STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL

IN RE:

APPLICATION OF HOMELAND TOWERS, LLC AND NEW CINGULAR WIRELESS PCS, LLC d/b/a AT&T FOR A CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED FOR THE CONSTRUCTION, MAINTENANCE, AND OPERATION OF A TELECOMMUNICATIONS FACILITY AT 60 VALE ROAD, BROOKFIELD, CONNECTICUT	DOCKET NO. 512 April 10, 2023

HOMELAND TOWERS, LLC AND NEW CINGULAR WIRELESS PCS, LLC d/b/a AT&T
DEVELOPMENT & MANAGEMENT PLAN

Homeland Towers, LLC, the Certificate Holder in the above-referenced Docket, respectfully submits the following Development & Management Plan ("D&M Plan") documents and materials for Facility approved in Docket No. 512 at 60 Vale Road, the certificate site:

Homeland Towers, LLC cover letter dated April 8, 2022 with the following Exhibits:

Exhibit A: Specifications for the Town of Brookfield's generator, equipment cabinet and antenna; and

Exhibit B: Signed and sealed tower manufacturer drawings by Ambor[1], signed and sealed Geotechnical Analysis; and signed and sealed Foundation drawings.

Two full-sized sets and 15 half-sized sets of D&M Plan Drawings prepared by All-Points Technology Corporation last revised April 5, 2023 and signed and sealed by Robert Charles Burns, CT P.E. license no. 20071.

[1] One hard copy of the calculations is submitted due to their length.

CERTIFICATE OF SERVICE

I hereby certify that on this day one original and 15 hard copies, and one electronic version of the foregoing were sent to the Connecticut Siting Council and one electronic copy was sent to:

Tara Carr
First Selectwoman
Town of Brookfield
100 Pocono Road
Brookfield, CT 06804
FirstSelectwoman@BrookfieldCT.gov

Dated: April 10, 2023

Lucia Chiocchio, Esq.
Cuddy & Feder LLP
445 Hamilton Ave, 14th Floor
White Plains, NY 10601
(914)-761-1300

cc: Manny Vicente, Homeland Towers
Ray Vergati, Homeland Towers
Harry Carey, AT&T
Rachelle Biden Lewis, AT&T
Lucia Chiocchio, Esq., Cuddy & Feder LLP
APT
C Squared

HOMELAND TOWERS

April 8, 2023

Via Federal Express
Honorable John Morissette, Presiding Officer
And Members of the Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051

Re: Docket No. 512 – Homeland Towers LLC (HT) and New Cingular Wireless PCS, LLC d/b/a AT&T Development & Management Plan- Tower Facility at 60 Vale Road, Brookfield, CT (CT076).

Dear Honorable Morissette and Members of the Siting Council,

Homeland Towers ("HT") respectfully requests that you please accept for review and Council approval this Development & Management Plan ("D&M Plan") filing for the Facility as approved in Docket No. 512.

Tower, Compound & Other Equipment

Enclosed are fifteen (15) sets of 11"x17" Development & Management Plans dated April 5, 2023 prepared by All Points Technology Corporation. These plans are being filed in accordance with the Council's Decision and Order dated February 2, 2023 ("Decision and Order"). Two full-sized sets of the Development & Management Plans are also enclosed. The D&M Plan incorporates a 165' AGL galvanized monopole as provided for in the Siting Council's Decision and Order in this Docket. AT&T will initially install nine (9) panel antennas and nine (9) RRH's at a centerline of 161' AGL. The Town of Brookfield also plans on installing two (2) omni antennas, one off the top of the tower with a mounting height of 168' AGL and the second at a mounting height of 90' AGL. As previously submitted into the record, the Town's omni antennas extending above the tower will be "Horizon Blue" in color as depicted in the Visual Resource Assessment dated September 1, 2021 prepared by All Points. Attachment ***Exhibit A*** contains antenna specification sheets for AT&T and the Town of Brookfield's public safety equipment along with their generator specification sheets. Attached as ***Exhibit B*** is a geotechnical study dated February 8, 2023 prepared by Welti Geotechnical, P.C. as well as a structural design report for the tower and foundation dated March 9, 2023 prepared by Ambor Structures. Homeland Towers and AT&T shall comply with items No. 1-18 as outlined in the Conditions of Decision and Order by the Council prior to the commencement of facility construction.

Required Notifications

In accordance with the provisions of RCSA Section 16-50j-77, Homeland Towers hereby notifies the Council of its intention to begin site work immediately after Council approval of the D&M Plan. Construction of the tower and other site improvements will commence upon issuance of a local building permit. Construction activities shall be 7:30 AM to 7:30 PM Monday through Saturday and 10:00 AM through 7:30 PM Sundays and Holidays. These hours/days are consistent with the Town of Brookfield's Construction and Noise Standards. The supervisor for all construction related matters on this project is David Weinpahl with On-Air Engineering, located at 88 Foundry Pond Road, Cold Spring, NY 10516 and can be reached by telephone at 201-456-4624.

HOMELAND TOWERS

We respectfully request that this matter be included on the Council's next available agenda for review and approval.
Thank you for your consideration of the enclosed.

Sincerely,

Raymond Vergati
rv@homelandtowers.us

Enclosures

cc: Tara Carr, First Selectwoman, Town of Brookfield
Manny Vicente, Homeland Towers LLC
Rachelle Biden-Lewis, AT&T
Scott Chasse, P.E., APT
Lucia Chiocchio, Esq., Cuddy & Feder LLP

HOMELAND TOWERS

EXHIBIT A

(AT&T and Town of Brookfield antenna and generator specifications)

Specification sheet

Pre-Configured Diesel generator sets

Features and Benefits

Robust product design and testing - The generator is designed to operate under extreme environmental conditions. The generator is tested and certified per the latest EPA and UL standards.

Heavy duty engines - Rugged 4-cycle industrial diesel engines deliver reliable power and fast response to load changes.

Alternator - Several alternator sizes offer selectable motor starting capability with low reactance 2/3 pitch windings, low waveform distortion with non-linear loads and fault clearing short-circuit capability.

Control system - The PowerCommand® 1.1 electronic control is standard equipment and provides total generator set system integration including automatic remote starting/stopping, precise frequency and voltage regulation, alarm and status message display, output metering, auto-shutdown at fault detection and NFPA 110 Level 1 compliance.

Cooling system - Standard cooling package provides reliable running at up to 122 ℉ (50 ℃) ambient temperature. Coolant heaters also come standard on generator sets for starting well below freezing.

Flexible exercise mode - The innovative, flexible exercise mode enables the generator to exercise at a time, frequency and duration that suits the customer's preference reducing unnecessary fuel consumption, emissions and noise.

Self-diagnostics and easy service - The generator is equipped with Cummins PowerCommand® electronic control to provide industry-leading self-diagnostic capabilities. In addition, critical components of the generator are designed to ensure service and preventive maintenance can be completed in a short period of time

			Standby 60 Hz	
Model	**Model Number**	**Fuel Tank**	**kW**	**kVA**
C20 D6	A063P962	None	20	20
C30 D6	A063P964	None	30	30
C50 D6	A063P966	None	50	50
C80D6C	A063P969	None	80	80
C100D6C	A063P987	None	100	100
C20 D6	A063P961	24 Hr.	20	20
C30 D6	A063P963	24 Hr.	30	30
C50 D6	A063P965	24 Hr.	50	50
C80D6C	A063P967	24 Hr.	80	80
C100D6C	A063P977	24 Hr.	100	100

Generator set specifications

Model	C20 D6	C30 D6	C50 D6	C80D6C	C100D6C
Enclosures	Sound Level 1 - Sandstone				
Controller	PowerCommand 1.1				
Voltage - Phase	120/240 – 1 Phase				
Operating temp. range	-40 ℉ to +122 ℉ (-40 ℃ to +50 ℃)				
Circuit Breaker	100	150	250	400 *	600 *
Battery Charger	Standard – 6A				
Governor reg. class	ISO 8528 Part 1 Class G3				
Voltage regulation, no load to full load	± 1.0%				
Random voltage variation	± 1.0%				
Frequency regulation	Isochronous				
Random freq. variation	± 0.5%				
Radio frequency emissions compliance	FCC code Title 47 part 15 class A and B				

* - Indicates that circuit breaker is adjustable

Engine specifications

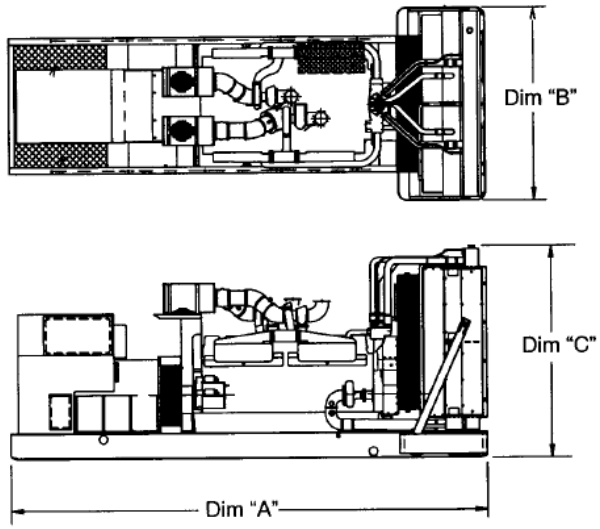
Model	C2 0D6	C30 D6	C50 D6	C80D6C	C100D6C
Engine	D2200	QSB3.3		QSB5	
Displacement	2.20 L (134.1 in^3)	3.3 L (199 in^3)		4.5 L (272 in^3)	
Cylinder block	Cast iron, in-line				
Battery capacity at ambient temperature of 0 ℃ (32 ℉)	550 amps	550 amps	550 amps	2x 850 amps	2x 850 amps
Battery charging alternator	50 amps	40 amps	50 amps	100 amps	100 amps
Starting voltage	12-volt, negative ground	12-volt, negative ground	12-volt, negative ground	2x 12-volt, negative ground	2x 12-volt, negative ground
Lube oil filter type(s)	Spin-on with relief valve				
Rated speed	1800 rpm				

Alternator specifications

Model	C20 D6	C30D6	C50D6	C80D6C	C100D6C
Design	Brushless, 4 pole, drip proof, revolving field				
Stator	2/3 pitch				
Rotor	Direct coupled, flexible disc				
Insulation system	Class H per NEMA MG1-1.65				
Standard temp. rise	120 ºC (248 ℉) Standby				
Exciter type	Torque match (shunt) with PMG as option				
Alternator cooling	Direct drive centrifugal blower				
AC waveform Total Harmonic Distortion (THDV)	< 5% no load to full linear load, < 3% for any single harmonic				
Telephone Influence Factor (TIF)	< 50 per NEMA MG1-22.43				
Telephone Harmonic Factor (THF)	< 3%				

Accessories

- Battery heater kit
- Engine oil heater
- Remote control displays
- Auxiliary output relays (2)
- Auxiliary configurable signal inputs (8) and relay outputs (8)
- Annunciator – RS485
- Audible alarm
- Enclosure Sound Level 2
- Battery charger – stand-alone,10A
- Circuit breakers
- Remote monitoring device – PowerCommand 500/550
- Base barrier – elevated generator sets
- Alternator heater



This outline drawing is for reference only. See respective model data sheet for specific model outline drawing number.
Do not use for installation design

Model	Tank	Dim "A" mm (in.)	Dim "B" mm (in.)	Dim "C" mm (in.)	Set weight* dry kg (lbs.)	Set weight* wet kg (lbs.)
C20D6	Yes	1830 (72)	864 (34)	1486 (58.5)	637 (1401)	653 (1437)
	No	1830 (72)	864 (34)	1156 (45.5)	494 (1091)	511 (1127)
C30D6	Yes	2384 (93.8)	864 (34)	1537 (60.5)	790 (1738)	811 (1784)
	No	2384 (93.8)	864 (34)	1156 (45.5)	580 (1282)	600 (1328)
C50D6	Yes	2384 (93.8)	864 (34)	1740 (68.5)	1003 (2207)	1024 (2253)
	No	2384 (93.8)	864 (34)	1156 (45.5)	695 (1538)	716 (1584)
C80D6C	Yes	3016 (119)	1016 (40)	2108 (83)	1505 (3309)	1556 (3425)
	No	3016 (119)	1016 (40)	1473 (58)	1136 (2500)	1185 (2614)
C100D6C	Yes	3016 (119)	1016 (40)	2108 (83)	1505 (3309)	1613 (3548)
	No	3016 (119)	1016 (40)	1473 (58)	1136 (2500)	1237 (2729)

* Weights above are average. Actual weight varies with product configuration.

For more information contact your local Cummins distributor or visit power.cummins.com

Our energy working for you.™

NAS-6437-EN (11/19) PD00000141

Codes and standards

Codes or standards compliance may not be available with all model configurations – consult factory for availability.

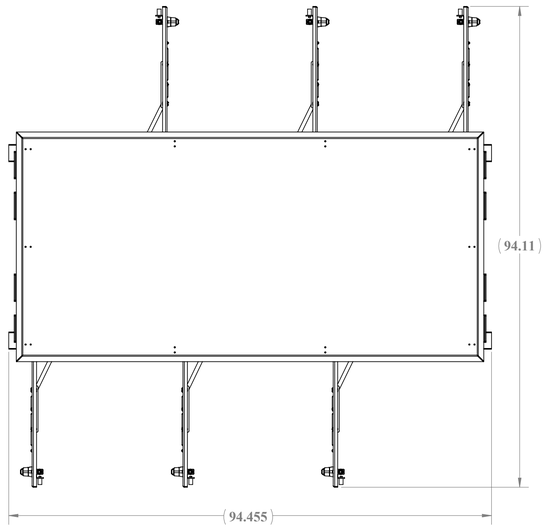
	This generator set is designed in facilities certified to ISO 9001 and manufactured in facilities certified to ISO 9001 or ISO 9002.		The generator set is available Listed to UL 2200, Stationary Engine Generator Assemblies.
	The Prototype Test Support (PTS) program verifies the performance integrity of the generator set design. Cummins products bearing the PTS symbol meet the prototype test requirements of NFPA 110 for Level 1 systems.	**U.S. EPA**	Engine certified to U.S. EPA SI Stationary Emission Regulation 40 CFR, Part 60.

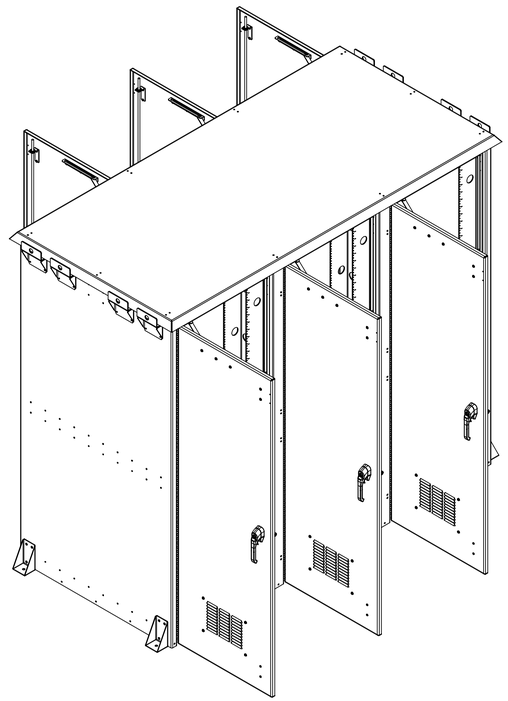
Warning: Back feed to a utility system can cause electrocution and/or property damage. Do not connect to any building's electrical system except through an approved device or after building main switch is open.

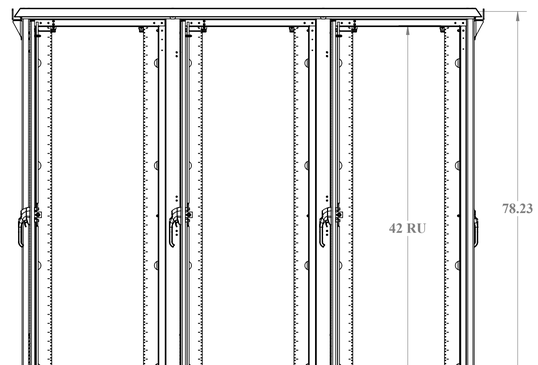
REVISIONS		
REV.	DESCRIPTION	DATE
A	Initial Release per DR- 00987	5/28/2014

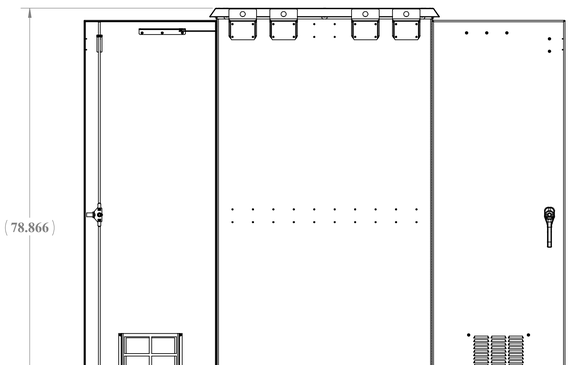
WEB DRAWING (NOT FOR FABRICATION)

For Fabrication Drawing of this enclosure see DWG #: 00042









NOTES: UNLESS OTHERWISE SPECIFIED

1. DIMENSIONS AND TOLERANCES ARE IN ACCORDANCE WITH ASME Y14.5M
2. DIMENSIONS ARE IN INCHES, UNLESS OTHERWISE SPECIFIED
3. THIS IS A SUPPLEMENTAL DRAWING AND MAY NOT BE FULLY DIMENSIONED. THE NOTES, TOLERANCES, AND SPECIAL INSTRUCTIONS ARE TO BE USED ALONG WITH THE LATEST REVISION OF THE SOLID DATABASE. THE PART OR ASSEMBLY IS TO BE CONTROLLED PER THE ELECTRONIC FILE.
4. ALL PEM STUDS SHALL BE FHS FOR STAINLESS ENCLOSURES AND FHA FOR ALUMINUM.
5. ALL EXTERIOR WASHERS SHALL BE SEALING WASHERS.
6. THE FOLLOWING WEATHER STRIPPING SHALL BE USED FOR THE FOLLOWING APPLICATIONS:
   DOOR LIP - TRIMLOCK 3100B3X1/8C
   FAN PLATES - STICKER-TITE 1/8x3/8
   ACS - STICKER-TITE 1/4x3/4
7. CUSTOM ENCLOSURES SHALL HAVE SECURITY TORX FOR ALL EXTERIOR HARDWARE.
8. SYMBOL ▭ DENOTES CRITICAL DIMENSIONS AND MUST BE INSPECTED.
9. REMOVE ALL BURRS AND SHARP EDGES 0.025" MAX RADIUS OR CHAMFER
10. DO NOT DEBURR PRESS FIT HOLES
11. DIMENSIONS SHALL APPLY AFTER ALODINE, PAINT, FINISH, OR COAT IS APPLIED
12. INSTALL PRESS FIT STANDOFFS, STUDS, AND NUTS IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS.
13. ALL OPEN HOLES SHALL BE POPULATED WITH APPLICABLE HARDWARE.
14. IDENTIFY PART WITH PART NUMBER, REVISION LETTER AND SERIAL NUMBER
15. FINISHED PART TO BE FREE OF OILS, LUBRICANTS, AND OTHER CONTAMINANTS
16. NO NYLON LOCK NUTS TO BE USED ON ANY PEM STUDS, UNLESS OTHERWISE SPECIFIED.
17. ALL PEM STUDS WILL BE SECURED WITH EXTERNAL TOOTH WASHER AND STANDARD NUTS.
18. TOLERANCES, UNLESS OTHERWISE SPECIFIED:
    a. HOLE SIZE: +/- 0.003"
    b. HOLE TO HOLE: +/- 0.005"
    c. HOLE TO EDGE: +/- 0.010"
    e. HOLE TO FOLD: +/- 0.015"
    f. FOLD TO FOLD: +/- 0.020"

DDB FORM: 7.1-2 REV:E 04/25/13

WEB DRAWING (NOT FOR FABRICATION)

ISO 9001 REGISTERED COMPANY
Certificate NO. 7252

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
ANGULAR: ±1°
FRACTIONAL/NO DECIMAL: ±0.1250
ONE PLACE DECIMAL: ± 0.0625
TWO PLACE DECIMAL: ± 0.0200
THREE PLACE DECIMAL: ± 0.0150
ALL HOLES ±0.0030 Ø
MATERIAL THICKNESS IS: 0.125"
MATERIAL: Varies
PAINT: Varies
DO NOT SCALE DRAWING

	NAME	DATE
Model by:	DDB	6/4/2014
Drawn by:	EdwardW	06/13/14
Sales.Rep.:		
Q.A. Appr.:	SteveA	07/23/14
Prod.Mgr.:	ClarkK	07/23/14
Control Number:		

DDB Unlimited Inc.
3OD-78DDX WEB
DWG, WEB, 3OD, 78, DDX

SIZE	Cage Code:	DWG. NO.:	REV
D	385Y5	00987	A
SCALE: 1:8	WEIGHT: 685 lbs.	SHEET 1 OF 1	

File Location: (DDB)(EPDM Vault:)
C:\DDB\Drawing Requests\Customers\DDB WEB DWG\3OD Family WEB\DR-00987 (3OD-78DDX WEB DWG)\

VHF Antenna - Omnidirectional, Low-PIM/Hi-PIP, 5.5 dBd

Model - DS1F06P36U-Series Antennas

Specifications	
Design Type	True Corporate Feed
Frequency Range	150-164 MHz
Passive Intermodulation – PIM (2 x 20W sources)	-150 dBc, 3rd Order
Bandwidth	14 MHz
Gain (average over BW)	5.5 dBd
Configuration	Single antenna
Beam Tilt (electrical downtilt)	(x) = - , 3 or 6 degrees
Vertical Beamwidth (E-Plane) typ.	16°
Impedance	50 ohms
VSWR / Return Loss	1.5:1 / 14 dB (min.)
Average Power Rating	500 W
Peak Instantaneous Power	25 kW
Polarization	Vertical
Lightning Protection	Direct Ground
Connector DS1F06P36U(x)D DS1F06P36U(x)M	 7/16 DIN (F) 4.3-10 (F)
Equivalent Flat-Plate Area	3.7 sq. ft.
Lateral Windload Thrust @100mph	153 lbf.
Rated Wind Speed	150 mph (without ice) 127 mph (with ½" radial ice)
Total Length	22 feet
Mounting Mast Length	35 inches
Mounting Hardware (included)	DSH3V3N
Top Sway Brace (Recommended if side mounting antennas)	DSH2H3S (order separately)
Mast O.D.	2.5 inches
Radome O.D.	3.0 inches
Radome color	Horizon Blue
Weight, antenna and hardware	90 lbs.
Shipping Weight	110 lbs.
Invertibility	0˚ electrical down-tilt models are invertible. For other invertible tilt options contact dbSpectra at *tech@dbspectra.com*
Ordering information DS1F06P36U(x)D – 7/16 DIN Connector DS1F06P36U(x)M – 4.3-10 Connector	1. Replace (x) in model number with Beam Tilt options. 2. "-" in the beam-tilt options represents 0˚ down-tilt.

Features and Benefits

Tested to stringent Peak Instantaneous Power (PIP) levels of 25 KW using dbSpectra's multi-channel P25 PIP test bed. High PIP level is demanded by today's digital systems!

PIM-rated Design – 3rd-Order performance better than -150 dBc.

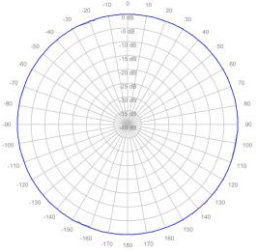
True Corporate Feed Array – provides for excellent gain and pattern consistency across a wider frequency range.

Sturdy Construction – Heavy-wall fiberglass radome minimizes tip deflection.

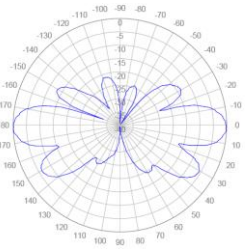
Excellent Lightning Protection – heavy internal conductor DC ground.

Radiation Patterns:

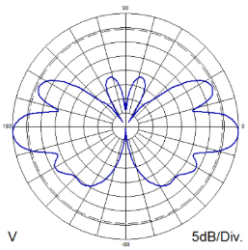
Horizontal



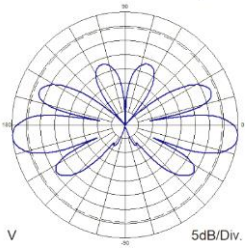
Vertical (No Tilt)



Vertical (3˚ DT)



Vertical (6˚ DT)



AIR 6449 B77D

- Advanced Antenna System (AAS)
- Support operation frequency range 3700-3980 MHz
- Up to 320W
- EIRP : 79 dBm (dual-polarization)
- Up to 200 MHz IBW & TCBW
- NR only
- Power consumption < 860W
- 4 x 25 Gbps eCPRI
- Weight: 81.6 pounds
- Weight with bracket: ~ 106 pounds
- Size (H x W x D): 30.39 x 15.87 x 8.07 inches
- -48 VDC (3-wire or 2-wire)
- -40 to +55˚C

8220-100 series

RUGGED POWER

POLAR POWER INC.

PRIME POWER DC GENERATOR SET

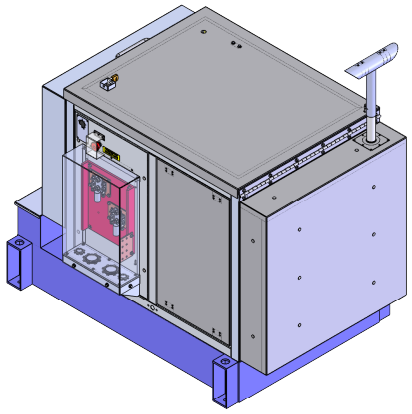
Founded in 1979 Polar Power specialized in solar photovoltaic systems, solar air conditioning and refrigeration. We developed and provided photovoltaic charging controls for telecommunications in the 1980s along with DC generators for the military. In 1994 we were first to provide DC generators with remote control and monitoring to the telecommunications industry.

Polar's success is based on engineering generators to meet the very specific needs of each application. Telecom site optimization is best met with the DC generator technology as the loads and batteries are DC. It makes no sense to install an AC generator and convert the output to DC. The AC generators are designed for a wide range of applications and they are not specifically produced for telecom applications so there are issues with reliability, space, and fuel efficiency.

Polar can save you considerable time and cost in permitting, installing, purchasing, and maintaining a backup generator. We reduce CAPEX and OPEX costs while improving backup reliability.

Model Number:

8220-100-D-15-03 - Diesel 15 kW -48 VDC



Intertek 4003706
Conforms to UL STD 2200
Certified to CSA STD C22.2 No. 100
Meets EPA Emission Regulations
CA/MA Emissions Compliant

Made in USA

2 year standard warranty

The concepts and features behind Polar's Hybrid application generator for telecommunications include:

SMALL FOOTPRINT. Polar's DC generator is considerably smaller in size than an AC generator. You can now backup sites that could not accommodate an AC generator. Smaller also means less cost for space leasing.

LOW MAINTENANCE. Due to oversized oil sump, and oil/fuel filtration system.

LOW ACOUSTIC NOISE. <62 dBA @ 7 meters for diesel, and low vibration so as not to disturb the local residents or building landlords.

LIGHTWEIGHT. Up to 1/3 the weight of a comparable AC generator.

CORROSION RESISTANT. All-aluminum enclosure with stainless hardware for low maintenance, and long service life.

FUEL EFFICIENT. Up to 85% fuel savings due to smaller engine displacement, high efficiency alternator, and variable speed operation.

RODENT RESISTANT. Small animals can quickly destroy a generator set by gnawing on wires, fuel lines, radiator hoses, etc. Cooling air inlets and outlets have perforated aluminum screens to keep small rodents and large insects out. Stainless steel wire braid is placed over fuel and radiator lines to prevent damage.

SUPERCAPACITOR STARTER. Failure to start is the number one problem plaguing generator reliability and typically this is caused by a bad starting battery. Polar unique design has replaced the starting battery with a Super Capacitor. Capacitors are more reliable and last longer than batteries (10-15 year life).

LONG LIFE. Controls and wire harnesses are designed to exceed a 20 year life. Higher grade, longer life electrical wire (UL 3173), weather tight connectors, gold plated connector pins on signal circuits. No transfer switches are required.

ADVANCED MONITORING. Remote diagnostics, control, and monitoring. Ethernet and RS232 standard, with optional SNMP.

POLAR POWER INC.

APPLICATION AND ENGINEERING DATA

COMPARING THE COST OF AC vs DC

	AC	DC
Transfer switch required	Yes	No
Rectifier	Yes	No
Permitting costs	$$	$
Shipping to site and installation cost	$$	$
Site preparation/reinforcing structures	$$$	$
Ethernet/RS232 remote control and monitoring	Extra	Standard

PERMITTING IS FACILITATED

- Small engine horsepower
- DC generator is fully isolated from the utility grid
- Low acoustic noise
- Incorporates all requirements made by local Fire Marshals

8220 ALTERNATOR FEATURES

- No mechanical adjustments
- Very lightweight
- High quality electrical output
- Voltage and current regulation
- Up to 94% efficiency
- -40° to 70° C operational range
- Class 220 C insulation
- Anodized type III process for aluminum parts
- Nickel plating for steel parts
- Stator is varnished

8220 ALTERNATOR SPECIFICATIONS

Type	Permanent Magnets, NdFeB
Weight (lb/kg)	46.5/21
Regulation Type	Variable engine speed operation over 500 RPM range
Stator	3 phase/32 poles
Overcurrent Protection (A)	15 kW - 350
Disconnect Means	Fused Disconnect, sized for each generator size.
Voltage Range (VDC)	44 to 62
Alternator Exhaust Flow (cfm/cmm)	130 to 180 or 3.68 to 5.1
MTBF (hr)	100,000+

ENCLOSURE

Model	88-25-0100
Type	Weather Protective
Materials	Marine Grade Aluminum
Door Hardware	Pad Locked with Removable Side Panels
Mounting	Secure Mounting Tabs

STARTER SUPERCAPACITOR SPECIFICATIONS

Model	20-16-0001
Storage Rating (Farads)	500
Voltage (VDC)	13-14.4
Weight (lb/kg)	12.1/5.5
Operating Temperature (°C/°F)	-40 to 65 or -40 to 149
Service Life (year)	10 to 15

CHARGER SPECIFICATIONS

Model	00-10-0015
Input Voltage (VDC)	28.8 to 60
Output Voltage (VDC)	14 to 14.4
Recharge time from 0 VDC (min)	10
Recharge time from 8 VDC (min)	2
Weight (lb/kg)	2.2/1

FUEL TANK SPECIFICATIONS

UL Rated Capacity (gal/L)	54/204
Tank Alarms	Yes
Visual Gages	Yes
Catch Basin (gal/L)	5/19
Listings	UL 142 (double wall)

ENGINE SPECIFICATIONS

Engine Model	Yanmar 3TNV88
Cylinders	3 In-line
Displacement (L)	1.642
Bore (in./mm)	3.4/88
Stroke (in./mm)	3.5/90
Intake Air System	Naturally Aspirated
Engine HP	24
Emissions Compliance	EPA and CARB Certified
Variable RPM	1500 to 1850

ENVIRONMENTAL

Operating Temperature (°C/°F)	-40 to 72 or -40 to 162
Operating Humidity %	100
Cold Start Aids	Glow Plugs

FUEL SYSTEM

Type	Diesel
Fuel Pump Type	Electrical
Injector Type	Mechanical
Fuel Filtering	Paper element

SOUND EMISSIONS

Contact us for current sound data.

POWER ADJUSTMENT FOR AMBIENT CONDITIONS

Temperature Deration	1% derate for every 5.6 ºC (10 ºF) above 25 ºC (77 ºF)
Altitude Deration	3% derate for every 300 m (1000 ft) above 91 m (300 ft)

WEIGHTS AND DIMENSIONS

Dry Weight (lb/kg)	1242 / 564
Dimensions (LxWxH) (in/cm)	61 x 40 x 45/155 x 102 x 115

ENGINE LUBRICATION SYSTEM

Oil Filter Type	Full flow spin-on canister
Oil Capacity	6.7 L
Oil Pressure Switch	Yes
Oil Pressure Transducer	Optional

ENGINE COOLING SYSTEM

Type	Pressurized Aluminum Radiator
Water Pump	Belt-driven, Pre-lubed, self-sealing
Fan Type	12 V Electric Fans
Fan Quantity	6
CFM	1300
M^3/hr.	2200
Fan Mode	Pusher
Temperature Switch	Yes

FUEL CONSUMPTION

	Output (kW)	gal/hr	L/hr
3TNV88	15	1.02	3.86

POLAR POWER INC.

OPERATING DATA

ENGINE COOLING

System coolant capacity (gal/L)	2.2/8.3
Maximum operation air temperature on radiator (°C/°F)	57/135
Maximum ambient temperature (°C/°F)	60/140

COMBUSTION REQUIREMENTS

Flow at rated power (cfm/cmm)	68/1.92

EXHAUST

Exhaust flow at rated output (cfm/cmm)	135/3.82
Exhaust temperature at rated output (°C/°F)	480/900

CONTROLLER FEATURES

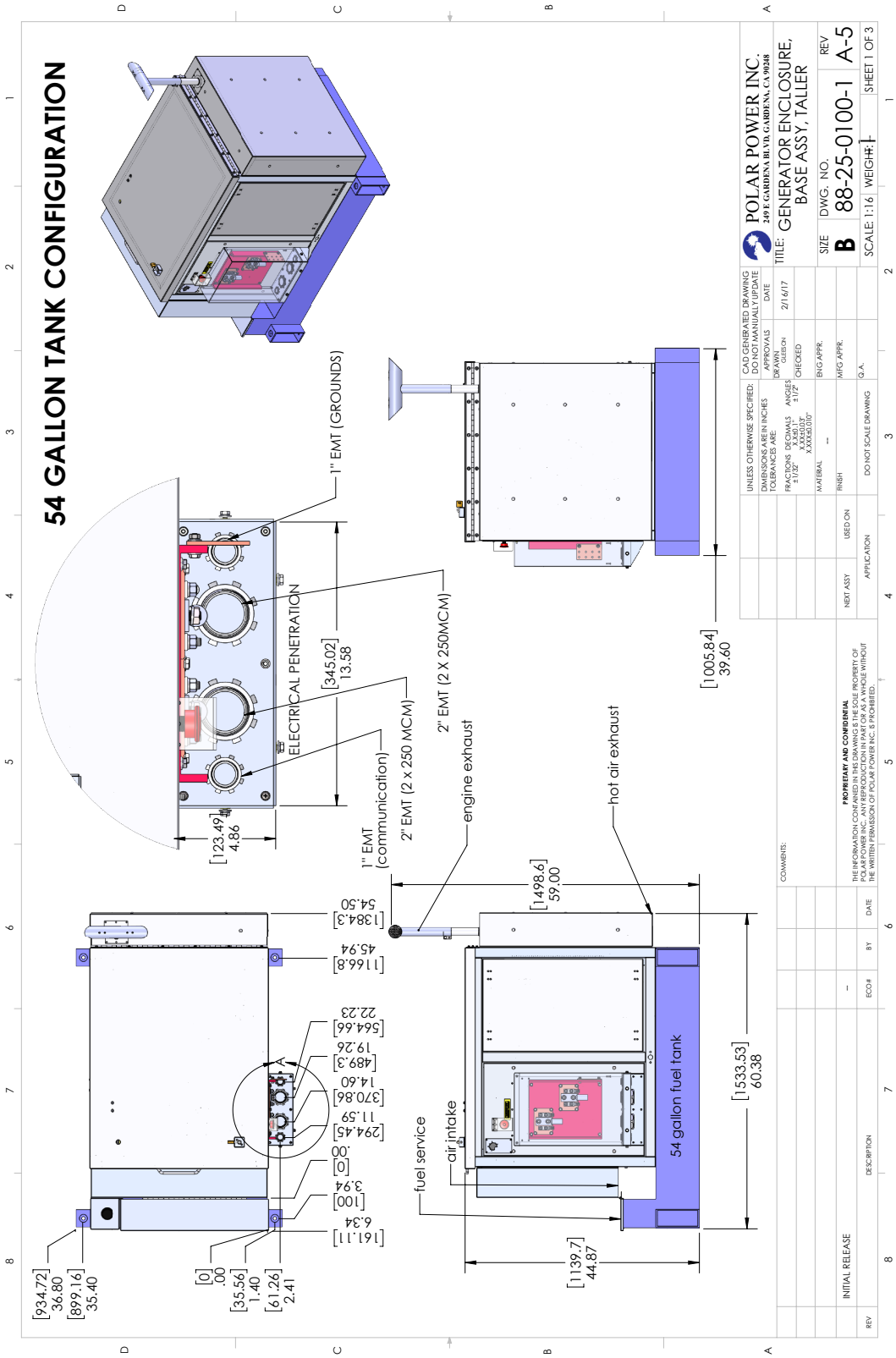
Controller Type.....Supra Model 250
4-Line Plain Text LCD Display.....Simple user interface for ease of operation
Engine Run Hours Indication.....Standard
Programmable Start Delay.....Standard
Run/Alarm/Maintenance Logs.....Standard
Engine Start Sequence.....Cyclic cranking: 5 sec on, 45 sec rest (3 attempts maximum)
Starter Supercapacitor Charger.....Standard
Automatic Voltage Regulation with Over and Under Voltage Protection.....Standard
Automatic Low Oil Pressure/High Oil Temperature Shutdown.....Standard
Overcrank/Overspeed.....Standard
Automatic High Engine Temperature Shutdown.....Standard
Field Upgradeable Firmware.....Standard
Glow Plug Delay .....Automatic With Temperature
Engine Start Delay.....Adjustable, Set at 60 sec
Return to Utility Delay.....Adjustable, Set at 60 sec
Engine Cooldown.....Adjustable, Set at 60 sec
Exerciser.....Programmable, weekly/bi-weekly

WARNING ALARMS

Low Diesel Fuel Level.....Standard
Diesel Fuel Tank Rapture Basin.....Standard
Low/High Supercapacitor Voltage.....Standard
High Water Temperature.....Standard
Low Oil Pressure.....Standard

CONTACT CLOSURE FOR REMOTE INDICATION

Shutdown Alarm.....Standard
Warning Alarm.....Standard
Engine Run.....Standard
Low Diesel Fuel Level.....Standard
Diesel Fuel Leak.....Standard
E-Stop Depressed.....Standard
Fuel Level Over 90%.....Standard


54 GALLON TANK CONFIGURATION
1" EMT (GROUNDS)
ELECTRICAL PENETRATION
2" EMT (2 X 250 MCM)
1" EMT (communication)
2" EMT (2 X 250MCM)
engine exhaust
hot air exhaust
fuel service
air intake
54 gallon fuel tank
[123.49] 4.86
[345.02] 13.58
[1005.84] 39.60
[1498.6] 59.00
[1533.53] 60.38
[1139.7] 44.87
[1384.3] 54.50
[1166.8] 45.94
[564.66] 22.23
[489.3] 19.26
[370.86] 14.60
[294.45] 11.59
[0] .00
[100] 3.94
[161.11] 6.34
[934.72] 36.80
[899.16] 35.40
[0] .00
[35.56] 1.40
[61.26] 2.41
POLAR POWER INC.
249 E GARDENA BLVD, GARDENA, CA 90248
TITLE: GENERATOR ENCLOSURE, BASE ASSY, TALLER
SIZE B
DWG. NO. 88-25-0100-1
REV A-5
SCALE: 1:16
WEIGHT:
SHEET 1 OF 3
CAD GENERATED DRAWING
DO NOT MANUALLY UPDATE
APPROVALS
DRAWN
CHECKED
ENG APPR.
MFG APPR.
Q.A.
DATE
2/16/17
UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONS ±1/32
DECIMALS X.XX ±0.03" X.XXX ±0.010"
ANGLES ±1/2°
MATERIAL --
FINISH --
NEXT ASSY
USED ON
APPLICATION
DO NOT SCALE DRAWING
COMMENTS:
PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF POLAR POWER INC. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF POLAR POWER INC. IS PROHIBITED.
REV
DESCRIPTION
ECO #
BY
DATE
INITIAL RELEASE
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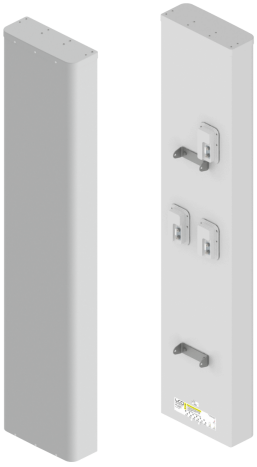
Antennas

MultiPort Series

DATA SHEET

Multi-Band Twelve-Port Antenna

TPA65R-BU8D



- Eight foot (2.4 m) multiband, twelve port antenna with a 65° azimuth beamwidth covering 698-896 MHz and 1695-2400 MHz frequencies
- Eight high band ports covering 1695-2400 MHz and four low band ports covering 698-896 MHz in a single antenna enclosure
- Innovative Low and High Band Array configuration allows for 4T4R (4x4 MIMO) on Low Band and Dual 4T4R (4x4 MIMO) High Band Arrays, using full length arrays (non stacked), all in under a 20.7" (525 mm) width enclosure, an Industry First
- Full Spectrum Compliance for WCS and AWS-3 frequencies and Band 14 Operations
- Array configuration allows for 4T4R (4X4 MIMO) on Low Band, essential for Band 14 Operations
- LTE Optimized FBR and SPR performance, providing for an efficient use of valuable radio capacity
- LTE Optimized Boresight and Sector XPD and USL performance, essential for LTE Performance
- Exceeds minimum PIM performance requirements
- Equipped with new 4.3-10 connector, which is 40% smaller than traditional 7/16 DIN connector
- Equipped with 3 field replaceable, integrated AISG 2.0 compliant Remote Electrical Tilt (RET) Controllers (Type 1 External)
- Ordering options for External RET Controllers (Type 1) or Internally Integraged RET Controllers (Type 17)

Overview

The CCI 12-Port multiband array is a twelve port antenna, with eight wide band ports covering 1695-2400 MHz and four low band ports covering 698-896 MHz. The antenna provides the capability to deploy Dual 4x4 Multiple-input Multiple-output (MIMO) in the high band and 4X4 Multiple-input Multiple-output (MIMO) across low band ports. The CCI 12-Port allows independent tilt control between the low band ports and high band ports and independent tilt control between left and right antenna arrays.

In this three RET configuration, the 1st RET is dedicated for the four Low Band ports. The 2nd RET is dedicated for the four Left High Band ports and the 3th RET is dedicated for the four Right High Band ports. This RET arrangement allows for complete flexibility in coverage control between left and right antenna arrays.

CCI antennas are designed and produced to ISO 9001 certification standards for reliability and quality in our state-of-the-art manufacturing facilities.

Applications

- Dual 4x4 MIMO for the High Band and 4X4 MIMO Low Band ports
- Ready for Network Standardization on 4.3-10 DIN connectors
- With CCI's multiband antennas, wireless providers can connect multiple platforms to a single antenna, reducing tower load, lease expense, deployment time and installation costs

SPECIFICATIONS

Multi-Band Twelve-Port Antenna

TPA65R-BU8D

Electrical

Ports	4 x Low Band Ports for 698-896 MHz	
Frequency Range	698-806 MHz	824-896 MHz
Gain[1]	15.6 dBi	16.6 dBi
Gain (Average)[2]	14.6 dBi	15.6 dBi
Azimuth Beamwidth (-3dB)	74°	63°
Elevation Beamwidth (-3dB)	9.5°	8.0°
Electrical Downtilt	2° to 12°	2° to 12°
Elevation Sidelobes (1st Upper)	<-19 dB	<-18 dB
Front-to-Back Ratio @180°	> 35 dB	> 35 dB
Front-to-Back Ratio ±20°	> 32 dB	> 32 dB
Cross-Polar Discrimination at Peak	> 25 dB	> 25 dB
Cross-Polar Discrimination at Sector[2]	11.2 dB	10.9 dB
Cross-Polar Port-to-Port Isolation	> 25 dB	> 25 dB
Voltage Standing Wave Ratio (VSWR)	< 1.5:1	< 1.5:1
Passive Intermodulation (2x20W)	≤ -153 dBc	≤ -153 dBc
Input Power Continuous Wave (CW)	500 watts	500 watts
Polarization	Dual Linear 45°	Dual Linear 45°
Input Impedance	50 ohms	50 ohms
Lightning Protection	DC Ground	DC Ground

[1]Peak gain across sub-bands.
[2]Electrical specifications follow document "Recommendation on Base Station Antenna Standards" (BASTA) V9.6.

Ports	8 x High Band Ports for 1695-2400 MHz			
Frequency Range	1695-1880 MHz	1850-1990 MHz	1920-2180 MHz	2300-2400 MHz
Gain[1]	18.0 dBi	18.1 dBi	18.3 dBi	18.0 dBi
Gain (Average)[2]	16.7 dBi	17.1 dBi	17.3 dBi	16.8 dBi
Azimuth Beamwidth (-3dB)	71°	67°	67°	62°
Elevation Beamwidth (-3dB)	5.7°	5.1°	4.7°	4.1°
Electrical Downtilt	0° to 8°	0° to 8°	0° to 8°	0° to 8°
Elevation Sidelobes (1st Upper)	<-18 dB	<-18 dB	<-17 dB	<-16 dB
Front-to-Back Ratio @180°	> 35 dB	> 35 dB	> 35 dB	> 35 dB
Front-to-Back Ratio ±20°	> 32 dB	> 32 dB	> 32 dB	> 32 dB
Cross-Polar Discrimination at Peak	> 19 dB	> 18 dB	> 20 dB	> 21 dB
Cross-Polar Discrimination at Sector[2]	11.0 dB	9.1 dB	9.9 dB	8.0 dB
Cross-Polar Port-to-Port Isolation	> 25 dB	> 25 dB	> 25 dB	> 25 dB
Voltage Standing Wave Ratio (VSWR)	< 1.5:1	< 1.5:1	< 1.5:1	< 1.5:1
Passive Intermodulation (2x20W)	≤ -153 dBc	≤ -153 dBc	≤ -153 dBc	≤ -153 dBc
Input Power Continuous Wave (CW)	300 watts	300 watts	300 watts	300 watts
Polarization	Dual Linear 45°	Dual Linear 45°	Dual Linear 45°	Dual Linear 45°
Input Impedance	50 ohms	50 ohms	50 ohms	50 ohms
Lightning Protection	DC Ground	DC Ground	DC Ground	DC Ground

[1]Peak gain across sub-bands.
[2]Electrical specifications follow document "Recommendation on Base Station Antenna Standards" (BASTA) V9.6.

SPECIFICATIONS

Multi-Band Twelve-Port Antenna

TPA65R-BU8D

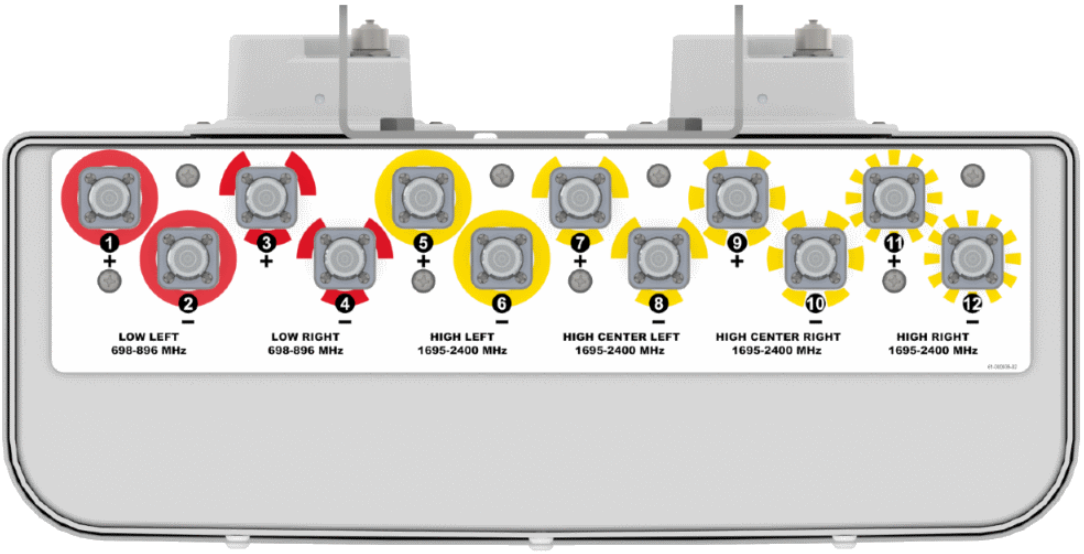
Mechanical

Dimensions (LxWxD)	96.0x20.7x7.7 in (2438x525x197 mm)
Survival Wind Speed	> 150 mph (> 241 kph)
Front Wind Load	457 lbs (2033 N) @ 100 mph (161 kph)
Side Wind Load	209 lbs (929 N) @ 100 mph (161 kph)
Equivalent Flat Plate Area	17.9 ft^2 (1.7 m^2)
Weight *	87.1 lbs (39.5 kg)
Package Dimensions (LxWxD)	104.3x28.7x16.9 in (2650x730x430 mm)
Package Weight	145 lbs (65.8 kg)
Connector	12 x 4.3-10 female
Mounting Pole	2 to 5 in (5 to 12 cm)

** Weight excludes mounting kit*

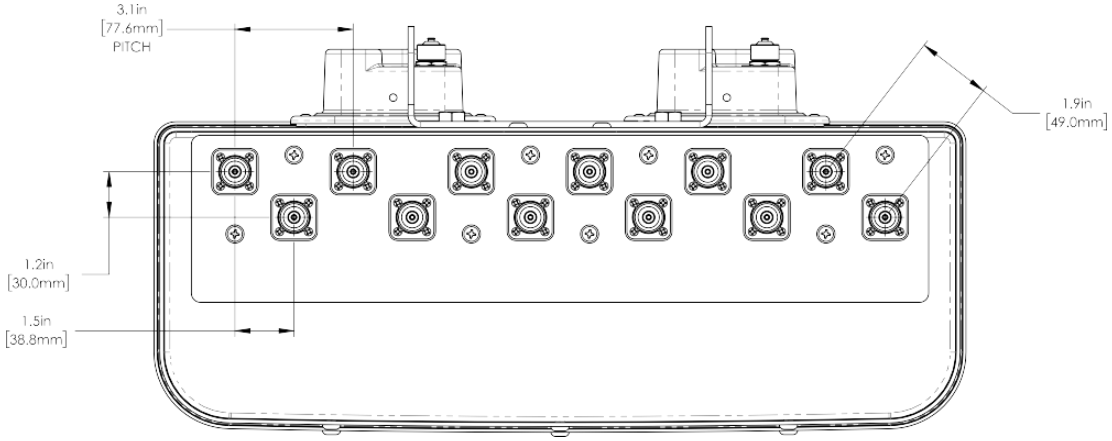
Bottom View

TPA65R-BU8DA



Connector Spacing

TPA65R-BU8DA

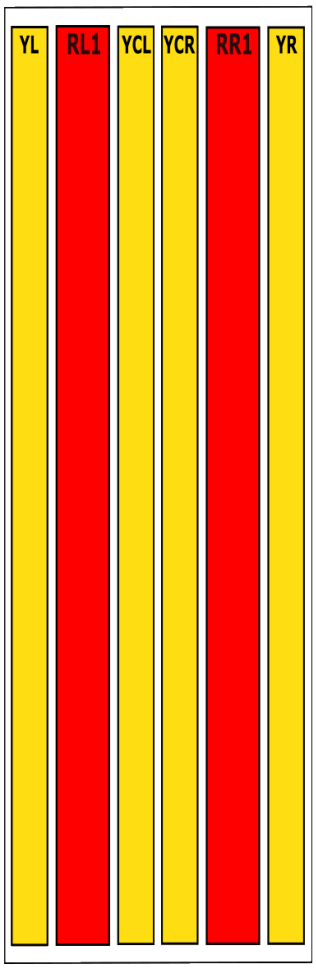


Mechanical

RET to Element Configuration

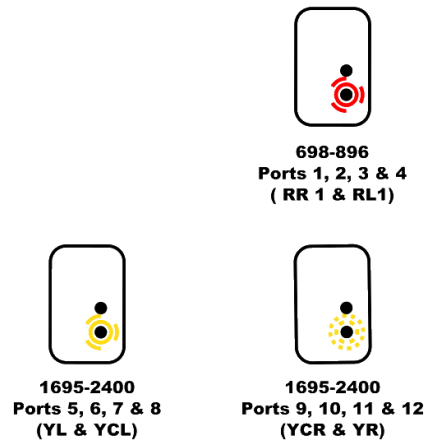
TPA65R-BU8DA Element and RET configuration (Type 1 External RET)

Top of antenna
Viewed from rear



RET placement as viewed from rear of antenna

Top of antenna

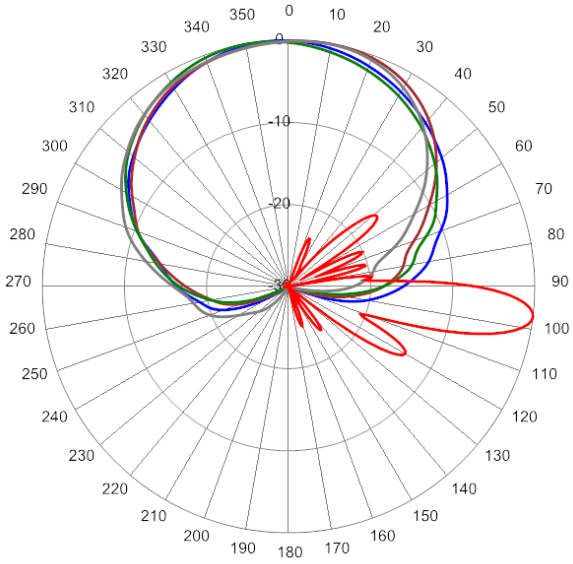


Array	Ports	Freq (MHz)	Ports controlled by common RET
RL1	1, 2	698-896	1, 2, 3, 4
RR1	3, 4	698-896	
YL	5, 6	1695-2400	5, 6, 7, 8
YCL	7, 8	1695-2400	
YCR	9,10	1695-2400	9, 10, 11, 12
YR	11,12	1695-2400	

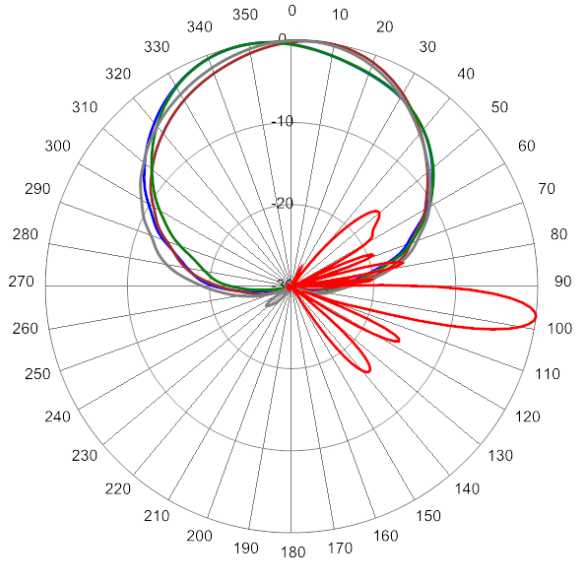
Mechanical

Typical Antenna Patterns

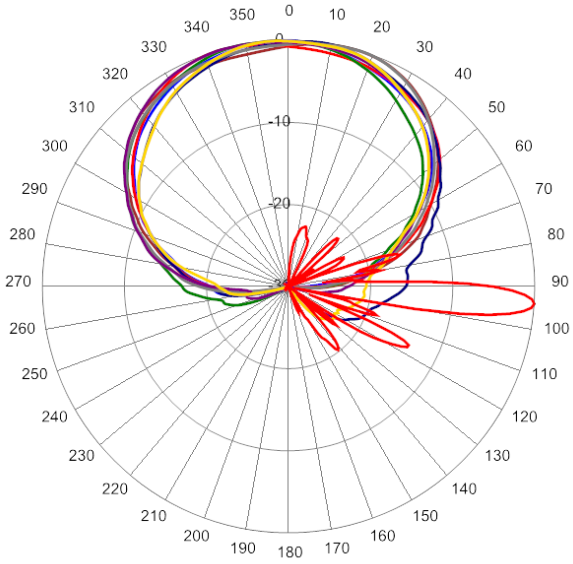
For detailed information on additional antenna patterns, contact customer support at support@cciproducts.com



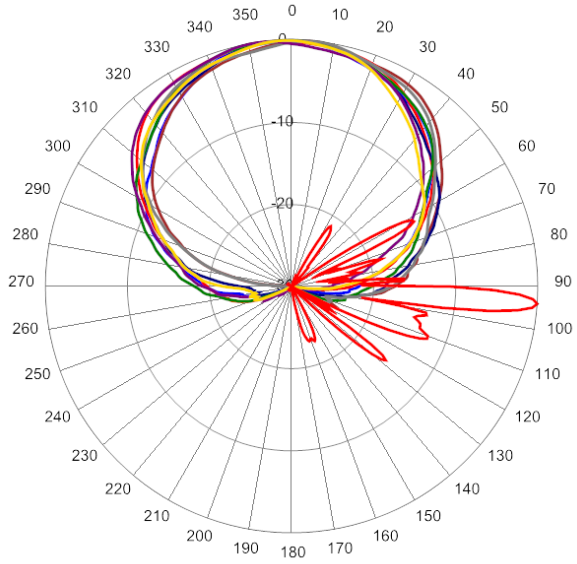
734 MHz Azimuth with Elevation 7°



880 MHz Azimuth with Elevation 7°



1720 MHz Azimuth with Elevation 4°



2155 MHz Azimuth with Elevation 4°

ORDERING

Multi-Band Twelve-Port Antenna

TPA65R-BU8D

Parts & Accessories

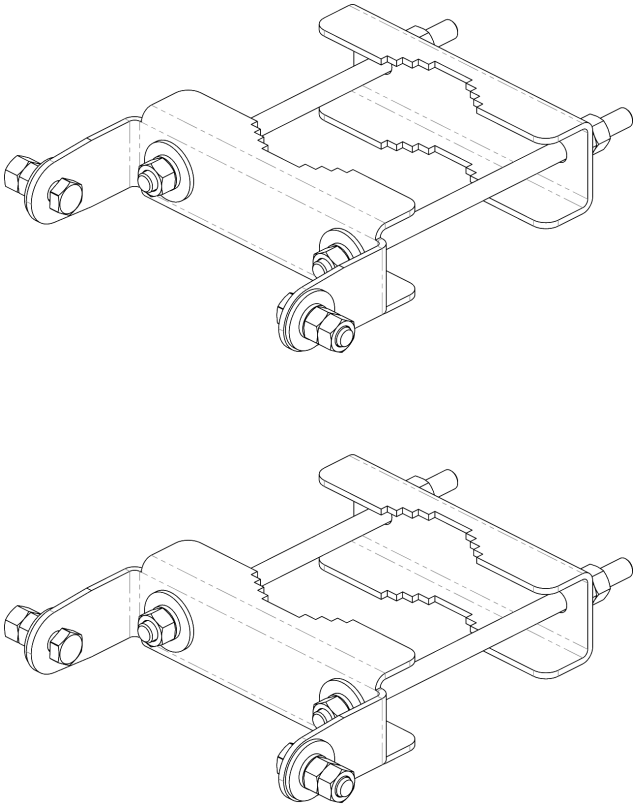
TPA65R-BU8DA-K	Eight foot (2.4 m) antenna with 65° azimuth beamwidth, 4.3-10 female connectors, 3 factory installed BSA-RET200 RET actuators (Type 1 external)and MBK-16 mounting bracket
TPA65R-BU8DB-K	Eight foot (2.4 m) antenna with 65° azimuth beamwidth, 4.3-10 female connectors, 3 factory installed BSA-RET400 RET actuators (Type 17 internal) and MBK-16 mounting bracket
MBK-16	Mounting bracket kit (top and bottom) with fixed 0° mechanical tilt
MBK-01	Mounting bracket kit (top and bottom) with 0° to 10° mechanical tilt adjustment
BSA-RET200	Type 1 Remote electrical tilt actuator
BSA-RET400	Type 17 Remote electrical tilt actuator
DPA-CBK-AG-RRU	Antenna with 3 RET (Type 1) to RRU AISG cable kit
DPA-CBK-RA-AG-RRU	Antenna with 3 RET (Tpye 1)to RRU AISG right angle cable kit
AISGC-M-F-10FT	10 Ft (3 m) Male/Female RRU to Antenna AISG cable

Mounting Bracket Kit

MBK-16

Mechanical

Weight	9.9 lbs (4.5 kg)
Hinge Pitch	47.25 in (1200 mm)
Mounting Pole Dimension	2 to 5 in (5 to 12 cm)
Fastener Size	M12
Installation Torque	40 ft·lbs (54 N·m)
Mechanical Tilt	0°



MBK-16 Top and Bottom Bracket

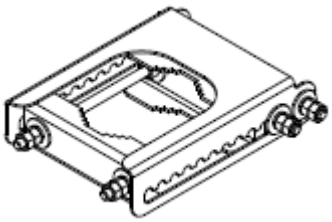
MultiPort Series

Mounting Bracket Kit

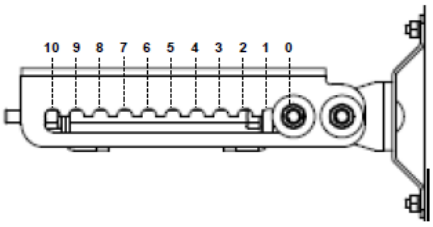
MBK-01

Mechanical

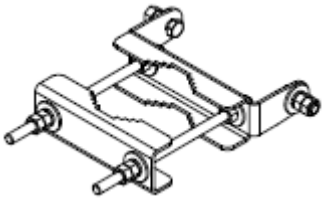
Weight	12.6 lbs (5.7 kg)
Hinge Pitch	47.25 in (1200 mm)
Mounting Pole Dimension	2 to 5 in (5 to 12 cm)
Fastener Size	M12
Installation Torque	40 ft·lb (54 N·m)
Mechanical Tilt Adjustment	0° - 10°



MBK-01 Top Adjustable Bracket



MBK-01 Top Adjustable Bracket Side View



MBK-01 Bottom Fixed Bracket

MultiPort Series

Remote Electrical Tilt Actuator (RET)

BSA-RET200

General Specifications

Part Number	BSA-RET200
Protocols	AISG 2.0
RET Type	Type 1
Adjustment Cycles	>10,000 cycles
Tilt Accuracy	±0.1°
Temperature Range	-40° C to 70° C

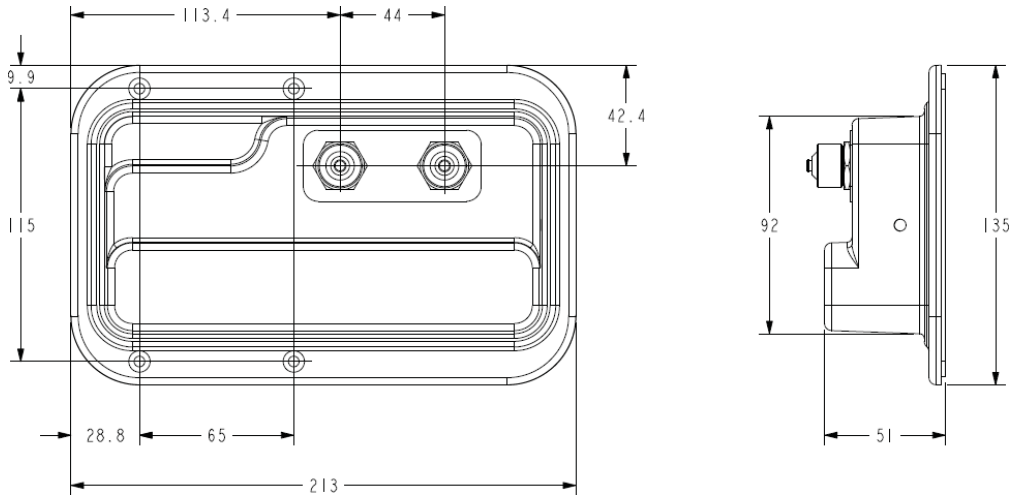
Electrical

Data Interface Signal	DC
Input Voltage	10-30 Vdc
Current Consumption Tilt	120 mA at V_{in}=24
Current Consumption Idle	55 mA at V_{in}=24
Hardware Interface	AISG-RS 485 A/B
Input Connector	Male 1 x 8 pin Daisy Chain
Output Connector	Female 1 x 8 pin Daisy Chain

Mechanical

Dimensions (LxWxD)	8.0x5.0x2.0 in. (213x135x51 mm)
Housing	ASA/ABS/Aluminum
Weight	1.7 lbs (0.75 kg)

ASA= Acrylic Styrene Acrylonitrile
ABS=Acrylanitrile Butadiene Styrene



Internal Remote Electrical Tilt (iRET)

General Specifications

Part Number	BSA-RET400
Protocols	AISG 2.0
RET Type	Type 17
Adjustment Cycles	>10,000 cycles
Tilt Accuracy	±0.1°
Temperature Range	-40° C to 70° C

Electrical

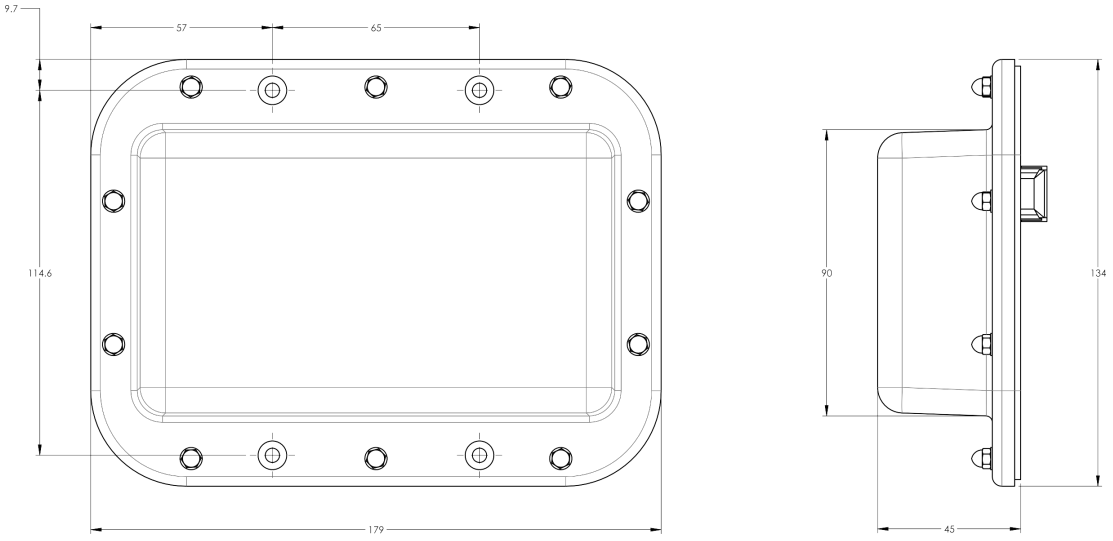
Data Interface Signal	DC
Input Voltage	10-30 Vdc
Current Consumption Tilt	100 mA at V_{in}=24 (500 mA MAX)
Current Consumption Idle	10 mA at V_{in}=24

Mechanical

Dimensions (LxWxD)	7.0x5.3x1.8 in. (179x134x45 mm)
Housing	ASA/ABS/Aluminum
Weight	1.3 lbs (0.6 kg)

ASA= Acrylic Styrene Acrylonitrile

ABS=Acrylanitrile Butadiene Styrene



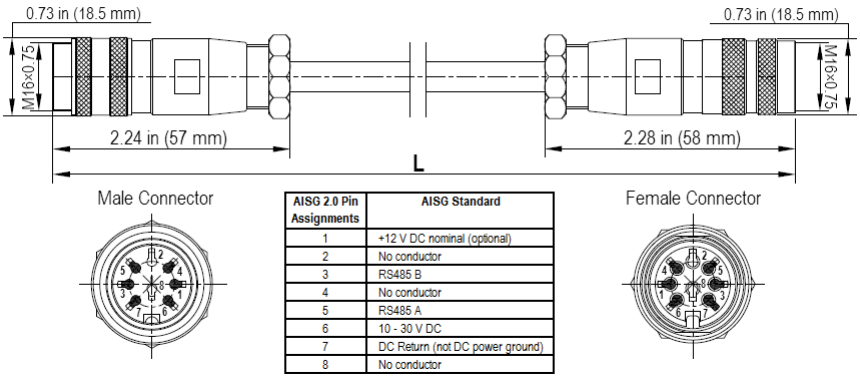
AISG Cable Kit

DPA-CBK-AG-RRU

Electrical/Mechanical/Environmental Specifications

	RET to RET Cables	RRU to Antenna Cables
Individual Cable Part Number	AISGC-M-F-27	AISGC-M-F-10FT
Cable style	UL2464	
Protocol	AISG 1.1 and AISG 2.0	
Maximum voltage	300 V	
Rated current	5 A at 104° F (40° C)	
Temperature Range	-40° to 80° C	
Flammability	UL 1581 VW-1	
Ingress Protection	IEC 60529:2001, IP67	
Tightening torque	Hand tighten only ≈ 1.84 ft-lbs (2.5 N·m)	
Construction	Shielded (Tinned Copper Braid)	
Braid coverage	85%	
Jacket Material	Matte Polyurethane (Black)	
Conductors	1 twisted pair - 24 AWG 3 conductors - 19 AWG AWM style 2464	
Cable Diameter	0.307 in (7.8 mm)	
Minimum bend radius	3.9 in (100 mm)	
Connectors	2 x 8 pin IEC 60130-9 Straight male/straight female	
Length	27 in (686 mm)	120 in (3048 mm)
Weight	0.33 lbs (0.15 kg)	0.69 lbs (0.31 kg)
Cables per kit	2	2

Mechanical Specifications



AISG 2.0 Pin Assignments	AISG Standard
1	+12 V DC nominal (optional)
2	No conductor
3	RS485 B
4	No conductor
5	RS485 A
6	10 - 30 V DC
7	DC Return (not DC power ground)
8	No conductor

AISG-Male to AISG-Female Jumper Cable

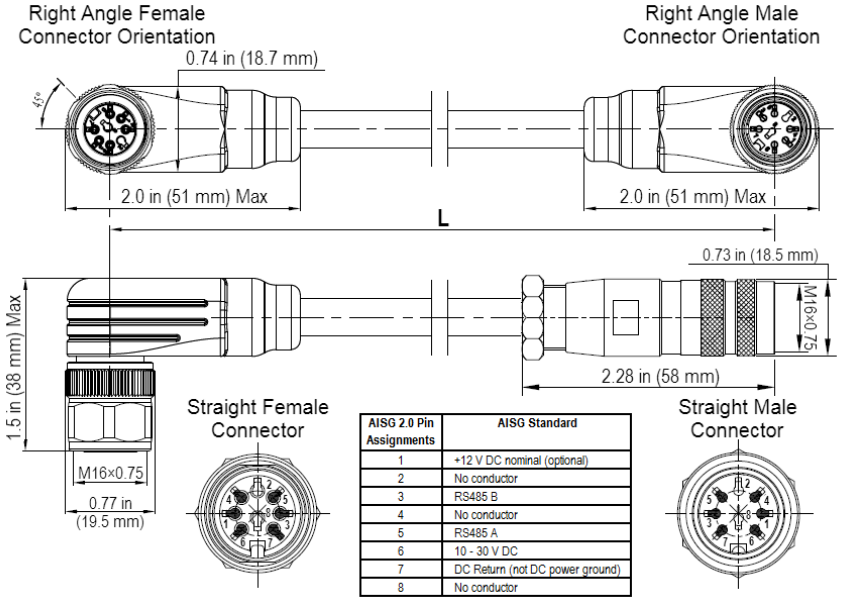
AISG Cable Kit

DPA-CBK-RA-AG-RRU

Electrical/Mechanical/Environmental Specifications

	RET to RET Cables	RRU to Antenna Cables
Individual Cable Part Number	AISGC-MRA-FRA-36	AISGC-M-FRA-10FT
Cable style	UL2464	
Protocol	AISG 1.1 and AISG 2.0	
Maximum voltage	300 V	
Rated current	5 A at 104° F (40° C)	
Temperature Range	-40° to 80° C	
Flammability	UL 1581 VW-1	
Ingress Protection	IEC 60529:2001, IP67	
Tightening torque	Hand tighten only ≈ 1.84 ft-lbs (2.5 N·m)	
Construction	Shielded (Tinned Copper Braid)	
Braid coverage	85%	
Jacket Material	Matte Polyurethane (Black)	
Conductors	1 twisted pair - 24 AWG 3 conductors - 19 AWG AWM style 2464	
Cable Diameter	0.307 in (7.8 mm)	
Minimum bend radius	3.9 in (100 mm)	
Connectors	2 x 8 pin IEC 60130-9 Right angle male/right angle female	2 x 8 pin IEC 60130-9 Straight male/right angle female
Length	36 in (914 mm)	120 in (3048 mm)
Weight	0.23 lbs (0.10 kg)	0.77 lbs (0.35 kg)
Cables per kit	2	2

Mechanical Specifications



AISG 2.0 Pin Assignments	AISG Standard
1	+12 V DC nominal (optional)
2	No conductor
3	RS485 B
4	No conductor
5	RS485 A
6	10 - 30 V DC
7	DC Return (not DC power ground)
8	No conductor

Right Angle to Right Angle and Right Angle to Straight Jumper Cable

AISG Cable

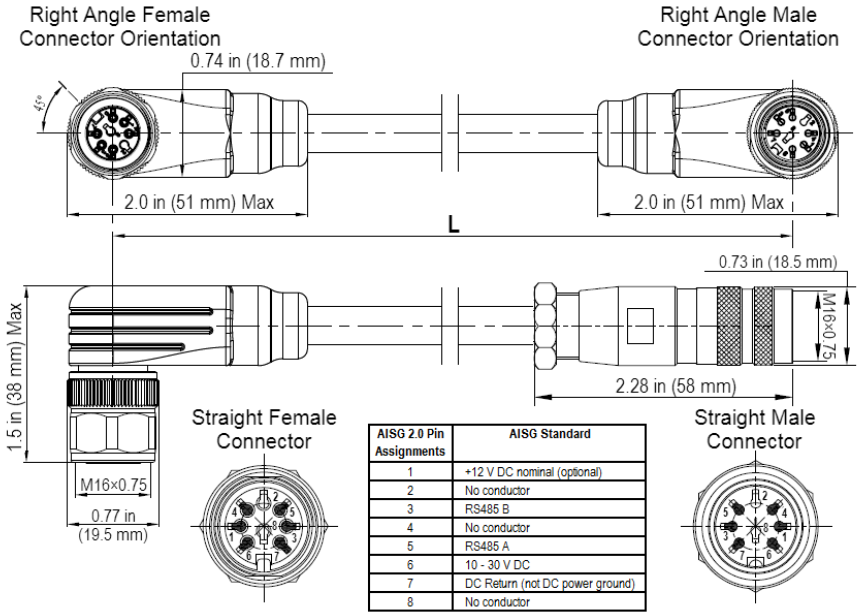
AISGC-M-F-xFT

Electrical Specifications

Individual Cable Part Number	AISGC-M-F-x(FT)
Cable style	UL2464
Protocol	AISG 1.1 and AISG 2.0
Maximum voltage	300 V
Rated current	5 A at 104° F (40° C)

Mechanical Specifications

Individual Cable Part Number	AISGC-M-F-x(FT)
Cables per kit	1
Connectors	2 x 8 pin IEC 60130-9 Straight male/straight female
Tightening torque	Hand tighten only ≈ 1.84 ft-lbs (2.5 Nm)
Construction	Shielded (Tinned Copper Braid)
Braid coverage	85%
Jacket Material	Matte Polyurethane (Black)
Conductors	1 twisted pair - 24 AWG 3 conductors - 19 AWG AWM style 2464
Cable Diameter	0.307 in (7.8 mm)
Length	See order details
Minimum bend radius	3.15 in (80 mm)



AISG 2.0 Pin Assignments	AISG Standard
1	+12 V DC nominal (optional)
2	No conductor
3	RS485 B
4	No conductor
5	RS485 A
6	10 - 30 V DC
7	DC Return (not DC power ground)
8	No conductor

AISG-Male to AISG-Female Jumper Cable

Environmental Specifications

Individual Cable Part Number	AISGC-M-F-xFT
Temperature Range	-40° to 80° C
Flammability	UL 1581 VW-1
Ingress Protection	IEC 60529:2001, IP67

STANDARDS & CERTIFICATIONS

Standards & Compliance

Safety	EN 60950-1, UL 60950-1
Emission	EN 55022
Immunity	EN 55024
Environmental	IEC 60068-2-1, IEC 60068-2-2, IEC 60068-2-5, IEC 60068-2-6, IEC-60068-2-11, IEC 60068-2-14, IEC 60068-2-18, IEC 60068-2-27, IEC 60068-2-29, IEC 60068-02-30, IEC 60068-2-52, IEC 60068-2-64, GR-63-CORE 4.3.1, EN 60529, IP 24

Certifications

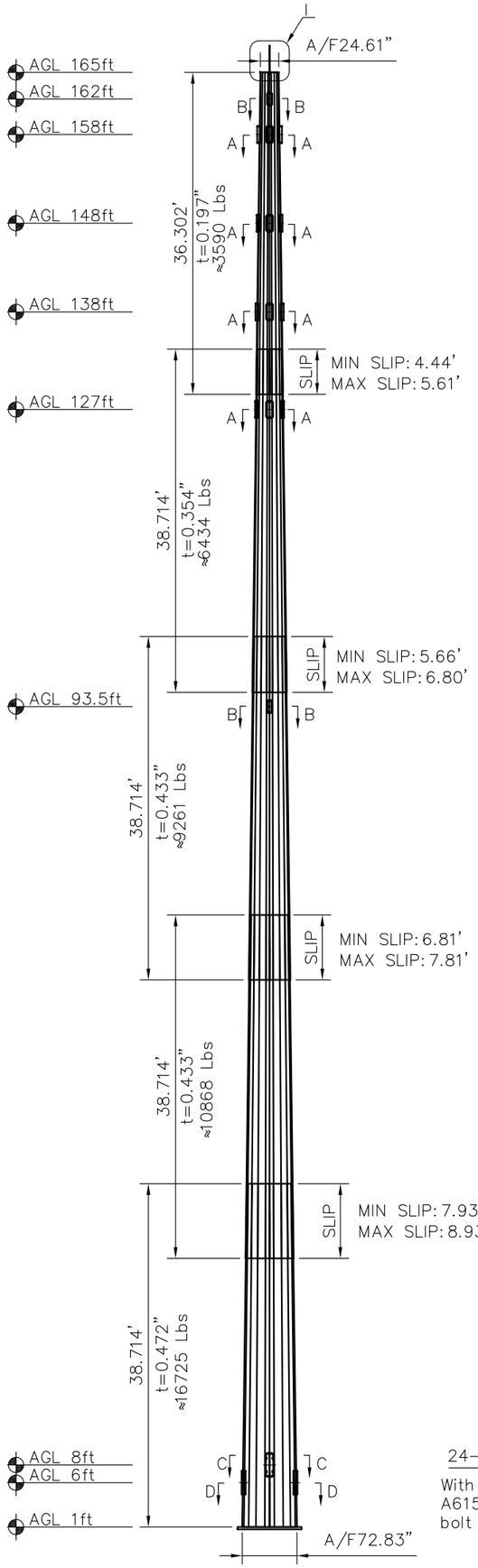
Antenna Interface Standards Group (AISG), Federal Communication Commission (FCC) Part 15 Class B, CE, CSA US, ISO 9001

HOMELAND TOWERS

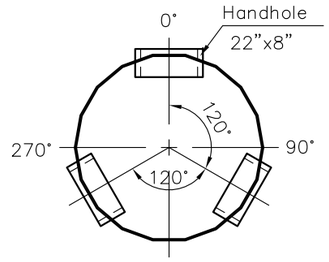
EXHIBIT B

(Geotech and Tower/Foundation Structural)

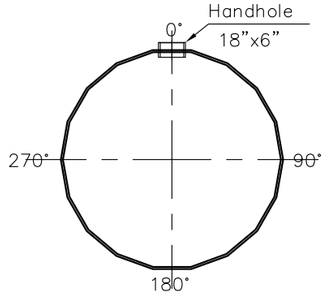
C21004005B
QUOTATION #



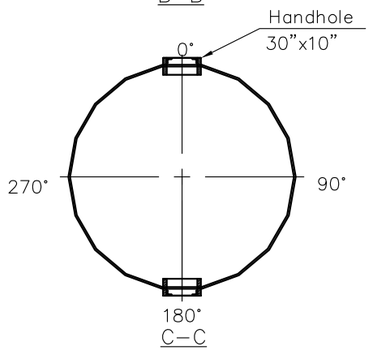
*AGL stands for Above ground line



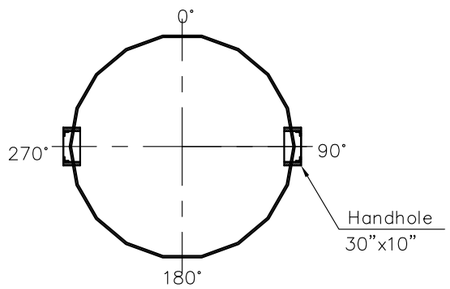
A–A



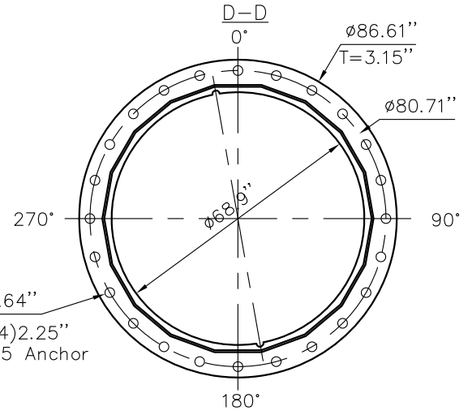
B–B



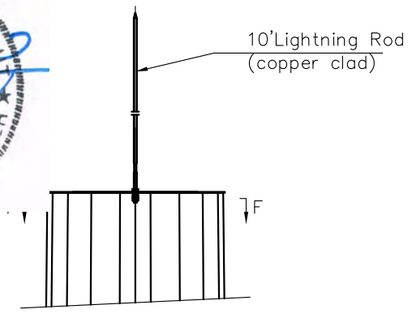
C–C



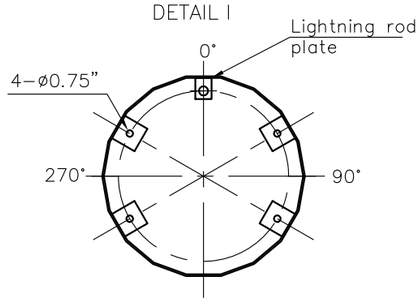
D–D



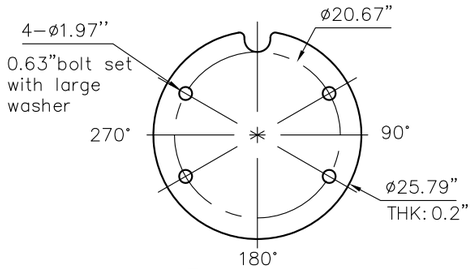
BASEPLATE



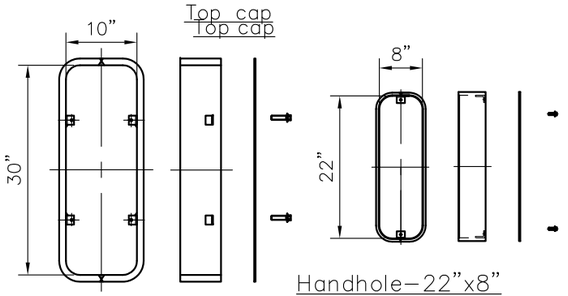
DETAIL I



F–F

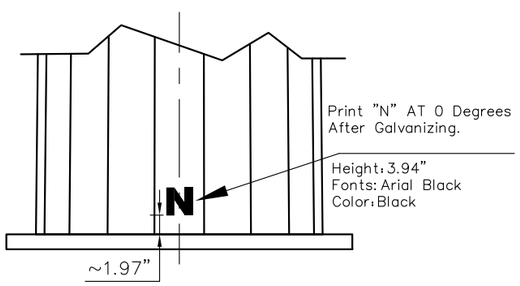


Top cap



Handhole 30"x10"

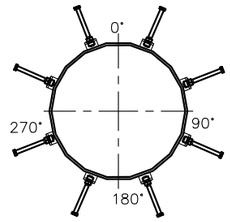
Handhole–22"x8"



Orientation Mark

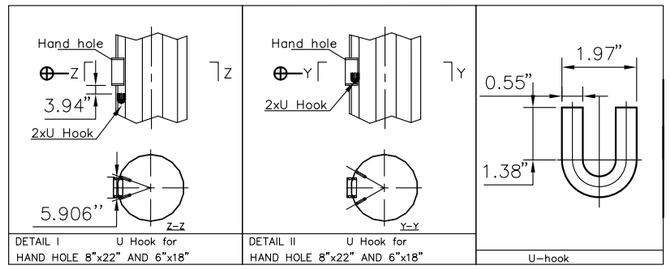
Tower Notes:

1. Material:
   Pole shaft: ASTM A572 GR65
   Baseplate: GR50 or Q355B; Top Flange: Q235B
2. Pole section has 18 sides
3. Finished: Galvanizing per ASTM A123
   Lightning Rod will be copper–clad
4. All fasteners will be with matric unit according to Chinese standard GB 5783/5782.



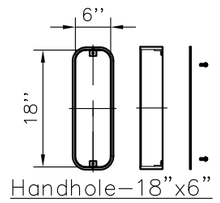
Work Steps and Climbing System Detail

1. Climbing System is centered at 40 Degrees –detail found on separate drawing.
2. Working steps are placed ~55"–67" below the appurtenance access center. Extra step bolts are placed~ 71"above working working steps for convenience.
3. Working steps (6~8) at the same elevation may not be evenly spaced.



1.U Hook use detail I as priority,if conflicts with slip joint, then use detail II.

Please refer to separate drawing for step bolts with safety system



Handhole–18"x6"

Site No.: CT076
Site name: Brookfield South
Site Coordinates: 41°26'08.94"N 73°23'57.56"W
Site Address: 60 Vale Rd.,Brookfield,CT

NO	PART NO.	DESCRIPTION	WEIGHT	QTY
7		Handhole 18"x6"		2
6		10'Steel Lightning Rod		1
5		Safety Device		TBD
4		Step Bolts		1
3		Handhole 22"x8"		12
2		Hand Hole 30"x10"		4
1		Pole		1

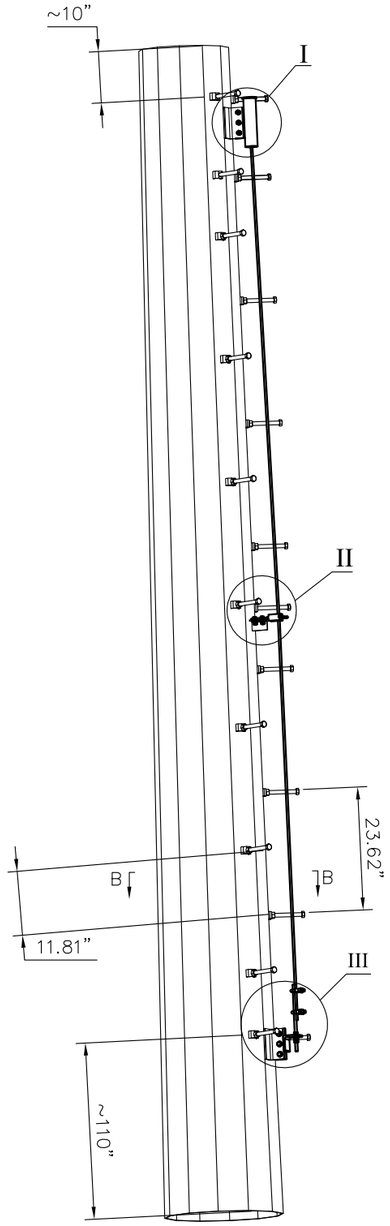
Ambor Structures
amborstructures.com

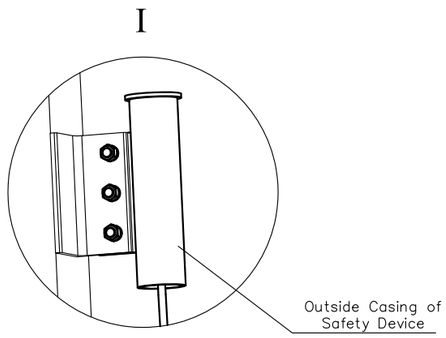
CLIENT	Homeland Towers					
TITLE	165ft.120mph TIA H					
DRAWN	ZHJ	2023/03/02	MATERIAL		MANUFACTURING ORDER	
ENGR	ZHJ	2023/03/02	THK(mm)			
CHECKED	JW	2023/03/02	WT(kg)		VERSION: A	
SPECIFICATIONS			SCALE			

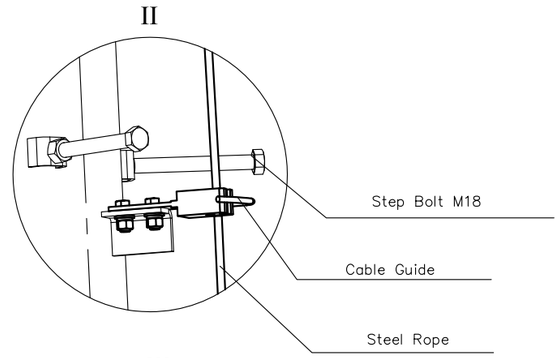
REV ID	DATE	REVISION DESCRIPTION
A		

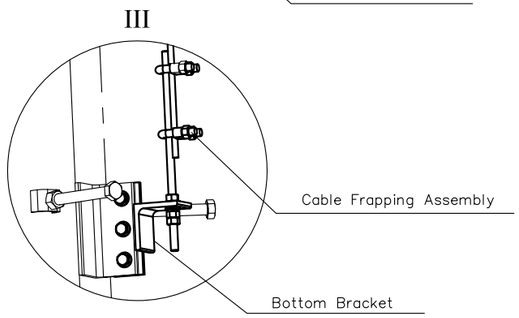
STATE OF CONNECTICUT
MICHAEL T. DE BOER
No. 18022
LICENSED PROFESSIONAL ENGINEER
03/09/2023

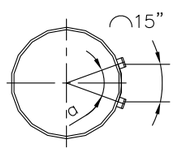
C21004005B
QUOTATION #











B–B

Note:

1. Arc length between two sides step bolt brackets is around 15". The angle "a" will be no bigger than 120°
2. Vertical distance between two step bolts on same side is around 23.62"
3. Vertical distance between two step bolts on different sides is around 11.81"
4. All fasteners will be with metric unit per Chinese standard GB 5783/5782.

03/09/2023

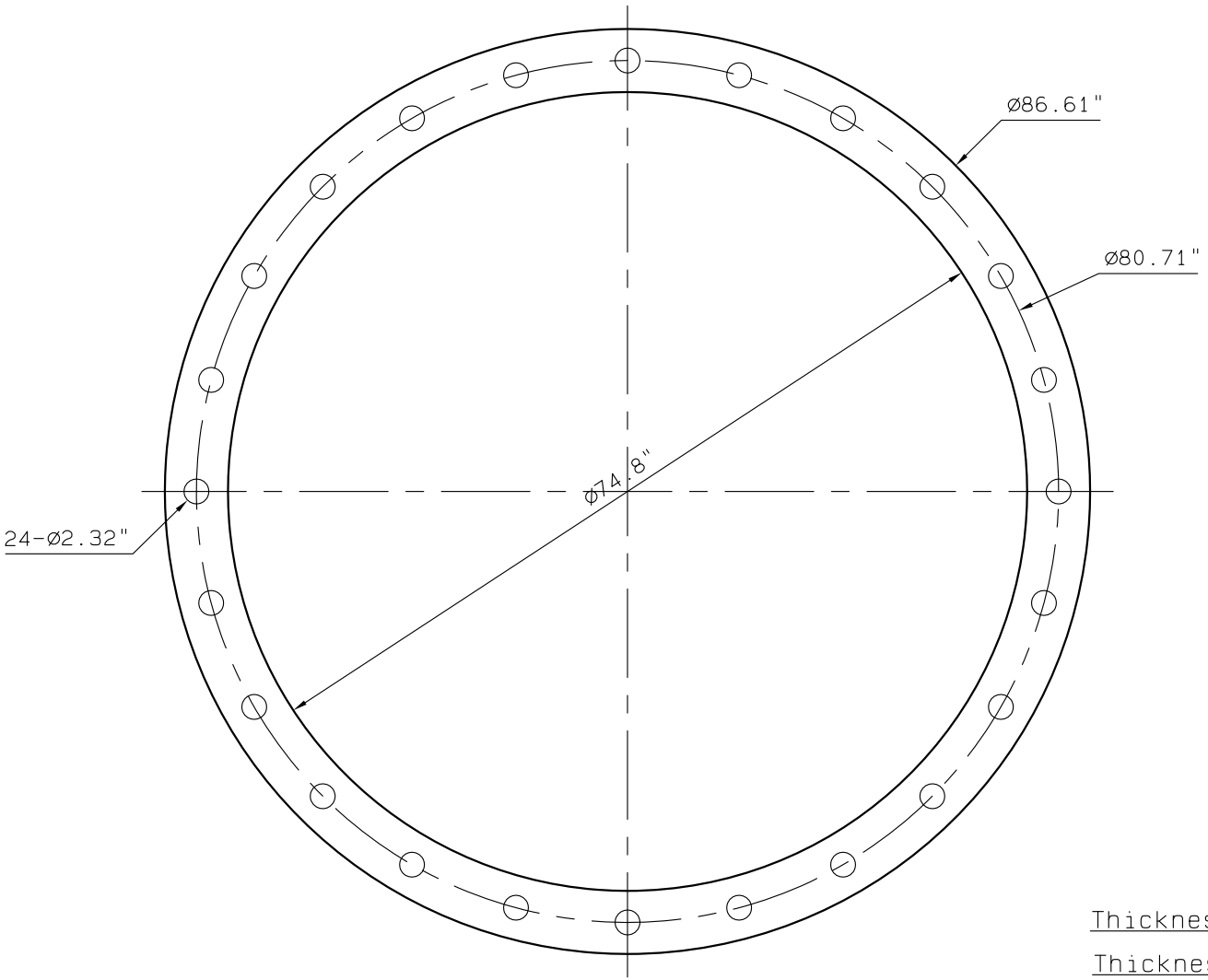
Site No.: CT076
Site name: Brookfield South
Site Coordinates: 41°26'08.94"N 73°23'57.56"W
Site Address: 60 Vale Rd.,Brookfield,CT

AMBOR
上海安伯工业设备有限公司
Shanghai Ambor Manufacturing Ltd.
www.ambor.cn

CLIENT	
TITLE	Step Bolts with Safety System

			DRAWN	ZHJ 2019/10/15	MATERIAL		MANUFACTURING ORDER	
			ENGR		THK(mm)			
A			CHECKED		WT(kg)		VERSION: A	
REV ID.	DATE	REVISION DESCRIPTION	SPECIFICATIONS		SCALE			

C21004005B
QUOTATION #



03/09/2023

Thickness of top template: 3/8" A36 or above

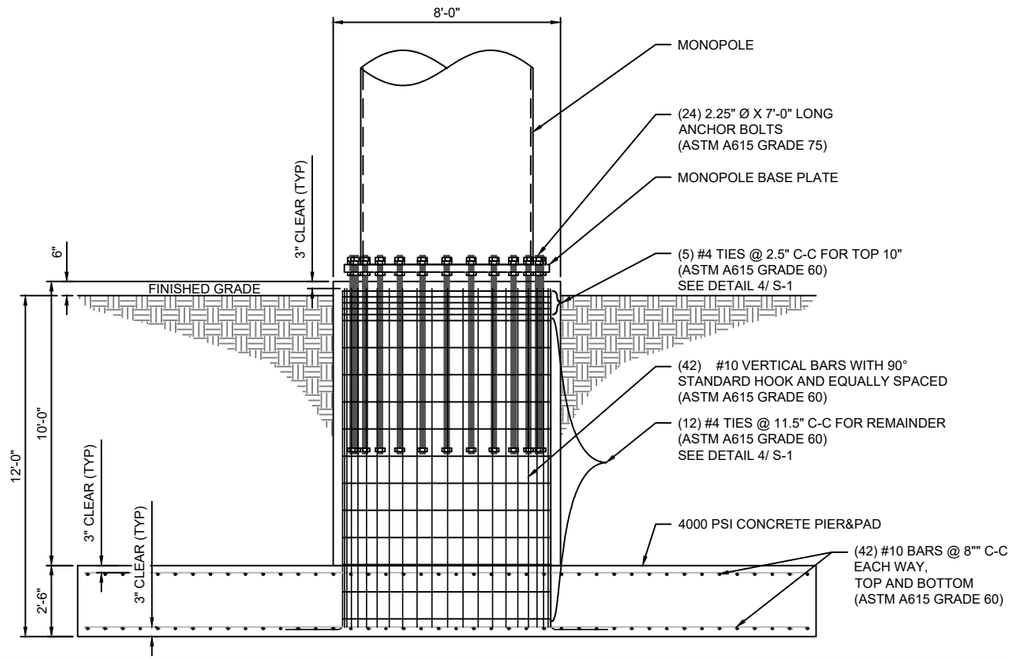
Thickness of bottom template: 1/2" A36 or above

Site No.: CT076
Site name: Brookfield South
Site Coordinates: 41°26'08.94"N 73°23'57.56"W
Site Address: 60 Vale Rd., Brookfield, CT

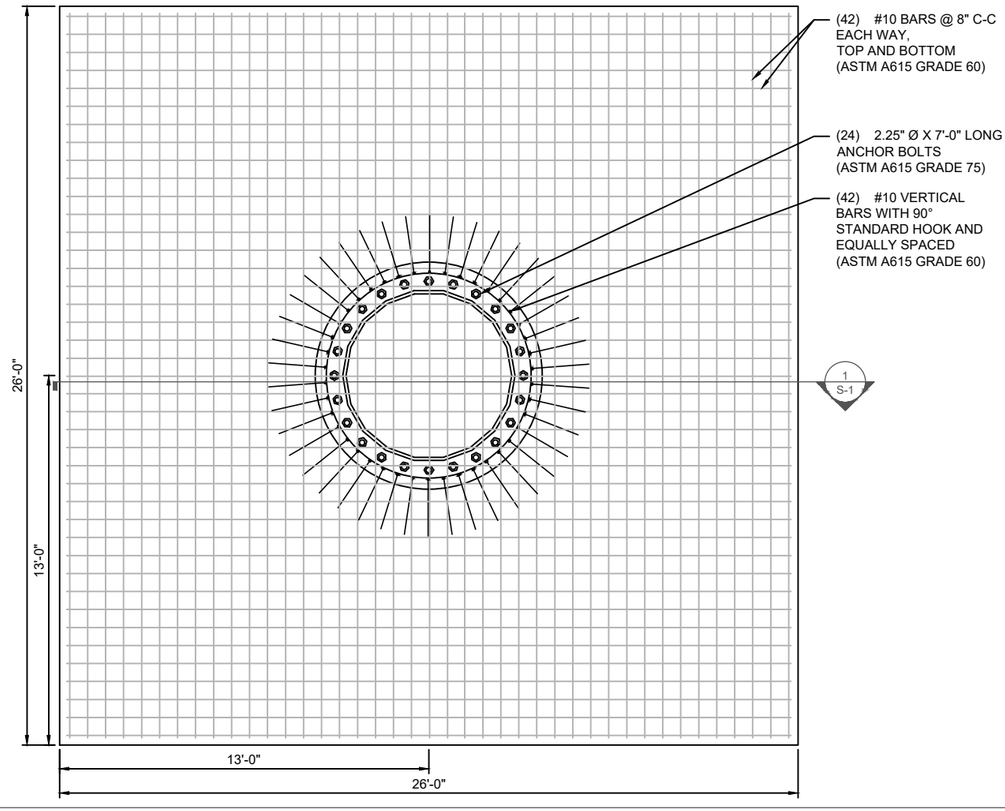
REV	ID	DATE	REVISION DESCRIPTION
A			

Ambor Structures
amborstructures.com

CLIENT	Homeland Towers					
TITLE	Template for 165ft.120mph TIA H					
DRAWN	ZHJ	2023/03/02	MATERIAL		MANUFACTURING ORDER	
ENGR	ZHJ	2023/03/02	THK (mm)			
CHECKED	JW	2023/03/02	WT (kg)		VERSION: A	
SPECIFICATIONS			SCALE			



1 PIER/PAD FOUNDATION ELEVATION N.T.S.



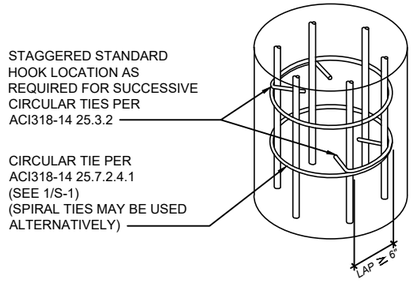
3 PIER/PAD FOUNDATION PLAN N.T.S.

1. FOUNDATION DESIGNED PER 2022 CONNECTICUT STATE BUILDING CODE AND PER SOIL REPORT PREPARED BY WELTI GEOTECHNICAL, P.C. DATED 02/08/23.
2. CONCRETE SHALL BE 4000 P.S.I. (MINIMUM) @ 28 DAYS COMPRESSIVE STRENGTH.
3. FOUNDATION INSTALLATION SHALL BE OBSERVED BY AN ENGINEER FROM WELTI GEOTECHNICAL, P.C.
4. PAD AND PIER FOUNDATION INSTALLATION SHALL BE OBSERVED IN ACCORDANCE WITH THE APPLICABLE CODES.
5. ALL REINFORCING SHALL BE A.S.T.M. A615 GRADE 60.
6. REFER TO SOIL REPORT FOR PROPER PREPARATION AND INSTALLATION REQUIREMENTS.
7. TOP OF CONCRETE TO BOTTOM OF LEVELING NUT SHALL NOT EXCEED 1.0 TIMES BOLT DIAMETER.
8. SPECIAL INSPECTIONS SHALL BE PERFORMED DURING INSTALLATION AND TESTING OF CAST-IN-PLACE FOUNDATION ELEMENTS AS REQUIRED BY THE 2022 CONNECTICUT STATE BUILDING CODE.
9. CONTRACTOR IS RESPONSIBLE FOR SHORING WORK ETC.

2 NOTES

SOIL PARAMETERS (PER REFERENCED GEO REPORT IN NOTE 1):

Soil Property/Parameter	Value
Soil Unit Weight (Backfill)	120 pcf
Soil Unit Weight (Natural)	120 pcf
Soil Unit Weight Submerged (Natural)	58 pcf
Angle of Internal Friction (φ)	30°
Cohesion	0
Pull Out Angle from Vertical	30°
Sliding Coefficient	0.6
Frost Protection Depth (by code)	3.5 feet
Allowable Soil Bearing Pressure on the natural soil inorganic at 6+ feet below the existing grade	2.0 Tons/sf



4 TIE BAR DETAIL N.T.S.

TEMPLATE NAME: BASE TEMPLATE

AMBER STRUCTURES

CELLSITE SOLUTIONS, LLC
4150 C STREET SW
CEDAR RAPIDS, IA

SITE NAME:
BROOKFIELD CT

ADDRESS:
60 VALE ROAD
BROOKFIELD, CT

STATE OF CONNECTICUT
MICHAEL T. DE BOER
No. 18022
LICENSED
PROFESSIONAL ENGINEER

03/09/2023

CALL CONNECTICUT ONE CALL
(800) 922-4455 CBYD.COM
CALL 2 WORKING DAYS
BEFORE YOU DIG!

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	03/07/23	BA	FOUNDATION DRAWING	

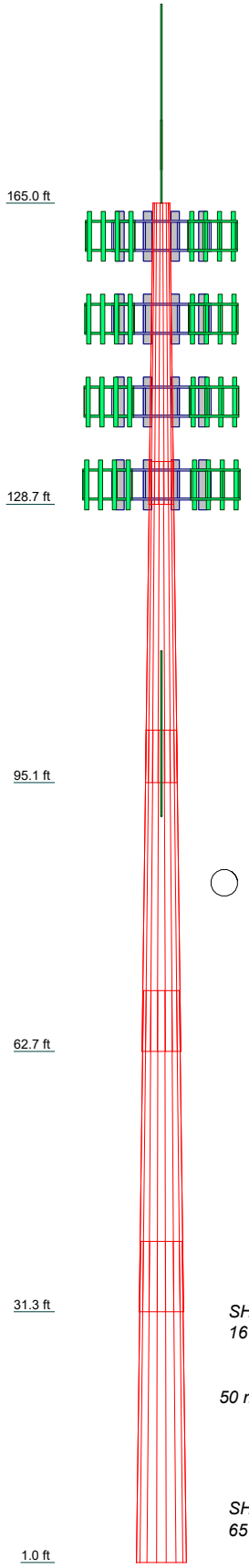
DRAWING TITLE

PIER/PAD FOUNDATION DETAILS

SHEET NUMBER:

S-1

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	36.30	18	0.197	5.11	24.606	35.909	A572-65	2.3
2	38.71	18	0.354	6.30	33.924	45.978		5.9
3	38.71	18	0.433	7.32	43.307	55.361		8.9
4	38.71	18	0.433	8.43	52.217	64.271		10.5
5	38.71	18	0.472		60.781	72.835		13.1
								40.6



ALL REACTIONS ARE FACTORED

AXIAL 200 K

SHEAR 16 K

MOMENT 2091 kip-ft

TORQUE 1 kip-ft

50 mph WIND - 1.000 in ICE

AXIAL 168 K

SHEAR 65 K

MOMENT 8815 kip-ft

TORQUE 2 kip-ft

REACTIONS - 120 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Omni Antenna 22'	179	200sq ft	141
Lightning Rod 10ft	165	200sq ft	131
200sq ft	161	Omni Antenna 22'	101
200sq ft	151		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-H Standard.
3. Tower designed for a 120 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. Installation per TIA/EIA-222 and AISC Specifications.
9. Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
10. TOWER RATING: 94.6%

Cellsite Solutions, LLC
4150 C Street SW
Cedar Rapids, IA 52404
Phone: 319-826-3404
FAX:

Job: ***165ft.120mph TIA H***			
Project: ***CT076 Brookfield South***			
Client: Homeland Towers	Drawn by: mike.deboer	App'd:	
Code: TIA-222-H	Date: 03/09/23	Scale: NTS	
Path:		Dwg No. E-1	

Tower Input Data

The tower is a monopole.
This tower is designed using the TIA-222-H standard.
The following design criteria apply:

- Tower is located in Fairfield County, Connecticut.
- Tower base elevation above sea level: 298.00 ft.
- Basic wind speed of 120 mph.
- Risk Category II.
- Exposure Category C.
- Simplified Topographic Factor Procedure for wind speed-up calculations is used.
- Topographic Category: 1.
- Crest Height: 0.00 ft.
- Nominal ice thickness of 1.000 in.
- Ice thickness is considered to increase with height.
- Ice density of 56.00 pcf.
- A wind speed of 50 mph is used in combination with ice.
- Temperature drop of 50.00 °F.
- Deflections calculated using a wind speed of 60 mph.
- Installation per TIA/EIA-222 and AISC Specifications..
- Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards..
- A non-linear (P-delta) analysis was used.
- Pressures are calculated at each section.
- Stress ratio used in pole design is 1.
- Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

	Consider Moments - Legs		Distribute Leg Loads As Uniform		Use ASCE 10 X-Brace Ly Rules
	Consider Moments - Horizontals		Assume Legs Pinned		Calculate Redundant Bracing Forces
	Consider Moments - Diagonals	√	Assume Rigid Index Plate		Ignore Redundant Members in FEA
	Use Moment Magnification	√	Use Clear Spans For Wind Area		SR Leg Bolts Resist Compression
√	Use Code Stress Ratios	√	Use Clear Spans For KL/r		All Leg Panels Have Same Allowable
√	Use Code Safety Factors - Guys		Retension Guys To Initial Tension		Offset Girt At Foundation
	Escalate Ice	√	Bypass Mast Stability Checks		Consider Feed Line Torque
	Always Use Max Kz	√	Use Azimuth Dish Coefficients		Include Angle Block Shear Check
	Use Special Wind Profile	√	Project Wind Area of Appurt.		Use TIA-222-H Bracing Resist. Exemption
	Include Bolts In Member Capacity		Autocalc Torque Arm Areas		Use TIA-222-H Tension Splice Exemption
	Leg Bolts Are At Top Of Section		Add IBC .6D+W Combination		Poles
	Secondary Horizontal Braces Leg		Sort Capacity Reports By Component	√	Include Shear-Torsion Interaction
	Use Diamond Inner Bracing (4 Sided)		Triangulate Diamond Inner Bracing		Always Use Sub-Critical Flow
	SR Members Have Cut Ends		Treat Feed Line Bundles As Cylinder		Use Top Mounted Sockets
	SR Members Are Concentric		Ignore KL/ry For 60 Deg. Angle Legs		Pole Without Linear Attachments
					Pole With Shroud Or No Appurtenances
					Outside and Inside Corner Radii Are Known

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	165.00-128.70	36.30	5.11	18	24.606	35.909	0.197	0.787	A572-65 (65 ksi)
L2	128.70-95.10	38.71	6.30	18	33.924	45.978	0.354	1.417	A572-65 (65 ksi)
L3	95.10-62.68	38.71	7.32	18	43.307	55.361	0.433	1.732	A572-65 (65 ksi)
L4	62.68-31.29	38.71	8.43	18	52.217	64.271	0.433	1.732	A572-65 (65 ksi)
L5	31.29-1.00	38.71		18	60.781	72.835	0.472	1.890	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	24.956	15.251	1148.031	8.665	12.500	91.843	2297.573	7.627	3.984	20.24
	36.433	22.313	3595.375	12.678	18.242	197.093	7195.480	11.159	5.974	30.346
L2	36.009	37.754	5375.305	11.917	17.234	311.910	10757.682	18.881	5.347	15.091
	46.633	51.311	13493.649	16.196	23.357	577.715	27005.053	25.660	7.469	21.078
L3	45.901	58.933	13686.385	15.220	22.000	622.107	27390.778	29.472	6.860	15.84
	56.148	75.502	28779.725	19.499	28.123	1023.335	57597.319	37.758	8.981	20.739
L4	55.269	71.181	24115.079	18.383	26.526	909.103	48261.890	35.597	8.428	19.461
	65.196	87.750	45179.289	22.662	32.650	1383.760	90418.027	43.883	10.549	24.36
L5	64.310	90.434	41555.007	21.409	30.877	1345.841	83164.694	45.226	9.866	20.883
	73.885	108.509	71784.157	25.689	37.000	1940.110	143662.770	54.265	11.987	25.373

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 165.00-128.70				1	1	1			
L2 128.70-95.10				1	1	1			
L3 95.10-62.68				1	1	1			
L4 62.68-31.29				1	1	1			
L5 31.29-1.00				1	1	1			

Monopole Base Plate Data

Base Plate Data	
Base plate is square	
Base plate is grouted	√
Anchor bolt grade	A615-75
Anchor bolt size	2.250 in
Number of bolts	24
Embedment length	90.000 in
f'_c	4.00 ksi

Base Plate Data	
Grout space	2.000 in
Base plate grade	A572-50
Base plate thickness	3.150 in
Bolt circle diameter	80.709 in
Outer diameter	86.614 in
Inner diameter	68.898 in
Base plate type	Plain Plate

Feed Line/Linear Appurtenances - Entered As Area

Description	*Face or Leg*	*Allow Shield*	*Exclude From Torque Calculation*	*Component Type*	*Placement* *ft*	*Total Number*		*C_AA_A* *ft^2/ft*	*Weight* *klf*
LDF-50A (1 5/8 FOAM)	C	No	Yes	Inside Pole	165.00 - 5.00	7	No Ice	0.00	0.00
							1/2" Ice	0.00	0.00
							1" Ice	0.00	0.00
LDF-50A (1 5/8 FOAM)	C	No	Yes	Inside Pole	161.00 - 5.00	12	No Ice	0.00	0.00
							1/2" Ice	0.00	0.00
							1" Ice	0.00	0.00
LDF-50A (1 5/8 FOAM)	C	No	Yes	Inside Pole	151.00 - 5.00	12	No Ice	0.00	0.00
							1/2" Ice	0.00	0.00
							1" Ice	0.00	0.00
LDF-50A (1 5/8 FOAM)	C	No	Yes	Inside Pole	141.00 - 5.00	12	No Ice	0.00	0.00
							1/2" Ice	0.00	0.00
							1" Ice	0.00	0.00
LDF-50A (1 5/8 FOAM)	C	No	Yes	Inside Pole	131.00 - 5.00	12	No Ice	0.00	0.00
							1/2" Ice	0.00	0.00
							1" Ice	0.00	0.00
LDF-50A (1 5/8 FOAM)	C	No	Yes	Inside Pole	101.00 - 5.00	1	No Ice	0.00	0.00
							1/2" Ice	0.00	0.00
							1" Ice	0.00	0.00
Safety line 3/8	C	No	Yes	CaAa (Out Of Face)	165.00 - 1.00	1	No Ice	0.04	0.00
							1/2" Ice	0.14	0.00
							1" Ice	0.24	0.00
Step pegs	C	No	Yes	CaAa (Out Of Face)	165.00 - 1.00	1	No Ice	0.08	0.00
							1/2" Ice	0.17	0.00
							1" Ice	0.28	0.00

Feed Line/Linear Appurtenances Section Areas

Tower Section	*Tower Elevation* *ft*	*Face*	*A_R* *ft^2*	*A_F* *ft^2*	*C_AA_A In Face* *ft^2*	*C_AA_A Out Face* *ft^2*	*Weight* *K*
L1	165.00-128.70	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	4.084	0.95
L2	128.70-95.10	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	3.780	1.58
L3	95.10-62.68	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	3.646	1.54
L4	62.68-31.29	A	0.000	0.000	0.000	0.000	0.00

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	3.532	1.50
L5	31.29-1.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	3.407	1.26

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	165.00-128.70	A	1.160	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	20.932	1.11
L2	128.70-95.10	A	1.129	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	19.375	1.72
L3	95.10-62.68	A	1.091	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	18.287	1.68
L4	62.68-31.29	A	1.036	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	17.229	1.62
L5	31.29-1.00	A	0.931	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	15.953	1.36

Discrete Tower Loads

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 K
Lightning Rod 10ft	C	From Face	0.00	0.00	165.00	No Ice	3.00	3.00	0.05
			0.00			1/2" Ice	4.03	4.03	0.07
			5.00			1" Ice	5.03	5.03	0.10
******									
Omni Antenna 22'	C	From Face	1.00	0.00	179.00	No Ice	6.60	6.60	0.06
			0.00			1/2" Ice	8.83	8.83	0.11
			0.00			1" Ice	11.08	11.08	0.17
******									
200sq ft	A	None		0.00	161.00	No Ice	200.00	200.00	23.00
						1/2" Ice	215.00	215.00	25.00
						1" Ice	230.00	230.00	27.00
******									
200sq ft	A	None		0.00	151.00	No Ice	200.00	200.00	23.00
						1/2" Ice	215.00	215.00	25.00
						1" Ice	230.00	230.00	27.00
******									
200sq ft	A	None		0.00	141.00	No Ice	200.00	200.00	23.00
						1/2" Ice	215.00	215.00	25.00

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 K
						1" Ice	230.00	230.00	27.00
******									
200sq ft	A	None		0.00	131.00	No Ice	200.00	200.00	23.00
						1/2" Ice	215.00	215.00	25.00
						1" Ice	230.00	230.00	27.00
******									
Omni Antenna 22'	C	From Face	1.00	0.00	101.00	No Ice	6.60	6.60	0.06
			0.00			1/2" Ice	8.83	8.83	0.11
			0.00			1" Ice	11.08	11.08	0.17

Tower Pressures - No Ice

$G_H = 1.100$

Section Elevation ft	z ft	K_Z	q_z ksf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1	145.83	1.37	0.05	92.857	A	0.000	92.857	92.857	100.00	0.000	0.000
165.00-128.70					B	0.000	92.857		100.00	0.000	0.000
					C	0.000	92.857		100.00	0.000	4.084
L2	111.31	1.294	0.04	115.707	A	0.000	115.707	115.707	100.00	0.000	0.000
128.70-95.10					B	0.000	115.707		100.00	0.000	0.000
					C	0.000	115.707		100.00	0.000	3.780
L3 95.10-62.68	78.52	1.203	0.04	137.815	A	0.000	137.815	137.815	100.00	0.000	0.000
					B	0.000	137.815		100.00	0.000	0.000
					C	0.000	137.815		100.00	0.000	3.646
L4 62.68-31.29	46.83	1.079	0.04	157.596	A	0.000	157.596	157.596	100.00	0.000	0.000
					B	0.000	157.596		100.00	0.000	0.000
					C	0.000	157.596		100.00	0.000	3.532
L5 31.29-1.00	16.15	0.862	0.03	174.392	A	0.000	174.392	174.392	100.00	0.000	0.000
					B	0.000	174.392		100.00	0.000	0.000
					C	0.000	174.392		100.00	0.000	3.407

Tower Pressure - With Ice

$G_H = 1.100$

Section Elevation ft	z ft	K_Z	q_z ksf	t_Z in	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1	145.83	1.37	0.01	1.160	99.876	A	0.000	99.876	99.876	100.00	0.000	0.000
165.00-128.70						B	0.000	99.876		100.00	0.000	0.000
						C	0.000	99.876		100.00	0.000	20.932
L2 128.70-95.10	111.31	1.294	0.01	1.129	122.204	A	0.000	122.204	122.204	100.00	0.000	0.000
						B	0.000	122.204		100.00	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z ksf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
						C	0.000	122.204		100.00	0.000	19.375
L3 95.10-62.68	78.52	1.203	0.01	1.091	143.916	A	0.000	143.916	143.916	100.00	0.000	0.000
						B	0.000	143.916		100.00	0.000	0.000
						C	0.000	143.916		100.00	0.000	18.287
L4 62.68-31.29	46.83	1.079	0.01	1.036	163.303	A	0.000	163.303	163.303	100.00	0.000	0.000
						B	0.000	163.303		100.00	0.000	0.000
						C	0.000	163.303		100.00	0.000	17.229
L5 31.29-1.00	16.15	0.862	0.01	0.931	179.619	A	0.000	179.619	179.619	100.00	0.000	0.000
						B	0.000	179.619		100.00	0.000	0.000
						C	0.000	179.619		100.00	0.000	15.953

Tower Pressure - Service

$G_H = 1.100$

Section Elevation ft	z ft	K_Z	q_z ksf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1	145.83	1.37	0.01	92.857	A	0.000	92.857	92.857	100.00	0.000	0.000
165.00-128.70					B	0.000	92.857		100.00	0.000	0.000
					C	0.000	92.857		100.00	0.000	4.084
L2	111.31	1.294	0.01	115.707	A	0.000	115.707	115.707	100.00	0.000	0.000
128.70-95.10					B	0.000	115.707		100.00	0.000	0.000
					C	0.000	115.707		100.00	0.000	3.780
L3 95.10-62.68	78.52	1.203	0.01	137.815	A	0.000	137.815	137.815	100.00	0.000	0.000
					B	0.000	137.815		100.00	0.000	0.000
					C	0.000	137.815		100.00	0.000	3.646
L4 62.68-31.29	46.83	1.079	0.01	157.596	A	0.000	157.596	157.596	100.00	0.000	0.000
					B	0.000	157.596		100.00	0.000	0.000
					C	0.000	157.596		100.00	0.000	3.532
L5 31.29-1.00	16.15	0.862	0.01	174.392	A	0.000	174.392	174.392	100.00	0.000	0.000
					B	0.000	174.392		100.00	0.000	0.000
					C	0.000	174.392		100.00	0.000	3.407

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1	0.95	2.32	A	1	0.73	0.05	1	1	92.857	3.75	0.10	C
165.00-128.70			B	1	0.73		1	1	92.857			
			C	1	0.73		1	1	92.857			
L2	1.58	5.87	A	1	0.73	0.04	1	1	115.707	4.35	0.13	C
128.70-95.10			B	1	0.73		1	1	115.707			
			C	1	0.73		1	1	115.707			
L3	1.54	8.85	A	1	0.73	0.04	1	1	137.815	4.77	0.15	C
95.10-62.68			B	1	0.73		1	1	137.815			
			C	1	0.73		1	1	137.815			
L4	1.50	10.47	A	1	0.73	0.04	1	1	157.596	4.86	0.15	C
62.68-31.29			B	1	0.73		1	1	157.596			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
			C	1	0.73		1	1	157.596			
L5 31.29-1.00	1.26	13.10	A	1	0.73	0.03	1	1	174.392	4.44	0.15	C
			B	1	0.73		1	1	174.392			
			C	1	0.73		1	1	174.392			
Sum Weight:	6.83	40.61						OTM	1683.03 kip-ft	22.17		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1	0.95	2.32	A	1	0.73	0.05	1	1	92.857	3.75	0.10	C
165.00-128.70			B	1	0.73		1	1	92.857			
			C	1	0.73		1	1	92.857			
L2	1.58	5.87	A	1	0.73	0.04	1	1	115.707	4.35	0.13	C
128.70-95.10			B	1	0.73		1	1	115.707			
			C	1	0.73		1	1	115.707			
L3	1.54	8.85	A	1	0.73	0.04	1	1	137.815	4.77	0.15	C
95.10-62.68			B	1	0.73		1	1	137.815			
			C	1	0.73		1	1	137.815			
L4	1.50	10.47	A	1	0.73	0.04	1	1	157.596	4.86	0.15	C
62.68-31.29			B	1	0.73		1	1	157.596			
			C	1	0.73		1	1	157.596			
L5 31.29-1.00	1.26	13.10	A	1	0.73	0.03	1	1	174.392	4.44	0.15	C
			B	1	0.73		1	1	174.392			
			C	1	0.73		1	1	174.392			
Sum Weight:	6.83	40.61						OTM	1683.03 kip-ft	22.17		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1	0.95	2.32	A	1	0.73	0.05	1	1	92.857	3.75	0.10	C
165.00-128.70			B	1	0.73		1	1	92.857			
			C	1	0.73		1	1	92.857			
L2	1.58	5.87	A	1	0.73	0.04	1	1	115.707	4.35	0.13	C
128.70-95.10			B	1	0.73		1	1	115.707			
			C	1	0.73		1	1	115.707			
L3	1.54	8.85	A	1	0.73	0.04	1	1	137.815	4.77	0.15	C
95.10-62.68			B	1	0.73		1	1	137.815			
			C	1	0.73		1	1	137.815			
L4	1.50	10.47	A	1	0.73	0.04	1	1	157.596	4.86	0.15	C
62.68-31.29			B	1	0.73		1	1	157.596			
			C	1	0.73		1	1	157.596			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L5 31.29-1.00	1.26	13.10	A	1	0.73	0.03	1	1	174.392	4.44	0.15	C
			B	1	0.73		1	1	174.392			
			C	1	0.73		1	1	174.392			
Sum Weight:	6.83	40.61						OTM	1683.03 kip-ft	22.17		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1	1.11	3.95	A	1	1.2	0.01	1	1	99.876	1.28	0.04	C
165.00-128.70			B	1	1.2		1	1	99.876			
			C	1	1.2		1	1	99.876			
L2	1.72	7.83	A	1	1.2	0.01	1	1	122.031	1.42	0.04	C
128.70-95.10			B	1	1.2		1	1	122.031			
			C	1	1.2		1	1	122.031			
L3	1.68	11.10	A	1	1.2	0.01	1	1	143.706	1.52	0.05	C
95.10-62.68			B	1	1.2		1	1	143.706			
			C	1	1.2		1	1	143.706			
L4	1.62	12.89	A	1	1.2	0.01	1	1	163.015	1.51	0.05	C
62.68-31.29			B	1	1.2		1	1	163.015			
			C	1	1.2		1	1	163.015			
L5 31.29-1.00	1.36	15.51	A	1	1.2	0.01	1	1	179.091	1.36	0.04	C
			B	1	1.2		1	1	179.091			
			C	1	1.2		1	1	179.091			
Sum Weight:	7.49	51.28						OTM	548.82 kip-ft	7.08		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1	1.11	3.95	A	1	1.2	0.01	1	1	99.876	1.28	0.04	C
165.00-128.70			B	1	1.2		1	1	99.876			
			C	1	1.2		1	1	99.876			
L2	1.72	7.83	A	1	1.2	0.01	1	1	122.031	1.42	0.04	C
128.70-95.10			B	1	1.2		1	1	122.031			
			C	1	1.2		1	1	122.031			
L3	1.68	11.10	A	1	1.2	0.01	1	1	143.706	1.52	0.05	C
95.10-62.68			B	1	1.2		1	1	143.706			
			C	1	1.2		1	1	143.706			
L4	1.62	12.89	A	1	1.2	0.01	1	1	163.015	1.51	0.05	C
62.68-31.29			B	1	1.2		1	1	163.015			
			C	1	1.2		1	1	163.015			
L5 31.29-1.00	1.36	15.51	A	1	1.2	0.01	1	1	179.091	1.36	0.04	C

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
			B	1	1.2		1	1	179.091			
			C	1	1.2		1	1	179.091			
Sum Weight:	7.49	51.28						OTM	548.82 kip-ft	7.08		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1	1.11	3.95	A	1	1.2	0.01	1	1	99.876	1.28	0.04	C
165.00-128.70			B	1	1.2		1	1	99.876			
			C	1	1.2		1	1	99.876			
L2	1.72	7.83	A	1	1.2	0.01	1	1	122.031	1.42	0.04	C
128.70-95.10			B	1	1.2		1	1	122.031			
			C	1	1.2		1	1	122.031			
L3	1.68	11.10	A	1	1.2	0.01	1	1	143.706	1.52	0.05	C
95.10-62.68			B	1	1.2		1	1	143.706			
			C	1	1.2		1	1	143.706			
L4	1.62	12.89	A	1	1.2	0.01	1	1	163.015	1.51	0.05	C
62.68-31.29			B	1	1.2		1	1	163.015			
			C	1	1.2		1	1	163.015			
L5 31.29-1.00	1.36	15.51	A	1	1.2	0.01	1	1	179.091	1.36	0.04	C
			B	1	1.2		1	1	179.091			
			C	1	1.2		1	1	179.091			
Sum Weight:	7.49	51.28						OTM	548.82 kip-ft	7.08		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1	0.95	2.32	A	1	0.73	0.01	1	1	92.857	0.84	0.02	C
165.00-128.70			B	1	0.73		1	1	92.857			
			C	1	0.73		1	1	92.857			
L2	1.58	5.87	A	1	0.73	0.01	1	1	115.707	0.97	0.03	C
128.70-95.10			B	1	0.73		1	1	115.707			
			C	1	0.73		1	1	115.707			
L3	1.54	8.85	A	1	0.73	0.01	1	1	137.815	1.07	0.03	C
95.10-62.68			B	1	0.73		1	1	137.815			
			C	1	0.73		1	1	137.815			
L4	1.50	10.47	A	1	0.73	0.01	1	1	157.596	1.09	0.03	C
62.68-31.29			B	1	0.73		1	1	157.596			
			C	1	0.73		1	1	157.596			
L5 31.29-1.00	1.26	13.10	A	1	0.73	0.01	1	1	174.392	0.99	0.03	C
			B	1	0.73		1	1	174.392			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
			C	1	0.73		1	1	174.392			
Sum Weight:	6.83	40.61						OTM	376.47 kip-ft	4.96		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1	0.95	2.32	A	1	0.73	0.01	1	1	92.857	0.84	0.02	C
165.00-128.70			B	1	0.73		1	1	92.857			
			C	1	0.73		1	1	92.857			
L2	1.58	5.87	A	1	0.73	0.01	1	1	115.707	0.97	0.03	C
128.70-95.10			B	1	0.73		1	1	115.707			
			C	1	0.73		1	1	115.707			
L3	1.54	8.85	A	1	0.73	0.01	1	1	137.815	1.07	0.03	C
95.10-62.68			B	1	0.73		1	1	137.815			
			C	1	0.73		1	1	137.815			
L4	1.50	10.47	A	1	0.73	0.01	1	1	157.596	1.09	0.03	C
62.68-31.29			B	1	0.73		1	1	157.596			
			C	1	0.73		1	1	157.596			
L5 31.29-1.00	1.26	13.10	A	1	0.73	0.01	1	1	174.392	0.99	0.03	C
			B	1	0.73		1	1	174.392			
			C	1	0.73		1	1	174.392			
Sum Weight:	6.83	40.61						OTM	376.47 kip-ft	4.96		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1	0.95	2.32	A	1	0.73	0.01	1	1	92.857	0.84	0.02	C
165.00-128.70			B	1	0.73		1	1	92.857			
			C	1	0.73		1	1	92.857			
L2	1.58	5.87	A	1	0.73	0.01	1	1	115.707	0.97	0.03	C
128.70-95.10			B	1	0.73		1	1	115.707			
			C	1	0.73		1	1	115.707			
L3	1.54	8.85	A	1	0.73	0.01	1	1	137.815	1.07	0.03	C
95.10-62.68			B	1	0.73		1	1	137.815			
			C	1	0.73		1	1	137.815			
L4	1.50	10.47	A	1	0.73	0.01	1	1	157.596	1.09	0.03	C
62.68-31.29			B	1	0.73		1	1	157.596			
			C	1	0.73		1	1	157.596			
L5 31.29-1.00	1.26	13.10	A	1	0.73	0.01	1	1	174.392	0.99	0.03	C
			B	1	0.73		1	1	174.392			
			C	1	0.73		1	1	174.392			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
Sum Weight:	6.83	40.61						OTM	376.47 kip-ft	4.96		

Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Leg Weight	40.61					
Bracing Weight	0.00					
Total Member Self-Weight	40.61			0.34	0.00	
Total Weight	139.61			0.34	0.00	
Wind 0 deg - No Ice		0.00	-64.78	-7869.71	0.00	0.00
Wind 30 deg - No Ice		32.39	-56.10	-6815.32	-3935.03	0.90
Wind 60 deg - No Ice		56.10	-32.39	-3934.68	-6815.66	1.56
Wind 90 deg - No Ice		64.78	0.00	0.34	-7870.05	1.80
Wind 120 deg - No Ice		56.10	32.39	3935.37	-6815.66	1.56
Wind 150 deg - No Ice		32.39	56.10	6816.01	-3935.03	0.90
Wind 180 deg - No Ice		0.00	64.78	7870.39	0.00	0.00
Wind 210 deg - No Ice		-32.39	56.10	6816.01	3935.03	-0.90
Wind 240 deg - No Ice		-56.10	32.39	3935.37	6815.66	-1.56
Wind 270 deg - No Ice		-64.78	0.00	0.34	7870.05	-1.80
Wind 300 deg - No Ice		-56.10	-32.39	-3934.68	6815.66	-1.56
Wind 330 deg - No Ice		-32.39	-56.10	-6815.32	3935.03	-0.90
Member Ice	10.67					
Total Weight Ice	169.83			1.05	0.00	
Wind 0 deg - Ice		0.00	-15.86	-1821.95	0.00	0.00
Wind 30 deg - Ice		7.93	-13.73	-1577.71	-911.50	0.28
Wind 60 deg - Ice		13.73	-7.93	-910.45	-1578.77	0.48
Wind 90 deg - Ice		15.86	0.00	1.05	-1823.00	0.56
Wind 120 deg - Ice		13.73	7.93	912.56	-1578.77	0.48
Wind 150 deg - Ice		7.93	13.73	1579.82	-911.50	0.28
Wind 180 deg - Ice		0.00	15.86	1824.06	0.00	0.00
Wind 210 deg - Ice		-7.93	13.73	1579.82	911.50	-0.28
Wind 240 deg - Ice		-13.73	7.93	912.56	1578.77	-0.48
Wind 270 deg - Ice		-15.86	0.00	1.05	1823.00	-0.56
Wind 300 deg - Ice		-13.73	-7.93	-910.45	1578.77	-0.48
Wind 330 deg - Ice		-7.93	-13.73	-1577.71	911.50	-0.28
Total Weight	139.61			0.34	0.00	
Wind 0 deg - Service		0.00	-14.49	-1760.06	0.00	0.00
Wind 30 deg - Service		7.24	-12.55	-1524.21	-880.20	0.20
Wind 60 deg - Service		12.55	-7.24	-879.86	-1524.56	0.35
Wind 90 deg - Service		14.49	0.00	0.34	-1760.41	0.40
Wind 120 deg - Service		12.55	7.24	880.55	-1524.56	0.35
Wind 150 deg - Service		7.24	12.55	1524.90	-880.20	0.20
Wind 180 deg - Service		0.00	14.49	1760.75	0.00	0.00
Wind 210 deg - Service		-7.24	12.55	1524.90	880.20	-0.20
Wind 240 deg - Service		-12.55	7.24	880.55	1524.56	-0.35
Wind 270 deg - Service		-14.49	0.00	0.34	1760.41	-0.40
Wind 300 deg - Service		-12.55	-7.24	-879.86	1524.56	-0.35
Wind 330 deg - Service		-7.24	-12.55	-1524.21	880.20	-0.20

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice
3	0.9 Dead+1.0 Wind 0 deg - No Ice
4	1.2 Dead+1.0 Wind 30 deg - No Ice
5	0.9 Dead+1.0 Wind 30 deg - No Ice
6	1.2 Dead+1.0 Wind 60 deg - No Ice
7	0.9 Dead+1.0 Wind 60 deg - No Ice
8	1.2 Dead+1.0 Wind 90 deg - No Ice
9	0.9 Dead+1.0 Wind 90 deg - No Ice
10	1.2 Dead+1.0 Wind 120 deg - No Ice
11	0.9 Dead+1.0 Wind 120 deg - No Ice
12	1.2 Dead+1.0 Wind 150 deg - No Ice
13	0.9 Dead+1.0 Wind 150 deg - No Ice
14	1.2 Dead+1.0 Wind 180 deg - No Ice
15	0.9 Dead+1.0 Wind 180 deg - No Ice
16	1.2 Dead+1.0 Wind 210 deg - No Ice
17	0.9 Dead+1.0 Wind 210 deg - No Ice
18	1.2 Dead+1.0 Wind 240 deg - No Ice
19	0.9 Dead+1.0 Wind 240 deg - No Ice
20	1.2 Dead+1.0 Wind 270 deg - No Ice
21	0.9 Dead+1.0 Wind 270 deg - No Ice
22	1.2 Dead+1.0 Wind 300 deg - No Ice
23	0.9 Dead+1.0 Wind 300 deg - No Ice
24	1.2 Dead+1.0 Wind 330 deg - No Ice
25	0.9 Dead+1.0 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	165 - 128.698	Pole	Max Tension	15	0.00	0.00	0.00
			Max. Compression	26	-101.95	0.00	-0.55
			Max. Mx	8	-82.16	-774.72	-0.16
			Max. My	14	-82.16	0.00	-774.95
			Max. Vy	8	43.92	-774.72	-0.16
			Max. Vx	14	43.92	0.00	-774.95
			Max. Torque	8			-0.91
L2	128.698 - 95.0951	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-144.31	0.00	-0.55
			Max. Mx	8	-117.82	-2606.52	-0.25
			Max. My	14	-117.82	0.00	-2606.78
			Max. Vy	8	58.24	-2606.52	-0.25
			Max. Vx	14	58.24	0.00	-2606.78
			Max. Torque	8			-0.91
L3	95.0951 - 62.6837	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-158.68	0.00	-1.12
			Max. Mx	8	-130.65	-4477.16	-0.43
			Max. My	14	-130.65	0.00	-4477.65
			Max. Vy	8	60.49	-4477.16	-0.43
			Max. Vx	14	60.49	0.00	-4477.65
			Max. Torque	8			-1.82
L4	62.6837 - 31.2861	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-175.18	0.00	-1.12
			Max. Mx	8	-145.41	-6343.19	-0.45
			Max. My	14	-145.41	0.00	-6343.69
			Max. Vy	8	62.49	-6343.19	-0.45
			Max. Vx	14	62.49	0.00	-6343.69
			Max. Torque	8			-1.81
L5	31.2861 - 1	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-199.72	0.00	-1.12
			Max. Mx	8	-167.50	-8814.78	-0.45
			Max. My	14	-167.50	0.00	-8815.29
			Max. Vy	8	64.86	-8814.78	-0.45
			Max. Vx	14	64.86	0.00	-8815.29
			Max. Torque	8			-1.81

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	33	199.72	0.00	-15.86
	Max. H_x	21	125.65	64.78	-0.00
	Max. H_z	3	125.65	0.00	64.78
	Max. M_x	2	8814.28	0.00	64.78
	Max. M_z	8	8814.78	-64.78	-0.00
	Max. Torsion	20	1.81	64.78	-0.00
	Min. Vert	5	125.65	-32.39	56.10
	Min. H_x	9	125.65	-64.78	-0.00
	Min. H_z	15	125.65	0.00	-64.78
	Min. M_x	14	-8815.29	0.00	-64.78
	Min. M_z	20	-8814.78	64.78	-0.00
	Min. Torsion	8	-1.81	-64.78	-0.00

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	139.61	0.00	0.00	0.34	0.00	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	167.54	0.00	-64.78	-8814.28	0.00	0.00
0.9 Dead+1.0 Wind 0 deg - No Ice	125.65	0.00	-64.78	-8545.59	0.00	0.00
1.2 Dead+1.0 Wind 30 deg - No Ice	167.54	32.39	-56.10	-7633.39	-4407.40	0.91
0.9 Dead+1.0 Wind 30 deg - No Ice	125.65	32.39	-56.10	-7400.75	-4273.01	0.90
1.2 Dead+1.0 Wind 60 deg - No Ice	167.54	56.10	-32.39	-4406.96	-7633.86	1.57
0.9 Dead+1.0 Wind 60 deg - No Ice	125.65	56.10	-32.39	-4272.69	-7401.08	1.56
1.2 Dead+1.0 Wind 90 deg - No Ice	167.54	64.78	0.00	0.45	-8814.78	1.81
0.9 Dead+1.0 Wind 90 deg - No Ice	125.65	64.78	0.00	0.32	-8545.94	1.80
1.2 Dead+1.0 Wind 120 deg - No Ice	167.54	56.10	32.39	4407.89	-7633.90	1.57
0.9 Dead+1.0 Wind 120 deg - No Ice	125.65	56.10	32.39	4273.35	-7401.11	1.56
1.2 Dead+1.0 Wind 150 deg - No Ice	167.54	32.39	56.10	7634.37	-4407.45	0.90
0.9 Dead+1.0 Wind 150 deg - No Ice	125.65	32.39	56.10	7401.44	-4273.04	0.90
1.2 Dead+1.0 Wind 180 deg - No Ice	167.54	0.00	64.78	8815.29	0.00	0.00
0.9 Dead+1.0 Wind 180 deg - No Ice	125.65	0.00	64.78	8546.30	0.00	0.00
1.2 Dead+1.0 Wind 210 deg - No Ice	167.54	-32.39	56.10	7634.37	4407.45	-0.90
0.9 Dead+1.0 Wind 210 deg - No Ice	125.65	-32.39	56.10	7401.44	4273.04	-0.90
1.2 Dead+1.0 Wind 240 deg - No Ice	167.54	-56.10	32.39	4407.89	7633.90	-1.57
0.9 Dead+1.0 Wind 240 deg - No Ice	125.65	-56.10	32.39	4273.35	7401.11	-1.56
1.2 Dead+1.0 Wind 270 deg - No Ice	167.54	-64.78	0.00	0.45	8814.78	-1.81
0.9 Dead+1.0 Wind 270 deg - No Ice	125.65	-64.78	0.00	0.32	8545.94	-1.80
1.2 Dead+1.0 Wind 300 deg - No Ice	167.54	-56.10	-32.39	-4406.96	7633.86	-1.57
0.9 Dead+1.0 Wind 300 deg - No Ice	125.65	-56.10	-32.39	-4272.69	7401.08	-1.56
1.2 Dead+1.0 Wind 330 deg - No Ice	167.54	-32.39	-56.10	-7633.39	4407.40	-0.91
0.9 Dead+1.0 Wind 330 deg - No Ice	125.65	-32.39	-56.10	-7400.75	4273.01	-0.90
1.2 Dead+1.0 Ice+1.0 Temp	199.72	0.00	0.00	1.12	0.00	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	199.72	0.00	-15.86	-2087.75	0.00	0.00
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	199.72	7.93	-13.73	-1807.85	-1044.59	0.29
1.2 Dead+1.0 Wind 60 deg+1.0	199.72	13.73	-7.93	-1043.15	-1809.29	0.50

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Ice+1.0 Temp 1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	199.72	15.86	0.00	1.44	-2089.19	0.58
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	199.72	13.73	7.93	1046.04	-1809.30	0.50
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	199.72	7.93	13.73	1810.74	-1044.60	0.29
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	199.72	0.00	15.86	2090.64	0.00	0.00
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	199.72	-7.93	13.73	1810.74	1044.60	-0.29
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	199.72	-13.73	7.93	1046.04	1809.30	-0.50
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	199.72	-15.86	0.00	1.44	2089.19	-0.58
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	199.72	-13.73	-7.93	-1043.15	1809.29	-0.50
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	199.72	-7.93	-13.73	-1807.85	1044.59	-0.29
Dead+Wind 0 deg - Service	139.61	0.00	-14.49	-1934.09	0.00	0.00
Dead+Wind 30 deg - Service	139.61	7.24	-12.55	-1674.92	-967.25	0.20
Dead+Wind 60 deg - Service	139.61	12.55	-7.24	-966.84	-1675.33	0.35
Dead+Wind 90 deg - Service	139.61	14.49	0.00	0.41	-1934.50	0.41
Dead+Wind 120 deg - Service	139.61	12.55	7.24	967.66	-1675.33	0.35
Dead+Wind 150 deg - Service	139.61	7.24	12.55	1675.73	-967.25	0.20
Dead+Wind 180 deg - Service	139.61	0.00	14.49	1934.91	0.00	0.00
Dead+Wind 210 deg - Service	139.61	-7.24	12.55	1675.73	967.25	-0.20
Dead+Wind 240 deg - Service	139.61	-12.55	7.24	967.66	1675.33	-0.35
Dead+Wind 270 deg - Service	139.61	-14.49	0.00	0.41	1934.50	-0.41
Dead+Wind 300 deg - Service	139.61	-12.55	-7.24	-966.84	1675.33	-0.35
Dead+Wind 330 deg - Service	139.61	-7.24	-12.55	-1674.92	967.25	-0.20

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-139.61	0.00	0.00	139.61	0.00	0.000%
2	0.00	-167.54	-64.78	0.00	167.54	64.78	0.000%
3	0.00	-125.65	-64.78	0.00	125.65	64.78	0.000%
4	32.39	-167.54	-56.10	-32.39	167.54	56.10	0.000%
5	32.39	-125.65	-56.10	-32.39	125.65	56.10	0.000%
6	56.10	-167.54	-32.39	-56.10	167.54	32.39	0.000%
7	56.10	-125.65	-32.39	-56.10	125.65	32.39	0.000%
8	64.78	-167.54	0.00	-64.78	167.54	-0.00	0.000%
9	64.78	-125.65	0.00	-64.78	125.65	-0.00	0.000%
10	56.10	-167.54	32.39	-56.10	167.54	-32.39	0.000%
11	56.10	-125.65	32.39	-56.10	125.65	-32.39	0.000%
12	32.39	-167.54	56.10	-32.39	167.54	-56.10	0.000%
13	32.39	-125.65	56.10	-32.39	125.65	-56.10	0.000%
14	0.00	-167.54	64.78	0.00	167.54	-64.78	0.000%
15	0.00	-125.65	64.78	0.00	125.65	-64.78	0.000%
16	-32.39	-167.54	56.10	32.39	167.54	-56.10	0.000%
17	-32.39	-125.65	56.10	32.39	125.65	-56.10	0.000%
18	-56.10	-167.54	32.39	56.10	167.54	-32.39	0.000%
19	-56.10	-125.65	32.39	56.10	125.65	-32.39	0.000%
20	-64.78	-167.54	0.00	64.78	167.54	-0.00	0.000%
21	-64.78	-125.65	0.00	64.78	125.65	-0.00	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
22	-56.10	-167.54	-32.39	56.10	167.54	32.39	0.000%
23	-56.10	-125.65	-32.39	56.10	125.65	32.39	0.000%
24	-32.39	-167.54	-56.10	32.39	167.54	56.10	0.000%
25	-32.39	-125.65	-56.10	32.39	125.65	56.10	0.000%
26	0.00	-199.72	0.00	0.00	199.72	0.00	0.000%
27	0.00	-199.72	-15.86	0.00	199.72	15.86	0.000%
28	7.93	-199.72	-13.73	-7.93	199.72	13.73	0.000%
29	13.73	-199.72	-7.93	-13.73	199.72	7.93	0.000%
30	15.86	-199.72	0.00	-15.86	199.72	-0.00	0.000%
31	13.73	-199.72	7.93	-13.73	199.72	-7.93	0.000%
32	7.93	-199.72	13.73	-7.93	199.72	-13.73	0.000%
33	0.00	-199.72	15.86	0.00	199.72	-15.86	0.000%
34	-7.93	-199.72	13.73	7.93	199.72	-13.73	0.000%
35	-13.73	-199.72	7.93	13.73	199.72	-7.93	0.000%
36	-15.86	-199.72	0.00	15.86	199.72	-0.00	0.000%
37	-13.73	-199.72	-7.93	13.73	199.72	7.93	0.000%
38	-7.93	-199.72	-13.73	7.93	199.72	13.73	0.000%
39	0.00	-139.61	-14.49	0.00	139.61	14.49	0.000%
40	7.24	-139.61	-12.55	-7.24	139.61	12.55	0.000%
41	12.55	-139.61	-7.24	-12.55	139.61	7.24	0.000%
42	14.49	-139.61	0.00	-14.49	139.61	-0.00	0.000%
43	12.55	-139.61	7.24	-12.55	139.61	-7.24	0.000%
44	7.24	-139.61	12.55	-7.24	139.61	-12.55	0.000%
45	0.00	-139.61	14.49	0.00	139.61	-14.49	0.000%
46	-7.24	-139.61	12.55	7.24	139.61	-12.55	0.000%
47	-12.55	-139.61	7.24	12.55	139.61	-7.24	0.000%
48	-14.49	-139.61	0.00	14.49	139.61	-0.00	0.000%
49	-12.55	-139.61	-7.24	12.55	139.61	7.24	0.000%
50	-7.24	-139.61	-12.55	7.24	139.61	12.55	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	6	0.00000001	0.00015490
3	Yes	5	0.00000001	0.00041950
4	Yes	7	0.00000001	0.00064556
5	Yes	7	0.00000001	0.00017396
6	Yes	7	0.00000001	0.00063864
7	Yes	7	0.00000001	0.00017182
8	Yes	6	0.00000001	0.00016851
9	Yes	5	0.00000001	0.00048212
10	Yes	7	0.00000001	0.00064772
11	Yes	7	0.00000001	0.00017460
12	Yes	7	0.00000001	0.00064073
13	Yes	7	0.00000001	0.00017244
14	Yes	6	0.00000001	0.00015493
15	Yes	5	0.00000001	0.00041957
16	Yes	7	0.00000001	0.00064073
17	Yes	7	0.00000001	0.00017244
18	Yes	7	0.00000001	0.00064772
19	Yes	7	0.00000001	0.00017460
20	Yes	6	0.00000001	0.00016851
21	Yes	5	0.00000001	0.00048212
22	Yes	7	0.00000001	0.00063864

23	Yes	7	0.00000001	0.00017182
24	Yes	7	0.00000001	0.00064556
25	Yes	7	0.00000001	0.00017396
26	Yes	4	0.00000001	0.00000001
27	Yes	6	0.00000001	0.00043147
28	Yes	6	0.00000001	0.00050655
29	Yes	6	0.00000001	0.00050544
30	Yes	6	0.00000001	0.00043216
31	Yes	6	0.00000001	0.00050818
32	Yes	6	0.00000001	0.00050700
33	Yes	6	0.00000001	0.00043265
34	Yes	6	0.00000001	0.00050700
35	Yes	6	0.00000001	0.00050818
36	Yes	6	0.00000001	0.00043216
37	Yes	6	0.00000001	0.00050544
38	Yes	6	0.00000001	0.00050655
39	Yes	5	0.00000001	0.00016023
40	Yes	5	0.00000001	0.00038649
41	Yes	5	0.00000001	0.00037868
42	Yes	5	0.00000001	0.00016133
43	Yes	5	0.00000001	0.00038932
44	Yes	5	0.00000001	0.00038114
45	Yes	5	0.00000001	0.00016037
46	Yes	5	0.00000001	0.00038114
47	Yes	5	0.00000001	0.00038932
48	Yes	5	0.00000001	0.00016133
49	Yes	5	0.00000001	0.00037868
50	Yes	5	0.00000001	0.00038649

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection ft	Gov. Load Comb.	Tilt °	Twist °
L1	165 - 128.698	2.15	45	1.49	0.00
L2	133.809 - 95.0951	1.38	45	1.27	0.00
L3	101.398 - 62.6837	0.75	45	0.90	0.00
L4	70 - 31.2861	0.34	45	0.57	0.00
L5	39.7139 - 1	0.11	45	0.29	0.00

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection ft	Tilt °	Twist °	Radius of Curvature ft
179.00	Omni Antenna 22'	45	2.15	1.49	0.00	29989
165.00	Lightning Rod 10ft	45	2.15	1.49	0.00	29989
161.00	200sq ft	45	2.05	1.46	0.00	29989
151.00	200sq ft	45	1.79	1.41	0.00	10710
141.00	200sq ft	45	1.54	1.33	0.00	6247
131.00	200sq ft	45	1.31	1.25	0.00	4831
101.00	Omni Antenna 22'	45	0.74	0.90	0.00	5000

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection ft	Gov. Load Comb.	Tilt °	Twist °
L1	165 - 128.698	9.86	14	6.84	0.01
L2	133.809 - 95.0951	6.31	14	5.85	0.00
L3	101.398 - 62.6837	3.43	14	4.13	0.00
L4	70 - 31.2861	1.56	14	2.63	0.00
L5	39.7139 - 1	0.48	14	1.34	0.00

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection ft	Tilt °	Twist °	Radius of Curvature ft
179.00	Omni Antenna 22'	14	9.86	6.84	0.01	6644
165.00	Lightning Rod 10ft	14	9.86	6.84	0.01	6644
161.00	200sq ft	14	9.38	6.74	0.01	6644
151.00	200sq ft	14	8.21	6.47	0.01	2371
141.00	200sq ft	14	7.08	6.14	0.00	1380
131.00	200sq ft	14	6.02	5.73	0.00	1065
101.00	Omni Antenna 22'	14	3.41	4.11	0.00	1093

Base Plate Design Data

Plate Thickness in	Number of Anchor Bolts	Anchor Bolt Size in	Actual Allowable Ratio Bolt Tension K	Actual Allowable Ratio Concrete Stress ksi	Actual Allowable Ratio Plate Stress ksi	Actual Allowable Ratio Stiffener Stress ksi	Controlling Condition	Critical Ratio
3.150	24	2.250	169.12 243.58 0.69	3.20 4.08 0.79	30.65 45.00 0.68		Conc fc	0.79 ✔

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	165 - 163.358	TP35.909x24.606x0.197	36.30	0.00	0.0	15.570	-0.21	910.87	0.000
	163.358 -					15.890	-0.34	929.55	0.000

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
	161.717								
	161.717 - 160.075					16.209	-26.62	948.24	0.028
	160.075 - 158.433					16.528	-26.76	966.92	0.028
	158.433 - 156.792					16.848	-26.91	985.60	0.027
	156.792 - 155.15					17.167	-27.06	1004.28	0.027
	155.15 - 153.509					17.487	-27.22	1022.97	0.027
	153.509 - 151.867					17.806	-27.38	1041.65	0.026
	151.867 - 150.225					18.125	-53.73	1060.33	0.051
	150.225 - 148.584					18.445	-53.90	1079.01	0.050
	148.584 - 146.942					18.764	-54.09	1097.70	0.049
	146.942 - 145.3					19.083	-54.28	1116.38	0.049
	145.3 - 143.659					19.403	-54.47	1135.06	0.048
	143.659 - 142.017					19.722	-54.68	1153.74	0.047
	142.017 - 140.376					20.042	-81.18	1172.43	0.069
	140.376 - 138.734					20.361	-81.41	1191.11	0.068
	138.734 - 137.092					20.680	-81.65	1209.79	0.067
	137.092 - 135.451					21.000	-81.90	1228.47	0.067
	135.451 - 133.809					21.319	-82.16	1247.16	0.066
	133.809 - 128.698					22.313	-49.00	1298.77	0.038
L2	133.809 - 128.698	TP45.978x33.924x0.354	38.71	0.00	0.0	39.544	-61.04	2313.33	0.026
	128.698 - 127.181					40.075	-110.46	2344.40	0.047
	127.181 - 125.664					40.606	-110.85	2375.47	0.047
	125.664 - 124.148					41.137	-111.25	2406.54	0.046
	124.148 - 122.631					41.668	-111.65	2437.61	0.046
	122.631 - 121.114					42.200	-112.06	2468.68	0.045
	121.114 - 119.598					42.731	-112.48	2499.75	0.045
	119.598 - 118.081					43.262	-112.90	2530.81	0.045
	118.081 - 116.564					43.793	-113.32	2561.88	0.044
	116.564 - 115.048					44.324	-113.75	2592.95	0.044
	115.048 - 113.531					44.855	-114.19	2624.02	0.044
	113.531 -					45.386	-114.63	2655.09	0.043

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
	112.014								
	112.014 - 110.498					45.917	-115.07	2686.16	0.043
	110.498 - 108.981					46.448	-115.52	2717.23	0.043
	108.981 - 107.464					46.979	-115.97	2748.30	0.042
	107.464 - 105.948					47.511	-116.42	2779.36	0.042
	105.948 - 104.431					48.042	-116.88	2810.43	0.042
	104.431 - 102.914					48.573	-117.35	2841.50	0.041
	102.914 - 101.398					49.104	-117.82	2872.57	0.041
	101.398 - 95.0951					51.311	-55.13	3001.68	0.018
L3	101.398 - 95.0951	TP55.361x43.307x0.433	38.71	0.00	0.0	61.631	-66.01	3605.40	0.018
	95.0951 - 93.701					62.227	-121.69	3640.30	0.033
	93.701 - 92.3068					62.824	-122.19	3675.21	0.033
	92.3068 - 90.9126					63.421	-122.69	3710.12	0.033
	90.9126 - 89.5184					64.018	-123.20	3745.02	0.033
	89.5184 - 88.1243					64.614	-123.71	3779.93	0.033
	88.1243 - 86.7301					65.211	-124.22	3814.83	0.033
	86.7301 - 85.3359					65.808	-124.74	3849.74	0.032
	85.3359 - 83.9417					66.404	-125.26	3884.65	0.032
	83.9417 - 82.5476					67.001	-125.78	3919.55	0.032
	82.5476 - 81.1534					67.598	-126.31	3954.46	0.032
	81.1534 - 79.7592					68.194	-126.84	3989.37	0.032
	79.7592 - 78.365					68.791	-127.37	4024.27	0.032
	78.365 - 76.9709					69.388	-127.91	4059.18	0.032
	76.9709 - 75.5767					69.984	-128.45	4094.08	0.031
	75.5767 - 74.1825					70.581	-129.00	4128.99	0.031
	74.1825 - 72.7883					71.178	-129.54	4163.90	0.031
	72.7883 - 71.3942					71.774	-130.09	4198.80	0.031
	71.3942 - 70					72.371	-130.65	4233.71	0.031
	70 - 62.6837					75.502	-68.40	4416.89	0.015
L4	70 - 62.6837	TP64.271x52.217x0.433	38.71	0.00	0.0	74.312	-67.12	4347.24	0.015
	62.6837 - 61.4076					74.858	-136.11	4379.19	0.031
	61.4076 - 60.1315					75.404	-136.64	4411.14	0.031

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
	60.1315 - 58.8554					75.950	-137.17	4443.09	0.031
	58.8554 - 57.5793					76.496	-137.70	4475.04	0.031
	57.5793 - 56.3032					77.043	-138.23	4506.99	0.031
	56.3032 - 55.0271					77.589	-138.77	4538.94	0.031
	55.0271 - 53.751					78.135	-139.31	4570.89	0.030
	53.751 - 52.4749					78.681	-139.85	4602.84	0.030
	52.4749 - 51.1988					79.227	-140.39	4634.79	0.030
	51.1988 - 49.9227					79.773	-140.94	4666.74	0.030
	49.9227 - 48.6466					80.320	-141.49	4698.69	0.030
	48.6466 - 47.3705					80.866	-142.04	4730.64	0.030
	47.3705 - 46.0944					81.412	-142.60	4762.59	0.030
	46.0944 - 44.8183					81.958	-143.16	4794.54	0.030
	44.8183 - 43.5422					82.504	-143.72	4826.49	0.030
	43.5422 - 42.2661					83.050	-144.28	4858.44	0.030
	42.2661 - 40.99					83.596	-144.85	4890.39	0.030
	40.99 - 39.7139					84.143	-145.41	4922.34	0.030
	39.7139 - 31.2861					87.749	-73.43	5133.35	0.014
L5	39.7139 - 31.2861	TP72.835x60.781x0.472	38.71	0.00	0.0	94.369	-78.70	5520.58	0.014
	31.2861 - 29.6921					95.113	-152.96	5564.12	0.027
	29.6921 - 28.0981					95.857	-153.73	5607.65	0.027
	28.0981 - 26.5041					96.602	-154.51	5651.19	0.027
	26.5041 - 24.9101					97.346	-155.28	5694.73	0.027
	24.9101 - 23.3161					98.090	-156.07	5738.27	0.027
	23.3161 - 21.7221					98.834	-156.85	5781.80	0.027
	21.7221 - 20.1281					99.578	-157.65	5825.34	0.027
	20.1281 - 18.5341					100.323	-158.44	5868.88	0.027
	18.5341 - 16.94					101.067	-159.24	5912.42	0.027
	16.94 - 15.346					101.811	-160.05	5955.95	0.027
	15.346 - 13.752					102.555	-160.86	5999.49	0.027
	13.752 - 12.158					103.300	-161.67	6043.03	0.027
	12.158 -					104.044	-162.49	6086.57	0.027

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
	10.564								
	10.564 - 8.97002					104.788	-163.32	6130.10	0.027
	8.97002 - 7.37602					105.532	-164.14	6173.64	0.027
	7.37602 - 5.78201					106.277	-164.98	6217.18	0.027
	5.78201 - 4.18801					107.021	-165.82	6260.72	0.026
	4.18801 - 2.59401					107.765	-166.66	6304.25	0.026
	2.59401 - 1					108.509	-167.50	6347.79	0.026

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	165 - 163.358	TP35.909x24.606x0.197	7.06	545.90	0.013	0.00	545.90	0.000
	163.358 - 161.717		8.33	564.60	0.015	0.00	564.60	0.000
	161.717 - 160.075		22.68	583.43	0.039	0.00	583.43	0.000
	160.075 - 158.433		47.26	602.38	0.078	0.00	602.38	0.000
	158.433 - 156.792		72.11	621.45	0.116	0.00	621.45	0.000
	156.792 - 155.15		97.23	640.62	0.152	0.00	640.62	0.000
	155.15 - 153.509		122.61	659.89	0.186	0.00	659.89	0.000
	153.509 - 151.867		148.26	679.25	0.218	0.00	679.25	0.000
	151.867 - 150.225		184.77	698.68	0.264	0.00	698.68	0.000
	150.225 - 148.584		233.35	718.18	0.325	0.00	718.18	0.000
	148.584 - 146.942		282.15	737.74	0.382	0.00	737.74	0.000
	146.942 - 145.3		331.17	757.34	0.437	0.00	757.34	0.000
	145.3 - 143.659		380.39	776.98	0.490	0.00	776.98	0.000
	143.659 - 142.017		429.82	796.65	0.540	0.00	796.65	0.000
	142.017 - 140.376		487.77	816.33	0.598	0.00	816.33	0.000
	140.376 - 138.734		559.42	836.02	0.669	0.00	836.02	0.000
	138.734 - 137.092		631.17	855.72	0.738	0.00	855.72	0.000
	137.092 - 135.451		703.01	875.39	0.803	0.00	875.39	0.000
	135.451 - 133.809		774.94	895.05	0.866	0.00	895.05	0.000
	133.809 -		383.93	956.01	0.402	0.00	956.01	0.000

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L2	128.698 - 133.809	TP45.978x33.924x0.354	646.27	2097.39	0.308	0.00	2097.39	0.000
	128.698 - 127.181		1117.14	2147.12	0.520	0.00	2147.12	0.000
	127.181 - 125.664		1204.17	2197.22	0.548	0.00	2197.22	0.000
	125.664 - 124.148		1291.28	2247.68	0.574	0.00	2247.68	0.000
	124.148 - 122.631		1378.49	2298.50	0.600	0.00	2298.50	0.000
	122.631 - 121.114		1465.78	2349.68	0.624	0.00	2349.68	0.000
	121.114 - 119.598		1553.15	2401.19	0.647	0.00	2401.19	0.000
	119.598 - 118.081		1640.59	2453.05	0.669	0.00	2453.05	0.000
	118.081 - 116.564		1728.10	2505.22	0.690	0.00	2505.22	0.000
	116.564 - 115.048		1815.68	2557.72	0.710	0.00	2557.72	0.000
	115.048 - 113.531		1903.33	2610.54	0.729	0.00	2610.54	0.000
	113.531 - 112.014		1991.05	2663.66	0.747	0.00	2663.66	0.000
	112.014 - 110.498		2078.82	2717.07	0.765	0.00	2717.07	0.000
	110.498 - 108.981		2166.67	2770.78	0.782	0.00	2770.78	0.000
	108.981 - 107.464		2254.57	2824.76	0.798	0.00	2824.76	0.000
	107.464 - 105.948		2342.53	2879.01	0.814	0.00	2879.01	0.000
	105.948 - 104.431		2430.56	2933.53	0.829	0.00	2933.53	0.000
	104.431 - 102.914		2518.64	2988.32	0.843	0.00	2988.32	0.000
	102.914 - 101.398		2606.79	3043.34	0.857	0.00	3043.34	0.000
	101.398 - 95.0951		1379.57	3274.53	0.421	0.00	3274.53	0.000
L3	101.398 - 95.0951	TP55.361x43.307x0.433	1598.04	4124.61	0.387	0.00	4124.61	0.000
	95.0951 - 93.701		3060.18	4194.45	0.730	0.00	4194.45	0.000
	93.701 - 92.3068		3142.83	4264.65	0.737	0.00	4264.65	0.000
	92.3068 - 90.9126		3225.57	4335.21	0.744	0.00	4335.21	0.000
	90.9126 - 89.5184		3308.39	4406.12	0.751	0.00	4406.12	0.000
	89.5184 - 88.1243		3391.30	4477.38	0.757	0.00	4477.38	0.000
	88.1243 - 86.7301		3474.30	4548.97	0.764	0.00	4548.97	0.000
	86.7301 - 85.3359		3557.39	4620.89	0.770	0.00	4620.89	0.000
	85.3359 - 83.9417		3640.57	4693.14	0.776	0.00	4693.14	0.000
	83.9417 -		3723.84	4765.71	0.781	0.00	4765.71	0.000

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
	82.5476							
	82.5476 - 81.1534		3807.21	4838.59	0.787	0.00	4838.59	0.000
	81.1534 - 79.7592		3890.67	4911.79	0.792	0.00	4911.79	0.000
	79.7592 - 78.365		3974.22	4985.28	0.797	0.00	4985.28	0.000
	78.365 - 76.9709		4057.88	5059.07	0.802	0.00	5059.07	0.000
	76.9709 - 75.5767		4141.63	5133.16	0.807	0.00	5133.16	0.000
	75.5767 - 74.1825		4225.48	5207.52	0.811	0.00	5207.52	0.000
	74.1825 - 72.7883		4309.43	5282.18	0.816	0.00	5282.18	0.000
	72.7883 - 71.3942		4393.48	5357.09	0.820	0.00	5357.09	0.000
	71.3942 - 70		4477.64	5432.27	0.824	0.00	5432.27	0.000
	70 - 62.6837		2521.68	5830.95	0.432	0.00	5830.95	0.000
L4	70 - 62.6837	TP64.271x52.217x0.433	2401.25	5678.57	0.423	0.00	5678.57	0.000
	62.6837 - 61.4076		5001.21	5748.36	0.870	0.00	5748.36	0.000
	61.4076 - 60.1315		5079.57	5818.33	0.873	0.00	5818.33	0.000
	60.1315 - 58.8554		5157.99	5888.51	0.876	0.00	5888.51	0.000
	58.8554 - 57.5793		5236.50	5958.87	0.879	0.00	5958.87	0.000
	57.5793 - 56.3032		5315.07	6029.42	0.882	0.00	6029.42	0.000
	56.3032 - 55.0271		5393.73	6100.13	0.884	0.00	6100.13	0.000
	55.0271 - 53.751		5472.46	6171.03	0.887	0.00	6171.03	0.000
	53.751 - 52.4749		5551.27	6242.09	0.889	0.00	6242.09	0.000
	52.4749 - 51.1988		5630.15	6313.32	0.892	0.00	6313.32	0.000
	51.1988 - 49.9227		5709.11	6384.72	0.894	0.00	6384.72	0.000
	49.9227 - 48.6466		5788.15	6456.26	0.897	0.00	6456.26	0.000
	48.6466 - 47.3705		5867.27	6527.96	0.899	0.00	6527.96	0.000
	47.3705 - 46.0944		5946.47	6599.80	0.901	0.00	6599.80	0.000
	46.0944 - 44.8183		6025.75	6671.78	0.903	0.00	6671.78	0.000
	44.8183 - 43.5422		6105.11	6743.91	0.905	0.00	6743.91	0.000
	43.5422 - 42.2661		6184.55	6816.16	0.907	0.00	6816.16	0.000
	42.2661 - 40.99		6264.07	6888.54	0.909	0.00	6888.54	0.000
	40.99 - 39.7139		6343.67	6961.05	0.911	0.00	6961.05	0.000
	39.7139 - 31.2861		3363.08	7442.66	0.452	0.00	7442.66	0.000
L5	39.7139 - 31.2861	TP72.835x60.781x0.472	3510.88	8208.10	0.428	0.00	8208.10	0.000

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
	31.2861 - 29.6921		6975.11	8314.27	0.839	0.00	8314.27	0.000
	29.6921 - 28.0981		7076.37	8420.67	0.840	0.00	8420.67	0.000
	28.0981 - 26.5041		7177.74	8527.42	0.842	0.00	8527.42	0.000
	26.5041 - 24.9101		7279.23	8634.33	0.843	0.00	8634.33	0.000
	24.9101 - 23.3161		7380.83	8741.50	0.844	0.00	8741.50	0.000
	23.3161 - 21.7221		7482.56	8848.92	0.846	0.00	8848.92	0.000
	21.7221 - 20.1281		7584.39	8956.50	0.847	0.00	8956.50	0.000
	20.1281 - 18.5341		7686.33	9064.33	0.848	0.00	9064.33	0.000
	18.5341 - 16.94		7788.40	9172.33	0.849	0.00	9172.33	0.000
	16.94 - 15.346		7890.57	9280.58	0.850	0.00	9280.58	0.000
	15.346 - 13.752		7992.87	9388.92	0.851	0.00	9388.92	0.000
	13.752 - 12.158		8095.27	9497.50	0.852	0.00	9497.50	0.000
	12.158 - 10.564		8197.79	9606.25	0.853	0.00	9606.25	0.000
	10.564 - 8.97002		8300.42	9715.17	0.854	0.00	9715.17	0.000
	8.97002 - 7.37602		8403.17	9824.17	0.855	0.00	9824.17	0.000
	7.37602 - 5.78201		8506.00	9933.33	0.856	0.00	9933.33	0.000
	5.78201 - 4.18801		8609.00	10042.58	0.857	0.00	10042.58	0.000
	4.18801 - 2.59401		8712.08	10152.00	0.858	0.00	10152.00	0.000
	2.59401 - 1		8815.25	10261.58	0.859	0.00	10261.58	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	165 - 163.358	TP35.909x24.606x0.197	0.69	273.26	0.003	0.00	596.37	0.000
	163.358 - 161.717		0.86	278.87	0.003	0.00	621.09	0.000
	161.717 - 160.075		14.90	284.47	0.052	0.46	646.30	0.001
	160.075 - 158.433		15.07	290.07	0.052	0.46	672.02	0.001
	158.433 - 156.792		15.23	295.68	0.052	0.46	698.24	0.001
	156.792 - 155.15		15.40	301.29	0.051	0.46	724.96	0.001
	155.15 - 153.509		15.56	306.89	0.051	0.46	752.19	0.001
	153.509 -		15.72	312.49	0.050	0.46	779.91	0.001

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
	151.867							
	151.867 - 150.225		29.55	318.10	0.093	0.46	808.14	0.001
	150.225 - 148.584		29.70	323.70	0.092	0.46	836.87	0.001
	148.584 - 146.942		29.83	329.31	0.091	0.46	866.10	0.001
	146.942 - 145.3		29.97	334.91	0.089	0.46	895.83	0.001
	145.3 - 143.659		30.09	340.52	0.088	0.46	926.07	0.000
	143.659 - 142.017		30.22	346.12	0.087	0.46	956.80	0.000
	142.017 - 140.376		43.68	351.73	0.124	0.46	988.04	0.000
	140.376 - 138.734		43.75	357.33	0.122	0.46	1019.78	0.000
	138.734 - 137.092		43.82	362.94	0.121	0.46	1052.02	0.000
	137.092 - 135.451		43.88	368.54	0.119	0.46	1084.77	0.000
	135.451 - 133.809		43.93	374.15	0.117	0.46	1118.01	0.000
	133.809 - 128.698		25.99	391.60	0.066	0.17	1224.73	0.000
L2	133.809 - 128.698	TP45.978x33.924x0.354	31.44	694.00	0.045	0.29	2137.01	0.000
	128.698 - 127.181		57.44	703.32	0.082	0.46	2194.79	0.000
	127.181 - 125.664		57.51	712.64	0.081	0.46	2253.35	0.000
	125.664 - 124.148		57.57	721.96	0.080	0.46	2312.68	0.000
	124.148 - 122.631		57.63	731.28	0.079	0.45	2372.78	0.000
	122.631 - 121.114		57.69	740.60	0.078	0.45	2433.65	0.000
	121.114 - 119.598		57.74	749.92	0.077	0.45	2495.29	0.000
	119.598 - 118.081		57.79	759.24	0.076	0.45	2557.70	0.000
	118.081 - 116.564		57.83	768.57	0.075	0.45	2620.88	0.000
	116.564 - 115.048		57.88	777.89	0.074	0.45	2684.84	0.000
	115.048 - 113.531		57.92	787.21	0.074	0.45	2749.57	0.000
	113.531 - 112.014		57.97	796.53	0.073	0.45	2815.06	0.000
	112.014 - 110.498		58.01	805.85	0.072	0.45	2881.32	0.000
	110.498 - 108.981		58.05	815.17	0.071	0.45	2948.37	0.000
	108.981 - 107.464		58.09	824.49	0.070	0.45	3016.18	0.000
	107.464 - 105.948		58.13	833.81	0.070	0.45	3084.75	0.000
	105.948 - 104.431		58.17	843.13	0.069	0.45	3154.10	0.000
	104.431 -		58.21	852.45	0.068	0.45	3224.22	0.000

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
	102.914							
	102.914 - 101.398		58.26	861.77	0.068	0.45	3295.12	0.000
	101.398 - 95.0951		27.75	900.50	0.031	0.44	3597.97	0.000
L3	101.398 - 95.0951	TP55.361x43.307x0.433	31.64	1081.62	0.029	0.47	4247.03	0.000
	95.0951 - 93.701		59.35	1092.09	0.054	0.91	4329.67	0.000
	93.701 - 92.3068		59.41	1102.56	0.054	0.91	4413.10	0.000
	92.3068 - 90.9126		59.48	1113.03	0.053	0.91	4497.32	0.000
	90.9126 - 89.5184		59.54	1123.51	0.053	0.91	4582.35	0.000
	89.5184 - 88.1243		59.60	1133.98	0.053	0.91	4668.17	0.000
	88.1243 - 86.7301		59.66	1144.45	0.052	0.91	4754.78	0.000
	86.7301 - 85.3359		59.73	1154.92	0.052	0.91	4842.19	0.000
	85.3359 - 83.9417		59.79	1165.39	0.051	0.91	4930.40	0.000
	83.9417 - 82.5476		59.86	1175.87	0.051	0.91	5019.41	0.000
	82.5476 - 81.1534		59.93	1186.34	0.051	0.91	5109.21	0.000
	81.1534 - 79.7592		59.99	1196.81	0.050	0.91	5199.80	0.000
	79.7592 - 78.365		60.06	1207.28	0.050	0.91	5291.20	0.000
	78.365 - 76.9709		60.13	1217.75	0.049	0.91	5383.38	0.000
	76.9709 - 75.5767		60.20	1228.23	0.049	0.91	5476.37	0.000
	75.5767 - 74.1825		60.27	1238.70	0.049	0.91	5570.15	0.000
	74.1825 - 72.7883		60.34	1249.17	0.048	0.91	5664.72	0.000
	72.7883 - 71.3942		60.42	1259.64	0.048	0.91	5760.10	0.000
	71.3942 - 70		60.49	1270.11	0.048	0.91	5856.27	0.000
	70 - 62.6837		31.80	1325.07	0.024	0.46	6374.00	0.000
L4	70 - 62.6837	TP64.271x52.217x0.433	29.74	1304.17	0.023	0.44	6174.57	0.000
	62.6837 - 61.4076		61.46	1313.76	0.047	0.91	6265.66	0.000
	61.4076 - 60.1315		61.52	1323.34	0.046	0.91	6357.42	0.000
	60.1315 - 58.8554		61.57	1332.93	0.046	0.91	6449.84	0.000
	58.8554 - 57.5793		61.63	1342.51	0.046	0.91	6542.94	0.000
	57.5793 - 56.3032		61.69	1352.10	0.046	0.91	6636.70	0.000
	56.3032 - 55.0271		61.75	1361.68	0.045	0.91	6731.12	0.000
	55.0271 - 53.751		61.81	1371.27	0.045	0.91	6826.22	0.000
	53.751 - 52.4749		61.87	1380.85	0.045	0.91	6921.98	0.000

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
	52.4749 - 51.1988		61.93	1390.44	0.045	0.91	7018.42	0.000
	51.1988 - 49.9227		61.99	1400.02	0.044	0.91	7115.52	0.000
	49.9227 - 48.6466		62.05	1409.61	0.044	0.91	7213.27	0.000
	48.6466 - 47.3705		62.11	1419.19	0.044	0.91	7311.71	0.000
	47.3705 - 46.0944		62.17	1428.78	0.044	0.91	7410.80	0.000
	46.0944 - 44.8183		62.24	1438.36	0.043	0.91	7510.57	0.000
	44.8183 - 43.5422		62.30	1447.95	0.043	0.91	7611.00	0.000
	43.5422 - 42.2661		62.36	1457.53	0.043	0.91	7712.10	0.000
	42.2661 - 40.99		62.43	1467.12	0.043	0.91	7813.87	0.000
	40.99 - 39.7139		62.49	1476.70	0.042	0.91	7916.30	0.000
	39.7139 - 31.2861		31.49	1540.00	0.020	0.44	8609.58	0.000
L5	39.7139 - 31.2861	TP72.835x60.781x0.472	32.18	1656.17	0.019	0.46	9127.67	0.000
	31.2861 - 29.6921		63.58	1669.24	0.038	0.91	9272.25	0.000
	29.6921 - 28.0981		63.65	1682.30	0.038	0.91	9417.92	0.000
	28.0981 - 26.5041		63.72	1695.36	0.038	0.91	9564.67	0.000
	26.5041 - 24.9101		63.79	1708.42	0.037	0.90	9712.67	0.000
	24.9101 - 23.3161		63.86	1721.48	0.037	0.90	9861.75	0.000
	23.3161 - 21.7221		63.94	1734.54	0.037	0.90	10011.92	0.000
	21.7221 - 20.1281		64.01	1747.60	0.037	0.90	10163.25	0.000
	20.1281 - 18.5341		64.08	1760.66	0.036	0.90	10315.75	0.000
	18.5341 - 16.94		64.15	1773.72	0.036	0.90	10469.42	0.000
	16.94 - 15.346		64.22	1786.79	0.036	0.90	10624.17	0.000
	15.346 - 13.752		64.29	1799.85	0.036	0.90	10780.00	0.000
	13.752 - 12.158		64.36	1812.91	0.036	0.90	10937.08	0.000
	12.158 - 10.564		64.43	1825.97	0.035	0.90	11095.25	0.000
	10.564 - 8.97002		64.51	1839.03	0.035	0.90	11254.50	0.000
	8.97002 - 7.37602		64.58	1852.09	0.035	0.90	11414.92	0.000
	7.37602 - 5.78201		64.65	1865.15	0.035	0.90	11576.50	0.000
	5.78201 - 4.18801		64.72	1878.21	0.034	0.90	11739.25	0.000
	4.18801 - 2.59401		64.79	1891.28	0.034	0.90	11903.08	0.000
	2.59401 - 1		64.86	1904.34	0.034	0.90	12068.00	0.000

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	165 - 163.358	0.000	0.013	0.000	0.003	0.000	0.013 ✔	1.000	4.8.2 ✔
	163.358 - 161.717	0.000	0.015	0.000	0.003	0.000	0.015 ✔	1.000	4.8.2 ✔
	161.717 - 160.075	0.028	0.039	0.000	0.052	0.001	0.070 ✔	1.000	4.8.2 ✔
	160.075 - 158.433	0.028	0.078	0.000	0.052	0.001	0.109 ✔	1.000	4.8.2 ✔
	158.433 - 156.792	0.027	0.116	0.000	0.052	0.001	0.146 ✔	1.000	4.8.2 ✔
	156.792 - 155.15	0.027	0.152	0.000	0.051	0.001	0.181 ✔	1.000	4.8.2 ✔
	155.15 - 153.509	0.027	0.186	0.000	0.051	0.001	0.215 ✔	1.000	4.8.2 ✔
	153.509 - 151.867	0.026	0.218	0.000	0.050	0.001	0.247 ✔	1.000	4.8.2 ✔
	151.867 - 150.225	0.051	0.264	0.000	0.093	0.001	0.324 ✔	1.000	4.8.2 ✔
	150.225 - 148.584	0.050	0.325	0.000	0.092	0.001	0.383 ✔	1.000	4.8.2 ✔
	148.584 - 146.942	0.049	0.382	0.000	0.091	0.001	0.440 ✔	1.000	4.8.2 ✔
	146.942 - 145.3	0.049	0.437	0.000	0.089	0.001	0.494 ✔	1.000	4.8.2 ✔
	145.3 - 143.659	0.048	0.490	0.000	0.088	0.000	0.545 ✔	1.000	4.8.2 ✔
	143.659 - 142.017	0.047	0.540	0.000	0.087	0.000	0.595 ✔	1.000	4.8.2 ✔
	142.017 - 140.376	0.069	0.598	0.000	0.124	0.000	0.682 ✔	1.000	4.8.2 ✔
	140.376 - 138.734	0.068	0.669	0.000	0.122	0.000	0.753 ✔	1.000	4.8.2 ✔
	138.734 - 137.092	0.067	0.738	0.000	0.121	0.000	0.820 ✔	1.000	4.8.2 ✔
	137.092 - 135.451	0.067	0.803	0.000	0.119	0.000	0.884 ✔	1.000	4.8.2 ✔
	135.451 - 133.809	0.066	0.866	0.000	0.117	0.000	0.946 ✔	1.000	4.8.2 ✔
	133.809 - 128.698	0.038	0.402	0.000	0.066	0.000	0.444 ✔	1.000	4.8.2 ✔
L2	133.809 - 128.698	0.026	0.308	0.000	0.045	0.000	0.337 ✔	1.000	4.8.2 ✔

Section No.	Elevation ft	Ratio $P_u/\phi P_n$	Ratio $M_{ux}/\phi M_{nx}$	Ratio $M_{uy}/\phi M_{ny}$	Ratio $V_u/\phi V_n$	Ratio $T_u/\phi T_n$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	128.698 - 127.181	0.047	0.520	0.000	0.082	0.000	0.574 ✔	1.000	4.8.2 ✔
	127.181 - 125.664	0.047	0.548	0.000	0.081	0.000	0.601 ✔	1.000	4.8.2 ✔
	125.664 - 124.148	0.046	0.574	0.000	0.080	0.000	0.627 ✔	1.000	4.8.2 ✔
	124.148 - 122.631	0.046	0.600	0.000	0.079	0.000	0.652 ✔	1.000	4.8.2 ✔
	122.631 - 121.114	0.045	0.624	0.000	0.078	0.000	0.675 ✔	1.000	4.8.2 ✔
	121.114 - 119.598	0.045	0.647	0.000	0.077	0.000	0.698 ✔	1.000	4.8.2 ✔
	119.598 - 118.081	0.045	0.669	0.000	0.076	0.000	0.719 ✔	1.000	4.8.2 ✔
	118.081 - 116.564	0.044	0.690	0.000	0.075	0.000	0.740 ✔	1.000	4.8.2 ✔
	116.564 - 115.048	0.044	0.710	0.000	0.074	0.000	0.759 ✔	1.000	4.8.2 ✔
	115.048 - 113.531	0.044	0.729	0.000	0.074	0.000	0.778 ✔	1.000	4.8.2 ✔
	113.531 - 112.014	0.043	0.747	0.000	0.073	0.000	0.796 ✔	1.000	4.8.2 ✔
	112.014 - 110.498	0.043	0.765	0.000	0.072	0.000	0.813 ✔	1.000	4.8.2 ✔
	110.498 - 108.981	0.043	0.782	0.000	0.071	0.000	0.830 ✔	1.000	4.8.2 ✔
	108.981 - 107.464	0.042	0.798	0.000	0.070	0.000	0.845 ✔	1.000	4.8.2 ✔
	107.464 - 105.948	0.042	0.814	0.000	0.070	0.000	0.860 ✔	1.000	4.8.2 ✔
	105.948 - 104.431	0.042	0.829	0.000	0.069	0.000	0.875 ✔	1.000	4.8.2 ✔
	104.431 - 102.914	0.041	0.843	0.000	0.068	0.000	0.889 ✔	1.000	4.8.2 ✔
	102.914 - 101.398	0.041	0.857	0.000	0.068	0.000	0.902 ✔	1.000	4.8.2 ✔
	101.398 - 95.0951	0.018	0.421	0.000	0.031	0.000	0.441 ✔	1.000	4.8.2 ✔
L3	101.398 - 95.0951	0.018	0.387	0.000	0.029	0.000	0.407 ✔	1.000	4.8.2 ✔
	95.0951 - 93.701	0.033	0.730	0.000	0.054	0.000	0.766 ✔	1.000	4.8.2 ✔
	93.701 - 92.3068	0.033	0.737	0.000	0.054	0.000	0.773 ✔	1.000	4.8.2 ✔
	92.3068 - 90.9126	0.033	0.744	0.000	0.053	0.000	0.780 ✔	1.000	4.8.2 ✔
	90.9126 - 89.5184	0.033	0.751	0.000	0.053	0.000	0.787 ✔	1.000	4.8.2 ✔
	89.5184 - 88.1243	0.033	0.757	0.000	0.053	0.000	0.793 ✔	1.000	4.8.2 ✔
	88.1243 - 86.7301	0.033	0.764	0.000	0.052	0.000	0.799 ✔	1.000	4.8.2 ✔

Section No.	Elevation ft	Ratio $P_u/\phi P_n$	Ratio $M_{ux}/\phi M_{nx}$	Ratio $M_{uy}/\phi M_{ny}$	Ratio $V_u/\phi V_n$	Ratio $T_u/\phi T_n$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	86.7301 - 85.3359	0.032	0.770	0.000	0.052	0.000	0.805 ✔	1.000	4.8.2 ✔
	85.3359 - 83.9417	0.032	0.776	0.000	0.051	0.000	0.811 ✔	1.000	4.8.2 ✔
	83.9417 - 82.5476	0.032	0.781	0.000	0.051	0.000	0.816 ✔	1.000	4.8.2 ✔
	82.5476 - 81.1534	0.032	0.787	0.000	0.051	0.000	0.821 ✔	1.000	4.8.2 ✔
	81.1534 - 79.7592	0.032	0.792	0.000	0.050	0.000	0.826 ✔	1.000	4.8.2 ✔
	79.7592 - 78.365	0.032	0.797	0.000	0.050	0.000	0.831 ✔	1.000	4.8.2 ✔
	78.365 - 76.9709	0.032	0.802	0.000	0.049	0.000	0.836 ✔	1.000	4.8.2 ✔
	76.9709 - 75.5767	0.031	0.807	0.000	0.049	0.000	0.841 ✔	1.000	4.8.2 ✔
	75.5767 - 74.1825	0.031	0.811	0.000	0.049	0.000	0.845 ✔	1.000	4.8.2 ✔
	74.1825 - 72.7883	0.031	0.816	0.000	0.048	0.000	0.849 ✔	1.000	4.8.2 ✔
	72.7883 - 71.3942	0.031	0.820	0.000	0.048	0.000	0.853 ✔	1.000	4.8.2 ✔
	71.3942 - 70	0.031	0.824	0.000	0.048	0.000	0.857 ✔	1.000	4.8.2 ✔
	70 - 62.6837	0.015	0.432	0.000	0.024	0.000	0.449 ✔	1.000	4.8.2 ✔
L4	70 - 62.6837	0.015	0.423	0.000	0.023	0.000	0.439 ✔	1.000	4.8.2 ✔
	62.6837 - 61.4076	0.031	0.870	0.000	0.047	0.000	0.903 ✔	1.000	4.8.2 ✔
	61.4076 - 60.1315	0.031	0.873	0.000	0.046	0.000	0.906 ✔	1.000	4.8.2 ✔
	60.1315 - 58.8554	0.031	0.876	0.000	0.046	0.000	0.909 ✔	1.000	4.8.2 ✔
	58.8554 - 57.5793	0.031	0.879	0.000	0.046	0.000	0.912 ✔	1.000	4.8.2 ✔
	57.5793 - 56.3032	0.031	0.882	0.000	0.046	0.000	0.914 ✔	1.000	4.8.2 ✔
	56.3032 - 55.0271	0.031	0.884	0.000	0.045	0.000	0.917 ✔	1.000	4.8.2 ✔
	55.0271 - 53.751	0.030	0.887	0.000	0.045	0.000	0.919 ✔	1.000	4.8.2 ✔
	53.751 - 52.4749	0.030	0.889	0.000	0.045	0.000	0.922 ✔	1.000	4.8.2 ✔
	52.4749 - 51.1988	0.030	0.892	0.000	0.045	0.000	0.924 ✔	1.000	4.8.2 ✔
	51.1988 - 49.9227	0.030	0.894	0.000	0.044	0.000	0.926 ✔	1.000	4.8.2 ✔
	49.9227 - 48.6466	0.030	0.897	0.000	0.044	0.000	0.929 ✔	1.000	4.8.2 ✔
	48.6466 - 47.3705	0.030	0.899	0.000	0.044	0.000	0.931 ✔	1.000	4.8.2 ✔

Section No.	Elevation ft	Ratio $P_u/\phi P_n$	Ratio $M_{ux}/\phi M_{nx}$	Ratio $M_{uy}/\phi M_{ny}$	Ratio $V_u/\phi V_n$	Ratio $T_u/\phi T_n$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	47.3705 - 46.0944	0.030	0.901	0.000	0.044	0.000	0.933 ✔	1.000	4.8.2 ✔
	46.0944 - 44.8183	0.030	0.903	0.000	0.043	0.000	0.935 ✔	1.000	4.8.2 ✔
	44.8183 - 43.5422	0.030	0.905	0.000	0.043	0.000	0.937 ✔	1.000	4.8.2 ✔
	43.5422 - 42.2661	0.030	0.907	0.000	0.043	0.000	0.939 ✔	1.000	4.8.2 ✔
	42.2661 - 40.99	0.030	0.909	0.000	0.043	0.000	0.941 ✔	1.000	4.8.2 ✔
	40.99 - 39.7139	0.030	0.911	0.000	0.042	0.000	0.943 ✔	1.000	4.8.2 ✔
	39.7139 - 31.2861	0.014	0.452	0.000	0.020	0.000	0.467 ✔	1.000	4.8.2 ✔
L5	39.7139 - 31.2861	0.014	0.428	0.000	0.019	0.000	0.442 ✔	1.000	4.8.2 ✔
	31.2861 - 29.6921	0.027	0.839	0.000	0.038	0.000	0.868 ✔	1.000	4.8.2 ✔
	29.6921 - 28.0981	0.027	0.840	0.000	0.038	0.000	0.869 ✔	1.000	4.8.2 ✔
	28.0981 - 26.5041	0.027	0.842	0.000	0.038	0.000	0.870 ✔	1.000	4.8.2 ✔
	26.5041 - 24.9101	0.027	0.843	0.000	0.037	0.000	0.872 ✔	1.000	4.8.2 ✔
	24.9101 - 23.3161	0.027	0.844	0.000	0.037	0.000	0.873 ✔	1.000	4.8.2 ✔
	23.3161 - 21.7221	0.027	0.846	0.000	0.037	0.000	0.874 ✔	1.000	4.8.2 ✔
	21.7221 - 20.1281	0.027	0.847	0.000	0.037	0.000	0.875 ✔	1.000	4.8.2 ✔
	20.1281 - 18.5341	0.027	0.848	0.000	0.036	0.000	0.876 ✔	1.000	4.8.2 ✔
	18.5341 - 16.94	0.027	0.849	0.000	0.036	0.000	0.877 ✔	1.000	4.8.2 ✔
	16.94 - 15.346	0.027	0.850	0.000	0.036	0.000	0.878 ✔	1.000	4.8.2 ✔
	15.346 - 13.752	0.027	0.851	0.000	0.036	0.000	0.879 ✔	1.000	4.8.2 ✔
	13.752 - 12.158	0.027	0.852	0.000	0.036	0.000	0.880 ✔	1.000	4.8.2 ✔
	12.158 - 10.564	0.027	0.853	0.000	0.035	0.000	0.881 ✔	1.000	4.8.2 ✔
	10.564 - 8.97002	0.027	0.854	0.000	0.035	0.000	0.882 ✔	1.000	4.8.2 ✔
	8.97002 - 7.37602	0.027	0.855	0.000	0.035	0.000	0.883 ✔	1.000	4.8.2 ✔
	7.37602 - 5.78201	0.027	0.856	0.000	0.035	0.000	0.884 ✔	1.000	4.8.2 ✔
	5.78201 - 4.18801	0.026	0.857	0.000	0.034	0.000	0.885 ✔	1.000	4.8.2 ✔
	4.18801 - 2.59401	0.026	0.858	0.000	0.034	0.000	0.886 ✔	1.000	4.8.2 ✔

Section No.	Elevation ft	Ratio $P_u / \phi P_n$	Ratio $M_{ux} / \phi M_{nx}$	Ratio $M_{uy} / \phi M_{ny}$	Ratio $V_u / \phi V_n$	Ratio $T_u / \phi T_n$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	2.59401 - 1	0.026	0.859	0.000	0.034	0.000	0.887 ✔	1.000	4.8.2 ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	165 - 128.698	Pole	TP35.909x24.606x0.197	1	-82.16	1247.16	94.6	Pass
L2	128.698 - 95.0951	Pole	TP45.978x33.924x0.354	2	-117.82	2872.57	90.2	Pass
L3	95.0951 - 62.6837	Pole	TP55.361x43.307x0.433	3	-130.65	4233.71	85.7	Pass
L4	62.6837 - 31.2861	Pole	TP64.271x52.217x0.433	4	-145.41	4922.34	94.3	Pass
L5	31.2861 - 1	Pole	TP72.835x60.781x0.472	5	-167.50	6347.79	88.7	Pass
							Summary	
						Pole (L1)	94.6	Pass
						Base Plate	78.5	Pass
						RATING =	**94.6**	**Pass**

Anchor bolt length calculation

PROJECT/ POLE TYPE:

Reference: According to the code ACI 318-08 (12.2), for deformed bars, we can get below information:

The user may easily construct simple, useful expressions. For example, in all structures with normalweight concrete ($\lambda = 1.0$), uncoated reinforcement ($\psi_e = 1.0$), No. 7 or larger bottom bars ($\psi_t = 1.0$) with $f'_c = 4000$ psi and Grade 60 reinforcement, the equations reduce to

$$\ell_d = \frac{(60{,}000)(1.0)(1.0)(1.0)}{20\sqrt{4000}} d_b = 47 d_b$$

or

$$\ell_d = \frac{3(60{,}000)(1.0)(1.0)(1.0)}{40\sqrt{4000}} d_b = 71 d_b$$

Thus, as long as minimum cover of d_b is provided along with a minimum clear spacing of $2d_b$, or a minimum clear cover of d_b and a minimum clear spacing of d_b are provided along with minimum ties or stirrups, a designer knows that $\ell_d = 47d_b$. The penalty for spacing bars closer or providing less cover is the requirement that $\ell_d = 71d_b$.

Many practical combinations of side cover, clear cover, and confining reinforcement can be used with 12.2.3 to produce significantly shorter development lengths than allowed by 12.2.2. For example, bars or wires with minimum clear cover not less than $2d_b$ and minimum clear spacing not less than $4d_b$ and without any confining reinforcement would have a $(c_b + K_{tr})/d_b$ value of 2.5 and would require a development length of only $28d_b$ for the example above.

So when the project satisfy below requirements:

1. The anchor bolts is for No.7 or larger bottom bars.
2. With minimum clear cover not less than 2db and minimum clear spacing not less than 4db.
3. Compressive strength of the concrete is 4000 psi.
4. Deformed bar is grade 60

The development length Ld should be

$$l_d \geq 28 d_b$$

where db is the bar diameter

For this project,

Diameter of bar	d_b =	2.25	in
Grade of bar	Fy=	75	ksi
Usage of bar	=	1.00	

So the required development length of anchor bolts in this project will be:

ld= Fy/60*usage*db*28 = 78.75 in

Considering the 12" length protrusion, the required minimum legnth of the anchor bolt for this project is

Ld= ld+12 = 90.75 in

Calculate by :

Date: 3/9/2023

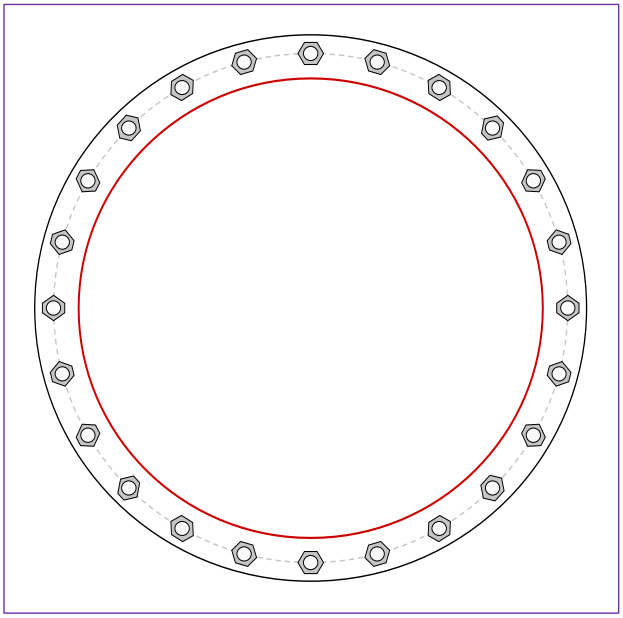
Monopole Base Plate Connection

Site Info	
BU #	Brookfield CT
Site Name	
Order #	

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
l_{ar} (in)	0

Applied Loads	
Moment (kip-ft)	8815.29
Axial Force (kips)	167.50
Shear Force (kips)	64.86

**TIA-222-H Section 15.5 Applied*



Connection Properties

Anchor Rod Data

(24) 2-1/4" ø bolts (A615-75 N; Fy=75 ksi, Fu=100 ksi) on 80.71" BC

Base Plate Data

86.61" OD x 3.15" Plate (A572-50; Fy=50 ksi, Fu=65 ksi)

Stiffener Data

N/A

Pole Data

72.834717" x 0.472441" 18-sided pole (A572-65; Fy=65 ksi, Fu=80 ksi)

Analysis Results

Anchor Rod Summary *(units of kips, kip-in)*

Pu_c = 225.35	ϕPn_c = 268.39	**Stress Rating**
Vu = 2.7	ϕVn = 120.77	**80.0%**
Mu = n/a	ϕMn = n/a	**Pass**

Base Plate Summary

Max Stress (ksi):	23.23	(Flexural)
Allowable Stress (ksi):	45	
Stress Rating:	**49.2%**	**Pass**

Pier and Pad Foundation

BU # :	Brookfield, CT
Site Name:	
App. Number:	

TIA-222 Revision:	H
Tower Type:	Monopole

Top & Bot. Pad Rein. Different?:	☐
Block Foundation?:	☐
Rectangular Pad?:	☐

Superstructure Analysis Reactions		
Compression, P_{comp}:	168	kips
Base Shear, Vu_comp:	65	kips
Moment, M_u:	8815	ft-kips
Tower Height, **H**:	165	ft
BP Dist. Above Fdn, bp_{dist}:	2	in

Pier Properties		
Pier Shape:	Circular	
Pier Diameter, **dpier**:	8	ft
Ext. Above Grade, **E**:	0.5	ft
Pier Rebar Size, **Sc**:	10	
Pier Rebar Quantity, **mc**:	42	
Pier Tie/Spiral Size, **St**:	4	
Pier Tie/Spiral Quantity, **mt**:	12	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, cc_{pier}:	3	in

Pad Properties		
Depth, **D**:	12	ft
Pad Width, W_1:	26	ft
Pad Thickness, **T**:	2.5	ft
Pad Rebar Size (Bottom dir. 2), Sp_2:	10	
Pad Rebar Quantity (Bottom dir. 2), mp_2:	42	
Pad Clear Cover, cc_{pad}:	3	in

Material Properties		
Rebar Grade, **Fy**:	60	ksi
Concrete Compressive Strength, **F'c**:	3	ksi
Dry Concrete Density, **δc**:	150	pcf

Soil Properties		
Total Soil Unit Weight, **γ**:	120	pcf
Ultimate Gross Bearing, Qult:	8.000	ksf
Cohesion, **Cu**:	0.000	ksf
Friction Angle, **ϕ**:	30	degrees
SPT Blow Count, N_{blows}:	8	
Base Friction, **μ**:	0.6	
Neglected Depth, **N**:	3.50	ft
Foundation Bearing on Rock?	No	
Groundwater Depth, **gw**:	N/A	ft

<--Toggle between Gross and Net

Foundation Analysis Checks	Capacity	Demand	Rating	Check
Lateral (Sliding) (kips)	751.71	65.00	**8.6%**	**Pass**
Bearing Pressure (ksf)	6.00	4.49	**74.8%**	**Pass**
*Overturning (kip*ft)*	11710.79	9638.33	**82.3%**	**Pass**
*Pier Flexure (Comp.) (kip*ft)*	9810.05	9465.00	**96.5%**	**Pass**
Pier Compression (kip)	23994.73	258.48	**1.1%**	**Pass**
*Pad Flexure (kip*ft)*	5540.78	4003.68	**72.3%**	**Pass**
Pad Shear - 1-way (kips)	643.27	635.20	**98.7%**	**Pass**
Pad Shear - 2-way (Comp) (ksi)	0.164	0.115	**69.8%**	**Pass**
*Flexural 2-way (Comp) (kip*ft)*	6603.17	5679.00	**86.0%**	**Pass**

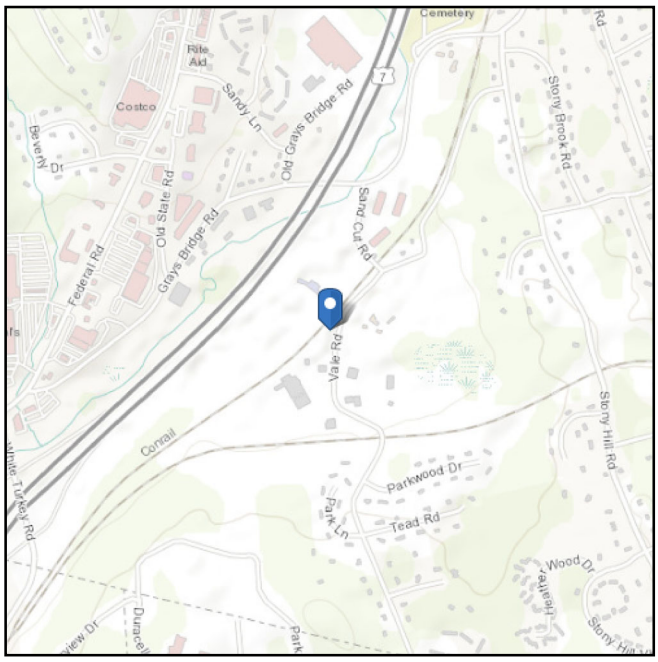
Structural Rating:	**98.7%**
Soil Rating:	**82.3%**

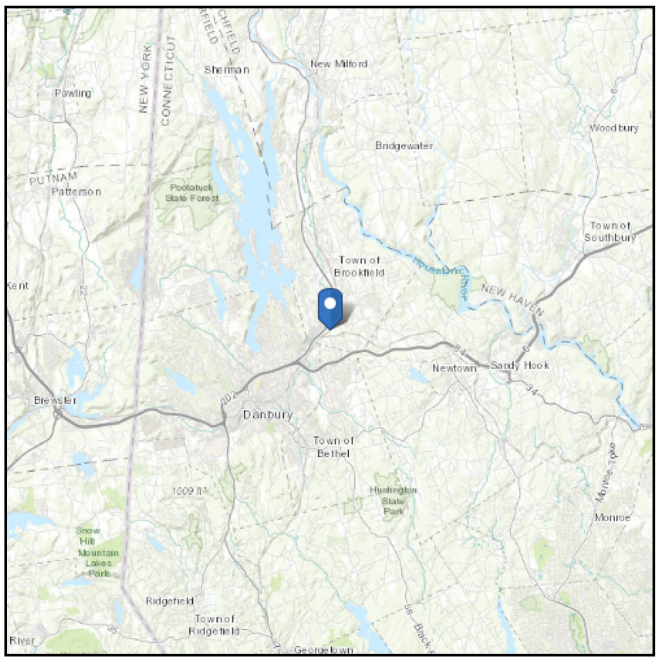
ASCE 7 Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-16
Risk Category: II
Soil Class: D - Default (see Section 11.4.3)

Latitude: 41.435817
Longitude: -73.399322
Elevation: 0 ft (NAVD 88)





Wind

Results:

Wind Speed	115 Vmph
10-year MRI	75 Vmph
25-year MRI	84 Vmph
50-year MRI	89 Vmph
100-year MRI	96 Vmph

Data Source: ASCE/SEI 7-16, Fig. 26.5-1B and Figs. CC.2-1–CC.2-4, and Section 26.5.2
Date Accessed: Mon Mar 06 2023

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-16 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

Site is not in a hurricane-prone region as defined in ASCE/SEI 7-16 Section 26.2.

Seismic

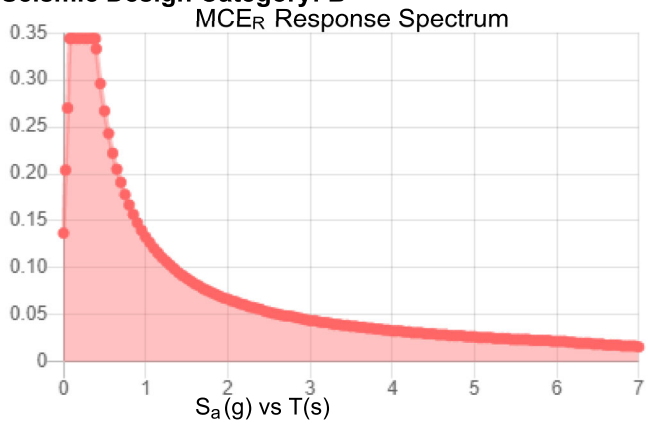
D - Default (see Section 11.4.3)

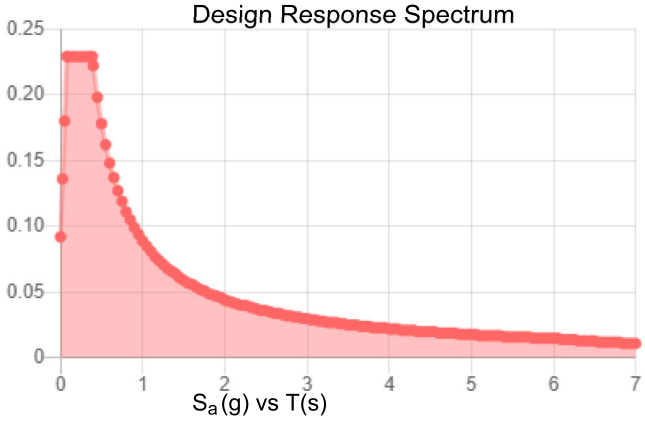
Site Soil Class:

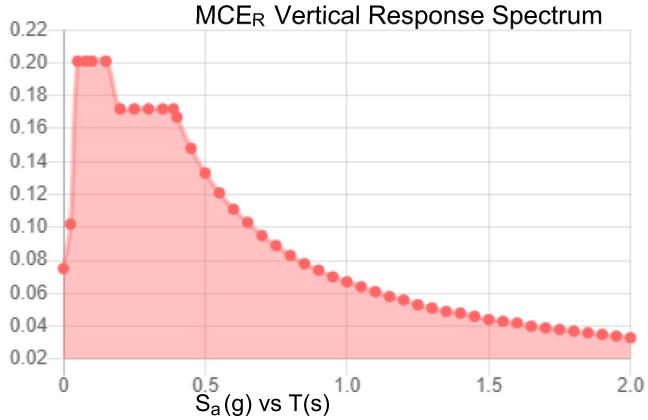
Results:

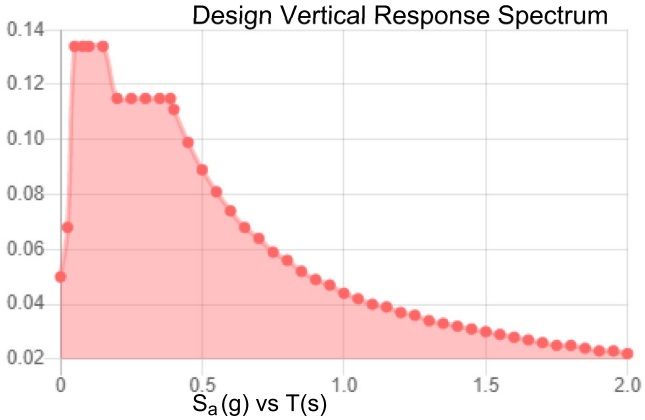
S_S :	0.215	S_{D1} :	0.089
S_1 :	0.056	T_L :	6
F_a :	1.6	PGA :	0.122
F_v :	2.4	PGA_M :	0.19
S_{MS} :	0.344	F_{PGA} :	1.555
S_{M1} :	0.133	I_e :	1
S_{DS} :	0.229	C_v :	0.73

Seismic Design Category: B









Data Accessed: **Mon Mar 06 2023**

Date Source:

USGS Seismic Design Maps based on ASCE/SEI 7-16 and ASCE/SEI 7-16 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-16 Ch. 21 are available from USGS.

Ice

Results:

Ice Thickness:	1.00 in.
Concurrent Temperature:	15 F
Gust Speed	50 mph
Data Source:	Standard ASCE/SEI 7-16, Figs. 10-2 through 10-8
Date Accessed:	Mon Mar 06 2023

Ice thicknesses on structures in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 500-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

WELTI GEOTECHNICAL, P.C.

227 Williams Street · P.O. Box 397
Glastonbury, CT 06033-0397

(860) 633-4623 / FAX (860) 657-2514

February 8, 2023

Mr. David Weinpahl, P.E.
On Air Engineering, LLC

Ref: Geotechnical Study for Proposed Cell Tower, 60 Vale Road, Brookfield, CT
Homeland Towers Site CT076 - Brookfield South

Dear David:

1.0 Herewith are the data from the test boring taken at the above referenced site. One boring was taken at the proposed tower location. The boring was drilled to auger refusal at a depth of 42.0 feet. A tower location was staked in the field by others. *The boring was drilled by Clarence Welti Associates, Inc. and sampling was conducted by this firm solely to obtain indications of subsurface conditions as part of a geotechnical exploration program. No services were performed to evaluate subsurface environmental conditions.*

2.0 The **Subject Project** will include the construction of a 165 foot high monopole tower.

3.0 The **Soils Cross Section** from the boring is generally as follows:

Fine SAND, trace Silt to 15.0 feet, loose to medium compact

SILT, trace fine Sand to 20 feet, loose to medium compact

Fine SAND, little to some Silt to 37.5 feet, medium compact

Weathered/Decomposed Rock to auger refusal on harder rock at 42 feet, very dense

Groundwater was at 17 feet below the existing grade at the completion of the boring

4.0 In general the criteria for tower support is that the foundation capacity would exceed the loads, which might collapse the tower. **Movements from strains in the soils should be limited to differential settlement (or lateral movements of less than ½").**

5.0 The foundation for the tower could be one of the following:

1. A large mat designed to prevent overturning by gravity resistance of the mat and soil cover.

2. A caisson/drilled pier foundation

5.1 In **alternate (1)** the weight of the mat and soil cover (if any) would provide the required resistance to over turning. The mat foundation should can be placed on the natural inorganic soils at least 6 feet below the existing grade. There should be a minimum 6" layer of 3/8" crushed stone atop a geotextile beneath the foundations on the natural soils. The allowable bearing pressure on the crushed stone atop the natural soils can be 2.0 Tons/sf.

5.2 In **summary** the following soil properties and design values would apply to alternate 1.

Soil Property/Parameter	Value
Soil Unit Weight (Backfill)	120 pcf
Soil Unit Weight (Natural)	120 pcf
Soil Unit Weight Submerged (Natural)	58 pcf
Angle of Internal Friction (φ)	30°
Cohesion	0
Pull Out Angle from Vertical	30°
Sliding Coefficient	0.6
Frost Protection Depth (by code)	3.5 feet
Allowable Soil Bearing Pressure on the natural soil inorganic at 6+ feet below the existing grade	2.0 Tons/sf

5.3 **Alternate 2** would be a caisson foundation. The depth of the caissons is to be determined by the designer to provide the required resistance to uplift and overturning forces as well as maintaining the allowable lateral deflection**.The following is summary of design parameters which can be used in the design of the drilled pier/caisson type foundation using the L-Pile computer program.

stratum depth	Total Unit Weight (pcf)	Effective (submerged) Unit Weight (pcf)	Friction Angle degrees	Soil Modulus Parameter, k - above groundwater (pci)	Soil Modulus Parameter, k - below groundwater (pci) *	Allowable Bearing Pressure at 6+ feet (Tsf)
0 to 10.0 feet; fine SAND, trace Silt	120	58	30	25	20	2.0
10.0 to 37.5 feet; SILT, trace fine Sand; or fine SAND, little to some Silt	120	58	32	90	60	3.0

The lateral deflection can be analyzed from Lpile Program or from a empirical formulas in Drilled Pier Foundations; Woodward Gardener Greer; Mcgraw Hill 1972. The soils to about 2 feet below the finished grades should be ignored in the calculating the lateral resistance.

** Typically this value would be about ½"

6.0 Regarding **backfill of foundations**, the material should conform to the following or be 3/8" crushed stone.

Percent Passing	Sieve Size
100	3.5"
50 - 100	3/4"
25 - 85	No.4

The fraction, passing the No.4 sieve should have less than 15% passing the No. 200 sieve.

All backfill and fill must be compacted to at least 95% of modified optimum density in accordance with ASTM D-1557.

7.0 The soils at the subject site are generally in OSHA class C which would require excavations that are in excess of 5 feet to have slopes which are less than 34^{o} (i.e., 1.5H to1.0V).

8.0 This report has been prepared for specific application to the subject project in accordance with generally accepted soil and foundation engineering practices. No other warranty, express or implied, is made. In the event that any changes in the nature, design and location of structures are planned, the conclusions and recommendations contained in this report should not be considered valid unless the changes are reviewed and conclusions of this report modified or verified in writing.

The analyses and recommendations submitted in this report are based in part upon data obtained from referenced explorations. The extent of variations between explorations may not become evident until construction. If variations then appear evident, it will be necessary to re-evaluate the recommendations of this report.

Welti Geotechnical, P.C., should perform a general review of the final design and specifications in order that geotechnical design recommendations may be properly interpreted and implemented as they were intended.

If you have any questions please call me.

Very truly yours,

Max Welti

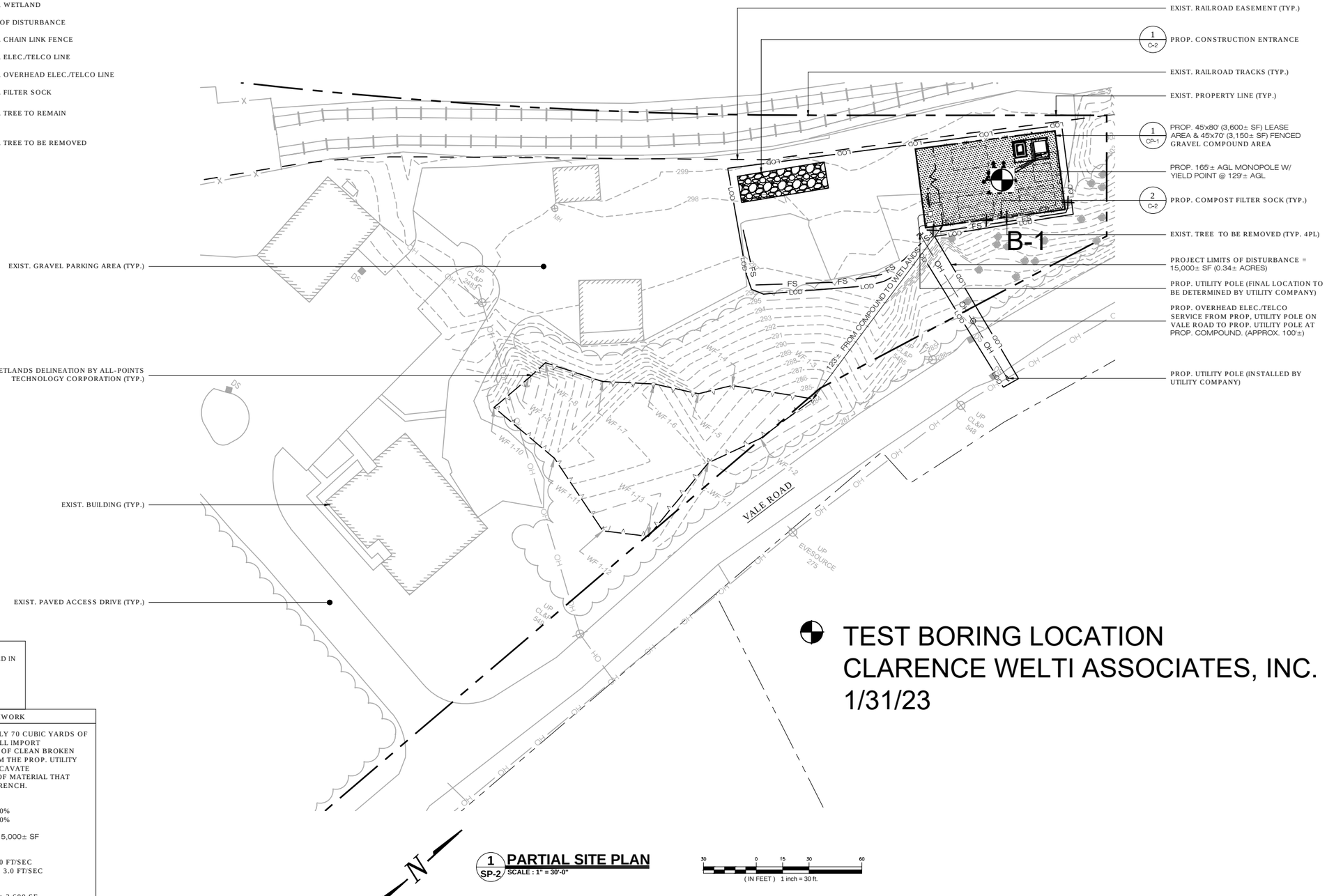
Max Welti, P. E.
President, Welti Geotechnical, P.C.

APPENDIX

TEST BORING LOCATION PLAN
+
TEST BORING LOG

LEGEND

- PROPERTY LINE
- RAILROAD EASEMENT
- EXIST. WETLAND
- LOD — LIMIT OF DISTURBANCE
- X — X — PROP. CHAIN LINK FENCE
- E/T — PROP. ELEC./TELCO LINE
- OH — PROP. OVERHEAD ELEC./TELCO LINE
- FS — PROP. FILTER SOCK
- EXIST. TREE TO REMAIN
- EXIST. TREE TO BE REMOVED



TEST BORING LOCATION
CLARENCE WELTI ASSOCIATES, INC.
1/31/23

1 SP-2 **PARTIAL SITE PLAN**
SCALE : 1" = 30'-0"

30 0 15 30 60
(IN FEET) 1 inch = 30 ft.

NOTE:
4 TREES WILL NEED TO BE REMOVED IN CONSTRUCTION OF THE FACILITY.

<10" DIA.	4 TREES
10"-14" DIA.	0 TREES
>14" DIA.	0 TREES

SITE AREAS & VOLUMES OF EARTHWORK

SITEWORK ENTAILS APPROXIMATELY 70 CUBIC YARDS OF EXCAVATION. THE COMPOUND WILL IMPORT APPROXIMATELY 70 CUBIC YARDS OF CLEAN BROKEN STONE. THE UTILITY TRENCH FROM THE PROP. UTILITY POLE AT THE COMPOUND WILL EXCAVATE APPROXIMATELY 8 CUBIC YARDS OF MATERIAL THAT WILL BE USED TO BACKFILL THE TRENCH.

COMPOUND AREA SLOPES:
EXISTING - 0.5%-1.0%
PROPOSED - 0.5%-1.0%

TOTAL AREA OF DISTURBANCE = 15,000± SF

STORMWATER VELOCITY:
PRIOR TO GROUND COVER < 3.0 FT/SEC
FOLLOWING GROUND COVER < 3.0 FT/SEC

STORMWATER VOLUME:
PROPOSED IMPERVIOUS AREA = 3,600 SF
WATER QUALITY STD VOLUME (1') = 300 CF
STORAGE VOLUME (6' DEPTH, 40% VOIDS) = 720 CF

GROUND COVER TO BE ESTABLISHED AS FOLLOWS (U.O.N):
- WHITE CLOVER @ 0.20#/- SF
- TALL FESCUE @ 0.45#/- SF
- RYEGRASS @ 0.10#/- SF

MAP REFERENCES:
1. 'EX-1 SITE SURVEY, 60 VALE ROAD, BROOKFIELD, CT 06804, FAIRFIELD COUNTY, 1 OF 1; PREPARED BY NORTHEAST TOWER SURVEYING, INC., 140 WEST MAPLEMERE ROAD, WILLIAMSVILLE, NEW YORK 14221, LATEST REVISION DATED: 02/08/22.

HOMELAND TOWERS, LLC
9 HARMONY STREET
2nd FLOOR
DANBURY, CT 06810
(203) 297-6345

at&t
340 MOUNT KEMBLE AVENUE
MORRISTOWN, NEW JERSEY 07960

ALL-POINTS TECHNOLOGY CORPORATION
567 VAUXHALL STREET EXTENSION - SUITE 311
WATERFORD, CT 06385 PHONE: (860)-663-1697
WWW.ALLPOINTSTECH.COM FAX:(860)-663-0935

PETITION DOCUMENTS

NO	DATE	REVISION
0	03/07/22	FOR REVIEW: RCB
1	03/23/22	CLIENT REVS: RCB
2	03/29/22	CLIENT REVS: RCB
3		
4		
5		
6		

DESIGN PROFESSIONALS OF RECORD

PROF: ROBERT C. BURNS P.E.
COMP: ALL-POINTS TECHNOLOGY CORPORATION, P.C.
ADD: 567 VAUXHALL STREET EXT. SUITE 311 WATERFORD, CT 06385

DEVELOPER: HOMELAND TOWERS, LLC
ADDRESS: 9 HARMONY STREET 2ND FLOOR DANBURY, CT 06810

HOMELAND TOWERS BROOKFIELD SOUTH

SITE ADDRESS: 60 VALE ROAD BROOKFIELD, CT 06804

APT FILING NUMBER: CT2831040

DATE: 03/07/22 | DRAWN BY: CSH | CHECKED BY: RCB

SHEET TITLE: **PARTIAL SITE PLAN**

SHEET NUMBER: **SP-2**

CLARENCE WELTI ASSOC., INC.
P.O. BOX 397
GLASTONBURY, CONN 06033

CLIENT
HOMELAND TOWERS, LLC

PROJECT NAME
PROPOSED CELL TOWER
LOCATION
160 VALE ROAD, BROOKFIELD, CT

	AUGER	CASING	SAMPLER	CORE BAR.
TYPE	HSA		SS	
SIZE I.D.	3.75"		1.375"	
HAMMER WT.			140lbs	
HAMMER FALL			30"	

OFFSET
LINE & STA.
N. COORDINATE
E. COORDINATE

SURFACE ELEV.
HOLE NO. B-1

GROUND WATER OBSERVATIONS
AT 17.0 FT. AFTER 0 HOURS
AT FT. AFTER HOURS

START DATE 1/31/23
FINISH DATE 1/31/23

DEPTH	SAMPLE NO.	BLOWS/6"	DEPTH	A	STRATUM DESCRIPTION + REMARKS	ELEV.
0	1	2-1-2-3	0.0'-2.0'		BR.FINE SAND, LITTLE SILT	
					1.0 LIGHT BR.FINE SAND, TRACE SILT	
	2	2-2-2-3	2.0'-4.0'			
	3	2-3-2-3	4.0'-6.0'			
5						
10	4	3-5-7	10.0'-11.5'			
15	5	1-2-4	15.0'-16.5'		15.0 GREY SILT, TRACE FINE SAND	
20	6	4-5-8	20.0'-21.5'		20.0 GREY FINE SAND, LITTLE TO SOME SILT	
25	7	2-4-6	25.0'-26.5'			
30	8	4-4-8	30.0'-31.5'			
35						

LEGEND: COL. A:
SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON
PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%

DRILLER: K. CHRISTIANA
INSPECTOR:

CLARENCE WELTI ASSOC., INC. P.O. BOX 397 GLASTONBURY, CONN 06033	CLIENT HOMELAND TOWERS, LLC	PROJECT NAME PROPOSED CELL TOWER LOCATION 160 VALE ROAD, BROOKFIELD, CT

DEPTH	SAMPLE NO.	SAMPLE BLOWS/6"	SAMPLE DEPTH	A	STRATUM DESCRIPTION + REMARKS	ELEV.
	9	2-3-12	35.0'-36.5'			
					37.5 WEATHERED/DECOMPOSED ROCK	
40	10	38-40-60	40.0'-41.3'			
					42.0 BOTTOM OF BORING @ 42.0' (AUGER REFUSAL)	
45						
50						
55						
60						
65						
70						
75						

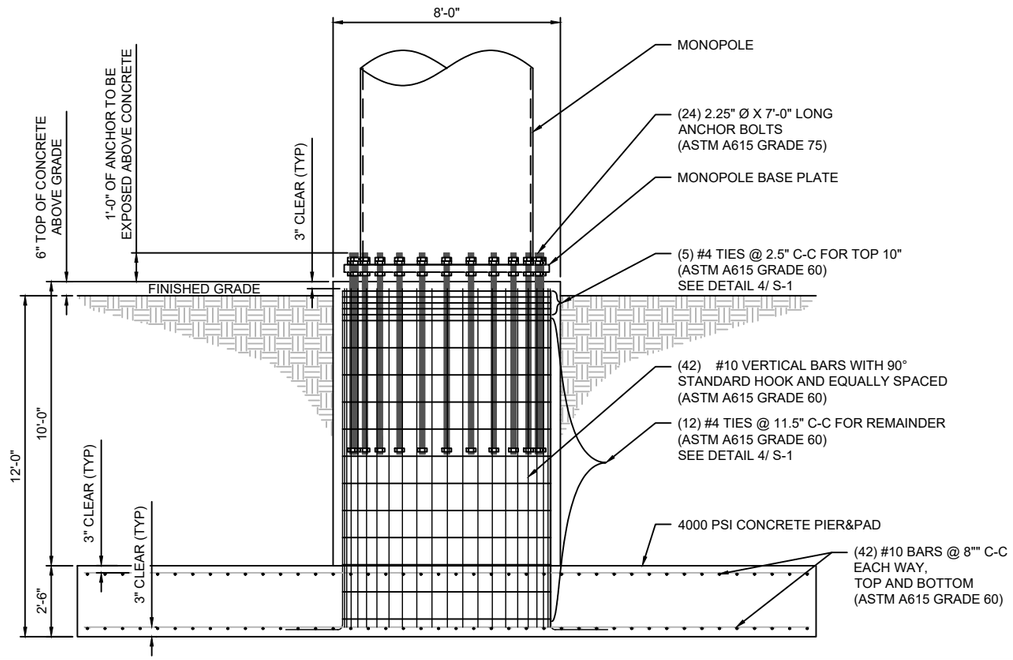
LEGEND: COL. A:

SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON

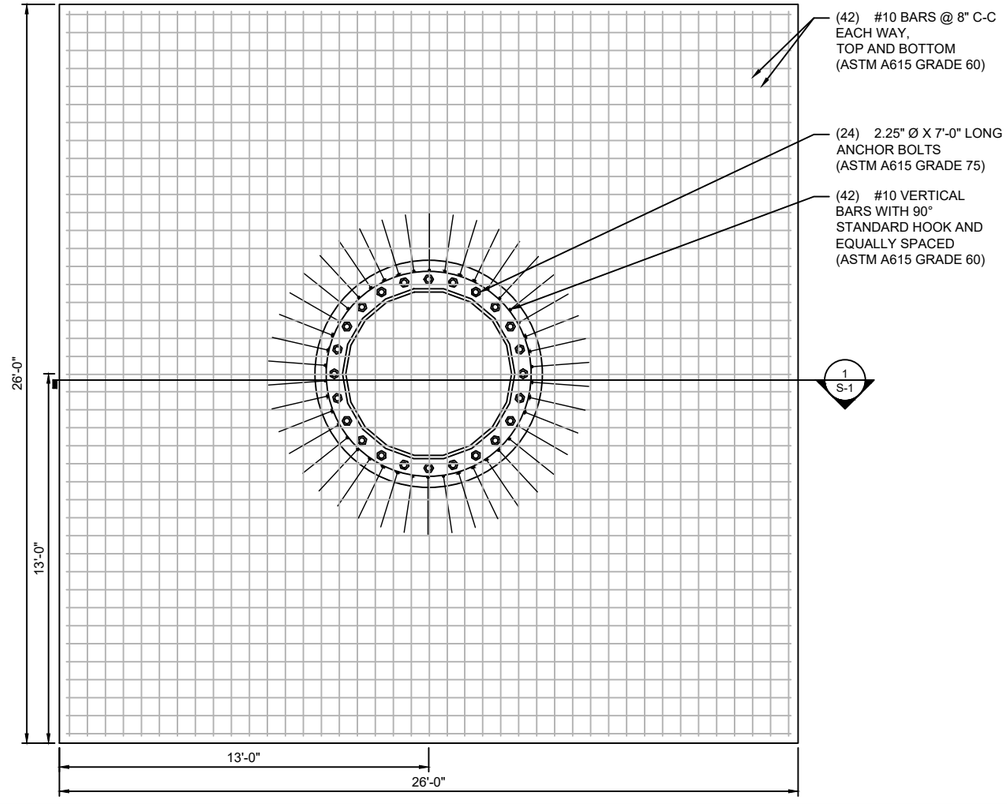
PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%

DRILLER: K. CHRISTIANA
INSPECTOR:

SHEET 2 OF 2 | HOLE NO. **B-1**



1 PIER/PAD FOUNDATION ELEVATION N.T.S.



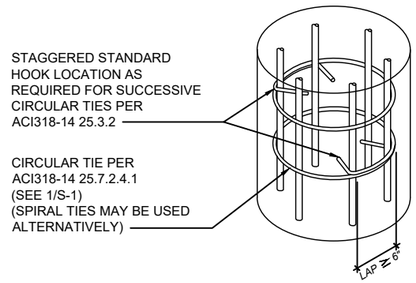
3 PIER/PAD FOUNDATION PLAN N.T.S.

1. FOUNDATION DESIGNED PER 2022 CONNECTICUT STATE BUILDING CODE AND PER SOIL REPORT PREPARED BY WELTI GEOTECHNICAL, P.C. DATED 02/08/23.
2. CONCRETE SHALL BE 4000 P.S.I. (MINIMUM) @ 28 DAYS COMPRESSIVE STRENGTH.
3. FOUNDATION INSTALLATION SHALL BE OBSERVED BY AN ENGINEER FROM WELTI GEOTECHNICAL, P.C.
4. PAD AND PIER FOUNDATION INSTALLATION SHALL BE OBSERVED IN ACCORDANCE WITH THE APPLICABLE CODES.
5. ALL REINFORCING SHALL BE A.S.T.M. A615 GRADE 60.
6. REFER TO SOIL REPORT FOR PROPER PREPARATION AND INSTALLATION REQUIREMENTS.
7. TOP OF CONCRETE TO BOTTOM OF LEVELING NUT SHALL NOT EXCEED 1.0 TIMES BOLT DIAMETER.
8. SPECIAL INSPECTIONS SHALL BE PERFORMED DURING INSTALLATION AND TESTING OF CAST-IN-PLACE FOUNDATION ELEMENTS AS REQUIRED BY THE 2022 CONNECTICUT STATE BUILDING CODE.
9. CONTRACTOR IS RESPONSIBLE FOR SHORING WORK ETC.

2 NOTES

SOIL PARAMETERS (PER REFERENCED GEO REPORT IN NOTE 1):

Soil Property/Parameter	Value
Soil Unit Weight (Backfill)	120 pcf
Soil Unit Weight (Natural)	120 pcf
Soil Unit Weight Submerged (Natural)	58 pcf
Angle of Internal Friction (φ)	30°
Cohesion	0
Pull Out Angle from Vertical	30°
Sliding Coefficient	0.6
Frost Protection Depth (by code)	3.5 feet
Allowable Soil Bearing Pressure on the natural soil inorganic at 6+ feet below the existing grade	2.0 Tons/sf



4 TIE BAR DETAIL N.T.S.

AMBER STRUCTURES
CELLSITE SOLUTIONS, LLC
4150 C STREET SW
CEDAR RAPIDS, IA

SITE NAME:
BROOKFIELD CT

ADDRESS:
60 VALE ROAD
BROOKFIELD, CT

ISSUED FOR:

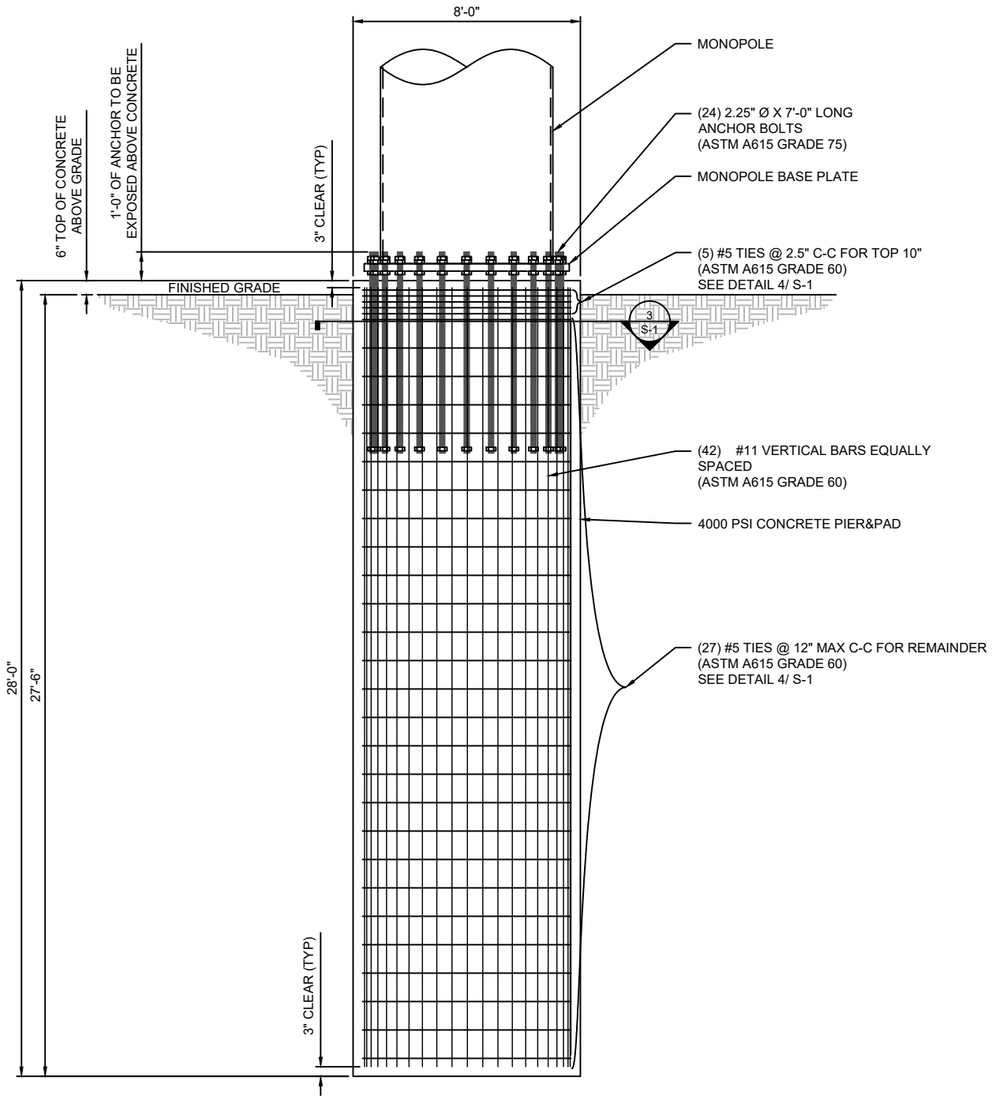
REV	DATE	DRWN	DESCRIPTION	DES./QA
0	03/07/23	BA	FOUNDATION DRAWING	

DRAWING TITLE

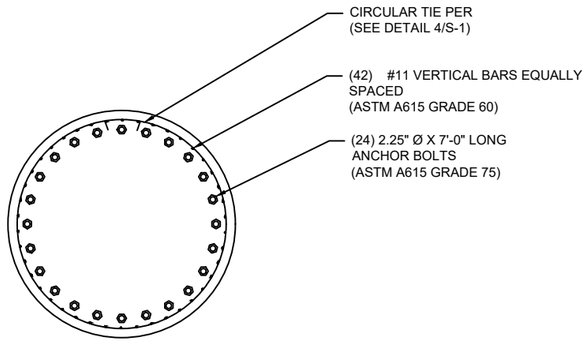
PIER/PAD FOUNDATION DETAILS

SHEET NUMBER:

S-1.1



1 PIER FOUNDATION ELEVATION



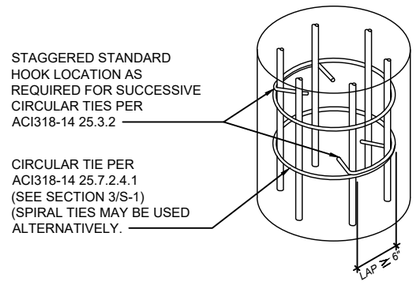
3 PIER FOUNDATION PLAN

1. FOUNDATION DESIGNED PER 2022 CONNECTICUT STATE BUILDING CODE AND PER SOIL REPORT PREPARED BY WELTI GEOTECHNICAL, P.C. DATED 02/08/23.
2. CONCRETE SHALL BE 4000 P.S.I. (MINIMUM) @ 28 DAYS COMPRESSIVE STRENGTH.
3. FOUNDATION INSTALLATION SHALL BE OBSERVED BY AN ENGINEER FROM WELTI GEOTECHNICAL, P.C.
4. CAISSON INSTALLATION SHALL BE OBSERVED IN ACCORDANCE WITH ACI 336 "STANDARD SPECIFICATIONS FOR THE CONSTRUCTION OF DRILLED PIERS", LATEST EDITION.
5. ALL REINFORCING SHALL BE A.S.T.M. A615 GRADE 60.
6. REFER TO SOIL REPORT FOR PROPER PREPARATION AND INSTALLATION REQUIREMENTS.
7. TOP OF CONCRETE CAISSON TO BOTTOM OF LEVELING NUT SHALL NOT EXCEED 1.0 TIMES BOLT DIAMETER.
8. SPECIAL INSPECTIONS SHALL BE PERFORMED DURING INSTALLATION AND TESTING OF CAST-IN-PLACE DEEP FOUNDATION ELEMENTS AS REQUIRED BY 2022 CONNECTICUT STATE BUILDING CODE.
9. CONTRACTOR IS RESPONSIBLE FOR SHORING WORK ETC.

SOIL PARAMETERS (PER REFERENCED GEO REPORT IN NOTE 1):

Soil Property/Parameter	Value
Soil Unit Weight (Backfill)	120 pcf
Soil Unit Weight (Natural)	120 pcf
Soil Unit Weight Submerged (Natural)	58 pcf
Angle of Internal Friction (φ)	30°
Cohesion	0
Pull Out Angle from Vertical	30°
Sliding Coefficient	0.6
Frost Protection Depth (by code)	3.5 feet
Allowable Soil Bearing Pressure on the natural soil inorganic at 6+ feet below the existing grade	2.0 Tons/sf
GROUNDWATER	17' BELOW GRADE

2 NOTES



4 TIE BAR DETAIL

AMBOR STRUCTURES
CELLSITE SOLUTIONS, LLC
4150 C STREET SW
CEDAR RAPIDS, IA

SITE NAME:
BROOKFIELD CT

ADDRESS:
60 VALE ROAD
BROOKFIELD, CT

STATE OF CONNECTICUT
MICHAEL T. DE BOER
No. 18022
LICENSED PROFESSIONAL ENGINEER

03/10/2023

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	03/07/23	BA	FOUNDATION DRAWING	

DRAWING TITLE

PIER FOUNDATION DETAILS

SHEET NUMBER:

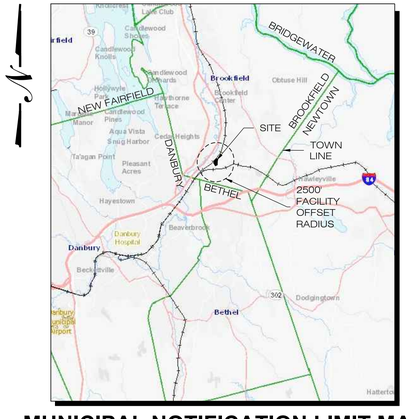
S-1.2

DEVELOPMENT & MANAGEMENT PLANS

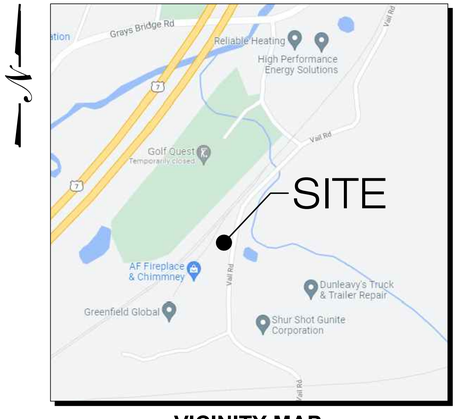
HOMELAND TOWERS, LLC

WIRELESS TELECOMMUNICATIONS FACILITY

BROOKFIELD SOUTH
60 VALE ROAD
BROOKFIELD, CT 06804



MUNICIPAL NOTIFICATION LIMIT MAP
SCALE : 1" = 2 Miles



VICINITY MAP
SCALE: N.T.S.

DRAWING INDEX

SITE INFORMATION

PROJECT LOCATION: 60 VALE ROAD
BROOKFIELD, CT 06804

PROJECT DESCRIPTION: RAWLAND SITE W/ GROUND EQUIPMENT WITHIN 3,150± SF TELECOMMUNICATIONS COMPOUND W/ NEW 165'± AGL GALVANIZED MONOPOLE

PROPERTY DEVELOPER: HOMELAND TOWERS, LLC
9 HARMONY STREET
2ND FLOOR
DANBURY, CT 06810

DEVELOPER CONTACT: RAY VERGATI
(203) 297-6345

ENGINEER CONTACT: ROBERT C. BURNS, P.E.
(860) 552-2036

LATITUDE: 41° 26' 08.94" N (41.435817)
LONGITUDE: 73° 23' 57.56" W (-73.399322)
ELEVATION: 298.0'± AMSL

MAP: E16
LOT: 23
ZONE: I-1 HO

OWNER:

70 VALE ROAD LLC
70 VALE ROAD
BROOKFIELD, CT 06804

APPLICANTS:

HOMELAND TOWERS, LLC
9 HARMONY STREET
2ND FLOOR
DANBURY, CT 06810
RAY VERGATI
(203) 297-6345

AT&T
340 MOUNT KEMBLE AVE.
MORRISTOWN, NJ 07960

HOMELAND PROJECT ATTORNEY:

CUDDY & FEDER, LLP
445 HAMILTON AVENUE
14TH FLOOR
WHITE PLAINS, NY 10601
(914) 761-1300

POWER PROVIDER:

EVERSOURCE: (800) 286-2000

TELCO PROVIDER:

FRONTIER (800) 921-8102

CALL BEFORE YOU DIG:

(800) 922-4455

GOVERNING CODES:

CONNECTICUT STATE BUILDING CODE, LATEST EDITION
NATIONAL ELECTRIC CODE, LATEST EDITION
TIA-222-H

HOMELAND TOWERS, LLC
9 HARMONY STREET
2nd FLOOR
DANBURY, CT 06810
(203) 297-6345

at&t
340 MOUNT KEMBLE AVENUE
MORRISTOWN, NEW JERSEY 07960

ALL-POINTS TECHNOLOGY CORPORATION
567 VAUXHALL STREET EXTENSION - SUITE 311
WATERFORD, CT 06385 PHONE: (860)-663-1697
WWW.ALLPOINTSTECH.COM FAX:(860)-663-0935

D&M DOCUMENTS

NO	DATE	REVISION
0	04/04/23	FOR REVIEW: RCB
1	04/05/23	CLIENT REVS: RCB
2		
3		
4		
5		
6		

DESIGN PROFESSIONALS OF RECORD

PROF: ROBERT C. BURNS P.E.
COMP: ALL-POINTS TECHNOLOGY CORPORATION, P.C.
ADD: 567 VAUXHALL STREET EXT. SUITE 311 WATERFORD, CT 06385

DEVELOPER: HOMELAND TOWERS, LLC
ADDRESS: 9 HARMONY STREET 2ND FLOOR DANBURY, CT 06810

HOMELAND TOWERS BROOKFIELD SOUTH

SITE ADDRESS: 60 VALE ROAD BROOKFIELD, CT 06804

APT FILING NUMBER: CT2831040

DATE: 04/04/23 | DRAWN BY: CSH
CHECKED BY: RCB

SHEET TITLE:

TITLE SHEET

SHEET NUMBER:

T-1

STATE OF CONNECTICUT · ROBERT CHARLES BURNS · 20071 · LICENSED PROFESSIONAL ENGINEER

BOUNDARY SURVEY

'CT076'
60 VALE ROAD
BROOKFIELD, CT 06804
FAIRFIELD COUNTY

SITE LOCATION — LOCATION MAP (NOT TO SCALE)

GENERAL NOTES:

1. SUBSURFACE UTILITIES WERE NOT LOCATED OR SURVEYED BY NORTHEAST TOWER SURVEYING, INC. AS PART OF THIS SURVEY. PERSONS DEPENDING ON THIS DOCUMENT SHOULD CONTACT THE LOCAL UNDERGROUND UTILITY LOCATING AGENCY PRIOR TO COMMENCING ANY EARTH MOVING OPERATIONS OR OTHER NEW CONSTRUCTION ACTIVITIES OR CALL 811 OR 1-800-922-4455.
2. VERTICAL DATUM IS NAVD 1988 AND ESTABLISHED BY GPS OBSERVATIONS REFERENCED TO THE NGS CORS NETWORK. PERMANENT SITE CONTROL HAS BEEN ESTABLISHED ON SITE.
3. HORIZONTAL DATUM IS NAD 83, STATE PLANE COORDINATES OF CONNECTICUT AND ESTABLISHED GPS OBSERVATIONS REFERENCED TO THE NGS CORS NETWORK. DEED BEARINGS ARE SHOWN HEREON AND NOT RELATED TO CURRENT HORIZONTAL CONTROL.
4. SURVEY MAY BE SUBJECT TO EASEMENTS AND RIGHT-OF-WAYS OF RECORD, BOTH RECORDED AND UNRECORDED.
5. ONLY COPIES FROM THE ORIGINAL SURVEY MAP EMBOSSED WITH AN ORIGINAL OF THE LAND SURVEYOR'S STAMP AND SIGNATURE SHALL BE CONSIDERED TO BE TRUE AND VAUID COPIES.
6. SURVEY NOT INTENDED FOR THE CONVEYANCE OF THE REAL PROPERTY. SURVEY ONLY PROVIDED IN CONJUNCTION WITH PLANNING, ZONING AND PERMITTING REQUIREMENTS. USE OF THIS SURVEY BY ANYONE OTHER THAN HOMELAND TOWER, LLC IS STRICTLY PROHIBITED.
7. PROPERTY LINES ESTABLISHED USING A COMBINATION OF EXISTING FIELD MONUMENTATION, PARENT PARCEL DEED AND OTHER RECORD DOCUMENTATION.
8. TOPOGRAPHIC FEATURES SHOWN HEREON ARE BASED UPON ACTUAL FIELD DATA COLLECTED ON DECEMBER 1, 2021.
9. ADDITIONAL BOUNDARY INFORMATION SHOWN HEREON IS BASED ON THE TOWN OF BROOKFIELD GIS DATA AS OF DECEMBER 9, 2021 AND IS NOT INTENDED TO BE CONSTRUED AS HAVING BEEN OBTAINED AS THE RESULT OF A FIELD BOUNDARY SURVEY.
10. REFER TO ADDITIONAL MAPS:POGRAPHIC FEATURES SHOWN HEREON ARE BASED UPON ACTUAL FIELD DATA COLLECTED ON DECEMBER 1, 2021.

MAP SHOWING EASEMENT AREA TO BE CONVEYED FROM LOT 3 TO LOTS 1 AND 2 RJM INDUSTRIAL PARK, VALE ROAD, BROOKFIELD, CT; FILED UNDER MAP NO. 425 IN THE TOWN OF BROOKFIELD CLERK'S OFFICE

NEW YORK, NEW HAVEN & HARTFORD RAILROAD VALUATION MAP

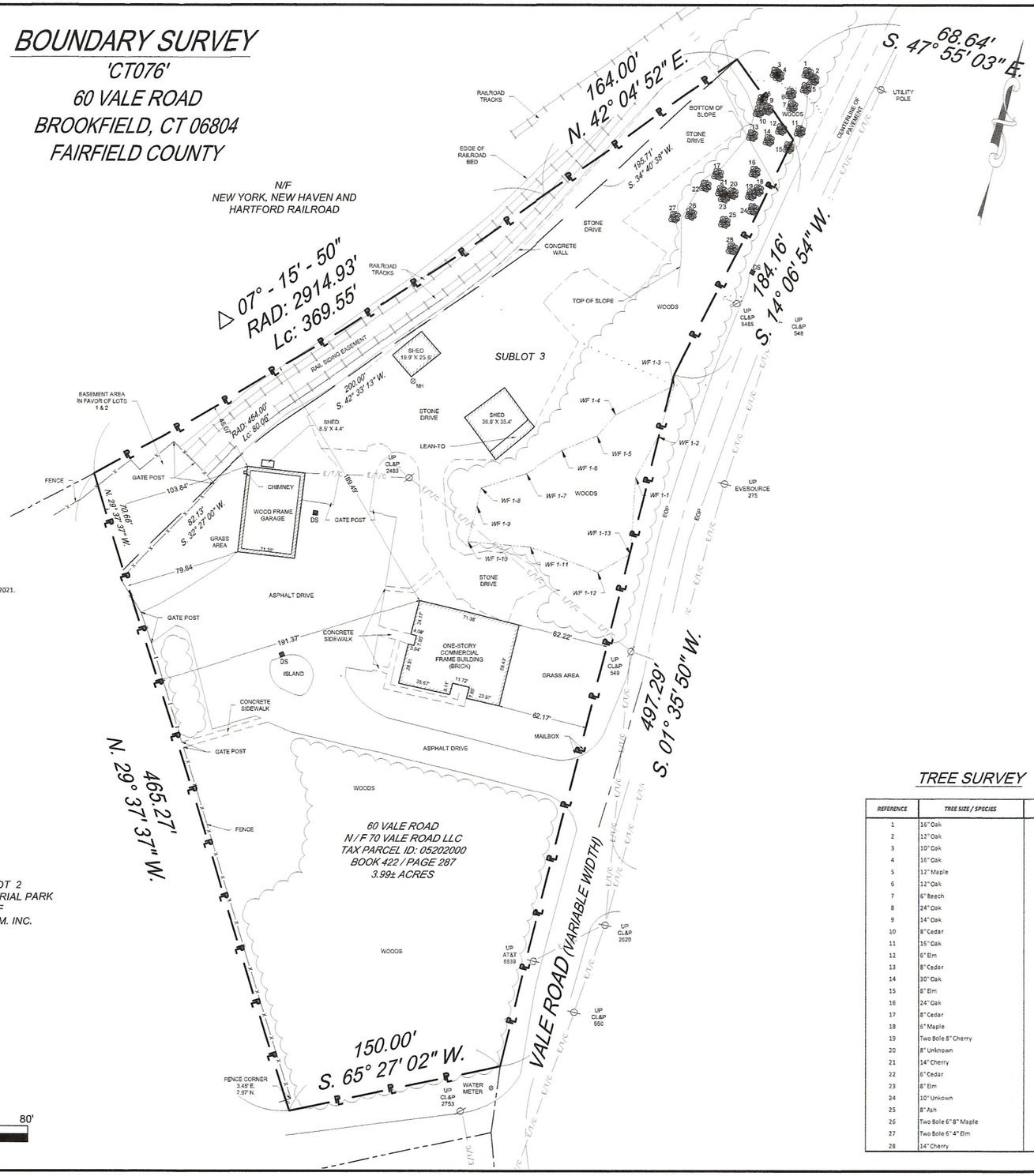
LEGAL DESCRIPTION

SITUATED IN THE TOWN OF BROOKFIELD, COUNTY OF FAIRFIELD, STATE OF CONNECTICUT, DESCRIBED AS FOLLOWS:

ALL THAT CERTAIN PIECE OR PARCEL OF LAND SITUATED IN THE TOWN OF BROOKFIELD, COUNTY OF FAIRFIELD AND STATE OF CONNECTICUT, BEING SHOWN AND DESIGNATED AS LOT 3 ON THAT CERTAIN MAP ENTITLED "TOWN OF BROOKFIELD, FAIRFIELD COUNTY, CONNECTICUT, FINAL SUBDIVISION MAP OF RJM INDUSTRIAL PARK MAP PREPARED FOR SYLVIA M. INC. BY CARROCCIO-COVILL & ASSOCIATES, SCALE 1" = 100', FEBRUARY 26, 1990 CONSISTING OF 3.99 ± ACRES. FILED IN THE MAP RECORDS OF THE TOWN F BROOKFIELD UNDER MAP NO. 255.

TAX ID: 05202000

BEING THE SAME PROPERTY CONVEYED TO 70 VALE ROAD, LLC. GRANTEE, FROM SYLVIA M. INC., GRANTOR, BY DEED RECORDED 09/20/2002, IN BOOK 422, PAGE 287 OF THE FAIRFIELD COUNTY RECORDS.



LEGEND

FH	⊗	MANHOLE
MH	○	GAS METER
GM	⋇	LIGHT STANDARD
LP	■	DRAINAGE STRUCT.
DS	○	FIRE HYDRANT
I.P. \ MON.	●	EXISTING IRON PIPE
UP	⊖	UTILITY POLE
		PROPERTY LINE
		WETLAND
		SUBLOT LINE
		ROW LINE
X — X		FENCE
		TREE
		EDGE OF WOODS
		BRUSH LINE
E/T/C		OVERHEAD UTILITIES
		CENTERLINE

40' 20' 0 40' 80'

SCALE: 1' = 40'

TREE SURVEY

REFERENCE	TREE SIZE / SPECIES	Note
1	16" Oak	
2	12" Oak	
3	10" Oak	
4	16" Oak	
5	12" Maple	
6	12" Oak	
7	6" Beech	
8	24" Oak	
9	14" Oak	
10	8" Cedar	
11	16" Oak	
12	6" Elm	
13	8" Cedar	
14	30" Oak	
15	8" Elm	
16	24" Oak	
17	8" Cedar	
18	6" Maple	
19	Two Bole 8" Cherry	
20	8" Unknown	
21	14" Cherry	
22	6" Cedar	
23	8" Elm	
24	10" Unkown	
25	8" Ash	
26	Two Bole 6" 8" Maple	
27	Two Bole 6" 4" Elm	
28	14" Cherry	

PLANS PREPARED FOR:

HOMELAND TOWERS
9 Harmony Street
Danbury, Connecticut 06810

SURVEY LICENSE:

STATE OF CONNECTICUT
EARLE C. NEWMAN
No. 15616
LICENSED
LAND SURVEYOR

CONSULTANT:

Northeast Tower Surveying, Inc.
140 West Maplemere Road Williamsville, New York 14221
(716) 548-2884
Northeast Tower Surveying, Inc. Project #21-178

DRAWING NOTICE:

REVISIONS:

DESCRIPTION	DATE	BY	REV
ISSUED FINAL	3/11/22	DSA	ECN

SITE NAME:

BROOKFIELD SOUTH

SITE NUMBER:

CT076

SITE ADDRESS:

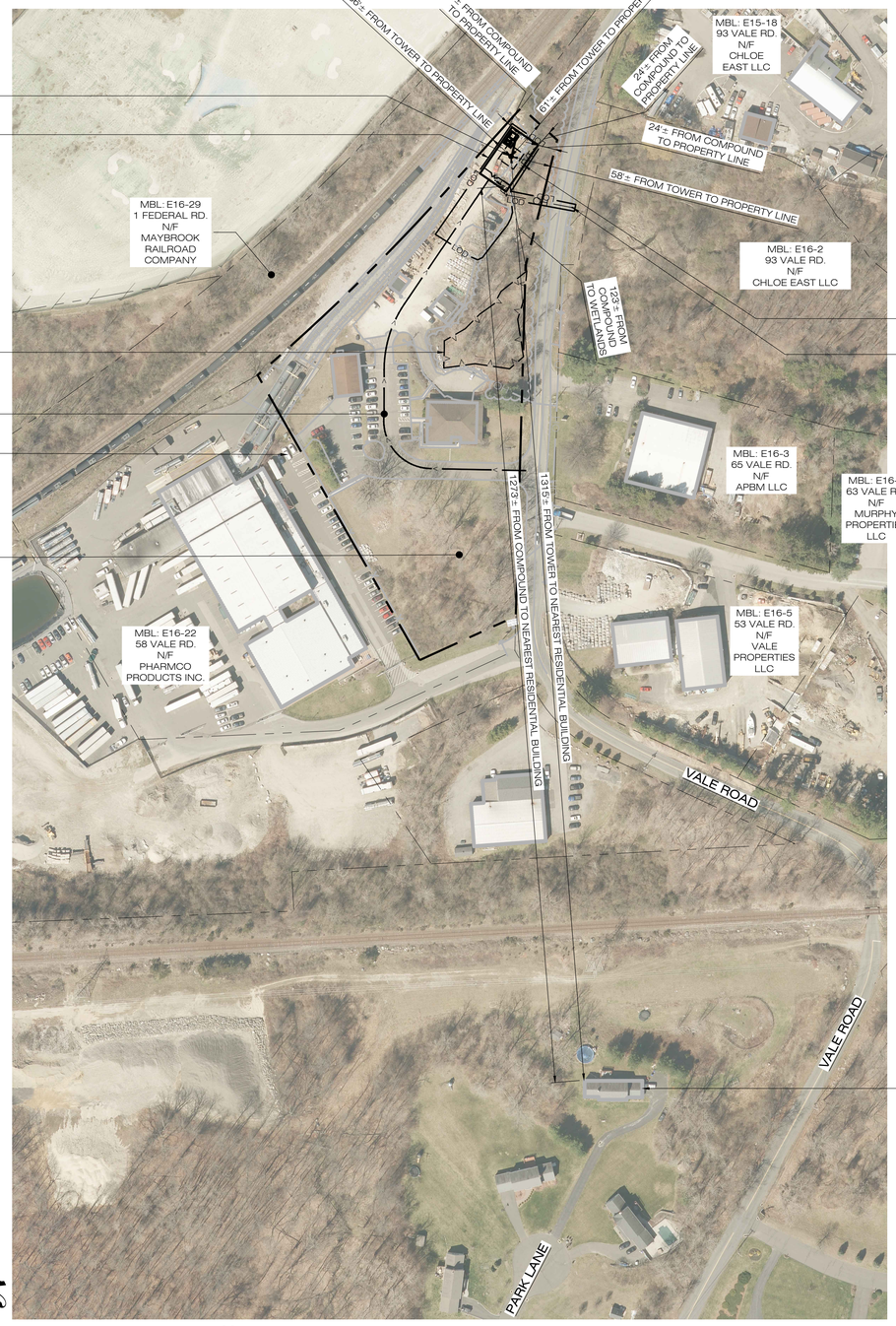
60 VALE ROAD
BROOKFIELD, CT 06804
FAIRFIELD COUNTY

SHEET DESCRIPTION:

BOUNDARY SURVEY

SHEET NUMBER:

EX-1



1 SP-1 **SITE PLAN**
SCALE : 1" = 100'-0"

100 0 50 100 200
(IN FEET) 1 inch = 100 ft.

MAP REFERENCES.
1. "EX-1 SITE SURVEY, 60 VALE ROAD, BROOKFIELD, CT 06804, FAIRFIELD COUNTY", 1 OF 1; PREPARED BY NORTHEAST TOWER SURVEYING, INC., 140 WEST MAPLEMERE ROAD, WILLIAMSVILLE, NEW YORK 14221, LATEST REVISION DATED: 03/11/22.

HOMELAND TOWERS, LLC
9 HARMONY STREET
2nd FLOOR
DANBURY, CT 06810
(203) 297-6345

at&t
340 MOUNT KEMBLE AVENUE
MORRISTOWN, NEW JERSEY 07960

ALL-POINTS TECHNOLOGY CORPORATION
567 VAUXHALL STREET EXTENSION - SUITE 311
WATERFORD, CT 06385 PHONE: (860)-663-1697
WWW.ALLPOINTSTECH.COM FAX:(860)-663-0935

D&M DOCUMENTS

NO	DATE	REVISION
0	04/04/23	FOR REVIEW: RCB
1	04/05/23	CLIENT REVS: RCB
2		
3		
4		
5		
6		

DESIGN PROFESSIONALS OF RECORD

PROF: ROBERT C. BURNS P.E.
COMP: ALL-POINTS TECHNOLOGY CORPORATION, P.C.
ADD: 567 VAUXHALL STREET EXT. SUITE 311 WATERFORD, CT 06385

DEVELOPER: HOMELAND TOWERS, LLC
ADDRESS: 9 HARMONY STREET 2ND FLOOR DANBURY, CT 06810

HOMELAND TOWERS BROOKFIELD SOUTH

SITE ADDRESS: 60 VALE ROAD BROOKFIELD, CT 06804

APT FILING NUMBER: CT2831040

DATE: 04/04/23 | DRAWN BY: CSH

CHECKED BY: RCB

SHEET TITLE:

SITE PLAN & ABUTTERS MAP

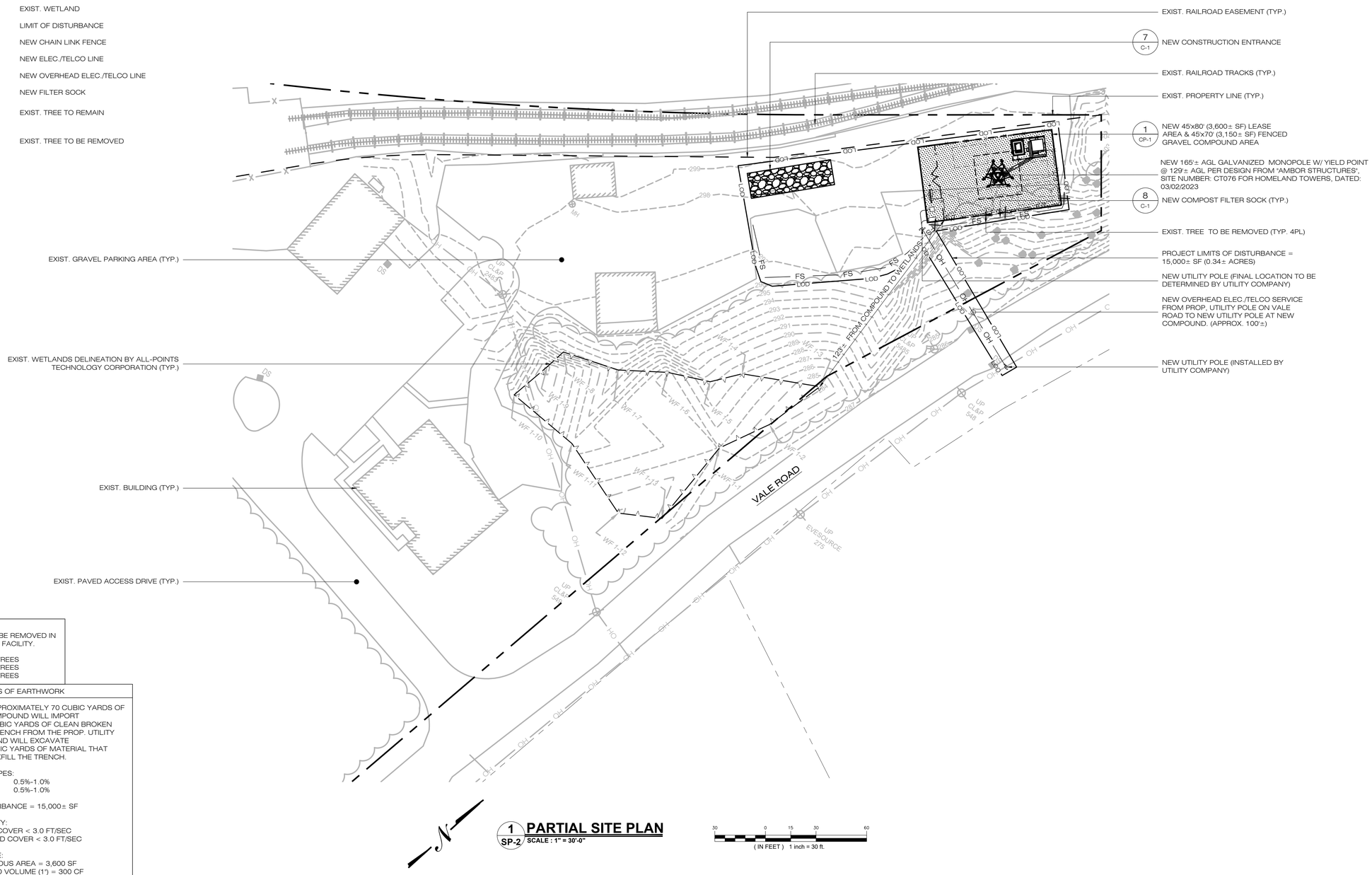
SHEET NUMBER:

SP-1

STATE OF CONNECTICUT · ROBERT CHARLES BURNS · 20071 · LICENSED PROFESSIONAL ENGINEER

LEGEND

- PROPERTY LINE
- RAILROAD EASEMENT
- EXIST. WETLAND
- LOD — LIMIT OF DISTURBANCE
- X — X — NEW CHAIN LINK FENCE
- E/T — NEW ELEC./TELCO LINE
- OH — NEW OVERHEAD ELEC./TELCO LINE
- FS — NEW FILTER SOCK
- EXIST. TREE TO REMAIN
- EXIST. TREE TO BE REMOVED



NOTE:
4 TREES WILL NEED TO BE REMOVED IN CONSTRUCTION OF THE FACILITY.

<10" DIA.	4 TREES
10"-14" DIA.	0 TREES
>14" DIA.	0 TREES

SITE AREAS & VOLUMES OF EARTHWORK

SITEWORK ENTAILS APPROXIMATELY 70 CUBIC YARDS OF EXCAVATION. THE COMPOUND WILL IMPORT APPROXIMATELY 70 CUBIC YARDS OF CLEAN BROKEN STONE. THE UTILITY TRENCH FROM THE PROP. UTILITY POLE AT THE COMPOUND WILL EXCAVATE APPROXIMATELY 8 CUBIC YARDS OF MATERIAL THAT WILL BE USED TO BACKFILL THE TRENCH.

COMPOUND AREA SLOPES:
EXISTING - 0.5%-1.0%
PROPOSED - 0.5%-1.0%

TOTAL AREA OF DISTURBANCE = 15,000± SF

STORMWATER VELOCITY:
PRIOR TO GROUND COVER < 3.0 FT/SEC
FOLLOWING GROUND COVER < 3.0 FT/SEC

STORMWATER VOLUME:
PROPOSED IMPERVIOUS AREA = 3,600 SF
WATER QUALITY STD VOLUME (1") = 300 CF
STORAGE VOLUME (6" DEPTH, 40% VOIDS) = 720 CF

GROUND COVER TO BE ESTABLISHED AS FOLLOWS (U.O.N):
- WHITE CLOVER @ 0.20#/- SF
- TALL FESCUE @ 0.45#/- SF
- RYEGRASS @ 0.10#/- SF

N

1 SP-2 PARTIAL SITE PLAN
SCALE : 1" = 30'-0"

30 0 15 30 60
(IN FEET) 1 inch = 30 ft.

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HOMELAND TOWERS, LLC
9 HARMONY STREET
2nd FLOOR
DANBURY, CT 06810
(203) 297-6345

at&t
340 MOUNT KEMBLE AVENUE
MORRISTOWN, NEW JERSEY 07960

ALL-POINTS TECHNOLOGY CORPORATION
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ADD: 567 VAUXHALL STREET EXT. SUITE 311 WATERFORD, CT 06385

DEVELOPER: HOMELAND TOWERS, LLC
ADDRESS: 9 HARMONY STREET 2ND FLOOR DANBURY, CT 06810

HOMELAND TOWERS BROOKFIELD SOUTH

SITE ADDRESS: 60 VALE ROAD BROOKFIELD, CT 06804

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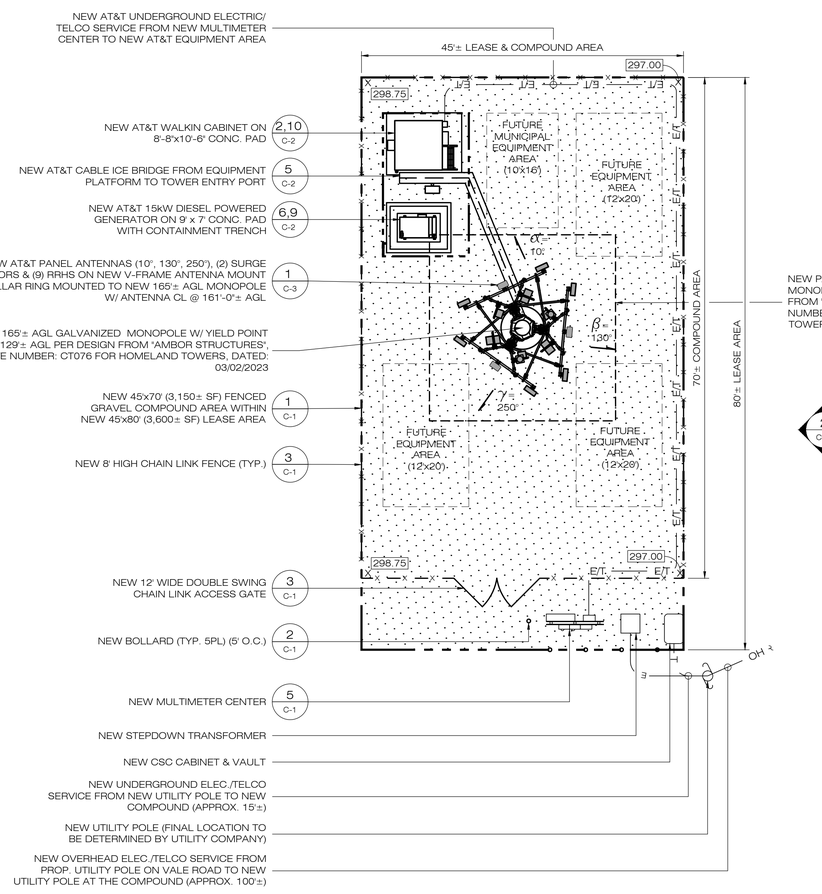
SHEET TITLE:
PARTIAL SITE PLAN

SHEET NUMBER:
SP-2

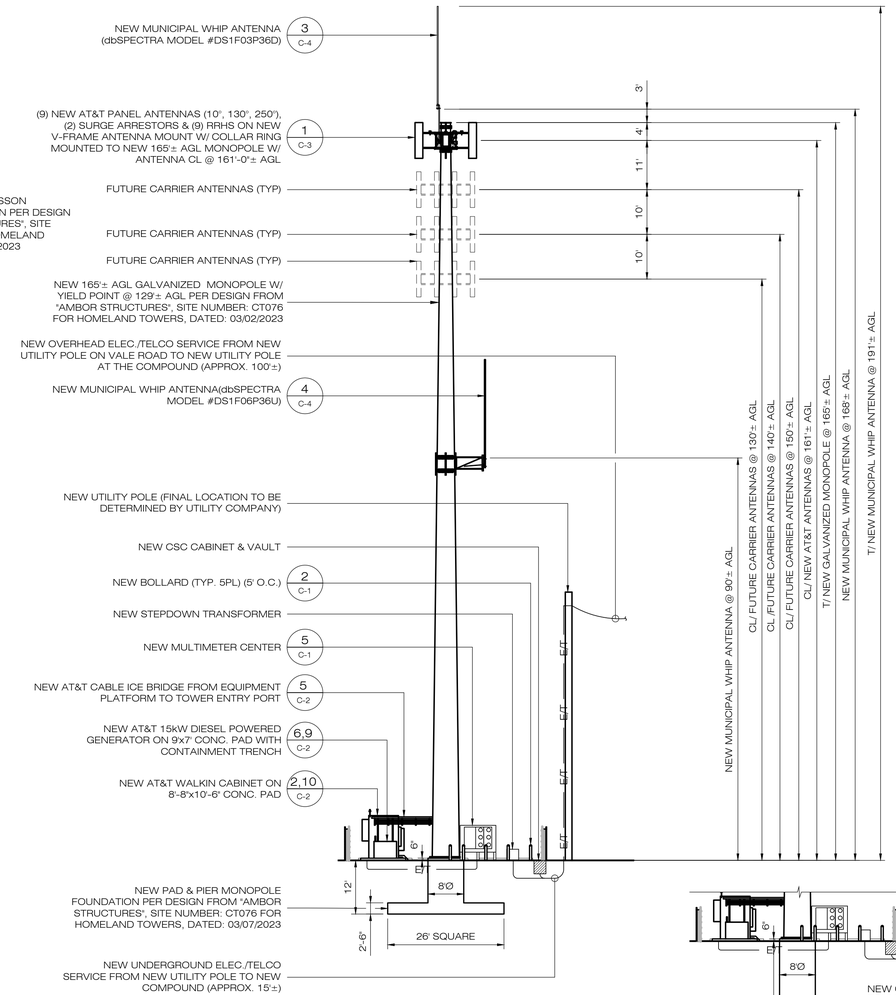
STATE OF CONNECTICUT · ROBERT CHARLES BURNS · 20071 · LICENSED PROFESSIONAL ENGINEER



1 CP-1 COMPOUND PLAN

SCALE : 1" = 10'-0"

(IN FEET) 1 inch = 10 ft.

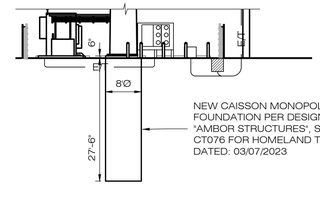


2 CP-1 NORTHEAST ELEVATION

SCALE : 1/16" = 1'-0"

16'-0" 0 8'-0" 16'-0" 32'-0"

1/16" SCALE: 1 INCH= 16'-0"



3 CP-1 CAISSON TOWER FOUNDATION

SCALE : 1/16" = 1'-0"

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DEVELOPER: HOMELAND TOWERS, LLC
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SITE ADDRESS: 60 VALE ROAD BROOKFIELD, CT 06804

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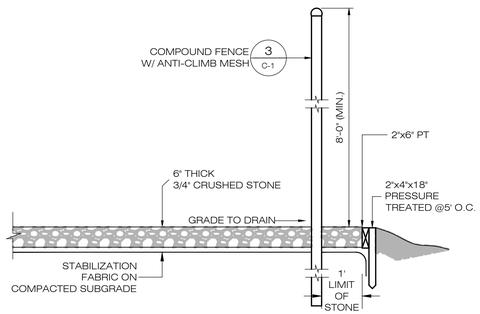
COMPOUND PLAN & ELEVATION

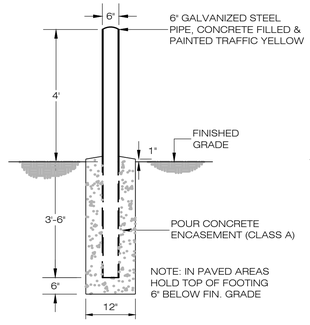
SHEET NUMBER:

CP-1

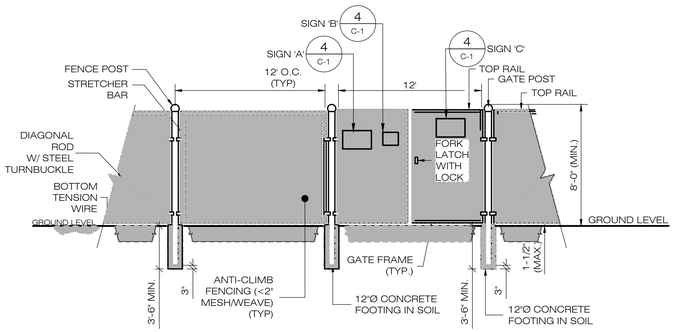
STATE OF CONNECTICUT ROBERT C. BURNS 20071 LICENSED PROFESSIONAL ENGINEER



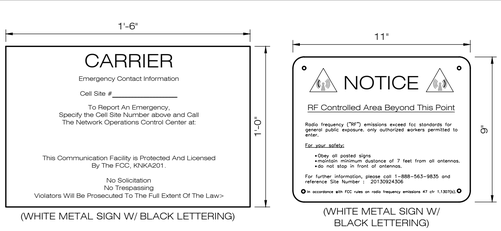
1 C-1 COMPOUND DETAIL
SCALE : N.T.S.



2 C-1 BOLLARD DETAIL
SCALE : N.T.S.



3 C-1 CHAIN-LINK FENCING & FENCE GATE DETAIL
SCALE : N.T.S.



(WHITE METAL SIGN W/ BLACK LETTERING)

SIGN 'A'

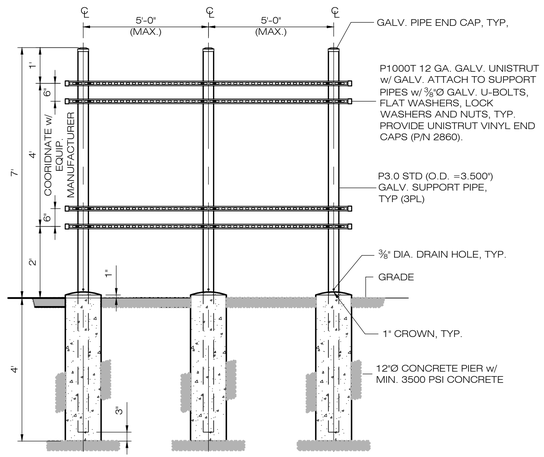
(WHITE METAL SIGN W/ BLACK LETTERING)

SIGN 'B'

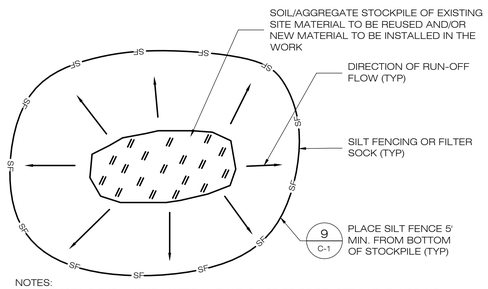
(WHITE SIGN W/ BLACK & WHITE LOGO & RED LETTERING)

SIGN 'C'

4 C-1 TYPICAL SIGNAGE
SCALE : N.T.S.



5 C-1 UTILITY BACKBOARD FRAME DETAIL
SCALE : N.T.S.



NOTES:
1. ALL EXISTING EXCAVATED MATERIAL THAT IS NOT TO BE REUSED IN THE WORK IS TO BE IMMEDIATELY REMOVED FROM THE SITE AND PROPERLY DISPOSED OF.

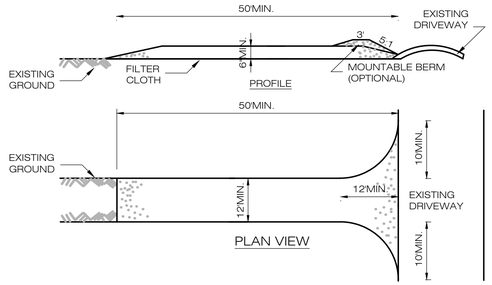
2. SOIL/AGGREGATE STOCKPILE SITES TO BE WHERE SHOWN ON THE DRAWINGS.

3. RESTORE STOCKPILE SITES TO PRE-EXISTING PROJECT CONDITION AND RESEED AS REQUIRED.

4. STOCKPILE HEIGHTS MUST NOT EXCEED 35'. STOCKPILE SLOPES MUST BE 2:1 OR FLATTER.

5. ANY SOIL IN STOCKPILES IN EXCESS OF SEVEN (7) DAYS SHALL BE SEEDED AND MULCHED OR COVERED.

6 C-1 TEMPORARY STOCKPILE DETAIL
SCALE : N.T.S.



CONSTRUCTION ENTRANCE SPECIFICATIONS:
1. STONE SIZE - USE 1-4 INCH STONE, OR RECLAIMED OR RECYCLED CONCRETE EQUIVALENT.

2. LENGTH - NOT LESS THAN 50 FEET (EXCEPT ON A SINGLE RESIDENCE LOT WHERE A 30 FOOT MINIMUM LENGTH WOULD APPLY).

3. THICKNESS - NOT LESS THAN SIX (6) INCHES.

4. WIDTH - TWELVE (12) FOOT MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS. TWENTY-FOUR (24) FOOT IF SINGLE ENTRANCE TO SITE.

5. GEOTEXTILE - WILL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE.

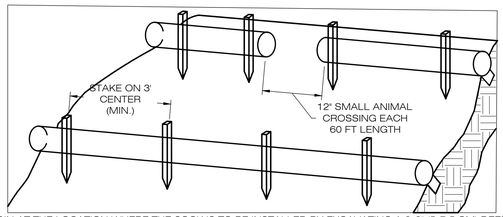
6. SURFACE WATER - ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ACCESS SHALL BE PIPED BENEATH THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 5:1 SLOPES WILL BE PERMITTED.

7. MAINTENANCE - THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY, ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY.

8. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON A AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.

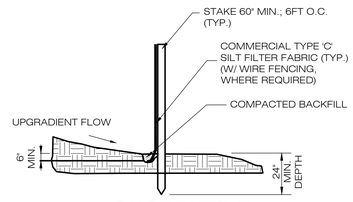
9. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER EACH RAIN.

7 C-1 CONSTRUCTION ENTRANCE DETAIL
SCALE : N.T.S.



1. BEGIN AT THE LOCATION WHERE THE SOCK IS TO BE INSTALLED BY EXCAVATING A 2-3" (5-7.5 CM) DEEP X 9" (22.9 CM) WIDE TRENCH ALONG THE CONTOUR OF THE SLOPE. EXCAVATED SOIL SHOULD BE PLACED UP SLOPE FROM THE ANCHOR TRENCH.
2. PLACE THE SOCK IN THE TRENCH SO THAT IT CONTOURS TO THE SOIL SURFACE. COMPACT SOIL FROM THE EXCAVATED TRENCH AGAINST THE SOCK ON THE UPHILL SIDE. SOCKS SHALL BE INSTALLED IN 60 FT CONTINUOUS LENGTHS WITH ADJACENT SOCKS TIGHTLY ABUT. EVERY 60 FT THE SOCK ROW SHALL BE SPACED 12 INCHES CLEAR, END TO END, FOR AMPHIBIAN AND REPTILE TRAVEL. THE OPEN SPACES SHALL BE STAGGERED MID LENGTH OF THE NEXT DOWN GRADIENT SOCK.
3. SECURE THE SOCK WITH 18-24" (45.7-61 CM) STAKES EVERY 3-4' (0.9 -1.2 M) AND WITH A STAKE ON EACH END. STAKES SHOULD BE DRIVEN THROUGH THE MIDDLE OF THE SOCK LEAVING AT LEAST 2-3" (5-7.5 CM) OF STAKE EXTENDING ABOVE THE SOCK. STAKES SHOULD BE DRIVEN PERPENDICULAR TO THE SLOPE FACE.

8 C-1 COMPOST FILTER SOCK SEDIMENTATION CONTROL BARRIER
SCALE : N.T.S.



GEOTEXTILE SILT FENCE DETAIL
9 C-1
SCALE : N.T.S.

HOMELAND TOWERS, LLC
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2nd FLOOR
DANBURY, CT 06810
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SHEET TITLE:
SITE DETAILS

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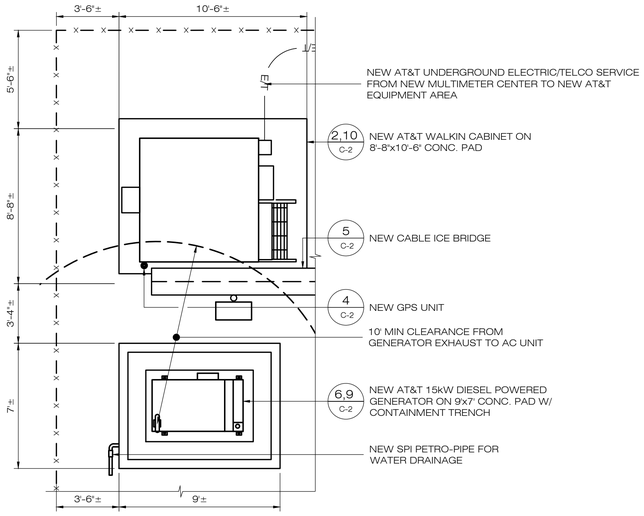
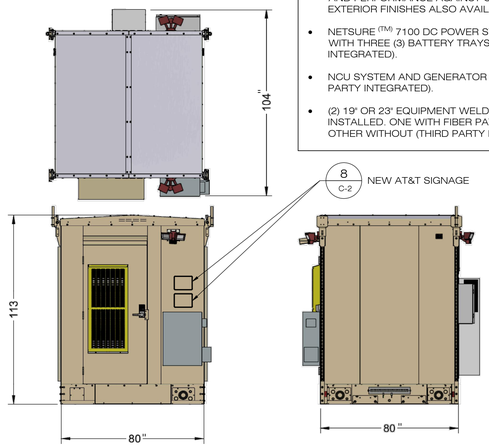


1 C-2 AT&T EQUIPMENT AREA

SCALE : ¼" = 1'-0"

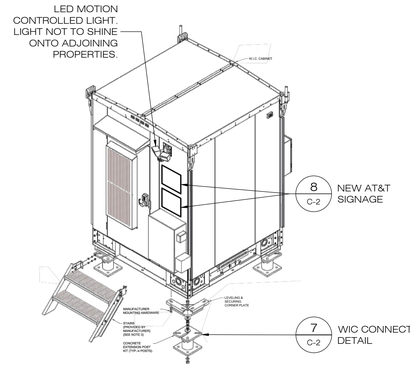


2 C-2 AT&T SMARTMOD WALK-IN CABINET (WIC) DETAILS

SCALE : ¼" = 1'-0"

WALK-IN CABINET SPECIFICATIONS:

- COLOR - PEBBLE GRAY, RAL7032
- FINISH - STANDARD FINISH IS MULTI-STAGE DRY POWER POLYESTER PAINT FOR MAXIMUM DURABILITY AND PERFORMANCE AGAINST CORROSION. OPTIONAL EXTERIOR FINISHES ALSO AVAILABLE UPON REQUEST.
- NETSURE (TM) 7100 DC POWER SYSTEM IN 23" RACK WITH THREE (3) BATTERY TRAYS (THIRD PARTY INTEGRATED).
- NCU SYSTEM AND GENERATOR CONTROL (THIRD PARTY INTEGRATED).
- (2) 19" OR 23" EQUIPMENT WELDED FRAMES INSTALLED. ONE WITH FIBER PATCH PANEL AND THE OTHER WITHOUT (THIRD PARTY INTEGRATED).

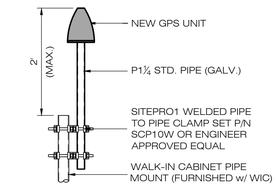


3 C-2 AT&T SMARTMOD WALK-IN CABINET (WIC)

SCALE : N.T.S.

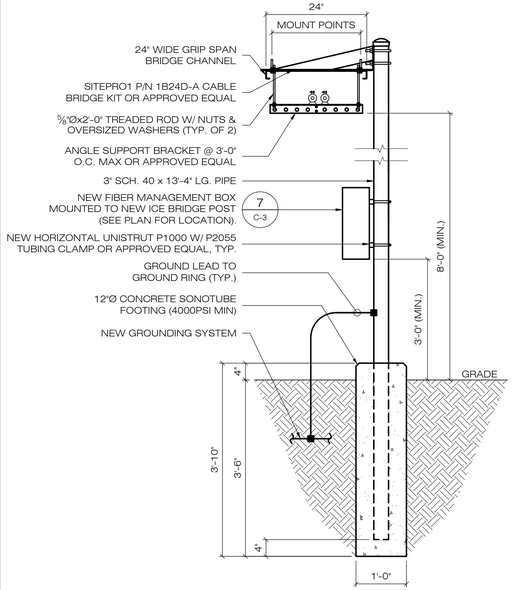
WALK-IN CABINET NOTES:

1. WALK-IN CABINET(WIC) TO BE INSTALLED ACCORDING TO MANUFACTURER RECOMMENDATIONS & SPECIFICATIONS.
2. CONTRACTOR TO CONFIRM PARTS & HARDWARE PRIOR TO CONSTRUCTION & COORDINATE w/ AT&T CM.
3. CONTRACTOR SHALL MAINTAIN A MAXIMUM OF 18" CLEARANCE FROM T/SLAB TO BOTTOM OF WIC TO ACCOMMODATE STAIRS. VERIFY IN FIELD PRIOR TO INSTALLATION.
4. COORDINATE POWER & TELCO CONDUIT STUB UP PLACEMENT WITH ELECTRICAL TRADES.
5. PROVIDE HVAC & ELECTRICAL WORKING SPACE CLEARANCES PER MANUFACTURER RECOMMENDATIONS & NEC REQUIREMENTS.
6. WIC DIMENSIONS: 6'-8"(W) x 6'-8"(L) x 9'-6"(H) (NO BASE). WIC WEIGHT: 5500lbs (EMPTY; 7500lbs (FULLY INTEGRATED).
7. CONTRACTOR SHALL PROVIDE & INSTALL SPECIFIED CONCRETE ANCHORS.



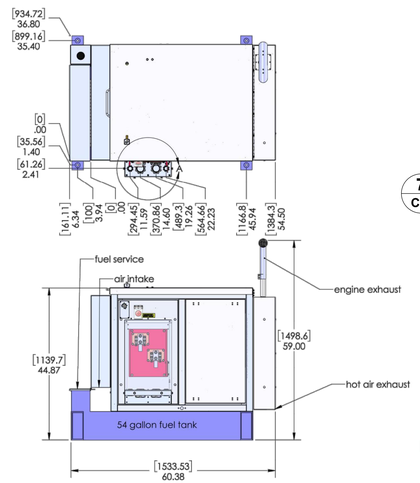
4 C-2 GPS MOUNT

SCALE : N.T.S.



5 C-2 CABLE BRIDGE DETAIL

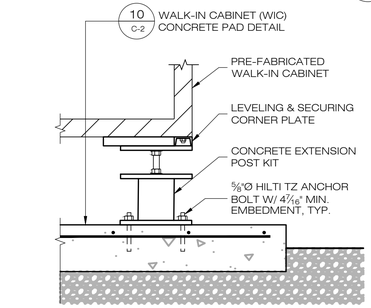
SCALE : N.T.S.



POLAR POWER, INC.,
15KW 48V DC DIESEL POWERED GENERATOR
HORIZONTAL ALUMINUM ENCLOSURE
54 GAL. FUEL TANK

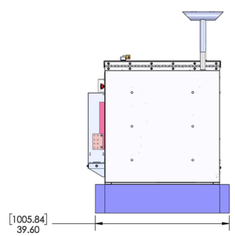
6 C-2 GENERATOR

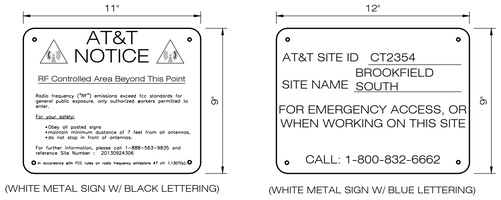
SCALE : N.T.S.



7 C-2 TYPICAL WIC CONNECTION DETAIL

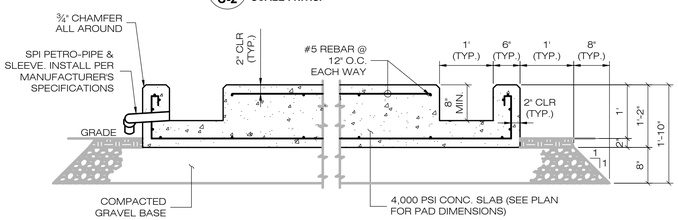
SCALE : N.T.S.





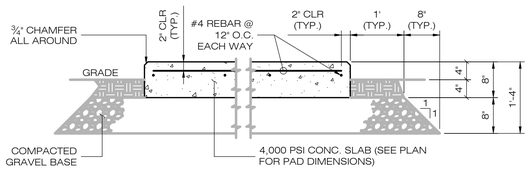
8 C-2 TYPICAL SIGNAGE

SCALE : N.T.S.



9 C-2 GENERATOR PAD

SCALE : N.T.S.



10 C-2 EQUIPMENT PAD

SCALE : N.T.S.

HOMELAND TOWERS, LLC
9 HARMONY STREET
2nd FLOOR
DANBURY, CT 06810
(203) 297-6345

at&t
340 MOUNT KEMBLE AVENUE
MORRISTOWN, NEW JERSEY 07960

ALL-POINTS TECHNOLOGY CORPORATION
567 VAUXHALL STREET EXTENSION - SUITE 311
WATERFORD, CT 06385 PHONE: (860)-663-1697
WWW.ALLPOINTSTECH.COM FAX:(860)-663-0935

D&M DOCUMENTS

NO	DATE	REVISION
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DESIGN PROFESSIONALS OF RECORD

PROF: ROBERT C. BURNS P.E.
COMP: ALL-POINTS TECHNOLOGY CORPORATION, P.C.
ADD: 567 VAUXHALL STREET EXT. SUITE 311 WATERFORD, CT 06385

DEVELOPER: HOMELAND TOWERS, LLC
ADDRESS: 9 HARMONY STREET 2ND FLOOR DANBURY, CT 06810

HOMELAND TOWERS BROOKFIELD SOUTH

SITE ADDRESS: 60 VALE ROAD BROOKFIELD, CT 06804

APT FILING NUMBER: CT2831040

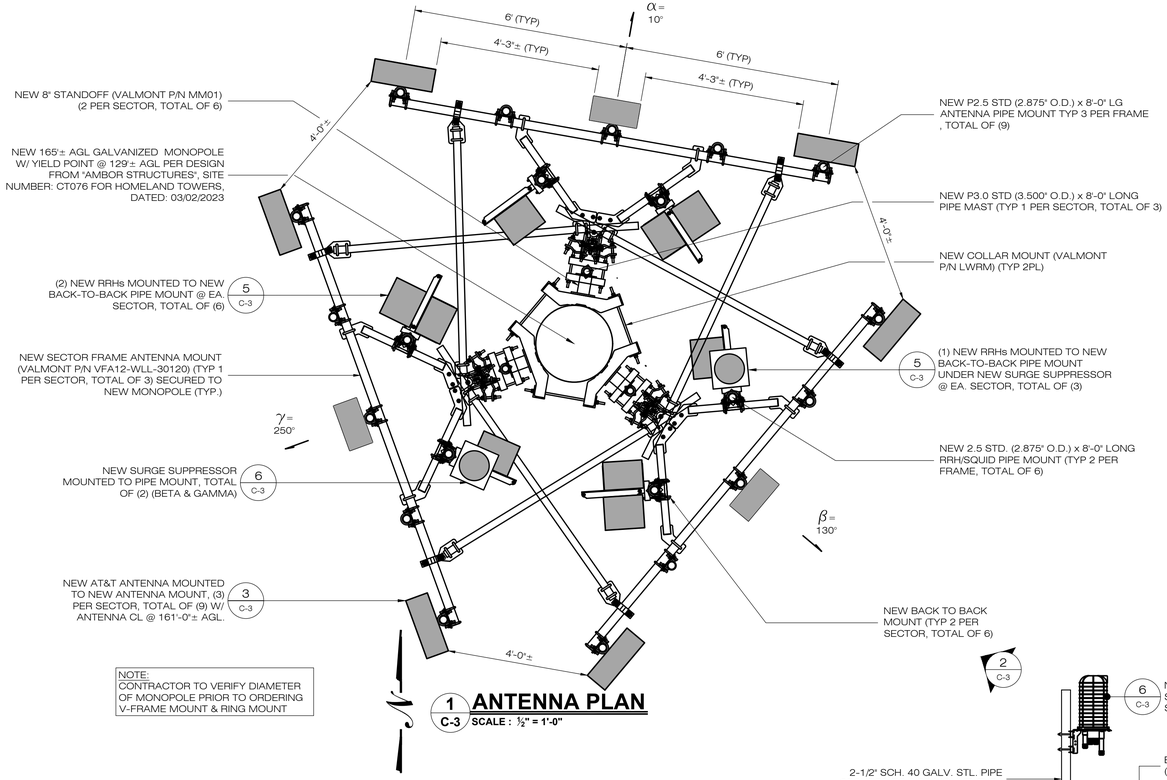
DATE: 04/04/23 | DRAWN BY: CSH | CHECKED BY: RCB

SHEET TITLE:

AT&T EQUIPMENT PLAN & DETAILS

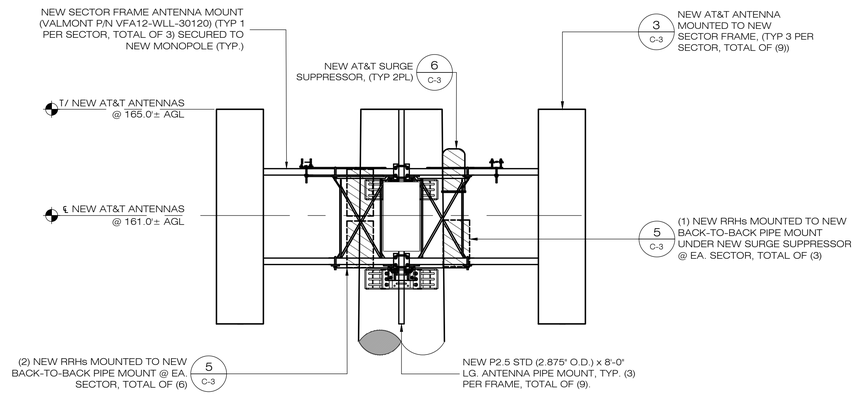
SHEET NUMBER: C-2

STATE OF CONNECTICUT ROBERT C. BURNS 20071 LICENSED PROFESSIONAL ENGINEER

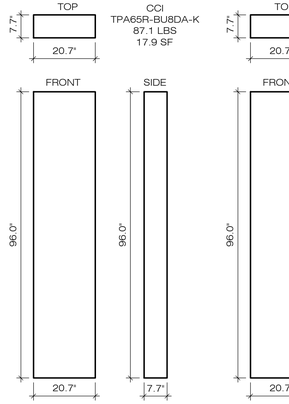


NOTE:
CONTRACTOR TO VERIFY DIAMETER OF MONOPOLE PRIOR TO ORDERING V-FRAME MOUNT & RING MOUNT

1 ANTENNA PLAN
C-3 SCALE : ½" = 1'-0"

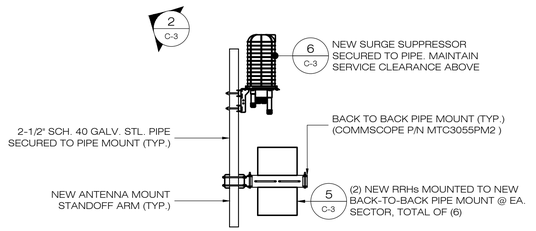


2 ANTENNA MOUNTING DETAIL
C-3 SCALE : ¾" = 1'-0"

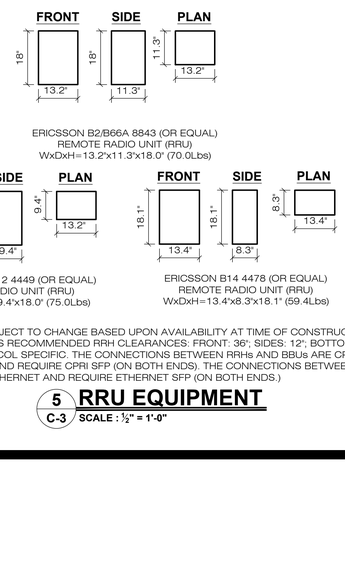


PANEL ANTENNAS

3 ANTENNA DETAIL
C-3 SCALE : ½" = 1'-0"

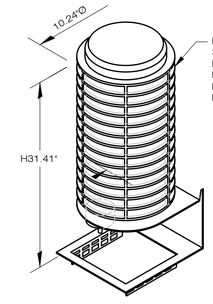


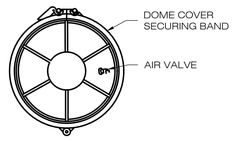
4 SQUID/RRH MOUNT
C-3 SCALE : ½" = 1'-0"



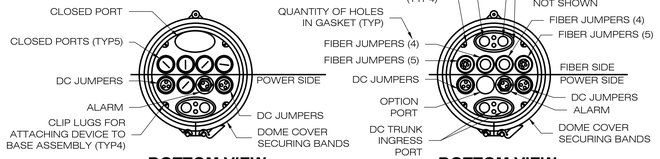
NOTES:
1. DIMENSIONS SUBJECT TO CHANGE BASED UPON AVAILABILITY AT TIME OF CONSTRUCTION.
2. MANUFACTURER'S RECOMMENDED RRH CLEARANCES: FRONT: 36"; SIDES: 12"; BOTTOM: 24"
3. SFPs ARE PROTOCOL SPECIFIC. THE CONNECTIONS BETWEEN RRHs AND BBUs ARE CPRI CONNECTIONS, AND REQUIRE CPRI SFP (ON BOTH ENDS). THE CONNECTIONS BETWEEN BBUs AND 7705 ARE ETHERNET AND REQUIRE ETHERNET SFP (ON BOTH ENDS.)

5 RRU EQUIPMENT
C-3 SCALE : ½" = 1'-0"





TOP VIEW



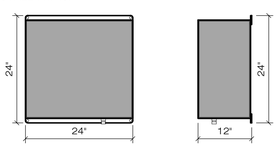
BOTTOM VIEW

BOTTOM VIEW

RAYCAP DC9-48-60-24-8C-EV (SURGE SUPPRESSOR)
HxDia. = 31.41"x10.24"Ø (26.2 Lbs)
(OR EQUAL)
COLOR: GRAY

NOTES:
1. MOUNT PER MANUFACTURER'S SPECIFICATIONS.
2. REMOVE CABLE SEALING GLAND AND INSTALL M32x1.5 METRIC TO 1" NPT ADAPTER (COOPER CROUSE-HINES P/N CAP 740 994 OR EQUIVALENT MFR) WHEN CONNECTING CONDUIT TO OVP

6 TYPICAL SURGE SUPPRESSOR
C-3 SCALE : N.T.S.



NOTE:
DIMENSIONS SHOWN ARE APPROXIMATE. VERIFY W/ OM PRIOR TO CONSTRUCTION

7 FIBER MANAGEMENT BOX
C-3 SCALE : ¾" = 1'-0"

HOMELAND TOWERS, LLC
9 HARMONY STREET
2nd FLOOR
DANBURY, CT 06810
(203) 297-6345

at&t
340 MOUNT KEMBLE AVENUE
MORRISTOWN, NEW JERSEY 07960

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SHEET TITLE:

AT&T ANTENNA PLAN & DETAILS

SHEET NUMBER:

C-3

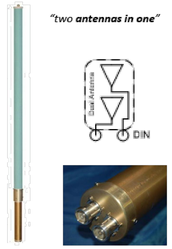
STATE OF CONNECTICUT · ROBERT C. BURNS · 20071 · LICENSED PROFESSIONAL ENGINEER

dbSpectra
Always a Better Value

VHF Antenna – Dual Omnidirectional, Low-PIM/Hi-PIP, 2.9 dBd

Model DS1F03P36D-Series Antennas

Specifications	
Design Type	True Corporate Feed/Dual
Frequency Range	150-164 MHz
Passive Intermodulation – PIM (2 x 20W)	-150 dBc, 3rd Order
Bandwidth	14 MHz
Gain (average over BW)	2.9 dBd
Isolation, typ.	>30 dB
Beam Tilt	(x) = - or 3 degrees
Vertical Beamwidth (E-Plane) typ.	34°
Impedance	50 Ohms
VSWR / Return Loss	1.5:1 / 14 dB (min.)
Average Power Rating	500 W (each antenna)
Peak Instantaneous Power	25 kW (each antenna)
Polarization	Vertical
Lightning Protection	Direct Ground
Connector types available	D = 7/16 DIN (F) × 2 M = 4.3-10 (F) × 2
Equivalent Flat-Plate Area	3.7 sq. ft.
Lateral Wind Load Thrust @100mph	155 lbf.
Rated Wind Speed	150 mph (without ice) 128 mph (with ½" radial ice)
Total Length	22.3 feet
Mounting Mast OD and Length	3.5 inches OD x 35 inches
Mounting Hardware (included)	DSH3V4N for Maximum 4" pipe
Top Sway Brace (Consider when side mounting)	DSH2H3S (order separately) Includes DS2H3R for 1.3"-3.5" Leg/pipe
Radome color	Horizon Blue
Radome O.D.	3.0 inches
Weight (approx.)	93 lbs.
Shipping Weight (approx.) with mounting hardware	120 lbs.
Inverted mounting of P36D models (Move drain plug from tip cap to connector plate)	Standard 0° beam-tilt antennas can be inverted but patterns are optimized for upright mounting
Ordering Information **DS1F03P36D(x)(y)** VHF Dual Antenna **DS1F03P3ID(x)(y)** VHF Inverted Dual Antenna	• (x) = Beam Tilt selection 0° beam-tilt = "-" • (y) = Connector type D = 7/16 DIN (F) M = 4.3-10 (F)



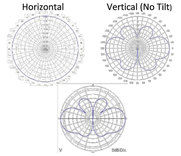
*"two **antennas in one**"*

Features and Benefits:

- Dual-antenna configuration saves overall cost – enables two antennas in one tower slot.
- High RF isolation between the independent antennas provides good performance and predictable interference protection.
- Tested to stringent Peak Instantaneous Power (PIP) levels of 25 KW using dbSpectra's multi-channel P25 PIP test bed. High PIP level is demanded by today's digital systems.
- PIM Rated Design – better than -150 dBc.

Radiation Patterns: Plots 5 dB/Div

Horizontal Vertical (No Tilt)



Vertical 3° DT

1 C-4 dbSPECTRA DS1F03P36D ANTENNA
SCALE : N.T.S.

dbSpectra
Always a Better Value

/HF Antenna - Omnidirectional, Low-PIM/Hi-PIP, 5.5 dBd

/odel - DS1F06P36U-Series Antennas

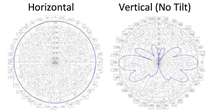
Specifications	
Design Type	True Corporate Feed
Frequency Range	150-164 MHz
Passive Intermodulation – PIM (2 x 20W sources)	-150 dBc, 3rd Order
Bandwidth	14 MHz
Gain (average over BW)	5.5 dBd
Configuration	Single antenna
Beam Tilt (electrical downtilt)	(x) = - , 3 or 6 degrees
Vertical Beamwidth (E-Plane) typ.	16°
Impedance	50 ohms
VSWR / Return Loss	1.5:1 / 14 dB (min.)
Average Power Rating	500 W
Peak Instantaneous Power	25 kW
Polarization	Vertical
Lightning Protection	Direct Ground
Connector DS1F06P36U(x)D DS1F06P36U(x)M	7/16 DIN (F) 4.3-10 (F)
Equivalent Flat-Plate Area	3.7 sq. ft.
Lateral Windload Thrust @100mph	153 lbf.
Rated Wind Speed	150 mph (without ice) 127 mph (with ½" radial ice)
Total Length	22 feet
Mounting Mast Length	35 inches
Mounting Hardware (included)	DSH3V3N
Top Sway Brace (Recommended if side mounting antennas)	DSH2H3S (order separately)
Mast O.D.	2.5 inches
Radome O.D.	3.0 inches
Radome color	Horizon Blue
Weight, antenna and hardware	90 lbs.
Shipping Weight	110 lbs.
Invertibility	0° electrical down-tilt models are invertible. For other invertible tilt options contact dbSpectra at *tech@dbspectra.com*
Ordering information DS1F06P36U(x)D – 7/16 DIN Connector DS1F06P36U(x)M – 4.3-10 Connector	1. Replace (x) in model number with Beam Tilt options. 2. "-" in the beam-tilt options represents 0° down-tilt.

Features and Benefits

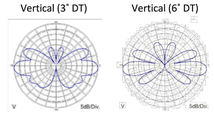
Tested to stringent Peak Instantaneous Power (PIP) levels of 25 KW using dbSpectra's multi-channel P25 PIP test bed. High PIP level is demanded by today's digital systems!
PIM-rated Design – 3rd-Order performance better than -150 dBc.
True Corporate Feed Array – provides for excellent gain and pattern consistency across a wider frequency range.
Sturdy Construction – Heavy-wall fiberglass radome minimizes tip deflection.
Excellent Lightning Protection – heavy internal conductor DC ground.

Radiation Patterns:

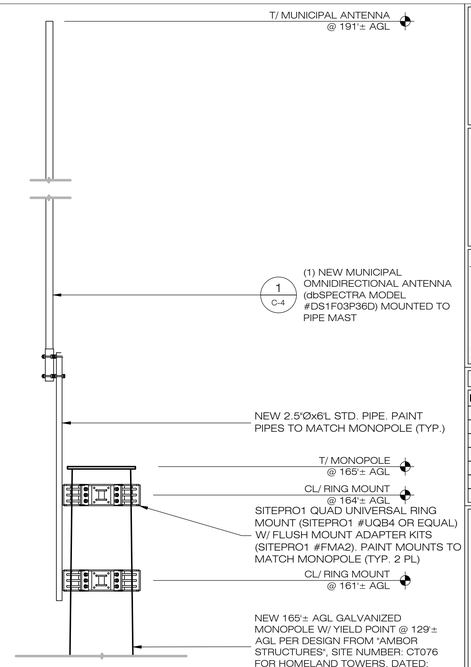
Horizontal Vertical (No Tilt)



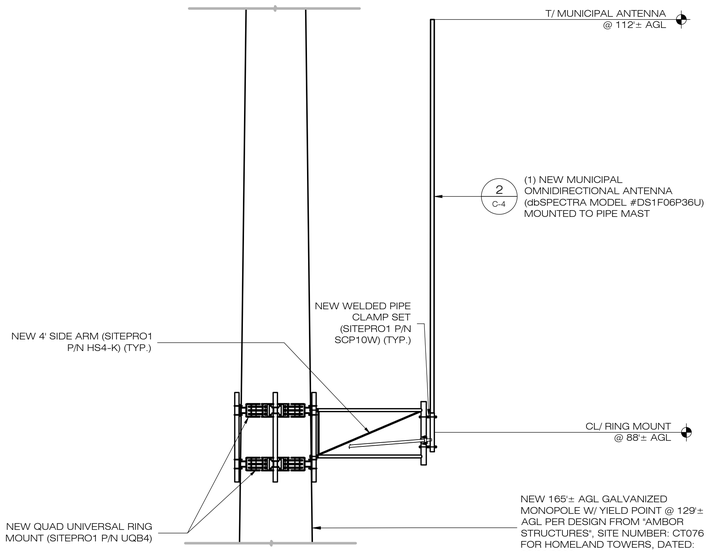
Vertical (3° DT) Vertical (6° DT)



2 C-4 dbSPECTRA DS1F06P36U ANTENNA
SCALE : N.T.S.



3 C-4 MUNICIPAL ANTENNA MOUNT (UPPER)
SCALE : 3/8" = 1'-0"



4 C-4 MUNICIPAL ANTENNA MOUNT (LOWER)
SCALE : 3/8" = 1'-0"

HOMELAND TOWERS, LLC
9 HARMONY STREET
2nd FLOOR
DANBURY, CT 06810
(203) 297-6345

at&t
340 MOUNT KEMBLE AVENUE
MORRISTOWN, NEW JERSEY 07960

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MUNICIPAL ANTENNA DETAILS

SHEET NUMBER:
C-4

STATE OF CONNECTICUT
ROBERT CHARLES BURNS
20071
LICENSED PROFESSIONAL ENGINEER

EROSION CONTROL NOTES

EROSION AND SEDIMENT CONTROL PLAN NOTES

1. THE CONTRACTOR SHALL CONSTRUCT ALL SEDIMENT AND EROSION CONTROLS IN ACCORDANCE WITH THE 2002 CONNECTICUT GUIDELINES FOR SOIL EROSION AND SEDIMENT CONTROL, LATEST EDITION, IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, AND AS DIRECTED BY THE TOWN OF BROOKFIELD, PERMITTEE, AND/OR SWPCP MONITOR. ALL PERIMETER SEDIMENTATION AND EROSION CONTROL MEASURES SHALL BE INSTALLED PRIOR TO THE START OF CLEARING AND GRUBBING AND DEMOLITION OPERATIONS.

2. THESE DRAWINGS ARE ONLY INTENDED TO DESCRIBE THE SEDIMENT AND EROSION CONTROL MEASURES FOR THIS SITE. SEE CONSTRUCTION SEQUENCE FOR ADDITIONAL INFORMATION. ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES SHOWN ON THE EROSION & SEDIMENT CONTROL PLAN ARE SHOWN AS REQUIRED BY THE ENGINEER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ENSURING THAT ALL EROSION CONTROL MEASURES ARE CONFIGURED AND CONSTRUCTED IN A MANNER THAT WILL MINIMIZE EROSION OF SOILS AND PREVENT THE TRANSPORT OF SEDIMENTS AND OTHER POLLUTANTS TO STORM DRAINAGE SYSTEMS AND/OR WATERCOURSES. ACTUAL SITE CONDITIONS OR SEASONAL AND CLIMATIC CONDITIONS MAY WARRANT ADDITIONAL CONTROLS OR CONFIGURATIONS, AS REQUIRED, AND AS DIRECTED BY THE PERMITTEE AND/OR SWPCP MONITOR. REFER TO SITE PLAN FOR GENERAL INFORMATION AND OTHER CONTRACT PLANS FOR APPROPRIATE INFORMATION.

3. A BOND OR LETTER OF CREDIT MAY BE REQUIRED TO BE POSTED WITH THE GOVERNING AUTHORITY FOR THE EROSION CONTROL INSTALLATION AND MAINTENANCE.

4. THE CONTRACTOR SHALL APPLY THE MINIMUM EROSION & SEDIMENT CONTROL MEASURES SHOWN ON THE PLAN IN CONJUNCTION WITH CONSTRUCTION SEQUENCING, SUCH THAT ALL ACTIVE WORK ZONES ARE PROTECTED. ADDITIONAL AND/OR ALTERNATIVE SEDIMENT AND EROSION CONTROL MEASURES MAY BE INSTALLED DURING THE CONSTRUCTION PERIOD IF FOUND NECESSARY BY THE CONTRACTOR, OWNER, SITE ENGINEER, MUNICIPAL OFFICIALS, OR ANY GOVERNING AGENCY. THE CONTRACTOR SHALL CONTACT THE OWNER AND APPROPRIATE GOVERNING AGENCIES FOR APPROVAL IF ALTERNATIVE CONTROLS OTHER THAN THOSE SHOWN ON THE PLANS ARE PROPOSED BY THE CONTRACTOR.

5. THE CONTRACTOR SHALL TAKE EXTREME CARE DURING CONSTRUCTION SO AS NOT TO DISTURB UNPROTECTED WETLAND AREAS OR INSTALLED SEDIMENTATION AND EROSION CONTROL MEASURES. THE CONTRACTOR SHALL INSPECT ALL SEDIMENT AND EROSION CONTROLS WEEKLY AND WITHIN 24 HOURS OF A STORM WITH A RAINFALL AMOUNT OF 0.25 INCHES OR GREATER TO VERIFY THAT THE CONTROLS ARE OPERATING PROPERLY AND MAKE REPAIRS AS NECESSARY IN A TIMELY MANOR.

6. THE CONTRACTOR SHALL KEEP A SUPPLY OF EROSION CONTROL MATERIAL (SILT FENCE, COMPOST FILTER SOCK, EROSION CONTROL BLANKET, ETC.) ON-SITE FOR PERIODIC MAINTENANCE AND EMERGENCY REPAIRS.

7. ALL FILL MATERIAL PLACED ADJACENT TO ANY WETLAND AREA SHALL BE GOOD QUALITY, WITH LESS THAN 5% FINES PASSING THROUGH A #200 SIEVE (BANK RUN), SHALL BE PLACED IN MAXIMUM ONE FOOT LIFTS, AND SHALL BE COMPACTED TO 95% MAX. DRY DENSITY MODIFIED PROCTOR OR AS SPECIFIED IN THE CONTRACT SPECIFICATIONS.

8. PROTECT EXISTING TREES THAT ARE TO BE SAVED BY FENCING, ORANGE SAFETY FENCE, CONSTRUCTION TAPE, OR EQUIVALENT FENCING/TAPE. ANY LIMB TRIMMING SHOULD BE DONE AFTER CONSULTATION WITH AN ARBORIST AND BEFORE CONSTRUCTION BEGINS IN THAT AREA; FENCING SHALL BE MAINTAINED AND REPAIRED DURING CONSTRUCTION.

9. CONSTRUCTION ENTRANCES (ANTI-TRACKING PADS) SHALL BE INSTALLED PRIOR TO ANY SITE EXCAVATION OR CONSTRUCTION ACTIVITY AND SHALL BE MAINTAINED THROUGHOUT THE DURATION OF ALL CONSTRUCTION IF REQUIRED. THE LOCATION OF THE TRACKING PADS MAY CHANGE AS VARIOUS PHASES OF CONSTRUCTION ARE COMPLETED. CONTRACTOR SHALL ENSURE THAT ALL VEHICLES EXITING THE SITE ARE PASSING OVER THE ANTI-TRACKING PADS PRIOR TO EXISTING.

10. ALL CONSTRUCTION SHALL BE CONTAINED WITHIN THE LIMIT OF DISTURBANCE, WHICH SHALL BE MARKED WITH SILT FENCE, SAFETY FENCE, HAY BALES, RIBBONS, OR OTHER MEANS PRIOR TO CLEARING. CONSTRUCTION ACTIVITY SHALL REMAIN ON THE UPHILL SIDE OF THE SEDIMENT BARRIER UNLESS WORK IS SPECIFICALLY CALLED FOR ON THE DOWNHILL SIDE OF THE BARRIER.

11. NO CUT OR FILL SLOPES SHALL EXCEED 2:1 EXCEPT WHERE STABILIZED BY ROCK FACED EMBANKMENTS OR EROSION CONTROL BLANKETS. ALL SLOPES SHALL BE SEEDED AND BANKS WILL BE STABILIZED IMMEDIATELY UPON COMPLETION OF FINAL GRADING UNTIL TURF IS ESTABLISHED.

12. DIRECT ALL DEWATERING PUMP DISCHARGE TO A SEDIMENT CONTROL DEVICE CONFORMING TO THE GUIDELINES WITHIN THE APPROVED LIMIT OF DISTURBANCE IF REQUIRED. DISCHARGE TO STORM DRAINS OR SURFACE WATERS FROM SEDIMENT CONTROLS SHALL BE CLEAR AND APPROVED BY THE PERMITTEE OR MUNICIPALITY.

13. THE CONTRACTOR SHALL MAINTAIN A CLEAN CONSTRUCTION SITE AND SHALL NOT ALLOW THE ACCUMULATION OF RUBBISH OR CONSTRUCTION DEBRIS ON THE SITE. PROPER SANITARY DEVICES SHALL BE MAINTAINED ON-SITE AT ALL TIMES AND SECURED APPROPRIATELY. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO AVOID THE SPILLAGE OF FUEL OR OTHER POLLUTANTS ON THE CONSTRUCTION SITE AND SHALL ADHERE TO ALL APPLICABLE POLICIES AND REGULATIONS RELATED TO SPILL PREVENTION AND RESPONSE/CONTAINMENT.

14. MINIMIZE LAND DISTURBANCES. SEED AND MULCH DISTURBED AREAS WITH TEMPORARY MIX AS SOON AS PRACTICABLE (2 WEEK MAXIMUM UNSTABILIZED PERIOD) USING PERENNIAL RYEGRASS AT 40 LBS PER ACRE. MULCH ALL CUT AND FILL SLOPES AND SWALES WITH LOOSE HAY AT A RATE OF 2 TONS PER ACRE. IF NECESSARY, REPLACE LOOSE HAY ON SLOPES WITH EROSION CONTROL BLANKETS OR JUTE CLOTH. MODERATELY GRADED AREAS, ISLANDS, AND TEMPORARY CONSTRUCTION STAGING AREAS MAY BE HYDROSEEDED WITH TACKIFIER.

15. SWEEP AFFECTED PORTIONS OF OFF SITE ROADS ONE OR MORE TIMES A DAY (OR LESS FREQUENTLY IF TRACKING IS NOT A PROBLEM) DURING CONSTRUCTION. FOR DUST CONTROL, PERIODICALLY MOISTEN EXPOSED SOIL SURFACES WITH WATER ON UNPAVED TRAVELWAYS TO KEEP THE TRAVELWAYS DAMP. CALCIUM CHLORIDE MAY ALSO BE APPLIED TO ACCESS ROADS. DUMP TRUCK LOADS EXITING THE SITE SHALL BE COVERED.

16. VEGETATIVE ESTABLISHMENT SHALL OCCUR ON ALL DISTURBED SOIL, UNLESS THE AREA IS UNDER ACTIVE CONSTRUCTION, IT IS COVERED IN STONE OR SCHEDULED FOR PAVING WITHIN 30 DAYS. TEMPORARY SEEDING OR NON-LIVING SOIL PROTECTION OF ALL EXPOSED SOILS AND SLOPES SHALL BE INITIATED WITHIN THE FIRST 7 DAYS OF SUSPENDING WORK IN AREAS TO BE LEFT LONGER THAN 30 DAYS.

17. MAINTAIN ALL PERMANENT AND TEMPORARY SEDIMENT CONTROL DEVICES IN EFFECTIVE CONDITION THROUGHOUT THE CONSTRUCTION PERIOD. UPON COMPLETION OF WORK SWEEP CONCRETE PADS, CLEAN THE STORMWATER MANAGEMENT SYSTEMS AND REMOVE ALL TEMPORARY SEDIMENT CONTROLS ONCE THE SITE IS FULLY STABILIZED AND APPROVAL HAS BEEN RECEIVED FROM PERMITTEE OR THE MUNICIPALITY.

18. SEEDING MIXTURES SHALL BE NEW ENGLAND SEMI-SHADE GRASS AND FORBS MIX, OR APPROVED EQUAL BY OWNER.

SEDIMENT & EROSION CONTROL NARRATIVE

1. THE PROJECT INCLUDES THE INSTALLATION OF A 165'± AGL GALVANIZED MONOPOLE WITH ASSOCIATED GROUND MOUNTED EQUIPMENT. ALL DISTURBED AREAS ARE TO BE SEEDED AND STABILIZED PRIOR TO THE INSTALLATION OF THE PROPOSED EQUIPMENT.

   THE PROPOSED PROJECT INVOLVES THE FOLLOWING CONSTRUCTION:
   A. CONSTRUCTION OF 165'± AGL MONOPOLE.
   C. CONSTRUCTION OF 45x70' (3,150± SF) FENCED EQUIPMENT COMPOUND W/ GRAVEL SURFACE TREATMENT AND ASSOCIATED UTILITIES.
   D. CONSTRUCTION OF 8'-8"x10'-6" CONCRETE EQUIPMENT PAD AND 7'x9' CONCRETE EQUIPMENT PAD.
   E. THE STABILIZATION OF PERVIOUS DISTURBED AREAS WITH PERMANENT GRASS TREATMENTS.

2. FOR THIS PROJECT, THERE ARE APPROXIMATELY 15,000± SF OF THE SITE BEING DISTURBED.

3. A GEOTECHNICAL ENGINEERING REPORT HAS BEEN COMPLETED FOR THIS PROJECT AND WILL BE AVAILABLE UNDER SEPARATE COVER.

4. IT IS ANTICIPATED THAT CONSTRUCTION WILL BE COMPLETED IN APPROXIMATELY 12 WEEKS.

5. REFER TO THE CONSTRUCTION SEQUENCING AND EROSION AND SEDIMENTATION NOTES FOR INFORMATION REGARDING SEQUENCING OF MAJOR OPERATIONS IN THE ON-SITE CONSTRUCTION PHASES.

6. MEASURES ARE BASED UPON ENGINEERING PRACTICE, JUDGEMENT AND THE APPLICABLE SECTIONS OF THE 2002 CONNECTICUT GUIDELINES FOR SOIL EROSION AND SEDIMENT CONTROL.

7. DETAILS FOR THE TYPICAL EROSION AND SEDIMENTATION MEASURES ARE SHOWN ON PLAN SHEET C-1 OR PROVIDED AS SEPARATE SUPPORT DOCUMENTATION FOR REVIEW IN THIS PLAN.

8. CONSERVATION PRACTICES TO BE USED DURING CONSTRUCTION AREA:
   A. STAGED CONSTRUCTION;
   B. MINIMIZE THE DISTURBED AREAS DURING CONSTRUCTION;
   C. STABILIZE DISTURBED AREAS AS SOON AS POSSIBLE WITH TEMPORARY OR PERMANENT MEASURES;
   D. MINIMIZE IMPERVIOUS AREAS;
   E. UTILIZE APPROPRIATE CONSTRUCTION EROSION AND SEDIMENTATION MEASURES.

SUGGESTED CONSTRUCTION SEQUENCE

THE FOLLOWING SUGGESTED SEQUENCE OF CONSTRUCTION ACTIVITIES IS PROJECTED BASED UPON ENGINEERING JUDGEMENT AND BEST MANAGEMENT PRACTICES. THE CONTRACTOR MAY ELECT TO ALTER THE SEQUENCING TO BEST MEET THE CONSTRUCTION SCHEDULE, THE EXISTING SITE ACTIVITIES AND WEATHER CONDITIONS. CONTRACTOR TO HIRE SURVEYOR FOR PROJECT STAKEOUT AS NEEDED THROUGHOUT CONSTRUCTION ACTIVITIES.

1. CONTACT THE OWNER TO SCHEDULE A PRE-CONSTRUCTION MEETING. PHYSICALLY FLAG THE TREES TO BE REMOVED IN THE FIELD AS NECESSARY TO FACILITATE THE PRE-CONSTRUCTION MEETING.

2. CONDUCT A PRE-CONSTRUCTION MEETING TO DISCUSS THE PROPOSED WORK AND EROSION AND SEDIMENTATION CONTROL MEASURES. THE MEETING SHOULD BE ATTENDED BY THE OWNER, THE OWNER REPRESENTATIVE(S), THE GENERAL CONTRACTOR, DESIGNATED SUB-CONTRACTORS AND THE PERSON, OR PERSONS, RESPONSIBLE FOR THE IMPLEMENTATION, OPERATION, MONITORING AND MAINTENANCE OF THE EROSION AND SEDIMENTATION MEASURES. THE CONSTRUCTION PROCEDURES FOR THE ENTIRE PROJECT SHALL BE REVIEWED AT THIS MEETING.

3. NOTIFY THE OWNER AT LEAST FORTY-EIGHT (48) HOURS PRIOR TO COMMENCEMENT OF ANY DEMOLITION, CONSTRUCTION OR REGULATED ACTIVITY ON THIS PROJECT. NOTIFY CALL BEFORE YOU DIG CONNECTICUT AT (800) 922-4455.

4. CLEAR AND GRUB AS REQUIRED, TO INSTALL THE PERIMETER EROSION AND SEDIMENTATION CONTROL MEASURES AND, IF APPLICABLE, TREE PROTECTION.

5. INSTALL CONSTRUCTION ENTRANCE.

6. PERFORM THE REMAINING CLEARING AND GRUBBING AS NECESSARY. REMOVE CUT WOOD AND STUMPS. CHIP BRUSH AND STOCKPILE FOR FUTURE USE OR REMOVE OFF-SITE. REMOVE AND DISPOSE OF DEMOLITION DEBRIS OFF-SITE.

7. TEMPORARILY SEED DISTURBED AREAS NOT UNDER CONSTRUCTION FOR THIRTY (30) DAYS OR MORE.

8. EXCAVATE AND ROUGH GRADE EQUIPMENT COMPOUND.

9. EXCAVATE FOR TOWER FOUNDATION & EQUIPMENT PADS.

10. PREPARE SUBGRADE AND INSTALL FORMS, STEEL REINFORCING, & CONCRETE FOR TOWER FOUNDATION & EQUIPMENT PADS.

11. INSTALL BURIED GROUND RINGS, GROUND RODS, GROUND LEADS, UTILITY CONDUITS & UTILITY EQUIPMENT.

12. BACKFILL TOWER FOUNDATION.

13. ERECT MONOPOLE.

14. INSTALL TELECOMMUNICATIONS EQUIPMENT ON TOWER & COMPOUND.

15. INSTALL COMPOUND GRAVEL SURFACES.

16. FINALIZE GRADES. INSTALL GRAVEL SURFACES.

17. INSTALL FENCING.

18. CONNECT GROUNDING LEADS & LIGHTNING PROTECTION

19. FINAL GRADE AROUND COMPOUND.

20. LOAM & SEED DISTURBED AREAS OUTSIDE COMPOUND, AS REQUIRED.

21. TEST ALL NEW EQUIPMENT.

22. AFTER THE SITE IS STABILIZED AND WITH THE APPROVAL OF THE OWNER, REMOVE PERIMETER EROSION AND SEDIMENTATION CONTROLS.

23. PERFORM FINAL PROJECT CLEANUP.

THE ESTIMATED TIME FOR THE COMPLETION OF THE WORK IS APPROXIMATELY TWELVE (12) WEEKS. THE EXACT PROCESS MAY VARY DEPENDING ON THE CONTRACTORS & SUBCONTRACTORS AVAILABILITY TO COMPLETE WORK & WEATHER DELAYS.

CONSTRUCTION OPERATION AND MAINTENANCE PLAN - BY CONTRACTOR

E&S MEASURE	INSPECTION SCHEDULE	MAINTENANCE REQUIRED
CONSTRUCTION ENTRANCE	DAILY	PLACE ADDITIONAL STONE, EXTEND THE LENGTH OR REMOVE AND REPLACE THE STONE. CLEAN PAVED SURFACES OF TRACKED SEDIMENT.
HAY BALES	WEEKLY & WITHIN 24 HOURS OF RAINFALL > 0.2"	REPAIR/REPLACE WHEN FAILURE, OR OBSERVED DETERIORATION, IS OBSERVED. REMOVE SILT WHEN IT REACHES 1/2 THE HEIGHT OF THE BALE.
SILT FENCE/FILTER SOCKS	WEEKLY & WITHIN 24 HOURS OF RAINFALL > 0.2"	REPAIR/REPLACE WHEN FAILURE, OR OBSERVED DETERIORATION, IS OBSERVED. REMOVE SILT WHEN IT REACHES 1/2 THE HEIGHT OF THE FENCE.
SILT SACKS	WEEKLY & WITHIN 24 HOURS OF RAINFALL > 0.2"	REPAIR/REPLACE WHEN FAILURE, OR OBSERVED DETERIORATION, IS OBSERVED. REMOVE SILT WHEN IT REACHES 1/2 THE HEIGHT OF THE SACK.
TOPSOIL/BORROW STOCKPILES	DAILY	REPAIR/REPLACE SEDIMENT BARRIERS AS NECESSARY.
WATER BARS	DAILY	REPAIR/RESHAPE AS NECESSARY. REMOVE SILT WHEN IT REACHES 1/2 THE HEIGHT OF THE WATER BAR.
TEMPORARY DIVERSION DITCHES	DAILY & WITHIN 24 HOURS OF RAINFALL > 0.2"	REPAIR/RESHAPE AS NECESSARY. REVIEW CONDITIONS IF REPETITIVE FAILURES OCCUR.
TEMPORARY SEDIMENT TRAPS/BASINS	WEEKLY & WITHIN 24 HOURS OF RAINFALL > 0.2"	REMOVE SEDIMENT WHEN IT REACHES 1/2 OF THE MINIMUM REQUIRED WET STORAGE VOLUME.
TEMPORARY SOIL PROTECTION	WEEKLY & WITHIN 24 HOURS OF RAINFALL > 0.2"	REPAIR ERODED OR BARE AREAS IMMEDIATELY. RESEED AND MULCH.

NOTE: CONSTRUCTION ACTIVITIES SHALL BE 7:30 AM TO 7:30 PM MONDAY THROUGH SATURDAY AND 10:00 AM TO 7:30 PM SUNDAY AND HOLIDAY. THE HOURS ARE CONSISTENT WITH THE TOWN OF BROOKFIELD CONSTRUCTION AND NOISE STANDARDS.

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DANBURY, CT 06810
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ALL-POINTS TECHNOLOGY CORPORATION
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D&M DOCUMENTS

NO	DATE	REVISION
0	04/04/23	FOR REVIEW: RCB
1	04/05/23	CLIENT REVS: RCB
2		
3		
4		
5		
6		

DESIGN PROFESSIONALS OF RECORD

PROF: ROBERT C. BURNS P.E.
COMP: ALL-POINTS TECHNOLOGY CORPORATION, P.C.
ADD: 567 VAUXHALL STREET EXT. SUITE 311 WATERFORD, CT 06385

DEVELOPER: HOMELAND TOWERS, LLC
ADDRESS: 9 HARMONY STREET 2ND FLOOR DANBURY, CT 06810

HOMELAND TOWERS BROOKFIELD SOUTH

SITE ADDRESS: 60 VALE ROAD BROOKFIELD, CT 06804

APT FILING NUMBER: CT2831040

DATE: 04/04/23 | DRAWN BY: CSH
CHECKED BY: RCB

SHEET TITLE:
EROSION CONTROL NOTES

SHEET NUMBER:
EC-1

STATE OF CONNECTICUT · ROBERT CHARLES BURNS · 20071 · LICENSED PROFESSIONAL ENGINEER

DESIGN BASIS:

GOVERNING CODES/DESIGN STANDARDS:

2021 INTERNATIONAL BUILDING CODE (IBC) AS AMENDED BY THE 2022 CONNECTICUT STATE BUILDING CODE
ASCE 7-16
TIA-222-H
NATIONAL ELECTRIC CODE (NEC)

DESIGN CRITERIA:

RISK CATEGORY (TOWER) :	II	(TIA-222-H TABLE 1604.5)
RISK CATEGORY (BASE EQUIP.):	II	(TIA-222-H, TABLE 2-1)

WIND LOADS:

ULTIMATE BASIC WIND SPEED, V_{ULT}: (3-SECOND GUST)	120 MPH	(2022 CSBC, APENDIX P)
EXPOSURE CATEGORY	C	(2021 IBC SEC. 1609.4.3)

ICE LOAD

BASIC WIND SPEED (V_I) = W/ ICE 3-SEC GUST	50 MPH	(TIA-222-H, ANNEX B)
DESIGN ICE THICKNESS (T_I) =	1.00"	(TIA-222-H, ANNEX B)

LIVE LOAD

ROOF LIVE LOAD, (LLR)	20 PSF	(IBC 2021 TABLE 1607.1)

SNOW LOAD

GROUND SNOW LOAD (P_G) =	30 PSF	(2021 CSBC APPENDIX P)
ROOF SNOW LOAD (P_F) =	30 PSF	(MIN. PER 2024 CSBC ADD 1608.1.1) (ASCE 7-16 EQ. 7.3-1, SEC 7.3.4)

SEISMIC LOAD:

REFER TO SECTION 1613 OF THE 2021 IBC/2022 CONNECTICUT STATE BUILDING CODE FOR SEISMIC CLASSIFICATION AND LOADING DETERMINATION.

01 GENERAL:

ABBREVIATIONS USED IN THESE SPECIFICATIONS INCLUDE THE FOLLOWING:

ACI	AMERICAN CONCRETE INSTITUTE
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE
AWS	AMERICAN WELDING SOCIETY
AISC	AMERICAN INSTITUTE OF STEEL CONSTRUCTION
ASCE	AMERICAN SOCIETY OF CIVIL ENGINEERS
ASTM	AMERICAN STANDARDS AND TESTING METHODS
CRSI	CONCRETE REINFORCING STEEL INSTITUTE
ICC-ES	INTERNATIONAL CODE COUNCIL EVALUATION SERVICE
TIA	TELECOMMUNICATIONS INDUSTRY ASSOCIATION
UL	UNDERWIRTERS LABORATORIES
NEC	NATIONAL ELECTRICAL CODE
NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
OSHA	OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

EVERY INDIVIDUAL TRADE, DISCIPLINE, AND CONTRACTOR SHALL INCLUDE THESE GENERAL SPECIFICATIONS.

THE ENGINEER IS NOT RESPONSIBLE FOR NOR A GUARANTOR OF THE INSTALLING CONTRACTORS WORK, ADEQUACY OF ANY SITE COMPONENT, SUPERVISION OF ANY WORK, AND SAFETY IN, ON, OR ABOUT THE WORK SITE.

ANY REFERENCE HEREIN TO AN OR EQUAL ITEM, THAT EQUAL ITEM SHALL BE PRE-APPROVED BY THE CONSTRUCTION MANAGER BEFORE INSTALLATION

ALL TRADES SHALL COORDINATE THEIR WORK WITH ALL OTHER TRADES AND OTHER WORK AND CONDITIONS AS APPROPRIATE OR REQUIRED TO AVOID CONFLICTS. RESOLVE AND COORDINATE ALL CONFLICTS WITH ALL AFFECTED WORK AND SITE OPERATIONS. COORDINATION WITH THE SITE SHALL BE WITH THE OWNER, OR OWNER'S SPECIFIED REPRESENTATIVE, FOR EVERYTHING RELATED TO THE INSTALLATION OF THIS PROJECT.

ALL WORK SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE EDITIONS OF ALL APPLICABLE CODES AND SHALL BE ACCEPTABLE TO ALL AUTHORITIES HAVING JURISDICTION (AHJ). WHERE A CONFLICT EXISTS BETWEEN CODES, PLANS, SPECIFICATIONS, AND/OR AHJ, THE MORE STRINGENT AUTHORITY SHALL APPLY. WHERE CONFLICT EXISTS BETWEEN PLANS AND SPECIFICATIONS, PLAN SHALL APPLY. WHERE CONFLICT EXISTS BETWEEN PLAN SHEETS, CONSTRUCTION MANAGER SHALL BE CONSULTED PRIOR TO COMMENCING ANY WORK.

CONTRACTOR SHALL PROVIDE ALL LABOR, MATERIALS, INSURANCE, EQUIPMENT, INSTALLATION, CONSTRUCTION TOOLS, TRANSPORTATION, ETC., FOR A COMPLETE AND PROPERLY OPERATIVE AND USABLE SYSTEM THROUGHOUT AND AS INDICATED ON THE DRAWINGS AND AS SPECIFIED HEREIN AND/OR OTHERWISE REQUIRED.

CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS, INSTALLATIONS, AND EQUIPMENT IN THE FIELD PRIOR TO BID, FABRICATION, AND INSTALLATION OF ANY WORK.

CONTRACTORS SHALL VERIFY ALL DIMENSIONS AND CONDITIONS IN THE FIELD PRIOR TO FABRICATION AND ERECTION OF ANY MATERIAL. THE ENGINEER SHALL BE NOTIFIED FOR INSPECTIONS PRIOR TO CLOSING PENETRATIONS AND OF ANY CONDITIONS WHICH PRECLUDE COMPLETION OF THE WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.

CONTRACTOR SHALL VISIT THE SITE TO MANAGE AND GAIN APPROVAL FOR ALL TENANT DISRUPTIONS, POWER OUTAGES, WORK SCHEDULES, DEFINITION OF WORK AREA AND WORK STORAGE, PROPER BUILDING/SITE ACCESS, NOISE AND CLEANLINESS REQUIREMENTS WITH THE BUILDING/SITE MANAGEMENT PRIOR TO ALL WORK. ANY DISRUPTIONS SHALL BE KEPT TO A MINIMUM AND SHALL BE IMPLEMENTED ONLY UPON WRITTEN APPROVAL OF THE OWNER.

THE CONTRACTOR SHALL SAFEGUARD AGAINST CREATING ANY HAZARD AFFECTING TENANT EGRESS OR COMPROMISING SITE SECURITY MEASURES.

PRIOR TO ALL BELOW-GRADE WORK AND ANY SURFACE WORK IN A NEW AREA FOR STRUCTURES OR VEHICLES, CONTRACTOR SHALL ENGAGE A MARKOUT SERVICE TO IDENTIFY ANY UNDERGROUND STRUCTURES, CONDUITS, AND PIPELINES IN THE AREA. ALL EXISTING SEWER, WATER, GAS, ELECTRIC, FIBER OPTIC, AND OTHER UNDERGROUND UTILITIES IDENTIFIED OR ENCOUNTERED, SHALL BE PROTECTED AT ALL TIMES. EXTREME CAUTION SHOULD BE USED BY THE CONTRACTOR WHEN DIGGING OR EXCAVATING IN ANY MANNER AROUND OR NEAR SUCH UTILITIES. CONTRACTOR IS RESPONSIBLE FOR REPAIRS, REPLACEMENT, AND ALL DAMAGES DUE TO DAMAGE OF UTILITIES BY HIS OPERATIONS.

ALL EXISTING AND NEW EQUIPMENT AND MATERIAL LOCATIONS, ROUTING, ORIENTATION, MOUNTING, SPECIFICATIONS AND GENERAL INSTALLED CHARACTERISTICS SHALL BE CONSIDERED DIAGRAMMATIC ON THE PLANS. EXACT CONDITIONS SHALL BE DETERMINED IN THE FIELD PRIOR TO ANY INSTALLATION. ANY DIFFERENCES THAT MAY CAUSE SCHEDULE, COST, OR QUALITY SHALL BE BROUGHT TO THE ATTENTION OF THE OWNER OR ENGINEER PRIOR TO ANY WORK.

ALL REFERENCES HEREIN TO VERIFICATION OF ANY CONDITION OF SITE, FIELD, PLANS, OR SPECIFICATIONS PRIOR TO ANY WORK SHALL BE THE FULL RESPONSIBILITY OF THE CONTRACTOR. ANY AND ALL ADDITIONS, MODIFICATIONS, CHANGES, REPAIR, OR DEMOLITION AS A RESULT OF FAILURE TO BRING ANY EXISTING CONDITION PROPERLY TO THE ATTENTION OF THE OWNER OR ENGINEER SHALL BE THE FULL RESPONSIBILITY OF THE CONTRACTOR WITHOUT DELAY, COST, OR CHANGES IN QUALITY.

ALL NOTES THIS SHEET SHALL APPLY UNLESS SPECIFICALLY NOTED OTHERWISE ON THE INCLUDED DRAWINGS OR IN SEPARATE PROJECT SPECIFICATIONS AS APPLICABLE. ALL SPECIFICATIONS SHALL BE CONSIDERED REQUIRED UNLESS APPROVED EQUAL BY THE OWNER, CONSTRUCTION MANAGER, OR ENGINEER AS APPLICABLE.

THE WORDS "PROVIDE" OR "INSTALL" SHALL MEAN FURNISH AND INSTALL.

CONTRACTOR SHALL PROVIDE ALL CUTTING AND PATCHING AS REQUIRED FOR THE INSTALLATION OF HIS WORK. ANY PATCHING SHALL MATCH EXISTING SURROUNDING AREA IN ALL RESPECTS. ALL REMOVED MATERIAL SHALL BE REMOVED FROM THE PREMISES DAILY IN AN APPROVED SAFE MANNER.

ALL SURPLUS MATERIAL SHALL BE REMOVED FROM THE SITE PROMPTLY WHEN DEEMED TO BE SURPLUS.

EVERY CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF HIS WORK AND NEWLY INSTALLED OR EXISTING WORK, INCLUDING PROTECTION OF THE SITE, ALL STRUCTURES, AND ALL OCCUPANTS. FURNISH, INSTALL, MAINTAIN, AND REMOVE AS APPROPRIATE, ALL APPROPRIATE BARRIERS, SAFETY GUARDS, SIGNAGE, AND SECURITY AS REQUIRED.

EVERY CONTRACTOR SHALL BE RESPONSIBLE FOR THEIR RESPECTIVE FEES, PERMITS, INSPECTIONS, TESTING, CERTIFICATES, AND ALL MANAGEMENT OF SAME REQUIRED FOR COMPLETION OF AND LEGAL OCCUPANCY OF THE FINISHED PROJECT.

ALL CONTRACTORS SHALL PROVIDE ALL NECESSARY TOOLS, FIXTURES, SERVICES, MATERIALS, JOB AIDS, AND PERSONNEL REQUIRED FOR THE EXECUTION OF THEIR WORK.

EACH CONTRACTOR SHALL GUARANTEE ALL MATERIALS AND WORKMANSHIP BY THEM TO BE FREE OF DEFECTS AND MAINTAINED FOR A PERIOD OF ONE YEAR AFTER ACCEPTANCE OF THE INSTALLATION BY THE OWNER AND ENGINEER.

ALL WORK SHALL BE PERFORMED BY LICENSED CONTRACTORS IN THE TRADE HAVING JURISDICTION.

ANY DEVIATION, MODIFICATION, ADDITION, OR CHANGE IN DESIGN SHALL NOT BE MADE WITHOUT WRITTEN APPROVAL OF THE OWNER OR ENGINEER.

ALL CONTRACTORS SHALL SUBMIT SHOP DRAWINGS OF ALL EQUIPMENT AND MATERIALS TO THE ENGINEER FOR APPROVAL PRIOR TO FABRICATION AND INSTALLATION, AND SHALL NOT PROCEED UNTIL ENGINEER APPROVAL IN WRITING IS RETURNED. EACH CONTRACTOR SHALL MAINTAIN ON JOB SITE A COMPLETE SET OF SHOP DRAWINGS WITH ANY DEVIATIONS FROM THE ORIGINAL DESIGN SHALL BE NOTED.

ALL MATERIALS AND EQUIPMENT SHALL BE NEW, WITHOUT BLEMISH OR DEFECT, AND SUITABLE AND LISTED FOR THE INSTALLATION AND SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS OR SPECIFICATIONS. ALL ITEMS OF EQUIPMENT OR MATERIAL THAT ARE OF ONE GENERIC TYPE SHALL BE ONE MANUFACTURER THROUGHOUT.

ALL MATERIALS, EQUIPMENT, TOOLS, AND ITEMS UNDER THE CONTRACTOR'S RESPONSIBILITY ON THE JOBSITE SHALL BE ADEQUATELY SECURED, MAINTAINED, AND PROTECTED, SO AS NOT TO BECOME DAMAGED OR CREATE ANY HAZARD TO PERSONNEL OR PROPERTY.

THE CONTRACTORS HOURS OF WORK SHALL BE IN ACCORDANCE WITH LOCAL CODES AND ORDINANCES AND BE APPROVED BY THE OWNER.

CONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR ALL OF HIS CREW AND INSURE THAT EVERY CREW MEMBER FOLLOWS SAVE WORK PRACTICES. SAFETY TRAINING SHALL INCLUDE, BUT NOT BE LIMITED TO, FALL PROTECTION, CONFINED SPACE ENTRY, ELECTRICAL SAFETY, AND TRENCHING/EXCAVATION SAFETY WHERE SUCH WORK IS EXECUTED OR ENCOUNTERED.

ALL TEMPORARY WORK REQUIRED OR SPECIFIED AS A PART OF THIS WORK, SHALL MEET ALL OF THE SAME REQUIREMENTS AS PERMANENT INSTALLATIONS, SHALL MEET ALL APPLICABLE CODE REQUIREMENTS, AND SHALL BE COMPLETELY REMOVED AFTER ITS PURPOSES HAVE BEEN SERVED.

ANY EXISTING UTILITY, SERVICE, STRUCTURE, EQUIPMENT, OR FIXTURE OBSTRUCTING THE WORK SHALL BE REMOVED AND/OR RELOCATED AS DIRECTED BY THE CONSTRUCTION MANAGER.

IF ASBESTOS IS ENCOUNTERED DURING WORK EXECUTION, CONTRACTOR SHALL IMMEDIATELY NOTIFY THE CONSTRUCTION MANAGER AND CEASE ALL ACTIVITIES IN AFFECTED AREAS UNTIL NOTIFIED BY THE CONSTRUCTION TO RESUME OPERATIONS.

EXIST. ELECTRICAL AND MECHANICAL FIXTURES, PIPING, WIRING AND EQUIPMENT OBSTRUCTING THE WORK SHALL BE REMOVED AND/OR RELOCATED AS DIRECTED BY THE CONSTRUCTION MANAGER. TEMPORARY SERVICE INTERRUPTIONS MUST BE COORDINATED WITH OWNER.

04 CONCRETE:

THESE SPECIFICATIONS SHALL INCLUDE THE GENERAL SPECIFICATIONS HEREIN.

ALL CONCRETE CONSTRUCTION SHALL BE DONE IN ACCORDANCE WITH THE AMERICAN CONCRETE INSTITUTE (ACI) CODES 301 & 318, LATEST REVISION.

ALL CONCRETE USED SHALL BE 4000 PSI (28 DAY COMP STRENGTH). THE CONCRETE MIX SHALL BE BASED ON USING THE FOLLOWING MATERIALS AND PARAMETERS:

PORTLAND CEMENT:	ASTM C150, T1
AGGREGATE:	ASTM C33, 1 INCH MAX
WATER:	POTABLE
ADMIXTURE:	NON-CHLORIDE
AIR:	6%*
SLUMP:	4 INCH

*ALL CONCRETE EXPOSED TO FREEZING WEATHER SHALL CONTAIN ENTRAINED AIR PER ACI 211 TABLE 4.2.1 OF ACI 318-05.

ALL REINFORCING STEEL SHALL BE ASTM A615, GR 60 (DEFORMED). WELDED WIRE FABRIC SHALL CONFORM TO ASTM A185 WELDED STEEL WIRE FABRIC. SPLICES SHALL BE CLASS 'B' AND ALL HOOKS SHALL BE ACI STANDARD UNO. REINFORCING BARS SHALL BE COLD BENT WHERE REQUIRED AND TIED (NOT WELDED).

THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCING STEEL:

- CONCRETE CAST AGAINST EARTH = 3 IN.
- CONCRETE EXPOSED TO EARTH OR WEATHER:
  - #6 AND LARGER = 2 IN.
  - #5 AND SMALLER = 1 1/2 IN.
- CONCRETE NOT EXPOSED TO EARTH OR WEATHER OR NOT CAST AGAINST THE GROUND:
  - SLAB AND WALL = 3/4 IN.
  - BEAMS AND COLUMNS = 1 1/2 IN.

A 3/4 IN. CHAMFER SHALL BE PROVIDED AT ALL EXPOSED EDGES OF CONCRETE, IN ACCORDANCE WITH ACI 301 SECTION 4.2.4.

CONCRETE SHALL BE PLACED IN A UNIFORM MANNER AND CONSOLIDATED IN PLACE.

CONCRETE FOOTINGS SHALL BE CAST AGAINST LEVEL, COMPACTED, NON-FROZEN BASE SOIL FREE OF STANDING WATER.

05 ANCHORS:

THESE SPECIFICATIONS SHALL INCLUDE THE GENERAL SPECIFICATIONS HEREIN.

EXPANSION ANCHORS SHALL BE USED WHERE ATTACHING TO CONCRETE. MASONRY MOUNTS SHALL HAVE INJECTION ADHESIVE ANCHORING.

EXPANSION BOLTS SHALL BE HILTI KWIK BOLT 3 OR EQUAL. MINIMUM EMBEDMENT 4 INCHES.

INJECTION ADHESIVE ANCHORING IN MASONRY WITH VOIDS SHALL BE HILTI HIT HY-70 OR EQUAL WITH THREADED ROD AND SCREEN TUBES. ANCHORING IN BRICKS WITH HOLES SHALL HAVE ANCHORS SPACED 2 COMPLETE BRICKS APART MINIMUM, SHALL MAINTAIN 2 COMPLETE BRICKS OR 16 INCHES FROM FREE EDGES (WHICHEVER IS LESS), AND SHALL BE EMBEDDED 3-1/2 INCHES MINIMUM. ANCHORING IN HOLLOW CONCRETE BLOCK SHALL USE 50% MORE ANCHORS THAN SHOWN IN DETAIL, SHALL LIMIT ONE ANCHOR MAXIMUM PER BLOCK CELL, SHALL MAINTAIN 12" SPACING FROM FREE EDGES, AND SHALL BE EMBEDDED THROUGH FACE.

INJECTION ADHESIVE ANCHORING IN SOLID MASONRY AND GROUT FILLED BLOCK SHALL BE HILTI HIT HY-200 OR EQUAL WITH THREADED ROD. MAINTAIN 12 INCHES BETWEEN ANCHORS AND ALL FREE EDGES. MINIMUM SPACING BETWEEN ANCHORS IS 8 INCHES.

ANCHORS SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS AND SHALL NOT BE INSTALLED IN MORTAR JOINTS.

GRATING SHALL BE ATTACHED USING FOUR GRATING CLAMPS OR 1/4 FILLET WELDS PER SECTION.

05 POST-INSTALLED ANCHORS:

THESE SPECIFICATIONS SHALL INCLUDE THE GENERAL SPECIFICATIONS HEREIN.

EXCEPT WHERE INDICATED ON THE DRAWINGS, POST-INSTALLED ANCHORS SHALL CONSIST OF THE FOLLOWING ANCHOR TYPES AND INSTALLED IN ACCORDANCE WITH THEIR RESPECTIVE ICC-ES REPORT AND MANUFACTURER'S PUBLISHED INSTALLATION INSTRUCTIONS:

APPLICATION	ANCHORING SYSTEM
CONCRETE	HILTI HY 200 ADHESIVE WITH SAFE SET (HDB) SYSTEM
REBAR DOWELING	HILTI RE 500v3 ADHESIVE WITH SAFE SET (HDB) SYSTEM
SOLID GROUTED MASONRY	HILTI HY 70 ADHESIVE WITH SCREEN TUBE
HOLLOW / MULTI-WIDTH MASONRY	HILTI HY 70 ADHESIVE WITH HILTI HY 70 ADHESIVE WITH SCREEN TUBE

ANCHOR CAPACITY USED IN DESIGN SHALL BE BASED ON THE TECHNICAL DATA PUBLISHED BY HILTI OR SUCH OTHER METHOD AS APPROVED BY THE STRUCTURAL ENGINEER OF RECORD. SUBSTITUTION REQUESTS FOR ALTERNATE PRODUCTS MUST BE APPROVED IN WRITING BY THE STRUCTURAL ENGINEER OF RECORD PRIOR TO USE. CONTRACTOR SHALL PROVIDE CALCULATIONS DEMONSTRATING THAT THE SUBSTITUTED PRODUCT IS CAPABLE OF ACHIEVING THE PERFORMANCE VALUES OF THE SPECIFIED PRODUCT INCLUDING AN ICC-ES REPORT SHOWING COMPLIANCE WITH THE RELEVANT BUILDING CODE, SEISMIC USE, LOAD RESISTANCE, INSTALLATION CATEGORY, IN-SERVICE TEMPERATURE, INSTALLATION TEMPERATURE, ETC.

ADHESIVE ANCHORS INSTALLED IN A HORIZONTALLY OR UPWARDLY INCLINED ORIENTATION INTO CONCRETE AND SUPPORTING A SUSTAINED TENSION LOAD SHALL BE INSTALLED BY A CERTIFIED ADHESIVE ANCHOR INSTALLER, PER SECTION 9.2.2 OF ACI-318-14. INSTALLER SHALL BE CERTIFIED THROUGH THE ACI/CRSI ADHESIVE ANCHOR INSTALLER CERTIFICATION PROGRAM.

ANCHORS SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS AND SHALL NOT TO BE INSTALLED IN MORTAR JOINTS.

AS PER OSHA 29 CFR 1926.1153 SILICA DUST CONTROL REGULATIONS, DRILLED HOLES FOR POST INSTALLED ANCHORS IN CONCRETE AND MASONRY SHALL BE INSTALLED USING HILTI SAFE SET INSTALLATION SYSTEM WHICH COMPRISES OF A CODE APPROVED HILTI HOLLOW DRILL BIT AND VACUUM. ALTERNATE INSTALLATION METHODS ARE ALSO ALLOWED WITH AN APPROVED DUSTLESS SYSTEM THAT MAINTAINS SILICA DUST EMISSION BELOW THE PERMISSIBLE LEVELS.

CONTRACTOR SHALL ARRANGE AN ANCHOR MANUFACTURER'S REPRESENTATIVE TO PROVIDE ON-SITE ANCHOR INSTALLATION TRAINING FOR ALL OF THEIR ANCHORING PRODUCTS SPECIFIED. CONTRACTOR SHALL SUBMIT DOCUMENTED CONFIRMATION THAT ALL OF THE CONTRACTOR'S PERSONNEL INSTALLING ANCHORS HAVE RECEIVED THE REQUIRED TRAINING PRIOR TO THE COMMENCEMENT OF WORK.

CONTINUOUS OR PERIODIC SPECIAL INSPECTION FOR POST INSTALLED ANCHORS SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 4.3/4.4 OF THE ICC-ES REPORT FOR THE INDIVIDUAL ANCHOR. SPECIAL INSPECTOR SHALL BE NOTIFIED PRIOR TO COMMENCEMENT OF WORK TO COORDINATE INSPECTION EFFORTS.

05 STEEL:

THESE SPECIFICATIONS SHALL INCLUDE THE GENERAL SPECIFICATIONS HEREIN.

MATERIALS:

WIDE FLANGE	ASTM A992, GR 50
TUBING	ASTM A500, GR B
PIPE	ASTM A53, GR B
BOLTS	ASTM A325
GRATING	TYPE GW-2 (1-1/4"x3/16" BARS)
EXISTING METALS	ASTM A36

PROVIDE CERTIFICATION THAT WELDERS TO BE USED IN WORK ARE LICENSED AND HAVE SATISFACTORILY PASSED AWS QUALIFICATION TEST UNDER THE PROVISIONS OF APPENDIX D, PARTS II AND III OF THE AWS CODE FOR WELDING IN BUILDING CONSTRUCTION.

ALL BUILDING CONNECTION POINTS TO BE CENTERED ON EXISTING STRUCTURAL BEARING POINTS AND THE LOCATIONS ARE TO BE VERIFIED IN FIELD PRIOR TO THE FABRICATION OF STEEL.

DESIGN AND CONSTRUCTION OF STRUCTURAL STEEL SHALL CONFORM TO THE LATEST EDITION OF AISC SPECIFICATION FOR *"THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS"*.

NON-STRUCTURAL CONNECTIONS FOR STEEL GRATING MAY USE 5/8" DIAMETER GALVANIZED ASTM A 307 BOLTS UNLESS OTHERWISE NOTED.

ALL STEEL MATERIAL SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT-DIPPED GALVANIZED) COATINGS" ON IRON AND STEEL PRODUCTS WITH A COATING WEIGHT OF 2 OZ/SF.

ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE EXPOSED TO WEATHER SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC COATING (HOT-DIP) ON IRON AND STEEL HARDWARE."

DAMAGED GALVANIZED SURFACES SHALL BE REPAIRED BY TOUCHING UP ALL DAMAGED GALVANIZED STEEL WITH COLD ZINC, "GALVANOX", "DRY GALV", OR "ZINC IT", IN ACCORDANCE WITH MANUFACTURERS GUIDELINES. TOUCH UP DAMAGED NON-GALVANIZED STEEL WITH SAME PAINT APPLIED IN SHOP OR FIELD.

THE ENGINEER SHALL BE NOTIFIED OF ANY INCORRECTLY FABRICATED, DAMAGED OR OTHERWISE MISFITTING OR NONCONFORMING MATERIALS OR CONDITIONS TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE ENGINEER REVIEW. FIELD CUTTING OF STRUCTURAL STEEL IS NOT PERMITTED EXCEPT WITH THE PRIOR APPROVAL OF THE ENGINEER.

CONTRACTOR TO REMOVE AND RE-INSTALL ALL FIRE PROOFING AS REQUIRED DURING CONSTRUCTION.

THE STEEL STRUCTURE SHALL BE DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER COMPLETION. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO DETERMINE ERECTION PROCEDURE AND SEQUENCE AND TO INSURE THE SAFETY OF THE BUILDING AND ITS COMPONENT PARTS DURING ERECTION.

ALL STEEL ELEMENTS SHALL BE INSTALLED PLUMB AND LEVEL.

TOWER MANUFACTURER'S DESIGNS SHALL PREVAIL FOR TOWER.

CONNECTIONS SHALL BE DESIGNED BY THE FABRICATOR AND CONSTRUCTED IN ACCORDANCE WITH THE LATEST EDITION OF THE AISC *"MANUAL OF STEEL CONSTRUCTION"*. CONNECTIONS SHALL BE PROVIDED TO CONFORM TO THE REQUIREMENTS OF TYPE 2 CONSTRUCTION.

STRUCTURAL CONNECTION BOLTS SHALL CONFORM TO ASTM A325. ALL BOLTS SHALL BE MINIMUM 3/4" DIAMETER AND EACH CONNECTION SHALL HAVE MINIMUM TWO BOLTS. LOCK WASHERS ARE NOT PERMITTED FOR A325 STEEL ASSEMBLIES. IF TENSION CONTROL BOLTS ARE USED, CONNECTIONS SHALL BE DESIGNED FOR SLIP CRITICAL BOLT ALLOWABLE LOAD VALUES.

DESIGN CONNECTIONS AT BEAM ENDS FOR 10 KIPS (MIN).

ALL U-BOLTED CONNECTIONS SHALL BE COMPLETED WITH DOUBLE NUTS OR A LOCK WASHER.

CONTRACTOR SHALL COMPLY WITH AWS CODE FOR PROCEDURES, APPEARANCE AND QUALITY OF WELDS, AND WELDING PROCESSES SHALL BE QUALIFIED IN ACCORDANCE WITH AWS *"STANDARD QUALIFICATION PROCEDURES"*. ALL WELDING SHALL BE PERFORMED USING E70XX ELECTRODES AND SHALL CONFORM TO AISC AND D1.1. WHERE FILLET WELD SIZES ARE NOT SHOWN, PROVIDE THE LARGER OF 1/4" FILLET OR MINIMUM SIZE PER TABLE J2.4 IN THE AISC *"MANUAL OF STEEL CONSTRUCTION"*. AT THE COMPLETION OF WELDING, ALL DAMAGE TO GALVANIZED COATING SHALL BE REPAIRED. SEE NOTE REGARDING DAMAGED GALVANIZED SURFACES.

ALL ARC AND GAS WELDING SHALL BE DONE BY A LICENSED AND CERTIFIED WELDER IN ACCORDANCE WITH AWS.

SEAL ALL PENETRATIONS AND SEAMS BETWEEN MASONRY AND STEEL WITH DOW CORNING 790 SILICONE BUILDING SEALANT OR EQUAL.

07 THERMAL & MOISTURE PROTECTION:

THESE SPECIFICATIONS SHALL INCLUDE THE GENERAL SPECIFICATIONS HEREIN.

FIRE-STOP ALL PENETRATIONS THROUGH BUILDING WALLS, FLOORS, AND CEILINGS, WITH LISTED AND ACCEPTED MATERIALS TO MAINTAIN THE FIRE RATING OF THE EXISTING ASSEMBLY. ALL FILL MATERIAL SHALL BE SHAPED, FITTED, AND PERMANENTLY SECURED IN PLACE. FIRESTOPPING SHALL BE INSTALLED IN ACCORD WITH ASTM E814.

HILTI CP620 FIRE FOAM OR 3M FIRE BARRIER PRODUCTS, OR EQUAL, SHALL BE USED TO FILL ALL VOIDS AND CAVITIES AND SHALL BE APPLIED IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS AND ASSOCIATED UL SYSTEM NUMBER.

FIRESTOPPING SHALL BE APPLIED AS SOON AS PRACTICABLE AFTER PENETRATIONS ARE MADE AND EQUIPMENT INSTALLED.

FIRESTOPPED PENETRATIONS SHALL BE LEFT EXPOSED AND MADE AVAILABLE FOR INSPECTION BEFORE APPLYING FINISHES THAT MAY CONCEAL SUCH PENETRATION. FIRESTOPPING MATERIAL CERTIFICATES SHALL BE MADE AVAILABLE AT THE TIME OF INSPECTION.

ANY BUILDING ROOF PENETRATION OR RESTORATION SHALL BE PERFORMED SO THAT ROOF WARRANTY IN PLACE IS NOT COMPROMISED. CONTRACTOR SHALL ARRANGE FOR OWNER'S ROOFING CONTRACTOR TO PERFORM ANY AND ALL ROOFING WORK IF SO REQUIRED BY EXISTING ROOF WARRANTY. OTHERWISE, ROOF SHALL BE MADE WATERTIGHT WITH LIKE CONSTRUCTION AS SOON AS PRACTICABLE AND AT COMPLETION OF CONSTRUCTION.

ALL PENETRATIONS INTO OR THROUGH BUILDING, SHELTER, EQUIPMENT, CABINET, AND SIMILAR ENCLOSURE EXTERIOR WALLS, SHALL BE SEALED WITH SILICONE SEALER.

26 ELECTRICAL:

THESE SPECIFICATIONS SHALL INCLUDE THE GENERAL SPECIFICATIONS HEREIN.

ALL ELECTRICAL CONDUCTORS:

- INSULATION SHALL BE MINIMUM 600V TYPE THHN, THWN-2, OR XHHW.
- BRANCH CIRCUIT CONDUCTORS SHALL BE SOFT DRAWN 98% MINIMUM CONDUCTIVITY PROPERLY REFINED COPPER.
- FEEDER CIRCUIT CONDUCTORS SHALL BE EITHER COPPER OR ALUMINUM OF THE APPROPRIATE SIZE FOR THE APPLICATION, OR AS SPECIFICALLY NOTED.
- PERMANENTLY LABEL OR TAG ALL CONDUCTORS WITH THEIR CIRCUIT DESIGNATION AT ALL TERMINATION ENDS, SPLICES, AND VISIBLE AS PASS-THROUGH IN ALL ENCLOSURES.

ALL CONDUIT, RACEWAY, WIREWAYS, DUCTS, ETC. SHALL BE LISTED AND SUITABLE FOR THE APPLICATION. ONLY THE FOLLOWING CONDUITS AS APPROVED AND LISTED FOR THE APPLICATION SHALL BE ACCEPTABLE:

- ELECTRICAL METALLIC TUBING (EMT).
- COMPRESSION COUPLINGS AND CONNECTORS ONLY MADE UP WRENCH TIGHT.
- FLEXIBLE METAL CONDUIT (FMC) AND LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC).
- FINAL CONNECTIONS TO VIBRATING OR ADJUSTABLE EQUIPMENT INCLUDING, BUT NOT LIMITED TO, LIGHT FIXTURES, HVAC UNITS, TRANSFORMERS, MOTORS, ETC. OR WHERE EQUIPMENT IS PLACED UPON SLAB ON-GRADE.
- RIGID GALVANIZED STEEL (RGS).
- ALL FITTINGS, CONNECTORS, AND COUPLINGS SHALL BE THREADED MADE UP WRENCH TIGHT.
- RIGID POLYVINYL CHLORIDE (PVC) SCHEDULE 40 OR SCHEDULE 80.
- MAY BE USED FOR SERVICES, EXTERIOR, BELOW GRADE, AND WET LOCATIONS.
- SHALL NOT BE USED IN CONCRETE SLABS NOR EXPOSED WITHIN A BUILDING OR STRUCTURE.
- METAL-CLAD CABLE (MC)
- CONCEALED INSTALLATIONS ONLY.
- WITHIN A DUCT WITH SMOOTH OR CORRUGATED METAL JACKET AND NO OUTER COVERING OVER THE METAL JACKET.

IN FINISHED SPACES, ALL CONDUITS SHALL BE CONCEALED EXCEPT TO MAKE A FINAL CONNECTION TO EQUIPMENT NOT MOUNTED IN OR AGAINST FINISH MATERIAL.

ALL FEEDER AND BRANCH CIRCUITS SHALL HAVE A SEPARATE PROPERLY SIZED AND MARKED GROUNDING CONDUCTOR, PER APPLICABLE CODES, THAT BONDS ALL ENCLOSURES, BOXES, ETC. CONDUIT SHALL NOT BE USED AS A GROUNDING OR BONDING CONDUCTOR.

IF EXISTING ELECTRIC SERVICE IS TO REMAIN, CONTRACTOR SHALL BE VERIFY THAT IT MEETS PROJECT REQUIREMENTS WITHOUT MODIFICATION. IF IT IS TO BE ADDED OR REPLACED AS A PART OF THIS WORK, CONTRACTOR SHALL ORDER FROM, COORDINATE WITH, AND GAIN APPROVAL FROM THE ELECTRICAL UTILITY. ALL ELECTRICAL EQUIPMENT SHALL BE AS SPECIFIED AND AS APPROVED BY THE LOCAL UTILITY WHERE APPLICABLE.

ALL EQUIPMENT, ENCLOSURES, ETC. SHALL BE SUITABLE FOR THE INSTALLED ENVIRONMENT, MINIMUM NEMA 3R FOR ALL EXTERIOR INSTALLATIONS.

WIRING DEVICES SHALL BE SPECIFICATION GRADE AND WIRING DEVICE COVER PLATES SHALL BE PLASTIC WITH ENGRAVING AS SPECIFIED. COLOR SHALL BE IVORY. ALL DEVICES AND COVER PLATES SHALL BE OF THE SAME MANUFACTURER.

ALL FIRE-RATED PENETRATIONS SHALL BE SEALED USING A SUITABLE AND LISTED FIRE SEALING DEVICE OR GROUT THAT WILL MAINTAIN THE FIRE RATING OF THE STRUCTURE PENETRATED.

PROVIDE PERMANENTLY AFFIXED ENGRAVED NAMEPLATES FOR ALL CODE REQUIRED LABELING AND ON ALL PANELS, METERING, DISCONNECTS, AND ELECTRICAL EQUIPMENT THAT IDENTIFIES EQUIPMENT SERVED, ELECTRICAL SOURCE WITH CIRCUIT IDENTIFICATION, AND VOLTAGES WITHIN.

ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR ALL FINAL TERMINATIONS TO ALL EQUIPMENT.

ALL ELECTRICAL APPURTENANCES THAT ARE DISCONNECTED SHALL BE COMPLETELY REMOVED WITH EXISTING STRUCTURES TO REMAIN, REPAIRED, FINISHED, FILLED, PAINTED, ETC. ALL PANEL SCHEDULES, EQUIPMENT LABELING, AND CODE-REQUIRED LABELING, SHALL BE VERIFIED AND PROPERLY COMPLETED TO MATCH THE INSTALLATION.

26 GROUNDING:

THESE SPECIFICATIONS SHALL INCLUDE THE GENERAL SPECIFICATIONS HEREIN.

GROUND ALL SYSTEMS AND EQUIPMENT IN ACCORDANCE WITH BEST INDUSTRY PRACTICE, THE REQUIREMENTS OF THE NFPA 70 NATIONAL ELECTRICAL CODE (NEC), AND ALL OTHER APPLICABLE CODES AND REGULATIONS.

ALL GROUNDING ELECTRODES PRESENT AT EACH SERVICE LOCATION SHALL BE BONDED TOGETHER TO FORM THE GROUNDING ELECTRODE SYSTEM.

ALL EQUIPMENT ENCLOSURES, DEVICES, AND CONDUITS SHALL BE GROUNDED BY THE INSTALLATION OF A SEPARATE GROUNDING CONDUCTOR FOR ALL FEEDER AND BRANCH CIRCUITS THAT IS SIZED PER CODE OR IS OF THE SIZE INDICATED ON THE DRAWINGS, SHALL BE CONTINUOUS IN LENGTH, AND SHALL BE BONDED TO EACH ENCLOSURE PASSED THROUGH. CONDUIT SHALL NOT BE USED AS A GROUNDING OR BONDING WIRE OR CIRCUIT.

BOND ALL METALLIC CONDUITS TOGETHER THAT ARE CONNECTED TO NON-METALLIC ENCLOSURES, IN-GROUND BOXES, AND TO AN ENCLOSURE WHERE A GROUND BUS IS SPECIFIED OR SUPPLIED. ACCOMPLISH THIS BOND WITH GROUNDING CONDUCTORS MINIMUM SIZED TO THE LARGEST GROUNDING CONDUCTOR PRESENT IN THE ENCLOSURE CONNECTED TO A GROUNDING TYPE BUSHING EQUALLY SIZED OR MAXIMUM GROUND WIRE ACCOMMODATION AVAILABLE IN STANDARD MANUFACTURE FOR THE CONDUIT SIZE, WHICHEVER IS LESS.

EQUIPMENT GROUNDING AND LOAD SIDE BONDING CONDUCTORS SHALL BE SIZED PER THE CIRCUIT'S OVER-CURRENT PROTECTIVE DEVICE (OCPD) SIZE. WHERE THE UNGROUNDED CONDUCTORS ARE INCREASED IN SIZE ABOVE THE STANDARD FOR THE CIRCUIT'S OCPD, INCREASE THE GROUNDING CONDUCTOR PROPORTIONATELY TO THE CROSS-SECTIONAL AREA OF THE UNGROUNDED CONDUCTORS.

SERVICE MAIN BONDING JUMPERS AND GROUNDING ELECTRODE CONDUCTORS SHALL BE SIZED AND INSTALLED PER THE MINIMUM OF ALL APPLICABLE CODES AND REGULATIONS.

26 LIGHTNING PROTECTION:

THESE SPECIFICATIONS SHALL INCLUDE THE GENERAL SPECIFICATIONS AND THE GROUNDING SPECIFICATIONS HEREIN.

THE LIGHTNING PROTECTION GROUNDING SYSTEM (LPGS) SHALL CONSIST OF BONDING ALL EQUIPMENT AND CONDUCTIVE STRUCTURES TO LOCALIZED SINGLE-POINT GROUNDING CONNECTIONS (TYPICALLY GROUND BARS) WHICH ARE BONDED TOGETHER AND TO AN IN-GROUND SYSTEM. IF THE LPGS IS ON A BUILDING, IT SHALL BE EFFECTIVELY BONDED TO THE ELECTRICAL SERVICE MAIN BONDING JUMPER AND TO ADDITIONAL IN-GROUND ELECTRODES AS MAY BE REQUIRED OR INDICATED. IF THE LPGS IS ON A DEDICATED COMMUNICATION SITE, ALL EQUIPMENT AREAS AND TOWERS SHALL EACH HAVE THEIR OWN IN-GROUND RING WITH EVERY RING BONDED TOGETHER, AND ALL CONDUCTIVE STRUCTURES IN CLOSE PROXIMITY (FENCES, ICE BRIDGES, ISOLATED EQUIPMENT, ETC.) ALSO BONDED TO PROVIDE A COMMON ELECTRICAL EQUIPOTENTIAL SYSTEM FOR ALL CONDUCTIVE ELEMENTS AND STRUCTURES.

CONDUCTORS:

- MIN #2 AWG SOLID BARE TINNED COPPER (SBTC) FOR ALL IN-GROUND CONDUCTORS.
- MIN #2 AWG COPPER GREEN STRANDED FOR BONDING STRUCTURES, AND FOR INTER-SYSTEM BONDING OF INDIVIDUAL ELEMENTS SUCH AS GROUND BAR TO GROUND BAR.
- MIN #6 AWG COPPER GREEN STRANDED OR ALL EQUIPMENT BONDING.
- INSTALL ALL IN-GROUND CONDUCTORS IN THE SAME HORIZONTAL PLANE OR IN A DOWNWARD DIRECTION AWAY FROM THE TOWER AND EQUIPMENT AREAS.
- AVOID LONG RUNS. MAKE DIRECT RUNS AS MUCH AS POSSIBLE.
- PLACE THROUGH NON-METALLIC SLEEVES WHEN PASSING THROUGH FLOORS, WALLS, CEILINGS, AND SIMILAR STRUCTURES.
- MAKE ALL CONNECTIONS IN CONTACT WITH EARTH WITH EXOTHERMIC WELDING. MAKE ALL OTHER CONNECTIONS WITH EXOTHERMIC WELDING, IRREVERSIBLE COMPRESSION CONNECTORS, OR LISTED COMPRESSION TWO-HOLE LUGS.
- INSTALL ALL CONDUCTORS WITH A MINIMUM 18 INCH BEND RADIUS AND NO BEND LONGER THAN A 90 DEGREE ARC. ALL BENDS SHALL BE HORIZONTAL, OR DOWNWARD TOWARDS EARTH.
- ALL CONDUCTORS PASSING FROM ABOVE-GROUND TO IN-GROUND CONNECTIONS, WHERE EXPOSED, SHALL BE COVERED AND PROTECTED WITH A NON-METALLIC CONDUIT SEALED AT BOTH ENDS.
- IF 2 OR MORE IN-GROUND CONDUCTOS ARE IN THE SAME PATH (2 RINGS OVERLAPPING, BONDING FOLLOWING ANOTHER RING OR RADIAL, OR SIMILAR), COMBINE WITH A SHARED SINGLE CONDUCTOR.

EQUIPMENT AND TOWER GROUND RINGS SHALL BE:

- BONDED TO ANY CONDUCTIVE OBJECT OR STRUCTURE WITHIN 5 FEET OF EQUIPMENT GROUND RINGS AND WITHIN 20 FEET OF TOWER GROUND RINGS.
- INSTALLED MINIMUM 18 INCHES FROM FOUNDATIONS, FOOTINGS, AND SIMILAR.

INSTALL ALL IN-GROUND RINGS, RADIALS, BONDS CONNECTING THEM, AND ALL SIMILAR GROUNDING:

- MIN 30 INCHES BELOW GRADE, OR 6 INCHES BELOW THE FROST LINE, WHICHEVER IS GREATER DEPTH.
- MIN 2 FEET FROM FOUNDATIONS, FOOTINGS, OTHER GROUNDING SYSTEMS, AND SIMILAR STRUCTURES, EXCEPT WHEN MAKING A BOND TO ANY OF THESE STRUCTURES. DO NOT BOND TO FOUNDATION INTERNAL REINFORCEMENT.

ALL EQUIPMENT GROUPED IN A COMMON AREA, COMPOUND, STRUCTURE, OR SIMILAR SHALL BE BONDED TO A SINGLE-POINT GROUND, PREFERABLY AN ISOLATED GROUND BAR. BOND THE GROUND BAR TO THE SYSTEM WITH MINIMUM SINGLE BONDING CONDUCTOR. IF BONDING TO AN IN-GROUND RING, INSTALL 2 BONDING CONDUCTORS MINIMUM WITH EACH CONDUCTOR INSTALLED DIRECTIONALLY AWAY FROM EACH OTHER AND PARALLEL TO THE IN-GROUND CONDUCTOR, WITH NO TEE CONNECTIONS.

TOWER GROUNDING:

- EACH TOWER LEG SHALL BE BONDED TO ITS RING. SINGLE-LEGGED TOWERS, OR MONOPOLES, SHALL HAVE 2 BONDS ON OPPOSITE SIDES.
- BOND TO TOWER BASE, NOT TO VERTICAL TOWER STRUCTURE, AWAY FROM TOWER MOUNTING HARDWARE.
- EACH BOND SHALL HAVE A CORRESPONDING GROUND ROD ON THE RING.
- EACH BOND SHALL CONSIST OF 2 CONDUCTORS FROM THE TOWER TO ITS RING WITH EACH CONDUCTOR DIRECTED IN OPPOSITE DIRECTIONS WITH A PARALLEL CONNECTION ON THE RING ON OPPOSITE SIDES OF THE GROUND ROD.

EQUIPMENT AREA GROUNDING:

- COMMUNICATION AREAS ON EARTH SHALL HAVE A GROUND RING.
- BOND ALL EQUIPMENT TO A SINGLE-POINT GROUND (GROUND BAR).
- BOND THE EQIPMENT SINGLE-POINT GROUND TO THE EQUIPMENT GROUND RING WITH MINIMUM 2 CONDUCTORS DIRECTED IN OPPOSITE DIRECTIONS WITH PARALLEL CONNECTIONS ON THE RING.
- IF EQUIPMENT IS ENCLOSED IN A SHELTER:
- IF THE SHELTER IS CONSIDERED TO BE EXPOSED TO A DIRECT LIGHTNING STRIKE, INSTALL A BUILDING LIGHTNING PROTECTION SYSTEM PER APPLICABLE VERSION OF NFPA 780.
- BOND ALL FIXED CONDUCTIVE BUILDING COMPONENTS TOGETHER AND TO THE BUILDING RING GROUND AT THE CORNERS. THIS IS TYPICALLY CALLED THE HALO GROUND. DO NOT BOND EQUIPMENT TO THE HALO GROUND.
- BOND ALL EQUIPMENT TOGETHER TO A SINGLE-POINT OR INTERIOR EQUIPMENT RING GROUND (IEGR). BOND THE SINGLE-POINT OR IEGR TO THE EXTERNAL EQUIPMENT RING GROUND.
- PLACE GROUND RODS AT THE EQUIPMENT GROUND RING CORNERS.

GROUND RODS:

- SEPARATION SPACE BETWEEN ANY 2 GROUND RODS SHALL BE NO CLOSER THAN THEIR DEPTH. THIS APPLIES TO ALL RODS IN THE COMPLETE SYSTEM.
- DRIVE VERTICALLY IN UNDISTURBED SOIL WITH THE TOP AT SAME DEPTH AS THE IN-GROUND CONDUCTOR. IF NOT POSSIBLE TO INSTALL VERTICALLY, PLACE AS CLOSE TO VERTICAL AS POSSIBLE AND IN A DIRECTION AWAY FROM THE NEAREST ABOVE-GROUND CONDUCTIVE ELEMENT (TOWER, EQUIPMENT, ETC.).

RADIALS (TYP. NEW DEDICATED COMMUNICATION SITES):

- WHERE FEASIBLE WITH ENOUGH SPACE AVAILABLE, INSTALL A MINIMUM OF 4, MAXIMUM 10 RING RADIALS.
- EACH RADIAL'S LENGTH SHALL BE MIN 20 FT, MAX 80 FT.
- EXTEND RADIALS PERPENDICULAR FROM RINGS IN AS STRAIGHT LINE AS POSSIBLE, AWAY FROM OTHER RING GROUNDS, RADIALS, BONDS, AND SIMILAR.
- A COMMON PRACTICE IS TO PLACE 4 RADIALS FROM THE TOWER RING TO THE 4 CORNERS OF THE AVAILABLE AREA.

AT A MINIMUM, BOND ALL COMPOUND CONDUCTIVE FENCE CORNER POSTS AND GATE POSTS TO THE LPGS. PREFERABLY, INSTALL A GROUND RING THAT FOLLOWS THE FENCE LINE, BONDING ALL POSTS TO THE RING.

27 ANTENNAS & CABLES:

THESE SPECIFICATIONS SHALL INCLUDE THE GENERAL SPECIFICATIONS HEREIN.

THE CONTRACTOR SHALL FURNISH AND INSTALL ALL TRANSMISSION CABLES, JUMPERS, CONNECTORS, GROUNDING STRAPS, ANTENNAS, MOUNT AND HARDWARE. ALL MATERIALS SHALL BE INSPECTED BY THE CONTRACTOR FOR DAMAGE UPON DELIVERY. JUMPERS SHALL BE SUPPLIED AT ANTENNAS AND EQUIPMENT INSIDE SHELTER. COORDINATE LENGTH OF JUMPER CABLES WITH OWNER. COORDINATE AND VERIFY ALL OF THE MATERIALS TO BE PROVIDED WITH OWNER PRIOR TO SUBMITTING BID AND ORDERING MATERIALS.

AFTER INSTALLATION, THE TRANSMISSION LINE SYSTEM SHALL BE PIM / SWEEP TESTED FOR PROPER INSTALLATION AND DAMAGE WITH ANTENNAS CONNECTED. CONTRACTOR SHALL OBTAIN AND USE LATEST TESTING PROCEDURES FROM OWNER OR MANUFACTURER PRIOR TO BIDDING.

ANTENNA CABLES SHALL BE UNIQUELY COLOR-CODED AT THE ANTENNAS, BOTH SIDES OF EQUIPMENT SHELTER WALL, AND JUMPER CABLES AT THE EQUIPMENT.

THE CONTRACTOR SHALL FURNISH AND INSTALL ALL CONNECTORS, ASSOCIATED CABLE MOUNTING AND GROUNDING HARDWARE, WALL MOUNTS, STANDOFFS, AND ALL ASSOCIATED HARDWARE TO INSTALL ALL CABLES AND ANTENNAS TO THE MANUFACTURER'S AND OWNER'S SPECIFICATIONS.

ANTENNA CABLES SHALL BE FOAM DIELECTRIC COAXIAL CABLES AS FOLLOWS:

- BASE STATION ANTENNAS:
  - 7/8" DIAMETER FOR CABLE LENGTHS UP TO 100 FT.
  - 1-5/8" DIAMETER FOR CABLE LENGTHS GREATER THAN 100 FT.
  - GPS ANTENNAS:
  - 7/8" DIAMETER FOR CABLE LENGTHS UP TO 200 FT.
  - 1-5/8" DIAMETER FOR CABLE LENGTHS GREATER THAN 200 FT.

MINIMUM BENDING RADIUS FOR COAXIAL CABLES SHALL BE:

- 15 FT FOR 7/8" COAXIAL CABLES.
- 25 FT FOR 1-5/8" COAXIAL CABLES.

CABLE SHALL BE INSTALLED WITH A MINIMUM NUMBER OF BENDS WHERE POSSIBLE. CABLE SHALL NOT BE LEFT UNTERMINATED AND SHALL BE SEALED IMMEDIATELY AFTER BEING INSTALLED.

ALL EXTERIOR CABLE CONNECTIONS SHALL BE COVERED WITH A WATERPROOF SPLICING KIT.

CONTRACTOR SHALL VERIFY EXACT LENGTH AND DIRECTION OF TRAVEL IN FIELD PRIOR TO CONSTRUCTION.

CABLE SHALL BE FURNISHED AND INSTALLED WITHOUT SPLICES AND WITH CONNECTORS AT EACH END.

27 CABLE TRAY:

THESE SPECIFICATIONS SHALL INCLUDE THE GENERAL SPECIFICATIONS HEREIN.

CABLE TRAY SHALL BE MADE OF EITHER CORROSION RESISTANT METAL OR WITH A CORROSION RESISTANT FINISH.

CABLE TRAY SHALL BE OF LADDER TRAY TYPE WITH FLAT COVER CLAMPED TO SIDE RAILS.

CABLE LADDER SHALL BE SIZED TO FIT ALL CABLES IN ACCORDANCE WITH NEC AND NEMA 11-15-84.

CABLE LADDER TRAYS SHALL BE NEMA CLASS 12A BY PW INDUSTRIES, INC. OR EQUAL.

CABLE LADDER TRAY SHALL BE SUPPORTED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.

ALL WORKMANSHIP SHALL CONFORM TO THESE REQUIREMENTS AND ALL LOCAL CODES AND STANDARDS TO ENSURE SAFE AND ADEQUATE GROUNDING SYSTEM.

31 EXCAVATION & FILL:

THESE SPECIFICATIONS SHALL INCLUDE THE GENERAL SPECIFICATIONS HEREIN.

CONTRACTOR SHALL GRADE ONLY AREAS SHOWN TO BE MODIFIED AS A PART OF THIS WORK AND ONLY TO THE EXTENT REQUIRED TO SHED OVERLAND WATER FLOW AWAY FROM SITE. ALL MADE SLOPES SHALL NOT BE STEEPER THAN 3:1 (HORIZONTAL:VERTICAL). SEDIMENTATION AND EROSION CONTROLS SHOWN AND SPECIFIED SHALL BE ESTABLISHED BEFORE STRIPPING EXISTING VEGETATION.

ORGANIC MATERIAL AND DEBRIS SHALL BE STRIPPED AND STOCKPILED BEFORE ADDING FILL MATERIAL.

NO FILL OR EMBANKMENT MATERIAL SHALL BE PLACED ON FROZEN GROUND. FROZEN MATERIALS, SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OR EMBANKMENT.

ALL FILL SHALL BE PLACED IN ONE FOOT LIFTS AND COMPACTED IN PLACE. STRUCTURAL FILL SHALL BE COMPACTED TO 95% OF ITS MAXIMUM DRY UNIT WEIGHT TESTED IN ACCORDANCE WITH ASTM D1557.

EXCAVATIONS FOR FOOTINGS SHALL BE CUT LEVEL TO THE REQUIRED DEPTH AND TO UNDISTURBED SOIL. REPORT UNSUITABLE SOIL CONDITIONS TO THE CONSTRUCTION MANAGER.

TRENCH EXCAVATIONS SHALL BE BACKFILLED AT THE END OF EACH DAY.

TOWER FOUNDATION EXCAVATION, BACKFILL AND COMPACTION SHALL BE IN ACCORDANCE WITH TOWER MANUFACTURER'S DESIGNS AND SPECIFICATIONS.

NATIVE GRAVEL MATERIAL MAY BE USED FOR TRENCH BACKFILL WHERE SELECT MATERIAL IS NOT SPECIFIED. GRAVEL MATERIAL FOR CONDUIT TRENCH BACKFILL SHALL NOT CONTAIN ROCK GREATER THAN 2 INCHES IN DIAMETER.

BANK OR CRUSHED GRAVEL SHALL CONSIST OF TOUGH, DURABLE PARTICLES OF CRUSHED OR UNCRUSHED GRAVEL FREE OF SOFT, THIN, ELONGATED OR LAMINATED PIECES AND MEET THE SPECIFIED GRADATION.

PROCESSED AGGREGATE BASE SHALL CONSIST OF COURSE AND FINE AGGREGATES COMBINED AND MIXED SO THAT THE RESULTING MATERIAL CONFORMS TO THE GRADATION. COURSE AGGREGATE SHALL BE EITHER GRAVEL OR BROKEN STONE AND FINE AGGREGATE SHALL CONSIST OF SAND.

BANK GRAVEL FILL SHALL PASS WITH THE FOLLOWING SIZE SQUARE MESH SIEVES:

25-60% WITH PASS 1/4"
15-45% WITH PASS #10
2-25% WITH PASS #40
0-10% WITH PASS #100
0-5% WITH PASS #200

BANK GRAVEL BASE SHALL PASS WITH THE FOLLOWING SIZE SQUARE MESH SIEVES:

100%	WITH PASS 5"
100%	WITH PASS 3-1/2"
100%	WITH PASS 2-1/4"
95-100%	WITH PASS 2"
55-100%	WITH PASS 1-1/2"
25-60%	WITH PASS 1/4"
15-45%	WITH PASS #10
5-25%	WITH PASS #40
0-10%	WITH PASS #100
0-5%	WITH PASS #200

PROCESSED AGG BASE SHALL PASS WITH THE FOLLOWING SIZE SQUARE MESH SIEVES:

90-100%	WITH PASS 3-1/2"
55-95%	WITH PASS 1-1/2"
50-75%	WITH PASS 3/4"
25-45%	WITH PASS 1/4"
5-20%	WITH PASS #40
2-12%	WITH PASS #100

FILL MATERIAL SHALL BE FREE OF ORGANIC MATERIAL, ICE, TRASH AND DEBRIS. REFER TO GEOTECHNICAL ENGINEERING AS APPLICABLE FOR ALL FILL MATERIAL REQUIREMENTS.

31 SEDIMENTATION & EROSION CONTROL:

THE CONTRACTOR SHALL CONSTRUCT ALL SEDIMENT AND EROSION CONTROLS IN ACCORDANCE WITH THE 2002 CONNECTICUT GUIDELINES FOR SOIL EROSION AND SEDIMENT CONTROL, LATEST EDITION, IN ACCORDANCE WITH THE CONTRACT DOCUMENTS AND AS DIRECTED BY THE TOWN OF PERMITTEE AND/OR SWPCP MONITOR. DIRECT ALL DEWATERING PUMP DISCHARGE TO A SEDIMENT CONTROL DEVICE SUCH AS TEMPORARY SEDIMENT TRAPS OR GRASS FILTERS WITHIN THE APPROVED LIMIT OF DISTURBANCE. DISCHARGE TO STORM DRAINS OR SURFACE WATERS FROM SEDIMENT CONTROLS SHALL BE CLEAR AND APPROVED BY THE ENGINEER.

THESE SPECIFICATIONS SHALL INCLUDE THE GENERAL SPECIFICATIONS HEREIN.

CONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXIST. SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN CONFORMANCE WITH THE LOCAL GUIDELINES FOR EROSION AND SEDIMENTATION CONTROL.

LIMITS OF CLEARING AND GRUBBING SHALL BE CLEARLY MARKED BEFORE COMMENCING WITH SUCH WORK.

SEDIMENTATION AND EROSION CONTROL (SEC) MEASURES SHOWN SHALL BE INSTALLED PRIOR TO LAND CLEARING, EXCAVATION OR GRADING OPERATIONS. REQUIREMENTS OF LOCAL WETLAND AGENCY SHALL BE MET PRIOR TO EARTHWORK OPERATIONS.

IT IS THE CONTRACTOR'S RESPONSIBILITY TO MAINTAIN SEC MEASURES THROUGHOUT DURATION OF PROJECT UNTIL DISTURBED LAND IS THOROUGHLY VEGETATED.

FAILURE OF THE SEC SYSTEMS SHALL BE CORRECTED IMMEDIATELY AND SUPPLEMENTED WITH ADDITIONAL MEASURES AS NEEDED.

TOPSOIL SHALL BE SPREAD TO FINISH GRADES AND SEEDED AS SOON AS FINISHED GRADES ARE ESTABLISHED. STRAW MULCH, JUTE NETTING OR MATS SHALL BE USED WHERE THE NEW SEED IS PLACED.

VEGETATIVE SEEDING:

- AREA TO BE SEEDED SHALL BE LOOSE AND FRIABLE TO A DEPTH OF 3". TOPSOIL SHALL BE LOOSENED BY RAKING OR DISKING BEFORE SEEDING. APPLY 50 Lbs. OF DOLOMITIC LIMESTONE AND 25 Lbs. OF 10-10-10 FERTILIZER PER 1000 SF. HARROW LIME AND FERTILIZER INTO LOOSE SOIL.
- APPLY COMMON BERMUDA AND RYE GRASS AT 50 LBS PER ACRE. USE CYCLONE SEED DRILL CULTIPACKER SEEDER OR HYDROSEEDER (SEED & FERTILIZER SLURRY) FOR STEEP SLOPES. IRRIGATE UNTIL VEGETATION IS COMPLETELY ESTABLISHED.

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D&M DOCUMENTS

NO	DATE	REVISION
0	04/04/23	FOR REVIEW: RCB
1	04/05/23	CLIENT REVS: RCB
2		
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DESIGN PROFESSIONALS OF RECORD

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BROOKFIELD, CT 06804

APT FILING NUMBER: CT2831040

DATE: 04/04/23 | DRAWN BY: CSH | CHECKED BY: RCB

SHEET TITLE:

NOTES & SPECIFICATIONS

SHEET NUMBER:

N-1

STATE OF CONNECTICUT ROBERT CHARLES BURNS No. 20071 LICENSED PROFESSIONAL ENGINEER

ENVIRONMENTAL NOTES - RESOURCES PROTECTION MEASURES

WETLAND PROTECTION AND SPILL PREVENTION PROGRAM

THE FOLLOWING PROTECTION MEASURES SATISFY CONDITIONS 2.C) AND 2.D) OF THE CONNECTICUT SITING COUNCILS DECISION AND ORDER DATED FEBRUARY 2, 2023 FOR DOCKET NO. 512 FOR THE TELECOMMUNICATIONS FACILITY PROPOSED AT 60 VALE ROAD IN BROOKFIELD, CONNECTICUT. AS A RESULT OF THE PROJECTS LOCATION IN THE VICINITY OF SENSITIVE WETLAND RESOURCES, THE FOLLOWING BEST MANAGEMENT PRACTICES ("BMPS") WHICH INCLUDE A PETROLEUM MATERIALS STORAGE AND SPILL PREVENTION PLAN SHALL BE IMPLEMENTED BY THE CONTRACTOR TO AVOID UNINTENTIONAL IMPACTS TO THESE RESOURCES DURING CONSTRUCTION ACTIVITIES.

IT IS OF THE UTMOST IMPORTANCE THAT THE CONTRACTOR COMPLIES WITH THE REQUIREMENT FOR THE INSTALLATION OF PROTECTIVE MEASURE BMPS AND THE EDUCATION OF ITS EMPLOYEES AND SUBCONTRACTORS PERFORMING WORK ON THE PROJECT SITE. ALL?POINTS TECHNOLOGY CORPORATION, P.C. ("APT") WILL SERVE AS THE ENVIRONMENTAL MONITOR FOR THIS PROJECT TO ENSURE THAT THESE PROTECTION MEASURES ARE IMPLEMENTED PROPERLY AND WILL PROVIDE AN EDUCATION SESSION ON THE PROJECTS PROXIMITY TO SENSITIVE WETLAND RESOURCES PRIOR TO THE START OF CONSTRUCTION ACTIVITIES. THE CONTRACTOR SHALL CONTACT DEAN GUSTAFSON, SENIOR WETLAND SCIENTIST AT APT, AT LEAST 5 BUSINESS DAYS PRIOR TO THE PRE?CONSTRUCTION MEETING. MR. GUSTAFSON CAN BE REACHED BY PHONE AT (860) 552-2033 OR VIA EMAIL AT DGUSTAFSON@ALLPOINTSTECH.COM.

THIS RESOURCES PROTECTION PROGRAM CONSISTS OF SEVERAL COMPONENTS INCLUDING: EDUCATION OF ALL CONTRACTORS AND SUB?CONTRACTORS PRIOR TO INITIATION OF WORK ON THE SITE; INSTALLATION OF EROSION CONTROLS; PETROLEUM MATERIALS STORAGE AND SPILL PREVENTION; PROTECTIVE MEASURES; HERBICIDE, PESTICIDE, AND SALT RESTRICTIONS; AND, REPORTING.

1. CONTRACTOR EDUCATION:

   a. PRIOR TO WORK ON SITE AND INITIAL DEPLOYMENT/MOBILIZATION OF EQUIPMENT AND MATERIALS, THE CONTRACTOR SHALL ATTEND AN EDUCATIONAL SESSION AT THE PRE?CONSTRUCTION MEETING WITH APT. THIS ORIENTATION AND EDUCATIONAL SESSION WILL CONSIST OF INFORMATION SUCH AS, BUT NOT LIMITED TO: IDENTIFICATION OF WETLAND RESOURCES PROXIMATE TO WORK AREAS, THE ENVIRONMENTALLY SENSITIVE NATURE OF THE DEVELOPMENT SITE, AND THE NEED TO FOLLOW THESE PROTECTION MEASURES.

   b. THE CONTRACTOR WILL BE PROVIDED WITH CELL PHONE AND EMAIL CONTACTS FOR APT PERSONNEL TO IMMEDIATELY REPORT ANY ISSUES.

   c. APT WILL INSTALL AND MAINTAIN EDUCATIONAL AWARENESS POSTER MATERIALS THROUGHOUT THE PROJECT SITE AND FOR THE DURATION OF THE CONSTRUCTION PROJECT PROVIDING NOTICE OF THE ENVIRONMENTALLY SENSITIVE NATURE OF THE WORK AREA. POSTERS WILL BE DISPLAYED ON THE PROJECT SITE TO HELP MAINTAIN WORKER AWARENESS AS THE PROJECT PROGRESSES.

2. EROSION AND SEDIMENTATION CONTROLS/ISOLATION BARRIERS

   a. PLASTIC NETTING USED IN A VARIETY OF EROSION CONTROL PRODUCTS (I.E., EROSION CONTROL BLANKETS, FIBER ROLLS [WATTLES], REINFORCED SILT FENCE) HAS BEEN FOUND TO ENTANGLE WILDLIFE, INCLUDING REPTILES, AMPHIBIANS, BIRDS AND SMALL MAMMALS. NO PERMANENT EROSION CONTROL PRODUCTS OR REINFORCED SILT FENCE WILL BE USED ON THE PROJECT. TEMPORARY EROSION CONTROL PRODUCTS THAT WILL BE EXPOSED AT THE GROUND SURFACE AND REPRESENT A POTENTIAL FOR WILDLIFE ENTANGLEMENT WILL USE EITHER EROSION CONTROL BLANKETS AND FIBER ROLLS COMPOSED OF NATURAL PROCESSED FIBERS MECHANICALLY BOUND TOGETHER TO FORM A CONTINUOUS MATRIX (NETLESS) OR NETTING COMPOSED OF PLANAR WOVEN NATURAL BIODEGRADABLE FIBER TO AVOID/MINIMIZE WILDLIFE ENTANGLEMENT. THE CONTRACTOR SHALL SUBMIT SPECIFICATION SHEETS OF ANY EROSION CONTROL BLANKETS TO THE ENVIRONMENTAL MONITOR FOR APPROVAL PRIOR TO INSTALLATION.

   b. INSTALLATION OF EROSION AND SEDIMENTATION CONTROLS SHALL BE PERFORMED BY THE CONTRACTOR IN ACCORDANCE WITH THE PROJECT SITE PLANS AS REQUIRED FOR EROSION CONTROL COMPLIANCE. THE ENVIRONMENTAL MONITOR WILL INSPECT THE WORK ZONES PRIOR TO AND FOLLOWING EROSION CONTROL BARRIER INSTALLATION TO ENSURE THE AREA IS FREE OF WILDLIFE AND SATISFACTORILY INSTALLED. THE INTENT OF THE BARRIER IS TO SERVE AS A PERIMETER EROSION CONTROL DEVICE WITH SECONDARY FUNCTION TO SEGREGATE THE MAJORITY OF THE WORK ZONE FROM POSSIBLE WILDLIFE THAT COULD BE ENCOUNTERED DURING CONSTRUCTION. OFTENTIMES COMPLETE ISOLATION OF A WORK ZONE IS NOT FEASIBLE DUE TO ACCESSIBILITY NEEDS AND LOCATIONS OF STAGING/MATERIAL STORAGE AREAS, ETC. IN THOSE CIRCUMSTANCES, THE BARRIERS WILL BE POSITIONED AT THE DIRECTION OF THE ENVIRONMENTAL MONITOR TO DEFLECT MIGRATING/DISPERSAL ROUTES AWAY FROM THE WORK ZONE TO MINIMIZE POTENTIAL ENCOUNTERS WITH WILDLIFE.

   c. THE CONTRACTOR IS RESPONSIBLE FOR DAILY INSPECTIONS OF THE SEDIMENTATION AND EROSION CONTROLS FOR TEARS OR BREECHES AND ACCUMULATION LEVELS OF SEDIMENT, PARTICULARLY FOLLOWING STORM EVENTS THAT GENERATE A DISCHARGE, AS DEFINED BY AND IN ACCORDANCE WITH APPLICABLE LOCAL, STATE AND FEDERAL REGULATIONS. THE CONTRACTOR SHALL NOTIFY THE ENVIRONMENTAL MONITOR WITHIN 24 HOURS OF ANY BREECHES OF THE SEDIMENTATION AND EROSION CONTROLS AND ANY SEDIMENT RELEASES BEYOND THE PERIMETER CONTROLS THAT RESULT IN IMPACT TO WETLANDS OR AREAS WITHIN 100 FEET OF WETLANDS. THE ENVIRONMENTAL MONITOR WILL PROVIDE PERIODIC INSPECTIONS OF THE SEDIMENTATION AND EROSION CONTROLS THROUGHOUT THE DURATION OF CONSTRUCTION ACTIVITIES ONLY AS IT PERTAINS TO THEIR FUNCTION TO PROTECT NEARBY WETLANDS. SUCH INSPECTIONS WILL GENERALLY OCCUR ONCE PER MONTH. THE FREQUENCY OF MONITORING MAY INCREASE DEPENDING UPON SITE CONDITIONS, LEVEL OF CONSTRUCTION ACTIVITIES IN PROXIMITY TO SENSITIVE RECEPTORS, OR AT THE REQUEST OF REGULATORY AGENCIES. IF THE ENVIRONMENTAL MONITOR IS NOTIFIED BY THE CONTRACTOR OF A SEDIMENT RELEASE, AN INSPECTION WILL BE SCHEDULED SPECIFICALLY TO INVESTIGATE AND EVALUATE POSSIBLE IMPACTS TO WETLAND RESOURCES.

   d. THIRD PARTY MONITORING OF SEDIMENTATION AND EROSION CONTROLS WILL BE PERFORMED BY OTHER PARTIES, AS NECESSARY, UNDER APPLICABLE LOCAL, STATE AND/OR FEDERAL REGULATIONS AND PERMIT CONDITIONS.

   e. THE EXTENT OF THE EROSION CONTROLS WILL BE AS SHOWN ON THE SITE PLANS. THE CONTRACTOR SHALL HAVE ADDITIONAL EROSION CONTROL MATERIALS STORED ON SITE SHOULD FIELD CONDITIONS WARRANT EXTENDING OR REINFORCING CONTROLS AS DIRECTED BY THE ENVIRONMENTAL MONITOR IN COORDINATION WITH THE CONTRACTOR.

   f. NO EQUIPMENT, VEHICLES OR CONSTRUCTION MATERIALS SHALL BE STORED WITHIN 100 FEET OF WETLAND RESOURCES WITHOUT SECONDARY CONTAINMENT.

   g. ALL SILT FENCING AND OTHER EROSION CONTROL DEVICES SHALL BE REMOVED WITHIN 30 DAYS OF COMPLETION OF WORK AND PERMANENT STABILIZATION OF SITE SOILS. IF FIBER ROLLS/WATTLES, STRAW BALES, OR OTHER NATURAL MATERIAL EROSION CONTROL PRODUCTS ARE USED, SUCH DEVICES WILL NOT BE LEFT IN PLACE TO BIODEGRADE AND SHALL BE PROMPTLY REMOVED AFTER SOILS ARE STABLE SO AS NOT TO CREATE A BARRIER TO WILDLIFE MOVEMENT. SEED FROM SEEDING OF SOILS SHOULD NOT SPREAD OVER FIBER ROLLS/WATTLES AS IT MAKES THEM HARDER TO REMOVE ONCE SOILS ARE STABILIZED BY VEGETATION.

   h. THE SUBJECT PROPERTY IS IN AN EXISTING STATE OF DISTURBANCE DUE TO CURRENT USAGE. AREAS OF DISTURBANCE THAT ARE LOCATED ALONG OR JUST BEYOND THE PROPOSED DEVELOPMENT'S LIMIT OF DISTURBANCE THAT ARE NOT PERMANENTLY STABILIZED WITH VEGETATION OR OTHER MEANS WILL RECEIVE SUCH TREATMENT DURING THE PROJECT'S CONSTRUCTION PHASE TO ENSURE THAT NEARBY WETLAND RESOURCES ARE PROPERLY PROTECTED.

3. PETROLEUM MATERIALS STORAGE AND SPILL PREVENTION

   a. CERTAIN PRECAUTIONS ARE NECESSARY TO STORE PETROLEUM MATERIALS, REFUEL AND CONTAIN AND PROPERLY CLEAN UP ANY INADVERTENT FUEL OR PETROLEUM (I.E., OIL, HYDRAULIC FLUID, ETC.) SPILL DUE TO THE PROJECTS LOCATION IN PROXIMITY TO WETLAND RESOURCES.

   b. A SPILL CONTAINMENT KIT CONSISTING OF A SUFFICIENT SUPPLY OF ABSORBENT PADS AND ABSORBENT MATERIAL WILL BE MAINTAINED BY THE CONTRACTOR AT THE CONSTRUCTION SITE THROUGHOUT THE DURATION OF THE PROJECT. IN ADDITION, A WASTE DRUM WILL BE KEPT ON SITE TO CONTAIN ANY USED ABSORBENT PADS/MATERIAL FOR PROPER AND TIMELY DISPOSAL OFF SITE IN ACCORDANCE WITH APPLICABLE LOCAL, STATE AND FEDERAL LAWS.

   c. SERVICING OF MACHINERY SHALL ONLY BE COMPLETED OUTSIDE OF THE PUBLIC WATER SUPPLY WATERSHED PROTECTION ZONE.

   d. AT A MINIMUM, THE FOLLOWING PETROLEUM AND HAZARDOUS MATERIALS STORAGE AND REFUELING RESTRICTIONS AND SPILL RESPONSE PROCEDURES WILL BE ADHERED TO BY THE CONTRACTOR.

      i. PETROLEUM AND HAZARDOUS MATERIALS STORAGE AND REFUELING
         1. REFUELING OF VEHICLES OR MACHINERY SHALL OCCUR A MINIMUM OF 100 FEET FROM WETLANDS OR IF WITHIN 100 FEET OF WETLANDS SHALL TAKE PLACE ON AN IMPERVIOUS PAD WITH SECONDARY CONTAINMENT DESIGNED TO CONTAIN FUELS.
         2. ANY FUEL OR HAZARDOUS MATERIALS THAT MUST BE KEPT ON SITE SHALL BE STORED ON AN IMPERVIOUS SURFACE UTILIZING SECONDARY CONTAINMENT.

      ii. INITIAL SPILL RESPONSE PROCEDURES
         1. STOP OPERATIONS AND SHUT OFF EQUIPMENT.
         2. REMOVE ANY SOURCES OF SPARK OR FLAME.
         3. CONTAIN THE SOURCE OF THE SPILL.
         4. DETERMINE THE APPROXIMATE VOLUME OF THE SPILL.
         5. IDENTIFY THE LOCATION OF NATURAL FLOW PATHS TO PREVENT THE RELEASE OF THE SPILL TO SENSITIVE NEARBY WETLANDS.
         6. ENSURE THAT FELLOW WORKERS ARE NOTIFIED OF THE SPILL.

      iii. SPILL CLEAN UP & CONTAINMENT
         1. OBTAIN SPILL RESPONSE MATERIALS FROM THE ONYSITE SPILL RESPONSE KIT. PLACE ABSORBENT MATERIALS DIRECTLY ON THE RELEASE AREA.
         2. LIMIT THE SPREAD OF THE SPILL BY PLACING ABSORBENT MATERIALS AROUND THE PERIMETER OF THE SPILL.
         3. ISOLATE AND ELIMINATE THE SPILL SOURCE.
         4. CONTACT APPROPRIATE LOCAL, STATE AND/OR FEDERAL AGENCIES, AS NECESSARY.
         5. CONTACT A DISPOSAL COMPANY TO PROPERLY DISPOSE OF CONTAMINATED MATERIALS.

      iv. REPORTING
         1. COMPLETE AN INCIDENT REPORT.
         2. SUBMIT A COMPLETED INCIDENT REPORT TO LOCAL, STATE AND FEDERAL AGENCIES, AS NECESSARY, INCLUDING THE CONNECTICUT SITING COUNCIL.

4. WETLAND PROTECTIVE MEASURES

   a. A THOROUGH COVER SEARCH OF THE CONSTRUCTION AREA WILL BE PERFORMED BY APT'S ENVIRONMENTAL MONITOR PRIOR TO AND FOLLOWING INSTALLATION OF THE SILT FENCING BARRIER TO REMOVE ANY WILDLIFE FROM THE WORK ZONE PRIOR TO THE INITIATION OF CONSTRUCTION ACTIVITIES. ANY WILDLIFE DISCOVERED WOULD BE TRANSLOCATED OUTSIDE THE WORK ZONE IN THE GENERAL DIRECTION THE ANIMAL WAS ORIENTED. PERIODIC INSPECTIONS WILL BE PERFORMED BY APT'S ENVIRONMENTAL MONITOR THROUGHOUT THE DURATION OF THE CONSTRUCTION, GENERALLY ON A MONTHLY BASIS.

   b. ALTHOUGH NO VERNAL POOL HABITAT IS KNOWN TO OCCUR ON OR ADJACENT TO THE PROJECT SITE, AS A PRECAUTION ANY STORMWATER MANAGEMENT FEATURES, RUTS OR ARTIFICIAL DEPRESSIONS THAT COULD HOLD WATER CREATED INTENTIONALLY OR UNINTENTIONALLY BY SITE CLEARING/CONSTRUCTION ACTIVITIES WILL BE PROPERLY FILLED IN AND PERMANENTLY STABILIZED WITH VEGETATION TO AVOID THE CREATION OF "DECOY POOLS" THAT COULD INTERCEPT AMPHIBIANS POTENTIALLY MOVING THROUGH THE PROJECT SITE.

   c. EROSION CONTROL MEASURES WILL BE REMOVED NO LATER THAN 30 DAYS FOLLOWING FINAL SITE STABILIZATION SO AS NOT TO IMPEDE WILDLIFE MOVEMENTS.

5. HERBICIDE, PESTICIDE, AND SALT RESTRICTIONS

   a. THE USE OF HERBICIDES AND PESTICIDES AT TELECOMMUNICATION FACILITIES IS TYPICALLY MINIMAL. IN THE EVENT HERBICIDES AND/OR PESTICIDES ARE REQUIRED, THEIR USE WILL BE USED IN ACCORDANCE WITH CURRENT INTEGRATED PEST MANAGEMENT ('IPM') PRINCIPLES WITH PARTICULAR ATTENTION TO AVOID APPLICATIONS WITHIN 100 FEET OF THE NEARBY WETLAND.

   b. MAINTENANCE OF THE FACILITY DURING THE WINTER MONTHS SHALL MINIMIZE THE APPLICATION OF CHLORIDE-BASED DEICERS SALT WITH USE OF MORE ENVIRONMENTALLY FRIENDLY ALTERNATIVES TO MINIMIZE IMPACT TO NEARBY WETLANDS.

6. REPORTING

   a. COMPLIANCE MONITORING REPORTS (BRIEF NARRATIVE AND APPLICABLE PHOTOS) DOCUMENTING EACH APT INSPECTION WILL BE SUBMITTED BY APT TO THE PERMITTEE AND ITS CONTRACTOR FOR COMPLIANCE VERIFICATION OF THESE PROTECTION MEASURES. THESE REPORTS ARE NOT TO BE USED TO DOCUMENT COMPLIANCE WITH ANY OTHER PERMIT AGENCY APPROVAL CONDITIONS (I.E., DEEP STORMWATER PERMIT MONITORING, ETC.). ANY NON-COMPLIANCE OBSERVATIONS OF EROSION CONTROL MEASURES OR EVIDENCE OF EROSION OR SEDIMENT RELEASE WILL BE IMMEDIATELY REPORTED TO THE PERMITTEE AND ITS CONTRACTOR AND INCLUDED IN THE REPORTS ALONG WITH ANY OBSERVATIONS OF VERNAL POOL HERPETOFAUNA.

   b. FOLLOWING COMPLETION OF THE CONSTRUCTION PROJECT, APT WILL PROVIDE A FINAL COMPLIANCE MONITORING REPORT TO THE PERMITTEE DOCUMENTING IMPLEMENTATION OF THE WETLAND PROTECTION PROGRAM AND MONITORING OBSERVATIONS. THE PERMITTEE IS RESPONSIBLE FOR PROVIDING A COPY OF THE FINAL COMPLIANCE MONITORING REPORT TO THE CONNECTICUT SITING COUNCIL FOR COMPLIANCE VERIFICATION.

   c. ANY OBSERVATIONS OF RARE SPECIES WILL BE REPORTED TO CTDEEP BY APT, WITH PHOTO?DOCUMENTATION (IF POSSIBLE) AND WITH SPECIFIC INFORMATION ON THE LOCATION AND DISPOSITION OF THE ANIMAL.

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DESIGN PROFESSIONALS OF RECORD

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SHEET TITLE:

ENVIRONMENTAL NOTES

SHEET NUMBER:

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STATE OF CONNECTICUT · ROBERT CHARLES BURNS · 20071 · LICENSED PROFESSIONAL ENGINEER