99.75 - 94.75	5		0	54.000	54.000	0.55	A53-B-42	0.976
25	94.75 - 89.75	5		0	54.000	54.000	0.55	A53-B-42	0.976
26	89.75 - 84.75	5		0	54.000	54.000	0.55	A53-B-42	0.976
27	84.75 - 80	4.75	0	0	54.000	54.000	0.55	A53-B-42	0.976
28	80 - 79.75	0.25		0	60.000	60.000	0.53	A53-B-42	0.982
29	79.75 - 74.75	5		0	60.000	60.000	0.53	A53-B-42	0.982
30	74.75 - 69.75	5		0	60.000	60.000	0.53	A53-B-42	0.982
31	69.75 - 64.75	5		0	60.000	60.000	0.53	A53-B-42	0.982
32	64.75 - 60	4.75	0	0	60.000	60.000	0.53	A53-B-42	0.982
33	60 - 59.75	0.25		0	60.000	60.000	0.655	A53-B-42	0.986
34	59.75 - 54.75	5		0	60.000	60.000	0.655	A53-B-42	0.986
35	54.75 - 49.75	5		0	60.000	60.000	0.655	A53-B-42	0.986
36	49.75 - 44.75	5		0	60.000	60.000	0.655	A53-B-42	0.986
37	44.75 - 40	4.75	0	0	60.000	60.000	0.655	A53-B-42	0.986
38	40 - 39.75	0.25		0	60.000	60.000	0.78	A53-B-42	0.989
39	39.75 - 34.75	5		0	60.000	60.000	0.78	A53-B-42	0.989
40	34.75 - 29.75	5		0	60.000	60.000	0.78	A53-B-42	0.989
41	29.75 - 24.75	5		0	60.000	60.000	0.78	A53-B-42	0.989
42	24.75 - 20	4.75	0	0	60.000	60.000	0.78	A53-B-42	0.989
43	20 - 19.75	0.25		0	60.000	60.000	0.78	A53-B-42	0.989
44	19.75 - 14.75	5		0	60.000	60.000	0.78	A53-B-42	0.989
45	14.75 - 9.75	5		0	60.000	60.000	0.78	A53-B-42	0.989
46	9.75 - 4.75	5		0	60.000	60.000	0.78	A53-B-42	0.989
47	4.75 - 0	4.75		0	60.000	60.000	0.78	A53-B-42	0.989

TNX Section Forces

Increment (ft): 5

	Section Height (ft)	TNX Output P_u (K)	TNX Output M_{ux} (kip-ft)	TNX Output V_u (K)
1	195 - 190	2.9445	24.85	5.1398
2	190 - 185	3.4714	51.436	5.4985
3	185 - 180	6.4259	111.21	12.123
4	180 - 175	7.1323	172.92	12.556
5	175 - 170	8.0136	241	13.86
6	170 - 165	8.7561	311.45	14.327
7	165 - 160	10.936	396.79	17.303
8	160 - 155	11.852	484.61	17.836
9	155 - 150	14.649	597.04	22.767
10	150 - 145	15.636	712.38	23.368
11	145 - 140	16.637	830.68	23.952
12	140 - 136.25	17.462	921.52	24.502
13	136.25 - 136	17.545	927.65	24.538
14	136 - 131	19.086	1052.3	25.321
15	131 - 126	20.637	1180.8	26.087
16	126 - 121	22.197	1313.2	26.836
17	121 - 120	22.509	1340.1	26.983
18	120 - 119.75	22.975	1346.9	27.308
19	119.75 - 114.75	24.642	1485.5	28.137
20	114.75 - 109.75	26.321	1628.1	28.928
21	109.75 - 104.75	28.006	1774.7	29.701
22	104.75 - 100	29.613	1917.4	30.417
23	100 - 99.75	30.09	1925.1	30.723
24	99.75 - 94.75	31.889	2080.7	31.54
25	94.75 - 89.75	33.767	2240.8	32.486
26	89.75 - 84.75	35.585	2405.1	33.318
27	84.75 - 80	37.321	2565	34.028
28	80 - 79.75	37.807	2573.6	34.315
29	79.75 - 74.75	39.773	2747.1	35.163
30	74.75 - 69.75	41.719	2924.9	35.94
31	69.75 - 64.75	43.672	3106.4	36.689
32	64.75 - 60	46.267	3282.3	37.393
33	60 - 59.75	46.437	3291.7	37.423
34	59.75 - 54.75	49.47	3480.6	38.157
35	54.75 - 49.75	51.824	3673.1	38.841
36	49.75 - 44.75	54.185	3868.9	39.491
37	44.75 - 40	57.371	4057.8	40.093
38	40 - 39.75	57.588	4067.9	40.115
39	39.75 - 34.75	61.2	4269.9	40.7
40	34.75 - 29.75	64.0	4475.0	41.3
41	29.75 - 24.75	66.7	4682.8	41.8
42	24.75 - 20	70.3	4882.7	42.4
43	20 - 19.75	70.5	4893.2	42.4
44	19.75 - 14.75	74.2	5106.4	42.9
45	14.75 - 9.75	76.9	5322.0	43.4
46	9.75 - 4.75	79.6	5539.9	43.8
47	4.75 - 0	82.0	5748.7	44.1

Analysis Results

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
195 - 190	Pole	TP24x24x0.375	Pole	4.3%	Pass
190 - 185	Pole	TP24x24x0.375	Pole	8.6%	Pass
185 - 180	Pole	TP24x24x0.375	Pole	18.5%	Pass
180 - 175	Pole	TP30x30x0.375	Pole	18.8%	Pass
175 - 170	Pole	TP30x30x0.375	Pole	26.1%	Pass
170 - 165	Pole	TP30x30x0.375	Pole	33.6%	Pass
165 - 160	Pole	TP30x30x0.375	Pole	42.8%	Pass
160 - 155	Pole	TP36x36x0.375	Pole	37.0%	Pass
155 - 150	Pole	TP36x36x0.375	Pole	45.7%	Pass
150 - 145	Pole	TP36x36x0.375	Pole	54.4%	Pass
145 - 140	Pole	TP36x36x0.375	Pole	63.3%	Pass
140 - 136.25	Pole	TP42x42x0.375	Pole	52.4%	Pass
136.25 - 136	Pole + Reinf.	TP42x42x0.61	Reinf. 7 Tension Rupture	37.5%	Pass
136 - 131	Pole + Reinf.	TP42x42x0.61	Reinf. 7 Tension Rupture	42.5%	Pass
131 - 126	Pole + Reinf.	TP42x42x0.61	Reinf. 7 Tension Rupture	47.6%	Pass
126 - 121	Pole + Reinf.	TP42x42x0.61	Reinf. 7 Tension Rupture	52.9%	Pass
121 - 120	Pole + Reinf.	TP42x42x0.61	Reinf. 7 Tension Rupture	54.0%	Pass
120 - 119.75	Pole + Reinf.	TP48x48x0.575	Reinf. 6 Tension Rupture	43.6%	Pass
119.75 - 114.75	Pole + Reinf.	TP48x48x0.575	Reinf. 6 Tension Rupture	48.1%	Pass
114.75 - 109.75	Pole + Reinf.	TP48x48x0.575	Reinf. 6 Tension Rupture	52.7%	Pass
109.75 - 104.75	Pole + Reinf.	TP48x48x0.575	Reinf. 6 Tension Rupture	57.4%	Pass
104.75 - 100	Pole + Reinf.	TP48x48x0.575	Reinf. 6 Tension Rupture	62.0%	Pass
100 - 99.75	Pole + Reinf.	TP54x54x0.55	Reinf. 5 Tension Rupture	51.1%	Pass
99.75 - 94.75	Pole + Reinf.	TP54x54x0.55	Reinf. 5 Tension Rupture	55.2%	Pass
94.75 - 89.75	Pole + Reinf.	TP54x54x0.55	Reinf. 5 Tension Rupture	59.4%	Pass
89.75 - 84.75	Pole + Reinf.	TP54x54x0.55	Reinf. 5 Tension Rupture	63.8%	Pass
84.75 - 80	Pole + Reinf.	TP54x54x0.55	Reinf. 5 Tension Rupture	68.0%	Pass
80 - 79.75	Pole + Reinf.	TP60x60x0.53	Reinf. 4 Tension Rupture	57.1%	Pass
79.75 - 74.75	Pole + Reinf.	TP60x60x0.53	Reinf. 4 Tension Rupture	60.9%	Pass
74.75 - 69.75	Pole + Reinf.	TP60x60x0.53	Reinf. 4 Tension Rupture	64.8%	Pass
69.75 - 64.75	Pole + Reinf.	TP60x60x0.53	Reinf. 4 Tension Rupture	68.8%	Pass
64.75 - 60	Pole + Reinf.	TP60x60x0.53	Reinf. 4 Tension Rupture	72.7%	Pass
60 - 59.75	Pole + Reinf.	TP60x60x0.655	Reinf. 3 Tension Rupture	59.2%	Pass
59.75 - 54.75	Pole + Reinf.	TP60x60x0.655	Reinf. 3 Tension Rupture	62.6%	Pass
54.75 - 49.75	Pole + Reinf.	TP60x60x0.655	Reinf. 3 Tension Rupture	66.1%	Pass
49.75 - 44.75	Pole + Reinf.	TP60x60x0.655	Reinf. 3 Tension Rupture	69.6%	Pass
44.75 - 40	Pole + Reinf.	TP60x60x0.655	Reinf. 3 Tension Rupture	73.0%	Pass
40 - 39.75	Pole + Reinf.	TP60x60x0.78	Reinf. 2 Tension Rupture	61.7%	Pass
39.75 - 34.75	Pole + Reinf.	TP60x60x0.78	Reinf. 2 Tension Rupture	64.8%	Pass
34.75 - 29.75	Pole + Reinf.	TP60x60x0.78	Reinf. 2 Tension Rupture	67.9%	Pass
29.75 - 24.75	Pole + Reinf.	TP60x60x0.78	Reinf. 2 Tension Rupture	71.0%	Pass
24.75 - 20	Pole + Reinf.	TP60x60x0.78	Reinf. 2 Tension Rupture	74.1%	Pass
20 - 19.75	Pole + Reinf.	TP60x60x0.78	Reinf. 1 Tension Rupture	74.3%	Pass
19.75 - 14.75	Pole + Reinf.	TP60x60x0.78	Reinf. 1 Tension Rupture	77.5%	Pass
14.75 - 9.75	Pole + Reinf.	TP60x60x0.78	Reinf. 1 Tension Rupture	80.8%	Pass
9.75 - 4.75	Pole + Reinf.	TP60x60x0.78	Reinf. 1 Tension Rupture	84.1%	Pass
4.75 - 0	Pole + Reinf.	TP60x60x0.78	Reinf. 1 Tension Rupture	87.2%	Pass
				Summary	
			Pole	86.9%	Pass
			Reinforcement	87.2%	Pass
			Overall	87.2%	Pass

Additional Calculations

Section Elevation (ft)	Moment of Inertia (in^4)			Area (in^2)			% Capacity							
	Pole	Reinf.	Total	Pole	Reinf.	Total	Pole	R1	R2	R3	R4	R5	R6	R7
195 - 190	1942	n/a	1942	27.83	n/a	27.83	4.3%							
190 - 185	1942	n/a	1942	27.83	n/a	27.83	8.6%							
185 - 180	1942	n/a	1942	27.83	n/a	27.83	18.5%							
180 - 175	3829	n/a	3829	34.90	n/a	34.90	18.8%							
175 - 170	3829	n/a	3829	34.90	n/a	34.90	26.1%							
170 - 165	3829	n/a	3829	34.90	n/a	34.90	33.6%							
165 - 160	3829	n/a	3829	34.90	n/a	34.90	42.8%							
160 - 155	6659	n/a	6659	41.97	n/a	41.97	37.0%							
155 - 150	6659	n/a	6659	41.97	n/a	41.97	45.7%							
150 - 145	6659	n/a	6659	41.97	n/a	41.97	54.4%							
145 - 140	6659	n/a	6659	41.97	n/a	41.97	63.3%							
140 - 136.25	10622	n/a	10622	49.04	n/a	49.04	52.4%							
136.25 - 136	10622	6429	17051	49.04	27.00	76.04	36.9%							37.5%
136 - 131	10622	6429	17051	49.04	27.00	76.04	41.9%							42.5%
131 - 126	10622	6429	17051	49.04	27.00	76.04	46.9%							47.6%
126 - 121	10622	6429	17051	49.04	27.00	76.04	52.2%							52.9%
121 - 120	10622	6429	17051	49.04	27.00	76.04	53.2%							54.0%
120 - 119.75	15908	8313	24221	56.11	27.00	83.11	43.2%						43.6%	
119.75 - 114.75	15908	8313	24221	56.11	27.00	83.11	47.6%						48.1%	
114.75 - 109.75	15908	8313	24221	56.11	27.00	83.11	52.1%						52.7%	
109.75 - 104.75	15908	8313	24221	56.11	27.00	83.11	56.8%						57.4%	
104.75 - 100	15908	8313	24221	56.11	27.00	83.11	61.4%						62.0%	
100 - 99.75	22710	10439	33149	63.18	27.00	90.18	50.8%					51.1%		
99.75 - 94.75	22710	10439	33149	63.18	27.00	90.18	54.9%					55.2%		
94.75 - 89.75	22710	10439	33149	63.18	27.00	90.18	59.1%					59.4%		
89.75 - 84.75	22710	10439	33149	63.18	27.00	90.18	63.4%					63.8%		
84.75 - 80	22710	10439	33149	63.18	27.00	90.18	67.6%					68.0%		
80 - 79.75	31217	12808	44025	70.24	27.00	97.24	56.9%				57.1%			
79.75 - 74.75	31217	12808	44025	70.24	27.00	97.24	60.7%				60.9%			
74.75 - 69.75	31217	12808	44025	70.24	27.00	97.24	64.6%				64.8%			
69.75 - 64.75	31217	12808	44025	70.24	27.00	97.24	68.6%				68.8%			
64.75 - 60	31217	12808	44025	70.24	27.00	97.24	72.4%				72.7%			
60 - 59.75	41363	12808	54171	93.46	27.00	120.46	59.0%			59.2%				
59.75 - 54.75	41363	12808	54171	93.46	27.00	120.46	62.4%			62.6%				
54.75 - 49.75	41363	12808	54171	93.46	27.00	120.46	65.8%			66.1%				
49.75 - 44.75	41363	12808	54171	93.46	27.00	120.46	69.3%			69.6%				
44.75 - 40	41363	12808	54171	93.46	27.00	120.46	72.7%			73.0%				
40 - 39.75	51381	12808	64189	116.58	27.00	143.58	61.5%		61.7%					
39.75 - 34.75	51381	12808	64189	116.58	27.00	143.58	64.5%		64.8%					
34.75 - 29.75	51381	12808	64189	116.58	27.00	143.58	67.6%		67.9%					
29.75 - 24.75	51381	12808	64189	116.58	27.00	143.58	70.8%		71.0%					
24.75 - 20	51381	12808	64189	116.58	27.00	143.58	73.8%		74.1%					
20 - 19.75	51381	12808	64189	116.58	27.00	143.58	74.0%	74.3%						
19.75 - 14.75	51381	12808	64189	116.58	27.00	143.58	77.2%	77.5%						
14.75 - 9.75	51381	12808	64189	116.58	27.00	143.58	80.5%	80.8%						
9.75 - 4.75	51381	12808	64189	116.58	27.00	143.58	83.7%	84.1%						
4.75 - 0	51381	12808	64189	116.58	27.00	143.58	86.9%	87.2%						

Note: Section capacity checked in 5 degree increments.

APPENDIX D

Flange Plate & Flange Bolt Analysis

Existing Flange Connection @ 20'
CT2086 SOUTHBURY KETTLETOWN ROAD
2016702.36 (FLANGE PLATES ANALYSIS ONLY)

*O.T. Moment =	1925	k*ft
Axial =	70.30	kips
Shear =	42.35	kips

*Above reactions have been adjusted due to consideration of modifications. See attached hand calculations for determination of flange bolt forces used in the analysis.

Acceptable Stress Ratio =	100.0%

Flange Bolts

# Bolts =	32	
Bolt Type =	A325	
F_t =	44	ksi
ASIF =	1.333	
Bolt Circle =	50	in
Bolt Diameter =	1.75	in

Tension & Shear (ASD, Section J3.5)

F_v =	21	ksi
Nominal Area =	2.41	in^2
f_v =	0.55	ksi
Applied Shear =	1.32	kips
Allowable Shear =	67.35	kips
Ft^2 - 4.39(fv^2))^1/2 =	43.98	ksi
Allowable Bolt Stress =	58.64652	ksi
B =	141.06	kips

Prying Action Check
N/A for stiffened flange

Max Comp. on Bolt =	59.91	kips
Max Tension on Bolt =	55.52	kips
Shear Capacity =	2.0%	
Tensile Capacity =	39.4%	
Bolt Capacity =	**39.4%**	**OK**

Pole Information

Shaft Diam. (Upper) =	60	in
Thickness (Upper)=	0.625	in
# of Sides (Upper) =	Round	
F_y (Upper) =	42	ksi
Shaft Diam. (Lower) =	60	in
Thickness (Lower)=	0.625	in
# of Sides (Lower) =	Round	
F_y (Lower) =	42	ksi

Upper Flange Plate

Location =	Internal	
Plate Strength (F_y) =	36	ksi
Plate Thickness =	1.25	in
Hole Diameter =	43	in
b =	4.28	in
Le =	7.00	in
f_b =	24.40	ksi
F_b =	36	ksi
UP Capacity =	**67.8%**	**OK**

Lower Flange Plate

Location =	Internal	
Plate Strength (F_y) =	36	ksi
Plate Thickness =	1.25	in
Hole Diameter =	43	in
b =	4.28	in
Le =	7.00	in
f_b =	24.40	ksi
F_b =	36	ksi
LP Capacity =	**67.8%**	**OK**

UpperStiffeners

Configuration =	Every Bolt	
Thickness =	0.625	in
Width =	7	in
Notch =	0.5	in
Height =	10	in
Stiffener Strength (F_y) =	36	ksi
Weld Info. Known? =	No	
Stiffener Vertical Force =	26.66	kips
Vert. Weld Capacity =	*Not Verified*	kips
Horiz. Weld Capacity =	*Not Verified*	kips
Stiffener Capacity =	54.7%	kips
Controlling Capacity =	**54.7%**	**OK**

Lower Stiffeners

Configuration =	Every Bolt	
Thickness =	0.625	in
Width =	7	in
Notch =	0.5	in
Height =	10	in
Stiffener Strength (F_y) =	36	ksi
Weld Info. Known? =	No	
Stiffener Vertical Force =	26.66	kips
Vert. Weld Capacity =	*Not Verified*	kips
Horiz. Weld Capacity =	*Not Verified*	kips
Stiffener Capacity =	54.7%	kips
Controlling Capacity =	**54.7%**	**OK**

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Project #: 2016702.36
Sheet No 1 Of 1

Calculated By: TW Date: 2/9/2016
Checked By: Date:

BOLT AND BRIDGE STIFFENER CALCULATIONS **@ 20'**

Moment from TNX (M) =	4882.66 kip-ft	ASIF =	1.33				
Axial from TNX (P) =	70.30 kip						
Inner Bolt Diameter =	1.25 in						
Inner Bolt Area (A_{inner}) =	1.23 in^2	Inner Bolt Circle (BC_{inner}) =	47 in				
Inner Bolt MOI ($I_{o.inner}$) =	0.12 in^4	Total Area ($A_{tot.in}$) =	39.27 in^2				
Number Inner Bolts (N_{inner}) =	32	Percent Total Area (η_{in}) =	24.2%	Axial, Inner Bolts ($P*\eta_{in}$) =	16.99 kips		
Outer Bolt Diameter =	1.25 in						
Outer Bolt Area (A_{outer}) =	1.23 in^2	Outer Bolt Circle (BC_{outer}) =	53 in				
Outer Bolt MOI ($I_{o.outer}$) =	0.12 in^4	Total Area ($A_{tot.out}$) =	39.27 in^2				
Number Outer Bolts (N_{outer}) =	32	Percent Total Area (η_{out}) =	24.2%	Axial, Outer Bolts ($P*\eta_{out}$) =	16.99 kips		
Bridge Stiffener Width =	6.00 in						
Bridge Stiffener Thickness =	1.50 in	Connection Bolt Hole Size =	1.21875 in				
Bridge Stiffener Unbraced Length =	30.00 in	Net Bridge Stiffener Area ($A_{e.pl}$) =	7.17188 in				
Bridge Stiffener Area (A_{pl}) =	9.00 in^2	Bridge Stiffener Circle (BC_{pl}) =	60.75 in				
Bridge Stiffener MOI (I_o) =	27.00 in^4	Total Area ($A_{tot.pl}$) =	54.00 in^2				
Number Bridge Stiffeners (N_{pl})	6	Percent Total Area (η_{pl}) =	33.2%	Axial, Bridge Stiffener ($P*\eta_{pl}$) =	23.36 kips		
Bridge Stiffener Width =	4.00 in						
Bridge Stiffener Thickness =	1.25 in	Connection Bolt Hole Size =	1.21875 in				
Bridge Stiffener Unbraced Length =	12.00 in	Net Bridge Stiffener Area ($A_{e.pl}$) =	3.47656 in				
Bridge Stiffener Area (A_{pl}) =	5.00 in^2	Bridge Stiffener Circle (BC_{pl}) =	60.625 in				
Bridge Stiffener MOI (I_o) =	6.67 in^4	Total Area ($A_{tot.pl}$) =	30.00 in^2				
Number Bridge Stiffeners (N_{pl})	6	Percent Total Area (η_{pl}) =	18.5%	Axial, Bridge Stiffener ($P*\eta_{pl}$) =	12.98 kips		

I_{inner} =	10847.24 $in.^4$	$(N_{inner}*A_{inner}*BC_{inner}^2/8 + N_{inner}*I_{o.inner})$	
I_{outer} =	13792.48 $in.^4$	$(N_{outer}*A_{outer}*BC_{outer}^2/8 + N_{outer}*I_{o.outer})$	
I_{pl} =	25073.30 $in.^4$	$(N_{pl}*A_{pl}*BC_{pl}^2/8 + N_{pl}*I_{o.pl})$	
I_{pl} =	13822.71 $in.^4$	$(N_{pl}*A_{pl}*BC_{pl}^2/8 + N_{pl}*I_{o.pl})$	
I_{tot} =	63535.73 $in.^4$	$(I_{inner} + I_{outer} + I_{pl})$	
$P_{u.t.inner}$ =	26.1 kips	$(M*(BC_{inner}/2)*A_{inner})/I_{total} - P*\eta_{in}/N_{inner})$	
$P_{u.t.outer}$ =	29.5 kips	$(M*(BC_{outer}/2)*A_{outer})/I_{total} - P*\eta_{out}/N_{outer})$	
$P_{u.t.pl}$ =	248.2 kips	$(M*(BC_{pl}/2)*A_{pl})/I_{total} - P*\eta_{pl}/N_{pl})$	
$P_{u.c.pl}$ =	256.0 kips	$(M*(BC_{pl}/2)*A_{pl})/I_{total} + P*\eta_{pl}/N_{pl})$	
$P_{u.t.pl}$ =	137.6 kips	$(M*(BC_{pl}/2)*A_{pl})/I_{total} - P*\eta_{pl}/N_{pl})$	
$P_{u.c.pl}$ =	141.9 kips	$(M*(BC_{pl}/2)*A_{pl})/I_{total} + P*\eta_{pl}/N_{pl})$	
$P_{nt.bolt}$ / (Ω x ASIF)=	72.15 kips		
Bolt Rating =	40.8% OK		

Bridge Stiffener Check

f_y =	50	ksi
f_u =	65	ksi
E =	29000	ksi
K =	0.85	
KL/r =	58.890	
F_e =	82.53	ksi
F_{cr} =	38.80	ksi
P_{nc} / Ω =	209.11	kips
P_{nt} / Ω =	233.09	kips
Bridge Stiffener Rating =	91.8%	OK

Existing Flange Connection @ 40'
CT2086 SOUTHBURY KETTLETOWN ROAD
2016702.36 (FLANGE PLATES ANALYSIS ONLY)

*O.T. Moment =	1956	k*ft
Axial =	57.59	kips
Shear =	40.09	kips

*Above reactions have been adjusted due to consideration of modifications. See attached hand calculations for determination of flange bolt forces used in the analysis.

Acceptable Stress Ratio =	100.0%

Flange Bolts

# Bolts =	32	
Bolt Type =	A325	
F_t =	44	ksi
ASIF =	1.333	
Bolt Circle =	50	in
Bolt Diameter =	1.75	in

Tension & Shear (ASD, Section J3.5)

F_v =	21	ksi
Nominal Area =	2.41	in^2
f_v =	0.52	ksi
Applied Shear =	1.25	kips
Allowable Shear =	67.35	kips
Ft^2 - 4.39(fv^2))^1/2 =	43.99	ksi
Allowable Bolt Stress =	58.64862	ksi
B =	141.07	kips

Prying Action Check

N/A for stiffened flange

Max Comp. on Bolt =	60.44	kips
Max Tension on Bolt =	56.84	kips
Shear Capacity =	1.9%	
Tensile Capacity =	40.3%	
Bolt Capacity =	**40.3%**	**OK**

Pole Information

Shaft Diam. (Upper) =	60	in
Thickness (Upper)=	0.5	in
# of Sides (Upper) =	Round	
F_y (Upper) =	42	ksi
Shaft Diam. (Lower) =	60	in
Thickness (Lower)=	0.625	in
# of Sides (Lower) =	Round	
F_y (Lower) =	42	ksi

Upper Flange Plate

Location =	Internal	
Plate Strength (F_y) =	36	ksi
Plate Thickness =	1.25	in
Hole Diameter =	43	in
b =	4.28	in
Le =	7.00	in
f_b =	24.62	ksi
F_b =	36	ksi
UP Capacity =	**68.4%**	**OK**

Lower Flange Plate

Location =	Internal	
Plate Strength (F_y) =	36	ksi
Plate Thickness =	1.25	in
Hole Diameter =	43	in
b =	4.28	in
Le =	7.00	in
f_b =	24.62	ksi
F_b =	36	ksi
LP Capacity =	**68.4%**	**OK**

UpperStiffeners

Configuration =	Every Bolt	
Thickness =	0.625	in
Width =	7	in
Notch =	0.5	in
Height =	10	in
Stiffener Strength (F_y) =	36	ksi
Weld Info. Known? =	No	
Stiffener Vertical Force =	30.04	kips
Vert. Weld Capacity =	*Not Verified*	kips
Horiz. Weld Capacity =	*Not Verified*	kips
Stiffener Capacity =	61.7%	kips
Controlling Capacity =	**61.7%**	**OK**

Lower Stiffeners

Configuration =	Every Bolt	
Thickness =	0.625	in
Width =	7	in
Notch =	0.5	in
Height =	10	in
Stiffener Strength (F_y) =	36	ksi
Weld Info. Known? =	No	
Stiffener Vertical Force =	26.87	kips
Vert. Weld Capacity =	*Not Verified*	kips
Horiz. Weld Capacity =	*Not Verified*	kips
Stiffener Capacity =	55.2%	kips
Controlling Capacity =	**55.2%**	**OK**

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Project #: 2016702.36
Sheet No 1 Of 1

Calculated By: TW Date: 2/9/2016
Checked By: Date:

BOLT AND BRIDGE STIFFENER CALCULATIONS @ 40'

Moment from TNX (M) =	4057.83 kip-ft	ASIF =	1.33				
Axial from TNX (P) =	57.59 kip						
Inner Bolt Diameter =	1.25 in						
Inner Bolt Area (A_{inner}) =	1.23 in^2	Inner Bolt Circle (BC_{inner}) =	47 in				
Inner Bolt MOI ($I_{o.inner}$) =	0.12 in^4	Total Area ($A_{tot.in}$) =	39.27 in^2				
Number Inner Bolts (N_{inner}) =	32	Percent Total Area (η_{in}) =	29.6%	Axial, Inner Bolts ($P*\eta_{in}$) =	17.06 kips		
Outer Bolt Diameter =	1.25 in						
Outer Bolt Area (A_{outer}) =	1.23 in^2	Outer Bolt Circle (BC_{outer}) =	53 in				
Outer Bolt MOI ($I_{o.outer}$) =	0.12 in^4	Total Area ($A_{tot.out}$) =	39.27 in^2				
Number Outer Bolts (N_{outer}) =	32	Percent Total Area (η_{out}) =	29.6%	Axial, Outer Bolts ($P*\eta_{out}$) =	17.06 kips		
Bridge Stiffener Width =	6.00 in						
Bridge Stiffener Thickness =	1.50 in	Connection Bolt Hole Size =	1.18 in				
Bridge Stiffener Unbraced Length =	30.00 in	Net Bridge Stiffener Area ($A_{e.pl}$)	7.23 in				
Bridge Stiffener Area (A_{pl}) =	9.00 in^2	Bridge Stiffener Circle (BC_{pl}) =	63 in				
Bridge Stiffener MOI (I_o) =	27.00 in^4	Total Area ($A_{tot.pl}$) =	54.00 in^2				
Number Bridge Stiffeners (N_{pl})	6	Percent Total Area (η_{pl}) =	40.7%	Axial, Bridge Stiffener ($P*\eta_{pl}$) =	23.46 kips		

I_{inner} =	10847.24 $in.^4$	$(N_{inner}*A_{inner}*BC_{inner}^2/8 + N_{inner}*I_{o.inner})$	
I_{outer} =	13792.48 $in.^4$	$(N_{outer}*A_{outer}*BC_{outer}^2/8 + N_{outer}*I_{o.outer})$	
I_{pl} =	26952.75 $in.^4$	$(N_{pl}*A_{pl}*BC_{pl}^2/8 + N_{pl}*I_{o.pl})$	
I_{tot} =	51592.47 $in.^4$	$(I_{inner} + I_{outer} + I_{pl})$	
$P_{u.t.inner}$ =	26.7 kips	$(M*(BC_{inner}/2)*A_{inner})/I_{total} - P*\eta_{in}/N_{inner})$	
$P_{u.t.outer}$ =	30.2 kips	$(M*(BC_{outer}/2)*A_{outer})/I_{total} - P*\eta_{out}/N_{outer})$	
$P_{u.t.pl}$ =	263.7 kips	$(M*(BC_{pl}/2)*A_{pl})/I_{total} - P*\eta_{pl}/N_{pl})$	
$P_{u.c.pl}$ =	271.5 kips	$(M*(BC_{pl}/2)*A_{pl})/I_{total} + P*\eta_{pl}/N_{pl})$	
$P_{nt.bolt} / (\Omega \times ASIF)$ =	72.15 kips		
Bolt Rating =	41.8% OK		

Bridge Stiffener Check

f_y =	50	ksi
f_u =	65	ksi
E =	29000	ksi
K =	0.85	
KL/r =	58.890	
F_e =	82.53	ksi
F_{cr} =	38.80	ksi
P_{nc} / Ω =	209.11	kips
P_{nt} / Ω =	234.98	kips
Bridge Stiffener Rating =	97.4%	OK

Existing Flange Connection @ 60'
CT2086 SOUTHBURY KETTLETOWN ROAD
2016702.36 (FLANGE PLATES ANALYSIS ONLY)

*O.T. Moment =	1582	k*ft
Axial =	46.27	kips
Shear =	37.39	kips

*Above reactions have been adjusted due to consideration of modifications. See attached hand calculations for determination of flange bolt forces used in the analysis.

Acceptable Stress Ratio	
=	100.0%

Flange Bolts

# Bolts =	32	
Bolt Type =	A325	
F_t =	44	ksi
ASIF =	1.333	
Bolt Circle =	50	in
Bolt Diameter =	1.75	in

Tension & Shear (ASD, Section J3.5)

F_v =	21	ksi
Nominal Area =	2.41	in^2
f_v =	0.49	ksi
Applied Shear =	1.17	kips
Allowable Shear =	67.35	kips
Ft^2 - 4.39(fv^2))^1/2 =	43.99	ksi
Allowable Bolt Stress =	58.65097	ksi
B =	141.07	kips

Prying Action Check

N/A for stiffened flange

Max Comp. on Bolt =	48.88	kips
Max Tension on Bolt =	45.99	kips
Shear Capacity =	1.7%	
Tensile Capacity =	32.6%	
Bolt Capacity =	**32.6%**	**OK**

Pole Information

Shaft Diam. (Upper) =	60	in
Thickness (Upper)=	0.375	in
# of Sides (Upper) =	Round	
F_y (Upper) =	42	ksi
Shaft Diam. (Lower) =	60	in
Thickness (Lower)=	0.5	in
# of Sides (Lower) =	Round	
F_y (Lower) =	42	ksi

Upper Flange Plate

Location =	Internal	
Plate Strength (F_y) =	36	ksi
Plate Thickness =	1.25	in
Hole Diameter =	43	in
b =	4.28	in
Le =	7.00	in
f_b =	19.91	ksi
F_b =	36	ksi
UP Capacity =	**55.3%**	**OK**

Lower Flange Plate

Location =	Internal	
Plate Strength (F_y) =	36	ksi
Plate Thickness =	1.25	in
Hole Diameter =	43	in
b =	4.28	in
Le =	7.00	in
f_b =	19.91	ksi
F_b =	36	ksi
LP Capacity =	**55.3%**	**OK**

UpperStiffeners

Configuration =	Every Bolt	
Thickness =	0.625	in
Width =	7	in
Notch =	0.5	in
Height =	10	in
Stiffener Strength (F_y) =	36	ksi
Weld Info. Known? =	No	
Stiffener Vertical Force =	27.56	kips
Vert. Weld Capacity =	*Not Verified*	kips
Horiz. Weld Capacity =	*Not Verified*	kips
Stiffener Capacity =	56.6%	kips
Controlling Capacity =	**56.6%**	**OK**

Lower Stiffeners

Configuration =	Every Bolt	
Thickness =	0.625	in
Width =	7	in
Notch =	0.5	in
Height =	10	in
Stiffener Strength (F_y) =	36	ksi
Weld Info. Known? =	No	
Stiffener Vertical Force =	24.29	kips
Vert. Weld Capacity =	*Not Verified*	kips
Horiz. Weld Capacity =	*Not Verified*	kips
Stiffener Capacity =	49.9%	kips
Controlling Capacity =	**49.9%**	**OK**

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Sheet No 1 Of 1

Calculated By: TW Date: 2/9/2016
Checked By: Date:

BOLT AND BRIDGE STIFFENER CALCULATIONS @ 60'

Moment from TNX (M) =	3282.32 kip-ft	ASIF =	1.33				
Axial from TNX (P) =	46.27 kip						
Inner Bolt Diameter =	1.25 in						
Inner Bolt Area (A_{inner}) =	1.23 in^2	Inner Bolt Circle (BC_{inner}) =	47 in				
Inner Bolt MOI ($I_{o.inner}$) =	0.12 in^4	Total Area ($A_{tot.in}$) =	39.27 in^2				
Number Inner Bolts (N_{inner}) =	32	Percent Total Area (η_{in}) =	29.6%	Axial, Inner Bolts ($P*\eta_{in}$) =	13.71 kips		
Outer Bolt Diameter =	1.25 in						
Outer Bolt Area (A_{outer}) =	1.23 in^2	Outer Bolt Circle (BC_{outer}) =	53 in				
Outer Bolt MOI ($I_{o.outer}$) =	0.12 in^4	Total Area ($A_{tot.out}$) =	39.27 in^2				
Number Outer Bolts (N_{outer}) =	32	Percent Total Area (η_{out}) =	29.6%	Axial, Outer Bolts ($P*\eta_{out}$) =	13.71 kips		
Bridge Stiffener Width =	6.00 in						
Bridge Stiffener Thickness =	1.50 in	Connection Bolt Hole Size =	1.21875 in				
Bridge Stiffener Unbraced Length =	30.00 in	Net Bridge Stiffener Area ($A_{e.pl}$)	7.17188 in				
Bridge Stiffener Area (A_{pl}) =	9.00 in^2	Bridge Stiffener Circle (BC_{pl}) =	63 in				
Bridge Stiffener MOI (I_o) =	27.00 in^4	Total Area ($A_{tot.pl}$) =	54.00 in^2				
Number Bridge Stiffeners (N_{pl})	6	Percent Total Area (η_{pl}) =	40.7%	Axial, Bridge Stiffener ($P*\eta_{pl}$) =	18.85 kips		

I_{inner} =	10847.24 $in.^4$	$(N_{inner}*A_{inner}*BC_{inner}^2/8 + N_{inner}*I_{o.inner})$	
I_{outer} =	13792.48 $in.^4$	$(N_{outer}*A_{outer}*BC_{outer}^2/8 + N_{outer}*I_{o.outer})$	
I_{pl} =	26952.75 $in.^4$	$(N_{pl}*A_{pl}*BC_{pl}^2/8 + N_{pl}*I_{o.pl})$	
I_{tot} =	51592.47 $in.^4$	$(I_{inner} + I_{outer} + I_{pl})$	
$P_{u.t.inner}$ =	21.6 kips	$(M*(BC_{inner}/2)*A_{inner})/I_{total} - P*\eta_{in}/N_{inner})$	
$P_{u.t.outer}$ =	24.4 kips	$(M*(BC_{outer}/2)*A_{outer})/I_{total} - P*\eta_{out}/N_{outer})$	
$P_{u.t.pl}$ =	213.3 kips	$(M*(BC_{pl}/2)*A_{pl})/I_{total} - P*\eta_{pl}/N_{pl})$	
$P_{u.c.pl}$ =	219.6 kips	$(M*(BC_{pl}/2)*A_{pl})/I_{total} + P*\eta_{pl}/N_{pl})$	
$P_{nt.bolt} / (\Omega \times ASIF)$ =	141.08 kips		
Bolt Rating =	17.3% OK		

Bridge Stiffener Check

f_y =	50	ksi
f_u =	65	ksi
E =	29000	ksi
K =	0.85	
KL/r =	58.890	
F_e =	82.53	ksi
F_{cr} =	38.80	ksi
P_{nc} / Ω =	209.11	kips
P_{nt} / Ω =	233.09	kips
Bridge Stiffener Rating =	78.8%	OK

Existing Flange Connection @ 80'
CT2086 SOUTHBURY KETTLETOWN ROAD
2016702.36

*O.T. Moment =	1383.00	k*ft
Axial =	37.32	kips
Shear =	34.03	kips

*Above reactions have been adjusted due to consideration of modifications. See attached hand calculations for determination of flange bolt forces used in the analysis.

Acceptable Stress Ratio =	100.0%

Flange Bolts

# Bolts =	48	
Bolt Type =	A325	
F_t =	44	ksi
ASIF =	1.333	
Bolt Circle =	57	in
Bolt Diameter =	1	in

Tension & Shear (ASD, Section J3.5)

F_v =	21	ksi
Nominal Area =	0.79	in^2
f_v =	0.90	ksi
Applied Shear =	0.71	kips
Allowable Shear =	21.99	kips
Ft^2 - 4.39(fv^2))^1/2 =	43.96	ksi
Allowable Bolt Stress =	58.61245	ksi
B =	46.03	kips

Prying Action Check

N/A for stiffened flange

Max Comp. on Bolt =	25.04	kips
Max Tension on Bolt =	23.48	kips
Shear Capacity =	3.2%	
Tensile Capacity =	51.0%	
Bolt Capacity =	**51.0%**	**OK**

Pole Information

Shaft Diam. (Upper) =	54	in
Thickness (Upper)=	0.375	in
# of Sides (Upper) =	Round	
F_y (Upper) =	42	ksi
Shaft Diam. (Lower) =	60	in
Thickness (Lower)=	0.375	in
# of Sides (Lower) =	Round	
F_y (Lower) =	42	ksi

Upper Flange Plate

Location =	External	
Plate Strength (F_y) =	36	ksi
Plate Thickness =	1.25	in
Outer Diameter =	60.375	in
b =	3.11	in
Le =	3.00	in
f_b =	20.36	ksi
F_b =	36	ksi
UP Capacity =	**56.5%**	**OK**

Lower Flange Plate

Location =	Internal	
Plate Strength (F_y) =	36	ksi
Plate Thickness =	1.25	in
Hole Diameter =	51.375	in
b =	3.11	in
Le =	2.00	in
f_b =	24.31	ksi
F_b =	36	ksi
LP Capacity =	**67.5%**	**OK**

UpperStiffeners

Configuration =	Every Bolt	
Thickness =	0.625	in
Width =	3	in
Notch =	0.5	in
Height =	5	in
Stiffener Strength (F_y) =	36	ksi
Weld Info. Known? =	Yes	
Vertical Weld Size =	0.3125	in
Horiz. Weld Type =	Fillet	
Fillet Size =	0.3125	in
Weld Strength =	70	ksi
Stiffener Vertical Force =	14.30	kips
Vert. Weld Capacity =	35.4%	kips
Horiz. Weld Capacity =	52.1%	kips
Stiffener Capacity =	56.0%	kips
Controlling Capacity =	**56.0%**	**OK**

Lower Stiffeners

Configuration =	Every Bolt	
Thickness =	0.625	in
Width =	2	in
Notch =	0.5	in
Height =	3.5	in
Stiffener Strength (F_y) =	36	ksi
Weld Info. Known? =	Yes	
Vertical Weld Size =	0.3125	in
Horiz. Weld Type =	Fillet	
Fillet Size =	0.3125	in
Weld Strength =	70	ksi
Stiffener Vertical Force =	9.25	kips
Vert. Weld Capacity =	33.9%	kips
Horiz. Weld Capacity =	56.3%	kips
Stiffener Capacity =	51.3%	kips
Controlling Capacity =	**56.3%**	**OK**

- Welds Control

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Project #: 2016702.36
Sheet No 1 Of 1

Calculated By: TW Date: 2/9/2016
Checked By: Date:

BOLT AND BRIDGE STIFFENER CALCULATIONS @ 80'

Moment from TNX (M) =	2565.04	kip-ft	ASIF =	1.33			
Axial from TNX (P) =	37.32	kip					
Inner Bolt Diameter =	1	in					
Inner Bolt Area (A_{inner}) =	0.79	in^2	Inner Bolt Circle (BC_{inner}) =	57	in		
Inner Bolt MOI ($I_{o.inner}$) =	0.05	in^4	Total Area ($A_{tot.in}$) =	37.70	in^2		
Number Inner Bolts (N_{inner}) =	48		Percent Total Area (η_{in}) =	58.3%		Axial, Inner Bolts ($P*\eta_{in}$) =	21.75 kips
Bridge Stiffener Width =	6.00	in					
Bridge Stiffener Thickness =	1.50	in	Connection Bolt Hole Size =	0	in		
Bridge Stiffener Unbraced Length =	12.00	in	Net Bridge Stiffener Area ($A_{e.pl}$)	9	in		
Bridge Stiffener Area (A_{pl}) =	9.00	in^2	Bridge Stiffener Circle (BC_{pl}) =	63	in		
Bridge Stiffener MOI (I_o) =	27.00	in^4	Total Area ($A_{tot.pl}$) =	27.00	in^2		
Number Bridge Stiffeners (N_{pl})	3		Percent Total Area (η_{pl}) =	41.7%		Axial, Bridge Stiffener ($P*\eta_{pl}$) =	15.57 kips

I_{inner} =	15312.91	$in.^4$	$(N_{inner}*A_{inner}*BC_{inner}^2/8 + N_{inner}*I_{o.inner})$
I_{pl} =	13476.38	$in.^4$	$(N_{pl}*A_{pl}*BC_{pl}^2/8 + N_{pl}*I_{o.pl})$
I_{tot} =	28789.28	$in.^4$	$(I_{inner} + I_{outer} + I_{pl})$
$P_{u.t.inner}$ =	23.5	kips	$(M*(BC_{inner}/2)*A_{inner})/I_{total} - P*\eta_{in}/N_{inner})$
$P_{u.t.pl}$ =	297.9	kips	$(M*(BC_{pl}/2)*A_{pl})/I_{total} - P*\eta_{pl}/N_{pl})$
$P_{u.c.pl}$ =	308.3	kips	$(M*(BC_{pl}/2)*A_{pl})/I_{total} + P*\eta_{pl}/N_{pl})$
$P_{nt.bolt} / (\Omega \times ASIF)$ =	46.04	kips	
Bolt Rating =	51.0%	OK	

Bridge Stiffener Check

f_y =	50	ksi
f_u =	65	ksi
E =	29000	ksi
K =	0.85	
KL/r =	23.556	
F_e =	515.82	ksi
F_{cr} =	48.01	ksi
P_{nc} / Ω =	258.75	kips
P_{nt} / Ω =	269.46	kips
Bridge Stiffener Rating =	89.4%	OK

Existing Flange Connection @ 100'
CT2086 SOUTHBURY KETTLETOWN ROAD
2016702.36

*O.T. Moment =	920.00	k*ft
Axial =	29.61	kips
Shear =	30.42	kips

*Above reactions have been adjusted due to consideration of modifications. See attached hand calculations for determination of flange bolt forces used in the analysis.

Acceptable Stress Ratio	
=	100.0%

Flange Bolts		
# Bolts =	36	
Bolt Type =	A325	
F_t =	44	ksi
ASIF =	1.333	
Bolt Circle =	51	in
Bolt Diameter =	1	in
Tension & Shear (ASD, Section J3.5)		
F_v =	21	ksi
Nominal Area =	0.79	in^2
f_v =	1.08	ksi
Applied Shear =	0.84	kips
Allowable Shear =	21.99	kips
Ft^2 - 4.39(fv^2))^1/2 =	43.94	ksi
Allowable Bolt Stress =	58.58964	ksi
B =	46.02	kips
Prying Action Check		
Tall =	43.90	kips
$t_{req'd}$ =	0.73	in
Max Comp. on Bolt =	24.87	kips
Max Tension on Bolt =	23.23	kips
Shear Capacity =	3.8%	
Tensile Capacity =	52.9%	
Bolt Capacity =	**52.9% OK**	

Pole Information		
Shaft Diam. (Upper) =	48	in
Thickness (Upper)=	0.375	in
# of Sides (Upper) =	Round	
F_y (Upper) =	42	ksi
Shaft Diam. (Lower) =	54	in
Thickness (Lower)=	0.375	in
# of Sides (Lower) =	Round	
F_y (Lower) =	42	ksi

Upper Flange Plate		
Location =	External	
Plate Strength (F_y) =	36	ksi
Plate Thickness =	1.25	in
Outer Diameter =	54.375	in
wcalc =	17.23	in
wmax =	25.70	in
w =	17.23	in
S =	4.49	in^3
f_b =	22.26	ksi
F_b =	36	ksi
UP Capacity =	**61.8% OK**	

Lower Flange Plate		
Location =	Internal	
Plate Strength (F_y) =	36	ksi
Plate Thickness =	1.25	in
Hole Diameter =	45.375	in
Pole Inner Diameter =	53.25	in
e =	1.13	in
w =	4.65	in
S =	1.21	in^3
f_b =	23.12	ksi
F_b =	36	ksi
LP Capacity =	**64.2% OK**	

UpperStiffeners		
Configuration =	Every Other	
Thickness =	0.625	in
Width =	3	in
Notch =	0.5	in
Height =	5	in
Stiffener Strength (F_y) =	36	ksi
Weld Info. Known? =	Yes	
Vertical Weld Size =	0.3125	in
Horiz. Weld Type =	Fillet	
Fillet Size =	0.3125	in
Weld Strength =	70	ksi

Stiffeners ineffective - check plate unstiffened

Lower Stiffeners		
Configuration =	Every Other	
Thickness =	0.625	in
Width =	2	in
Notch =	0.5	in
Height =	3.5	in
Stiffener Strength (F_y) =	36	ksi
Weld Info. Known? =	Yes	
Vertical Weld Size =	0.3125	in
Horiz. Weld Type =	Fillet	
Fillet Size =	0.3125	in
Weld Strength =	70	ksi

Stiffeners ineffective - check plate unstiffened

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Project #: 2016702.36
Sheet No 1 Of 1

Calculated By: TW Date: 2/9/2016
Checked By: Date:

BOLT AND BRIDGE STIFFENER CALCULATIONS @ 100'

Moment from TNX (M) =	1917.42	kip-ft	ASIF =	1.33			
Axial from TNX (P) =	29.61	kip					
Inner Bolt Diameter =	1	in					
Inner Bolt Area (A_{inner}) =	0.79	in^2	Inner Bolt Circle (BC_{inner}) =	51	in		
Inner Bolt MOI ($I_{o.inner}$) =	0.05	in^4	Total Area ($A_{tot.in}$) =	25.92	in^2		
Number Inner Bolts (N_{inner}) =	33		Percent Total Area (η_{in}) =	49.0%		Axial, Inner Bolts ($P*\eta_{in}$) =	14.50 kips
Bridge Stiffener Width =	6.00	in					
Bridge Stiffener Thickness =	1.50	in	Connection Bolt Hole Size =	0	in		
Bridge Stiffener Unbraced Length =	12.00	in	Net Bridge Stiffener Area ($A_{e.pl}$)	9	in		
Bridge Stiffener Area (A_{pl}) =	9.00	in^2	Bridge Stiffener Circle (BC_{pl}) =	57	in		
Bridge Stiffener MOI (I_o) =	27.00	in^4	Total Area ($A_{tot.pl}$) =	27.00	in^2		
Number Bridge Stiffeners (N_{pl})	3		Percent Total Area (η_{pl}) =	51.0%		Axial, Bridge Stiffener ($P*\eta_{pl}$) =	15.11 kips

I_{inner} =	8428.25	$in.^4$	$(N_{inner}*A_{inner}*BC_{inner}^2/8 + N_{inner}*I_{o.inner})$
I_{pl} =	11046.38	$in.^4$	$(N_{pl}*A_{pl}*BC_{pl}^2/8 + N_{pl}*I_{o.pl})$
I_{tot} =	19474.63	$in.^4$	$(I_{inner} + I_{outer} + I_{pl})$
$P_{u.t.inner}$ =	23.2	kips	$(M*(BC_{inner}/2)*A_{inner})/I_{total} - P*\eta_{in}/N_{inner})$
$P_{u.t.pl}$ =	298.0	kips	$(M*(BC_{pl}/2)*A_{pl})/I_{total} - P*\eta_{pl}/N_{pl})$
$P_{u.c.pl}$ =	308.1	kips	$(M*(BC_{pl}/2)*A_{pl})/I_{total} + P*\eta_{pl}/N_{pl})$
$P_{nt.bolt} / (\Omega \times ASIF)$ =	43.91	kips	
Bolt Rating =	52.9%	OK	

Bridge Stiffener Check

f_y =	50	ksi
f_u =	65	ksi
E =	29000	ksi
K =	0.85	
KL/r =	23.556	
F_e =	515.82	ksi
F_{cr} =	48.01	ksi
P_{nc} / Ω =	258.75	kips
P_{nt} / Ω =	269.46	kips
Bridge Stiffener Rating =	89.3%	OK

Existing Flange Connection @ 120'
CT2086 SOUTHBURY KETTLETOWN ROAD
2016702.36

*O.T. Moment =	571.00	k*ft
Axial =	22.51	kips
Shear =	27.00	kips

*Above reactions have been adjusted due to consideration of modifications. See attached hand calculations for determination of flange bolt forces used in the analysis.

Acceptable Stress Ratio =	100.0%

Flange Bolts		
# Bolts =	32	
Bolt Type =	A325	
F_t =	44	ksi
ASIF =	1.333	
Bolt Circle =	45	in
Bolt Diameter =	1	in
Tension & Shear (ASD, Section J3.5)		
F_v =	21	ksi
Nominal Area =	0.79	in^2
f_v =	1.07	ksi
Applied Shear =	0.84	kips
Allowable Shear =	21.99	kips
Ft^2 - 4.39(fv^2))^1/2 =	43.94	ksi
Allowable Bolt Stress =	58.58986	ksi
B =	46.02	kips
Prying Action Check		
Tall =	43.71	kips
$t_{req'd}$ =	0.65	in
Max Comp. on Bolt =	19.73	kips
Max Tension on Bolt =	18.33	kips
Shear Capacity =	3.8%	
Tensile Capacity =	41.9%	
Bolt Capacity =	**41.9% OK**	

Pole Information		
Shaft Diam. (Upper) =	42	in
Thickness (Upper)=	0.375	in
# of Sides (Upper) =	Round	
F_y (Upper) =	42	ksi
Shaft Diam. (Lower) =	48	in
Thickness (Lower)=	0.375	in
# of Sides (Lower) =	Round	
F_y (Lower) =	42	ksi

Upper Flange Plate		
Location =	External	
Plate Strength (F_y) =	36	ksi
Plate Thickness =	1.25	in
Outer Diameter =	48.375	in
wcalc =	16.16	in
wmax =	25.56	in
w =	16.16	in
S =	4.21	in^3
f_b =	17.77	ksi
F_b =	36	ksi
UP Capacity =	**49.4% OK**	

Lower Flange Plate		
Location =	Internal	
Plate Strength (F_y) =	36	ksi
Plate Thickness =	1.25	in
Hole Diameter =	39.375	in
Pole Inner Diameter =	47.25	in
e =	1.13	in
w =	4.64	in
S =	1.21	in^3
f_b =	18.38	ksi
F_b =	36	ksi
LP Capacity =	**51.0% OK**	

UpperStiffeners		
Configuration =	Every Other	
Thickness =	0.625	in
Width =	3	in
Notch =	0.5	in
Height =	5	in
Stiffener Strength (F_y) =	36	ksi
Weld Info. Known? =	Yes	
Vertical Weld Size =	0.3125	in
Horiz. Weld Type =	Fillet	
Fillet Size =	0.3125	in
Weld Strength =	70	ksi

Stiffeners ineffective - check plate unstiffened

Lower Stiffeners		
Configuration =	Every Other	
Thickness =	0.625	in
Width =	2	in
Notch =	0.5	in
Height =	3.5	in
Stiffener Strength (F_y) =	36	ksi
Weld Info. Known? =	Yes	
Vertical Weld Size =	0.3125	in
Horiz. Weld Type =	Fillet	
Fillet Size =	0.3125	in
Weld Strength =	70	ksi

Stiffeners ineffective - check plate unstiffened

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Project #: 2016702.36
Sheet No 1 Of 1

Calculated By: TW Date: 2/9/2016
Checked By: Date:

BOLT AND BRIDGE STIFFENER CALCULATIONS @ 120'

Moment from TNX (M) =	1340.03	kip-ft	ASIF =	1.33			
Axial from TNX (P) =	22.51	kip					
Inner Bolt Diameter =	1	in					
Inner Bolt Area (A_{inner}) =	0.79	in^2	Inner Bolt Circle (BC_{inner}) =	45	in		
Inner Bolt MOI ($I_{o.inner}$) =	0.05	in^4	Total Area ($A_{tot.in}$) =	25.13	in^2		
Number Inner Bolts (N_{inner}) =	32		Percent Total Area (η_{in}) =	48.2%		Axial, Inner Bolts ($P*\eta_{in}$) =	10.85 kips
Bridge Stiffener Width =	6.00	in					
Bridge Stiffener Thickness =	1.50	in	Connection Bolt Hole Size =	0	in		
Bridge Stiffener Unbraced Length =	12.00	in	Net Bridge Stiffener Area ($A_{e.pl}$)	9	in		
Bridge Stiffener Area (A_{pl}) =	9.00	in^2	Bridge Stiffener Circle (BC_{pl}) =	51	in		
Bridge Stiffener MOI (I_o) =	27.00	in^4	Total Area ($A_{tot.pl}$) =	27.00	in^2		
Number Bridge Stiffeners (N_{pl})	3		Percent Total Area (η_{pl}) =	51.8%		Axial, Bridge Stiffener ($P*\eta_{pl}$) =	11.66 kips

I_{inner} =	6363.30	$in.^4$	$(N_{inner}*A_{inner}*BC_{inner}^2/8 + N_{inner}*I_{o.inner})$
I_{pl} =	8859.38	$in.^4$	$(N_{pl}*A_{pl}*BC_{pl}^2/8 + N_{pl}*I_{o.pl})$
I_{tot} =	15222.67	$in.^4$	$(I_{inner} + I_{outer} + I_{pl})$
$P_{u.t.inner}$ =	18.3	kips	$(M*(BC_{inner}/2)*A_{inner})/I_{total} - P*\eta_{in}/N_{inner})$
$P_{u.t.pl}$ =	238.5	kips	$(M*(BC_{pl}/2)*A_{pl})/I_{total} - P*\eta_{pl}/N_{pl})$
$P_{u.c.pl}$ =	246.3	kips	$(M*(BC_{pl}/2)*A_{pl})/I_{total} + P*\eta_{pl}/N_{pl})$
$P_{nt.bolt} / (\Omega \times ASIF)$ =	43.71	kips	
Bolt Rating =	41.9%	OK	

Bridge Stiffener Check

f_y =	50	ksi
f_u =	65	ksi
E =	29000	ksi
K =	0.85	
KL/r =	23.556	
F_e =	515.82	ksi
F_{cr} =	48.01	ksi
P_{nc} / Ω =	258.75	kips
P_{nt} / Ω =	269.46	kips
Bridge Stiffener Rating =	71.4%	OK

Existing Flange Connection @ 140'
CT2086 SOUTHBURY KETTLETOWN ROAD
2016702.36

O.T. Moment =	830.68	k*ft
Axial =	16.64	kips
Shear =	23.95	kips

Acceptable Stress Ratio =	100.0%

Flange Bolts		
# Bolts =	28	
Bolt Type =	A325	
F_t =	44	ksi
ASIF =	1.333	
Bolt Circle =	39	in
Bolt Diameter =	1	in
Tension & Shear (ASD, Section J3.5)		
F_v =	21	ksi
Nominal Area =	0.79	in^2
f_v =	1.09	ksi
Applied Shear =	0.86	kips
Allowable Shear =	21.99	kips
Ft^2 - 4.39(fv^2))^1/2 =	43.94	ksi
Allowable Bolt Stress =	58.58771	ksi
B =	46.01	kips
Prying Action Check		
Tall =	43.46	kips
$t_{req'd}$ =	0.92	in
Max Comp. on Bolt =	37.10	kips
Max Tension on Bolt =	35.91	kips
Shear Capacity =	3.9%	
Tensile Capacity =	82.6%	
Bolt Capacity =	**82.6% OK**	

Pole Information		
Shaft Diam. (Upper) =	36	in
Thickness (Upper)=	0.375	in
# of Sides (Upper) =	Round	
F_y (Upper) =	42	ksi
Shaft Diam. (Lower) =	42	in
Thickness (Lower)=	0.375	in
# of Sides (Lower) =	Round	
F_y (Lower) =	42	ksi

Upper Flange Plate		
Location =	External	
Plate Strength (F_y) =	36	ksi
Plate Thickness =	1.25	in
Outer Diameter =	42.375	in
wcalc =	15.00	in
wmax =	25.38	in
w =	15.00	in
S =	3.91	in^3
f_b =	33.28	ksi
F_b =	36	ksi
UP Capacity =	**92.4% OK**	

Lower Flange Plate		
Location =	Internal	
Plate Strength (F_y) =	36	ksi
Plate Thickness =	1.25	in
Hole Diameter =	33.375	in
Pole Inner Diameter =	41.25	in
e =	1.13	in
w =	4.63	in
S =	1.21	in^3
f_b =	34.62	ksi
F_b =	36	ksi
LP Capacity =	**96.2% OK**	

UpperStiffeners		
Configuration =	Every Other	
Thickness =	0.5	in
Width =	3	in
Notch =	0.5	in
Height =	5	in
Stiffener Strength (F_y) =	36	ksi
Weld Info. Known? =	Yes	
Vertical Weld Size =	0.3125	in
Horiz. Weld Type =	Fillet	
Fillet Size =	0.3125	in
Weld Strength =	70	ksi

Stiffeners ineffective - check plate unstiffened

Lower Stiffeners		
Configuration =	Every Other	
Thickness =	0.5	in
Width =	2	in
Notch =	0.5	in
Height =	3.5	in
Stiffener Strength (F_y) =	36	ksi
Weld Info. Known? =	Yes	
Vertical Weld Size =	0.3125	in
Horiz. Weld Type =	Fillet	
Fillet Size =	0.3125	in
Weld Strength =	70	ksi

Stiffeners ineffective - check plate unstiffened

Existing Flange Connection @ 160'
CT2086 SOUTHBURY KETTLETOWN ROAD
2016702.36

O.T. Moment =	396.79	k*ft
Axial =	10.94	kips
Shear =	17.30	kips

Acceptable Stress Ratio =	100.0%

Flange Bolts		
# Bolts =	24	
Bolt Type =	A325	
F_t =	44	ksi
ASIF =	1.333	
Bolt Circle =	33	in
Bolt Diameter =	1	in
Tension & Shear (ASD, Section J3.5)		
F_v =	21	ksi
Nominal Area =	0.79	in^2
f_v =	0.92	ksi
Applied Shear =	0.72	kips
Allowable Shear =	21.99	kips
Ft^2 - 4.39(fv^2))^1/2 =	43.96	ksi
Allowable Bolt Stress =	58.6106	ksi
B =	46.03	kips
Prying Action Check		
Tall =	43.14	kips
$t_{req'd}$ =	0.76	in
Max Comp. on Bolt =	24.49	kips
Max Tension on Bolt =	23.58	kips
Shear Capacity =	3.3%	
Tensile Capacity =	54.7%	
Bolt Capacity =	**54.7% OK**	

Pole Information		
Shaft Diam. (Upper) =	30	in
Thickness (Upper)=	0.375	in
# of Sides (Upper) =	Round	
F_y (Upper) =	42	ksi
Shaft Diam. (Lower) =	36	in
Thickness (Lower)=	0.375	in
# of Sides (Lower) =	Round	
F_y (Lower) =	42	ksi

Upper Flange Plate		
Location =	External	
Plate Strength (F_y) =	36	ksi
Plate Thickness =	1.25	in
Outer Diameter =	36.375	in
wcalc =	13.75	in
wmax =	21.04	in
w =	13.75	in
S =	3.58	in^3
f_b =	22.66	ksi
F_b =	36	ksi
UP Capacity =	**63.0% OK**	

Lower Flange Plate		
Location =	Internal	
Plate Strength (F_y) =	36	ksi
Plate Thickness =	1.25	in
Hole Diameter =	27.375	in
Pole Inner Diameter =	35.25	in
e =	1.13	in
w =	4.61	in
S =	1.20	in^3
f_b =	22.93	ksi
F_b =	36	ksi
LP Capacity =	**63.7% OK**	

UpperStiffeners		
Configuration =	Every Other	
Thickness =	0.625	in
Width =	3	in
Notch =	0.5	in
Height =	5	in
Stiffener Strength (F_y) =	36	ksi
Weld Info. Known? =	Yes	
Vertical Weld Size =	0.3125	in
Horiz. Weld Type =	Fillet	
Fillet Size =	0.3125	in
Weld Strength =	70	ksi

Stiffeners ineffective - check plate unstiffened

Lower Stiffeners		
Configuration =	Every Other	
Thickness =	0.625	in
Width =	2	in
Notch =	0.5	in
Height =	3.5	in
Stiffener Strength (F_y) =	36	ksi
Weld Info. Known? =	Yes	
Vertical Weld Size =	0.3125	in
Horiz. Weld Type =	Fillet	
Fillet Size =	0.3125	in
Weld Strength =	70	ksi

Stiffeners ineffective - check plate unstiffened

Existing Flange Connection @ 180'
CT2086 SOUTHBURY KETTLETOWN ROAD
2016702.36

O.T. Moment =	111.21	k*ft
Axial =	6.43	kips
Shear =	12.12	kips

Acceptable Stress Ratio =	100.0%

Flange Bolts		
# Bolts =	20	
Bolt Type =	A325	
F_t =	44	ksi
ASIF =	1.333	
Bolt Circle =	27	in
Bolt Diameter =	1	in
Tension & Shear (ASD, Section J3.5)		
F_v =	21	ksi
Nominal Area =	0.79	in^2
f_v =	0.77	ksi
Applied Shear =	0.61	kips
Allowable Shear =	21.99	kips
Ft^2 - 4.39(fv^2))^1/2 =	43.97	ksi
Allowable Bolt Stress =	58.62704	ksi
B =	46.05	kips
Prying Action Check		
Tall =	42.69	kips
$t_{req'd}$ =	0.50	in
Max Comp. on Bolt =	10.20	kips
Max Tension on Bolt =	9.56	kips
Shear Capacity =	2.8%	
Tensile Capacity =	22.4%	
Bolt Capacity =	**22.4% OK**	

Pole Information		
Shaft Diam. (Upper) =	24	in
Thickness (Upper)=	0.375	in
# of Sides (Upper) =	Round	
F_y (Upper) =	42	ksi
Shaft Diam. (Lower) =	30	in
Thickness (Lower)=	0.375	in
# of Sides (Lower) =	Round	
F_y (Lower) =	42	ksi

Upper Flange Plate		
Location =	External	
Plate Strength (F_y) =	36	ksi
Plate Thickness =	1.25	in
Outer Diameter =	30.375	in
wcalc =	12.37	in
wmax =	20.84	in
w =	12.37	in
S =	3.22	in^3
f_b =	9.81	ksi
F_b =	36	ksi
UP Capacity =	**27.3% OK**	

Lower Flange Plate		
Location =	Internal	
Plate Strength (F_y) =	36	ksi
Plate Thickness =	1.25	in
Hole Diameter =	24.25	in
Pole Inner Diameter =	29.25	in
e =	1.13	in
w =	4.59	in
S =	1.20	in^3
f_b =	9.59	ksi
F_b =	36	ksi
LP Capacity =	**26.6% OK**	

UpperStiffeners		
Configuration =	Every Other	
Thickness =	0.625	in
Width =	3	in
Notch =	0.5	in
Height =	5	in
Stiffener Strength (F_y) =	36	ksi
Weld Info. Known? =	Yes	
Vertical Weld Size =	0.3125	in
Horiz. Weld Type =	Fillet	
Fillet Size =	0.3125	in
Weld Strength =	70	ksi

Stiffeners ineffective - check plate unstiffened

Lower Stiffeners		
Configuration =	Every Other	
Thickness =	0.625	in
Width =	2	in
Notch =	0.5	in
Height =	3.5	in
Stiffener Strength (F_y) =	36	ksi
Weld Info. Known? =	Yes	
Vertical Weld Size =	0.3125	in
Horiz. Weld Type =	Fillet	
Fillet Size =	0.3125	in
Weld Strength =	70	ksi

Stiffeners ineffective - check plate unstiffened

APPENDIX E

Anchor Rod & Base Plate Analysis

Anchor Rod and Base Plate Stresses
CT2086 SOUTHBURY KETTLETOWN ROAD
2016702.36

*Overturning Moment =	4485.90	k*ft
Axial Force =	81.99	k
Shear Force =	44.11	k
Centroid Offset =		in

Acceptable Stress Ratio =	105.0%

*Above reactions have been adjusted due to consideration of modifications. See attached hand calculations for determination of anchor rod forces used in the analysis below.

Anchor Rods		
Number of Rods =	52	
Type =	Bolt	
Rod Ultimate Strength (Fu) =	150	ksi
ASIF =	1.333	
Rod Circle =	67	in
Rod Diameter =	1.25	in
Area =	1.23	in^2
Max Tension on Rod =	60.22	kips
Max Compression on Rod =	63.37	kips
Allow. Rod Force =	80.99	kips
Anchor Rod Capacity =	**74.3%**	**OK**

Base Plate		
Location =	External	
Plate Strength (F_y) =	36	ksi
Outside Diameter =	69.75	in
Plate Thickness =	1.25	in
b =	3.42	in
Le =	4.50	in
fb =	35.75	ksi
Fb =	36	ksi
BP Capacity =	**99.3%**	**OK**

Stiffeners		
Configuration =	Every Rod	
Thickness =	0.625	in
Width =	4.5	in
Notch =	0.5	in
Height =	8	in
Stiffener Strength (F_y) =	36	ksi
Weld Info. Known? =	Yes	
Vertical Weld Size =	0.375	in
Horiz. Weld Type =	Fillet	
Fillet Size =	0.375	in
Weld Strength =	70	ksi
Stiffener Vertical Force =	37.25	kips
Vert. Weld Capacity =	44.5%	kips
Horiz. Weld Capacity =	69.2%	kips
Stiffener Capacity =	90.2%	kips
Controlling Capacity =	**90.2%**	**OK**

Pole		
Pole Diameter =	60	in
Number of Sides =	Round	
Thickness =	0.625	in
Pole Yield Strength =	42	ksi

Anchor Rod Interaction, TIA-222-G
CT2086 SOUTHBURY KETTLETOWN ROAD
2016702.36

tnx Reactions		
Overturning Moment=	5748.68	k*ft
Axial Force =	81.99	k
Shear Force =	44.11	k

Existing Anchor Rods		
Number of Rods =	52	
Rod Circle =	67	in
Rod Diameter =	1.25	in
Est. Dist. b/w ea. Rod =		in
Plate Type =	Round	
Plate Diameter =	69.75	in

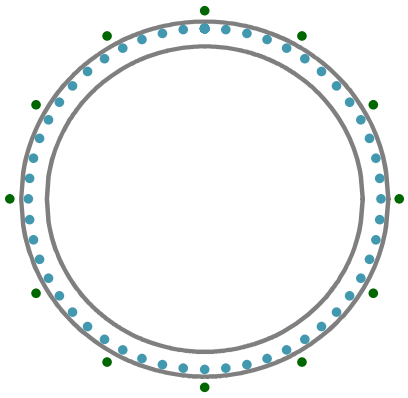
Pole		
Pole Diameter =	60	in
Number of Sides =	Round	
Thickness =	0.625	in

First Added Anchor Rods		
Number of Rods =	12	
Rod Circle =	74.00	in
Rod Diameter =	1.25	in
Anchor Rod Grade =	F1554 GR 105	

Rod Number	Initial Angle
1	0
2	30
3	60
4	90
5	120
6	150
7	180
8	210
9	240
10	270
11	300
12	330

First Added Anchor Rods		
Max Rod Compression =	68.25	k
ϕRnt =	96.90	k
Anchor Rod Capacity =	70.43%	**OK**

Reactions in Existing Rods		
Overturning Moment=	**4485.90**	k*ft
Axial Force =	**81.99**	k
Shear Force =	**44.11**	k
Centroid Offset =	**0.00**	in



Second Added Anchor Rods		
Number of Rods =		
Rod Circle =		in
Rod Diameter =		in
Anchor Rod Grade =		

APPENDIX F

Foundation Analysis

Pile Analysis

CT2086 SOUTHBURY KETTLETOWN ROAD

2016702.36

M	5748.68	k-ft
P	156.99	k
V	44.11	k
M tot	5991.299	k-ft
M tot 45	4236.488	k-ft
d	5.5	ft
h	46	ft
Vconc	11638	ft^3
wconc	1745.7	k

Pile Ultimate Capacities

Existing

Compression	150	k
Tension	100	k

Modification

Compression	100	k
Tension	100	k

Wequip 75 k (weight of the equipment above the pad)

n existing	24
n mod	48

Total force on piles

				X			45	
	n	x (ft)	y (ft)	Pc (k)	Pt (k)	Mu (k-ft)	Pc (k)	Pt (k)
Existing	4	0	0	26.43	26.43	0.00	26.43	26.43
	10	6	6	28.68	24.17	860.35	29.61	23.24
	10	12	12	30.93	21.92	1855.84	32.80	20.06
	24							
Mod	2	0	0	26.43	26.43	0.00	26.43	26.43
	4	3.5	3.5	27.74	25.11	194.18	28.28	24.57
	4	7	7	29.05	23.80	406.75	30.14	22.71
	4	10.5	10.5	30.37	22.48	637.72	32.00	20.85
	4	14	14	31.68	21.17	887.08	33.86	18.99
	4	17.5	17.5	33.00	19.86	1154.83	35.72	17.14
	26	21	21	34.31	18.54	9366.36	37.57	15.28
	48							

Pile Capacities

Existing

Compression	41.2%
Tension	52.9%

Modification

Compression	68.6%
Tension	52.9%

Reinforcement Capacity

Mu	19972.05	k-ft
a	4.262575	in
d	60.885	in
Phi Mn	26439.17	k-ft

Capacity 75.5%