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 ONE OF TWO SITES IN THE TOWN OF KENT, CONNECTICUT	DOCKET NO. 488 June 14, 2021

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 Site B 93 Richards Road, the certificated site:

Homeland Towers, LLC cover letter dated June 9, 2021;

AT&T Commitment Letter dated June 9, 2021;

Geotechnical Investigation Report by Delta Oaks Group dated December 31, 2020;

Structural Drawings by Valmont Structures dated May 19, 2021 with Structural Calculations by Bennet & Pless;

Polar Power, Inc Emergency Generator Specifications;

KMW Antenna Specifications and Ericsson Remote Radio Head (RRH) Specifications;

Paint color samples; and

Two full-sized sets and 15 half-sized sets of D&M Plan Drawings prepared by All-Points Technology Corporation dated June 9, 2021 and signed and sealed by Robert Charles Burns, CT P.E. license no. 20071.

CERTIFICATE OF SERVICE

I hereby certify that on this day the foregoing was sent electronically to the Connecticut Siting Council and to the service list below with one original and fifteen (15) hard copies sent to the Connecticut Siting Council via overnight mail:

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June 14, 2021

Lucia Chiocchio
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445 Hamilton Ave,14th Floor
White Plains, NY 10601
(914)-761-1300
Attorneys for the Applicants

cc: Homeland Towers; AT&T; APT; C Squared; Christopher B. Fisher, Esq.

HOMELAND TOWERS

June 9, 2021

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. 488 – Homeland Towers LLC (HT) and New Cingular Wireless PCS, LLC d/b/a AT&T Development & Management Plan- Tower Facility at 93 Richards Road, Kent CT (CT757).

Dear Presiding Officer 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. 488.

Tower, Compound & Other Equipment

Enclosed are fifteen (15) sets of 11"x17" Development & Management Plans dated 6/9/2021 prepared by All Points Technology Corporation. Two full-sized sets of the Development & Management Plans are also enclosed. These plans are being filed in accordance with the Council's Decision and Order dated December 3, 2020 ("Decision and Order"). The D&M Plan incorporates a 135' tall monopole as provided for in the Siting Council's Decision and Order in this Docket. AT&T will initially install six (6) panel antennas, nine (9) RRH's and two (2) squid boxes at a centerline of 131' above grade level ("AGL"). The monopole will be painted a two-tone color scheme, brown-gray (PL Shadow Beige) #2257) on bottom and gray-blue (PL White Smoke #1201) on the top. Antennas and mounting equipment will be painted the same color as the upper portion of the tower. All plantings will be warranted for three years. As shown on Sheet A-1 of the enclosed D&M Plans, the monopole is designed with a yield point at 51' AGL to ensure that the tower setback radius remains within the property boundaries. Attached please also find a geotechnical study dated December 31, 2020 prepared by Delta Oaks Group as well as a structural design report for the tower and foundation dated April 28, 2021 prepared by Ambor Structures. Specifications for AT&T's antennas and generator are also provided along with color swatches for the two-tone tower.

The proposed D&M Plan also includes construction plans for the site clearing, drainage, and erosion and sedimentation control measures consistent with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control as amended.

Per 2(a) of the Decision and Order, attached is a letter dated June 9, 2021 from AT&T stating their firm commitment to install their associated wireless equipment at the facility upon completion of 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. The supervisor for all construction related matters on this project is Ray Vergati with Homeland Towers, LLC located at 9 Harmony Street, 2nd Floor, Danbury, CT 06810 and can be reached by telephone at 203-297-6345.

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: Honorable Jean Speck, First Selectman, Town of Kent
Manny Vicente, Homeland Towers LLC
Brian Leyden, AT&T
Scott Chasse, P.E., APT
Lucia Chiocchio, Esq., Cuddy & Feder LLP

June 9, 2021

Re: Connecticut Siting Council Docket No. 488
Homeland Towers, LLC and New Cingular Wireless PCS, LLC d/b/a AT&T
Certificate of Environmental Compatibility and Public Need for the construction, maintenance, and operation of a telecommunications facility located at 93 Richards Road, Kent, Connecticut
AT&T's Use of the Approved Facility

Dear Ms. Bachman:

In accordance with condition 2a of the Siting Council's Decision and Order ("D&O") in Docket No. 488, this letter serves as AT&T's commitment to install and operate its wireless facility on the approved monopole facility upon completion of construction by Homeland Towers, LLC. AT&T anticipates that its Kent facility will be operational within the eighteen-month timeframe included in the D&O.

Thank you for your consideration of this information.

Very truly yours,

Brian Leyden

Sr. Manager, Real Estate & Construction
AT&T Mobility New England

cc: Homeland Towers LLC
SAI
Lucia Chiocchio, Esq

AT&T Mobility
550 Cochituate Road
Suites 13 & 14
Framingham, MA 01701

GEOTECHNICAL INVESTIGATION REPORT

December 31, 2020

Prepared For:

InSite Wireless Group, LLC

Kent
CT757
Proposed 154-Foot Monopole Tower
93 Richards Road, Kent (Litchfield County), Connecticut 06785
Latitude N 41° 42' 31.0" Longitude W 73° 25' 13.7"

Delta Oaks Group Project GEO20-07686-08
Revision 0

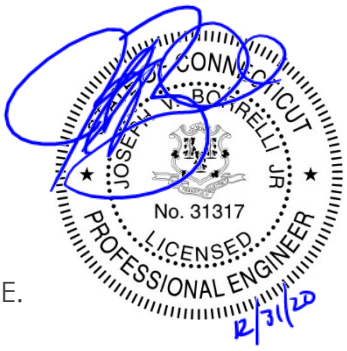
geotech@deltaoaksgroup.com

Performed By:

Justin Brosseau, E.I.

Reviewed By:

Joseph V. Borrelli, Jr., P.E.



INTRODUCTION

This geotechnical investigation report has been completed for the proposed 154-foot monopole tower located at 93 Richards Road in Kent (Litchfield County), Connecticut. The purpose of this investigation was to provide engineering recommendations and subsurface condition data at the proposed tower location. A geotechnical engineering interpretation of the collected information was completed and utilized to suggest design parameters regarding the adequacy of the structure's proposed foundation capacity under various loading conditions. This report provides the scope of the geotechnical investigation; geologic material identification; results of the geotechnical laboratory testing; and design parameter recommendations for use in the design of the telecommunication facility's foundation and site development.

SITE CONDITION SUMMARY

The proposed tower and compound are located in a clearing on a heavily wooded hill exhibiting a gradually sloping topography from the east to west across the tower compound and subject property.

REFERENCES

- Survey Drawings, prepared by All-Points Technology Corporation, dated February 5, 2020
- TIA Standard (TIA-222-G), dated August 2005

SUBSURFACE FIELD INVESTIGATION SUMMARY

The subsurface field investigation was conducted through the advancement of three mechanical soil test borings to the auger refusal depth of 3.0, 3.0, and 4.5 feet bgs in borings B-1 through B-3, respectively. Samples were obtained at selected intervals in accordance with ASTM D 1586. The sampling was conducted at the staked centerline of the proposed tower. Upon encountering auger refusal 5.0 feet of rock coring was conducted in accordance with ASTM D 2113. Soil and rock samples were transported to our laboratory and classified by a geotechnical engineer in accordance with ASTM D 2487. A detailed breakdown of the material encountered in our subsurface field investigation can be found in the boring logs presented in the Appendix of this report.

Additional testing was performed on selected samples in accordance with ASTM D 7012 (Unconfined Compressive Strength – Rock). Laboratory data can be found in the Appendix of this report.

A boring plan portraying the spatial location of the boring in relation to the proposed tower, tower compound and immediate surrounding area can be found in the Appendix.

SUBSURFACE CONDITION SUMMARY

The following provides a general overview of the site's subsurface conditions based on the data obtained during our field investigation.

FILL

Topsoil was encountered during the subsurface field investigation from the existing ground surface at a depth of 0.7 feet bgs in boring B-1 and 0.3 feet bgs in borings B-2 and B-3.

SOIL

The residual soil encountered in the subsurface field investigation began at a depth of 0.7 feet bgs in boring B-1 and 0.3 feet bgs in borings B-2 and B-3 and consisted of silty sand. The materials ranged from a very loose to very dense relative density.

Auger advancement refusal was encountered during the subsurface field investigation at a depth of 3.0, 3.0, and 4.5 feet bgs in borings B-1 through B-3, respectively.

ROCK

Rock was encountered during the subsurface investigation at a depth of 3.0 feet bgs in boring B-2. The rock can be described as highly to moderately fractured, moderately weathered, hard gneiss.

SUBSURFACE WATER

At the time of drilling, subsurface water was not encountered during the subsurface investigation. However, subsurface water elevations can fluctuate throughout the year due to variations in climate, hydraulic parameters, nearby construction activity and other factors.

FROST PENETRATION

The frost penetration depth for Litchfield County, Connecticut is 40 inches (3.3 feet).

CORROSIVITY

Soil resistivity was performed in accordance with ASTM G187 with a test result of 171,000 ohms-cm.

FOUNDATION DESIGN SUMMARY

In consideration of the provided tower parameters and the determined soil characteristics, Delta Oaks Group recommends utilizing a shallow foundation and/or drilled shaft foundation for the proposed structure. The strength parameters presented in the following sections can be utilized for design of the foundation.

GENERAL SUBSURFACE STRENGTH PARAMETERS

Boring	Depth (bgs)	USCS	Moist/Buoyant Unit Weight (pcf)	Phi Angle (degrees)	Cohesion (psf)
B-1	0.0 – 0.7	TOPSOIL	105	0	0
	0.7 – 3.0	SM	130	40	0

Boring	Depth (bgs)	USCS	Moist/Buoyant Unit Weight (pcf)	Phi Angle (degrees)	Cohesion (psf)
B-2	0.0 – 0.3	TOPSOIL	105	0	0
	0.3 – 3.0	SM	130	40	0
	3.0 – 8.0	GNEISS	140	0	12,000

Boring	Depth (bgs)	USCS	Moist/Buoyant Unit Weight (pcf)	Phi Angle (degrees)	Cohesion (psf)
B-3	0.0 – 0.3	TOPSOIL	105	0	0
	0.3 – 2.0	SM	105	29	0
	2.0 – 4.5	SM	130	40	0

- The unit weight provided assumes overburden soil was compacted to a minimum of 95% of the maximum dry density as obtained by the standard Proctor method (ASTM D 698) and maintained a moisture content within 3 percent of optimum
- The values provided for phi angle and cohesion should be considered ultimate.

SUBSURFACE STRENGTH PARAMETERS – SHALLOW FOUNDATION

Boring	Dimensions (feet)	Depth (feet bgs)	Net Ultimate Bearing Capacity (psf)
B-2	Greater than 5.0 x 5.0	Greater than 3.3	30,000

- Delta Oaks Group recommends the foundation bear a minimum of 3.3 feet bgs or entirely on bedrock.
- A sliding friction factor of 0.35 can be utilized along the base of the proposed foundation.
- The bearing capacity can be increased by 1/3 for transient loading.
- An Ultimate Passive Pressure Table with a reduction due to frost penetration to a depth of 3.3 feet bgs is presented on the following page.
- Delta Oaks Group recommends an appropriate factor of safety be utilized for the design of the foundation.

ULTIMATE PASSIVE PRESSURE VS. DEPTH - TOWER FOUNDATION

Soil Layers (feet)		Moist Unit Weight	Phi Angle	Cohesion	PV	KP	Ph
Top	0.0	105	0	0	0.00	1.00	0.00
Bottom	0.3	105	0	0	31.50	1.00	15.75
Top	0.3	130	40	0	31.50	4.60	72.43
Bottom	3.0	130	40	0	382.50	4.60	879.54
Top	3.0	140	0	12000	382.50	1.00	12191.25
Bottom	3.3	140	0	12000	424.50	1.00	12212.25
Top	3.3	140	0	12000	424.50	1.00	24424.50
Bottom	10.0	140	0	12000	1362.50	1.00	25362.50

SUBSURFACE STRENGTH PARAMETERS - DRILLED SHAFT FOUNDATION

Boring	Depth (bgs)	Net Ultimate Bearing Capacity (psf)	Ultimate Skin Friction - Compression (psf)	Ultimate Skin Friction - Uplift (psf)
B-2	0.0 – 3.3	–	–	–
	3.3 – 4.0	79,970	4,800	4,800
	4.0 – 6.0	79,950	4,800	4,800
	6.0 – 8.0	79,930	4,800	4,800

- The top 3.3 feet of soil should be ignored due to the frost penetration and the potential soil disturbance during construction.
- The bearing capacity can be increased by 1/3 for transient loading.
- The values presented assume the concrete is cast-in-place against earth walls and any casing utilized during construction of the foundation was removed.
- Delta Oaks Group recommends an appropriate factor of safety be utilized for the design of the foundation.

SUBSURFACE STRENGTH PARAMETERS – SUPPORT STRUCTURE FOUNDATION

Boring	Depth (bgs)	Net Ultimate Bearing Capacity (psf)	Minimum Design Footing Width (ft)	Modulus of Subgrade Reaction (pci)
B-3	3.5	15,000	2.0	225

- Delta Oaks Group recommends utilizing a slab on grade in conjunction with continuous perimeter footings that bear on residual soil or properly compacted structural fill placed in accordance with the recommendations provided in the *CONSTRUCTION* section of this report.
- The slab on grade should be properly reinforced to prevent concrete cracking and shrinkage.
- The foundation should bear a minimum of 3.5 feet bgs or entirely on bedrock.
- A sliding friction factor of 0.35 can be utilized along the base of the proposed foundation.
- An Ultimate Passive Pressure Table is presented on the following page. An appropriate reduction should be considered in accordance with local building code frost penetration depth.
- Delta Oaks Group recommends an appropriate factor of safety be utilized for the design of the foundation.

ULTIMATE PASSIVE PRESSURE VS. DEPTH – SUPPORT STRUCTURE FOUNDATION

Soil Layers (feet)		Moist Unit Weight	Phi Angle	Cohesion	PV	KP	Ph
Top	0.0	105	0	0	0.00	1.00	0.00
Bottom	0.3	105	0	0	31.50	1.00	15.75
Top	0.3	105	29	0	31.50	2.88	45.39
Bottom	2.0	105	29	0	210.00	2.88	302.62
Top	2.0	130	40	0	210.00	4.60	482.89
Bottom	3.3	130	40	0	379.00	4.60	871.49
Top	3.3	130	40	0	379.00	4.60	1742.99
Bottom	10.0	130	40	0	1250.00	4.60	5748.64

CONSTRUCTION

SITE DEVELOPMENT

The proposed access road and tower compound should be evaluated by a Geotechnical Engineer, or their representative, after the removal or "cutting" of the areas to design elevation but prior to the placement of any structural fill material to verify the presence of unsuitable or weak material. Unsuitable or weak materials should be undercut to a suitable base material as determined by a Geotechnical Engineer, or their representative. Backfill of any undercut area(s) should be conducted in accordance with the recommendations provided in the *STRUCTURAL FILL PLACEMENT* section of this report.

Excavations should be sloped or shored in accordance and compliance with OSHA 29 CFR Part 1926, Excavation Trench Safety Standards as well as any additional local, state and federal regulations.

STRUCTURAL FILL PLACEMENT

Structural fill materials should be verified, prior to utilization, to have a minimum unit weight of 110 pcf (pounds per cubic foot) when compacted to a minimum of 95% of its maximum dry density and within plus or minus 3 percentage points of optimum moisture. Materials utilized should not contain more than 5 percent by weight of organic matter, waste, debris or any otherwise deleterious materials. The Liquid Limit should be no greater than 40 with a Plasticity Index no greater than 20. Structural fill material should contain a maximum particle size of 4 inches with 20 percent or less of the material having a particle size between 2 and 4 inches. Backfill should be placed in thin horizontal lifts not to exceed 8 inches (loose) in large grading areas and 4 inches (loose) where small handheld or walk-behind compaction equipment will be utilized. The potential suitability of on-site materials to be utilized as fill should be evaluated by a Geotechnical Engineer, or their representative just prior to construction.

During construction structural fill placement should be monitored and tested. This should include at minimum, visual observation as well as a sufficient amount of in-place field density tests by a Geotechnical Engineer, or their representative. Materials should be compacted to a minimum of 95% of the maximum dry density as determined by ASTM D 698 (standard Proctor method). Moisture contents should be maintained to within plus or minus 3 percentage points of the optimum moisture content.

SHALLOW FOUNDATIONS

Foundation excavation(s) should be evaluated by a Geotechnical Engineer, or their representative, prior to reinforcing steel and concrete placement. This evaluation should include visual observation to verify a level bearing surface; vertical side-walls with no protrusions, sloughing or caving; and the exposed bearing surface is free of deleterious material, loose soil and standing water. Excavation dimensions should be verified and testing performed on the exposed bearing surface to verify compliance with design recommendations. Bearing testing should be conducted in accordance with ASTM STP399 (Dynamic Cone Penetrometer). A 6-inch layer of compacted crushed stone should be installed prior to reinforcing steel and concrete placement. If subsurface water is encountered during excavation dewatering methods such as sump pumps or well points may be required.

DRILLED SHAFT FOUNDATIONS

Drilled shaft foundations (caissons) are typically installed utilizing an earth auger to reach the design depth of the foundation. Specialized roller bits or core bits can be utilized to penetrate boulders or rock. The equipment utilized should have cutting teeth to result in an excavation with little or no soil smeared or caked on the excavation sides with spiral-like corrugated walls. The drilled shaft design diameter should be maintained throughout the excavation with a plumbness tolerance of 2 percent of the length and an eccentricity tolerance of 3 inches from plan location. A removable steel casing can be installed in the shaft to prevent caving of the excavation sides due to soil relaxation. Upon completion of the drilling and casing placement, loose soils and subsurface water greater than 3-inches in depth should be removed from the bottom of the excavation for the "dry" installation method. The drilled shaft installation should be evaluated by a Geotechnical Engineer, or their representative, to verify suitable end bearing conditions, design diameter and bottom cleanliness. The evaluation should be conducted immediately prior to as well as during concrete placement operations.

The drilled shaft should be concreted as soon as reasonably practical after excavation to reduce the deterioration of the supporting soils to prevent potential caving and water intrusion. A concrete mix design with a slump of 6 to 8 inches employed in conjunction with the design concrete compressive strength should be utilized for placement. Super plasticizer may be required to obtain the recommended slump range. During placement, the concrete may fall freely through the open area in the reinforcing steel cage provided it does not strike the reinforcing steel and/or the casing prior to reaching the bottom of the excavation. The removable steel casing should be extracted as concrete is placed. During steel casing removal a head of concrete should be maintained above the bottom of the casing to prevent soil and water intrusion into the concrete below the bottom of the casing.

If subsurface water is anticipated and/or weak soil layers are encountered drilled shafts are typically installed utilizing the "wet" method by excavating beneath a drilling mud slurry. The drilling mud slurry is added to the drilled shaft excavation after groundwater has been encountered and/or the sides of the excavation are observed to be caving or sloughing. Additional inspection by a Geotechnical Engineer, or their representative, during the "wet" method should consist of verifying maintenance of sufficient slurry head, monitoring the specific gravity, pH and sand content of the drilling slurry, and monitoring any changes in the depth of the excavation between initial approval and just prior to concreting.

Concrete placement utilizing the "wet" method is conducted through a tremie pipe at the bottom of the excavation with the drilling mud slurry level maintained at a minimum of 5 feet or one shaft diameter, whichever is greater, above the ground water elevation. The bottom of the tremie should be set one tremie pipe diameter above the excavation. A closure flap at the bottom of the tremie or a sliding plug introduced into the tremie before the concrete is recommended to reduce the potential contamination of the concrete by the drilling mud slurry. The bottom of the tremie must be maintained in the concrete during placement. Additional concrete should be placed through the tremie causing the slurry to overflow from the excavation in order to reduce the potential for the development of "slurry pockets" remaining in the drilled shaft.

QUALIFICATIONS

The design parameters and conclusions provided in this report have been determined in accordance with generally accepted geotechnical engineering practices and are considered applicable to a rational degree of engineering certainty based on the data available at the time of report preparation and our practice in this geographic region. All recommendations and supporting calculations were prepared based on the data available at the time of report preparation and knowledge of typical geotechnical parameters in the applicable geographic region.

The subsurface conditions used in the determination of the design recommendations contained in this report are based on interpretation of subsurface data obtained at specific boring locations. Irrespective of the thoroughness of the subsurface investigation, the potential exists that conditions between borings will differ from those at the specific boring locations, that conditions are not as anticipated during the original analysis, or that the construction process has altered the soil conditions. That potential is significantly increased in locations where existing fill materials are encountered. Additionally, the nature and extent of these variations may not be evident until the commencement of construction. Therefore, a geotechnical engineer, or their representative, should observe construction practices to confirm that the site conditions do not differ from those conditions anticipated in design. If such variations are encountered, Delta Oaks Group should be contacted immediately in order to provide revisions and/or additional site exploration as necessary

Samples obtained during our subsurface field investigation will be retained by Delta Oaks Group for a period of 30 days unless otherwise instructed by InSite Wireless Group, LLC. No warranty, expressed or implied, is presented.

Delta Oaks Group appreciates the opportunity to be of service for this Geotechnical Investigation Report. Please do not hesitate to contact Delta Oaks Group with any questions or should you require additional service on this project.

APPENDIX

BORING PLAN


B-3
B-2
B-1
1343.7
1342.7
1342.6
CONC. PIT
STONE DRIVE
STONE PAD
MAIN STORAGE BUILDING BARN
BENCHMARK SPIKE ON GROUND ELEV.=1343.08
BIT PAD

PROJECT NAME Kent (CT757)

CLIENT Insite Wireless

PROJECT NUMBER GEO20-07686-08

Boring No.: B-1

PROJECT LOCATION 93 Richards Road, Kent (Litchfield County) Kent, Connecticut 06785

DATE DRILLED : 12/28/2020

DRILLING METHOD : Hollow Stem Auger

GROUND ELEVATION : 1353

BORING DEPTH (ft) : 3

GROUND WATER LEVELS:

AT TIME OF DRILLING : --- Not Encountered

AT END OF DRILLING : --- Not Encountered

AFTER DRILLING : --- Not Encountered

DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE	MATERIAL CLASSIFICATION	Pocket Penetrometer (tsf)	BLOWS 1st	BLOWS 2nd	BLOWS 3rd	N VALUE	▲ SPT N VALUE ▲ 10 20 30 40 50 60 70 80 90
0.0	TOPSOIL				8	17	50/2"	100	
	SILTY SAND (SM), very dense, brown, with g ravel, trace clay, moist		SM						
	-- Brown and gray, partially weathered rock								
2.5					50/3"			100	
	Refusal at 3.0 feet. Bottom of borehole at 3.0 feet.								
5.0									
7.5									
10.0									

PROJECT NAME Kent (CT757)

CLIENT Insite Wireless

PROJECT NUMBER GEO20-07686-08

Boring No.: B-2

PROJECT LOCATION 93 Richards Road, Kent (Litchfield County) Kent, Connecticut 06785

DATE DRILLED : 12/28/2020

DRILLING METHOD : Hollow Stem Auger & Rock Coring

GROUND ELEVATION : 1353

BORING DEPTH (ft) : 8

GROUND WATER LEVELS:

AT TIME OF DRILLING : --- Not Encountered

AT END OF DRILLING : --- Not Encountered

AFTER DRILLING : --- Not Encountered

DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE	MATERIAL CLASSIFICATION	Pocket Penetrometer (tsf)	BLOWS 1st	BLOWS 2nd	BLOWS 3rd	N VALUE
0.0	TOPSOIL							
	SILTY SAND (SM), very dense, brown, trace clay and gravel, moist		SM		1	1	50/3"	100
2.5	-- Dark gray, with gravel, no clay				34	50/4"		100
	GNEISS, gray, highly to moderately fractured, moderately weathered, hard				REC 98%	RQD 85%		
5.0	COMPRESSIVE STRENGTH 6,030 psi @ 4.5'							
7.5	COMPRESSIVE STRENGTH 5,510 psi @ 6.5'							
	Refusal at 3.0 feet. Bottom of borehole at 8.0 feet.							
10.0								

▲ SPT N VALUE ▲

10 20 30 40 50 60 70 80 90

PROJECT NAME Kent (CT757)

CLIENT Insite Wireless

PROJECT NUMBER GEO20-07686-08

Boring No.: B-3

PROJECT LOCATION 93 Richards Road, Kent (Litchfield County) Kent, Connecticut 06785

DATE DRILLED : 12/28/2020

DRILLING METHOD : Hollow Stem Auger

GROUND ELEVATION : 1353

BORING DEPTH (ft) : 4.5

GROUND WATER LEVELS:

AT TIME OF DRILLING : --- Not Encountered

AT END OF DRILLING : --- Not Encountered

AFTER DRILLING : --- Not Encountered

DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE	MATERIAL CLASSIFICATION	Pocket Penetrometer (tsf)	BLOWS 1st	BLOWS 2nd	BLOWS 3rd	N VALUE
0.0	TOPSOIL							
	SILTY SAND (SM), very loose, brown, trace clay and gravel, moist		SM		1	1	3	4
	-- Very dense, tan, with gravel, no clay				8	27	33	60
2.5					50/3"			100
5.0	Refusal at 4.5 feet. Bottom of borehole at 4.5 feet.							
7.5								
10.0								

▲ SPT N VALUE ▲

10 20 30 40 50 60 70 80 90

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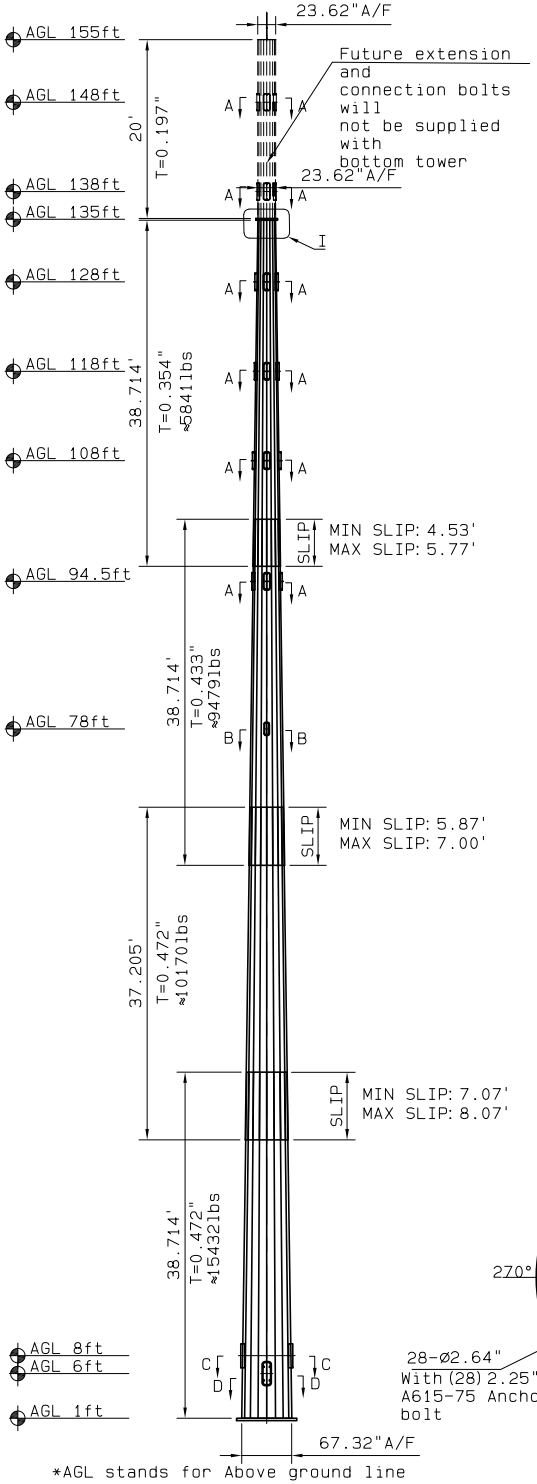
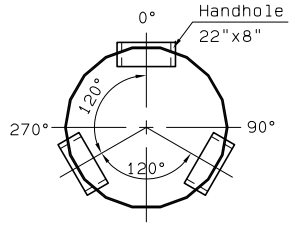
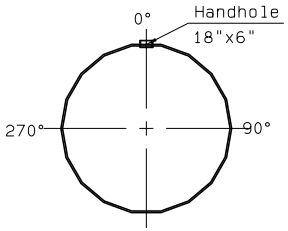
QUOTATION #

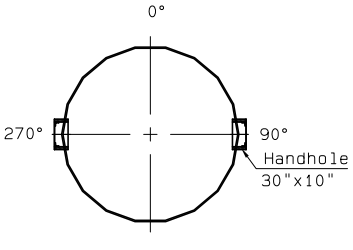




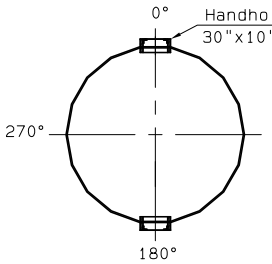
A–A



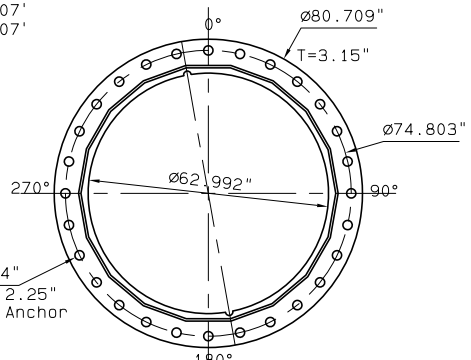
B–B



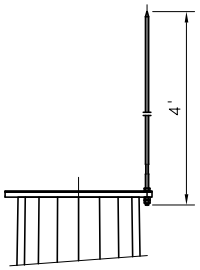
C–C



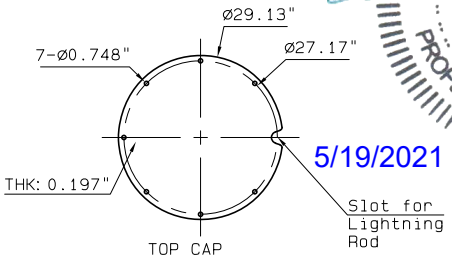
D–D



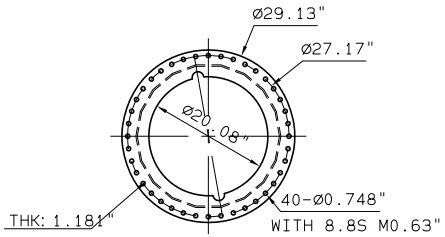
BASEPLATE



DETAIL I



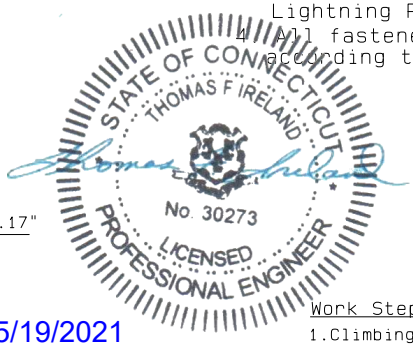
TOP CAP

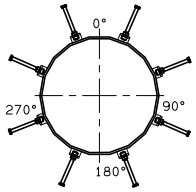


TOP FLANGE

Tower Design Notes:

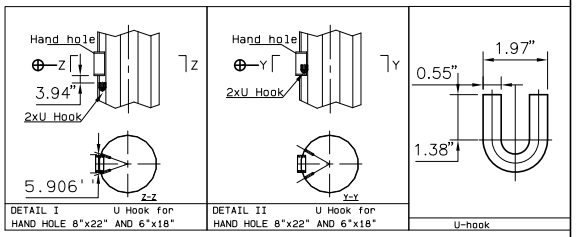
1. Material:
Pole shaft: ASTM A572 GR65
Baseplate: GR50 or Q345B; Top Flange: Q235B
2. Pole section has 18 sides
3. Finished: Galvanizing per ASTM A123
Lightning Rod will be copper-clad
4. All fasteners will be with matric unit according to Chinese standard GB 5783/5782.



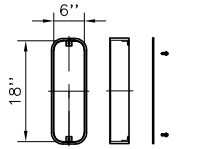


Work Steps and Climbing System Detail

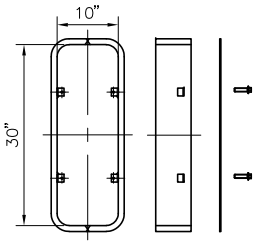
1. Climbing System is centered at 40 Degrees -detail found on separate drawing.
2. Working steps are placed ~55''-67'' below the appurtenance access center. Extra step bolts are placed~ 71''above working working steps for convenience.
3. Working steps (6~8) at the same elevation may not be evenly spaced.



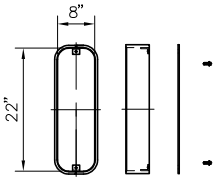
1. U Hook use detail I as priority, if conflicts with slip joint, then use detail II.



Handhole-18"x6"



Handhole 30"x10"



Handhole-22"x8"

Please refer to separate drawing for step bolts with safety system

Site No.: CT757

Site name: Kent

Site Coordinates: 41.721228°,-73.427844°

Site Address: 93 Richards Road, Kent, CT

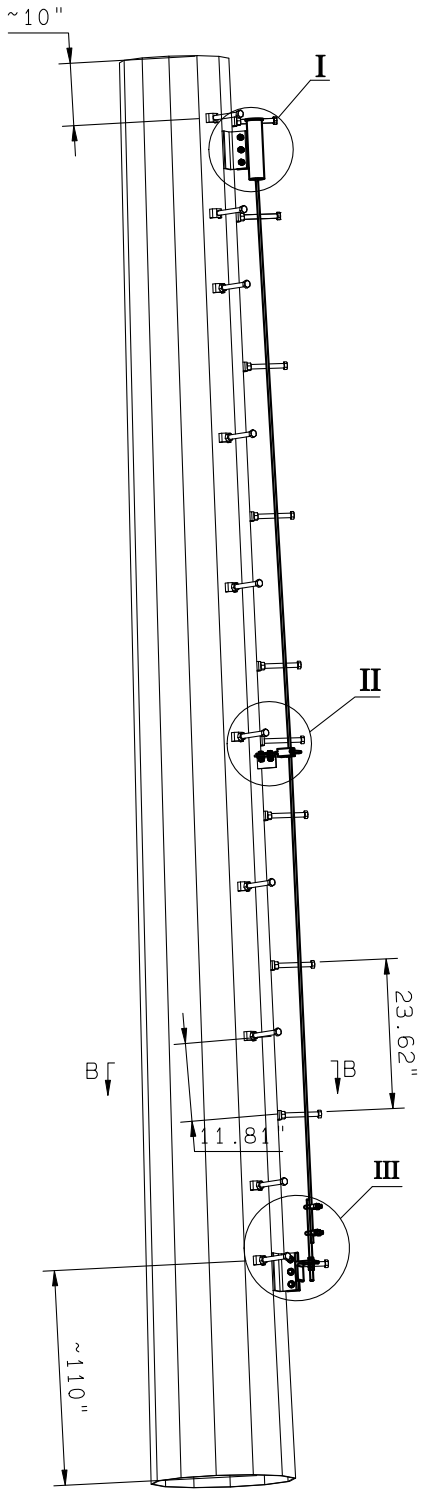
NO	PART NO.	DESCRIPTION	WEIGHT	QTY
7		Handhole 18"x6"		1
6		Lightning rod		1
5		Safety Device		TBD
4		Step Bolts		1
3		Handhole 22"x8"		12
2		Hand Hole 30"x10"		4
1		Pole		1

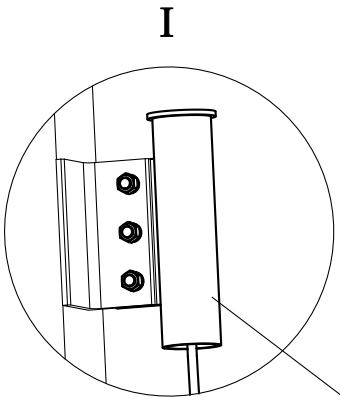
AMBOR Amber Structures
amborstructures.com

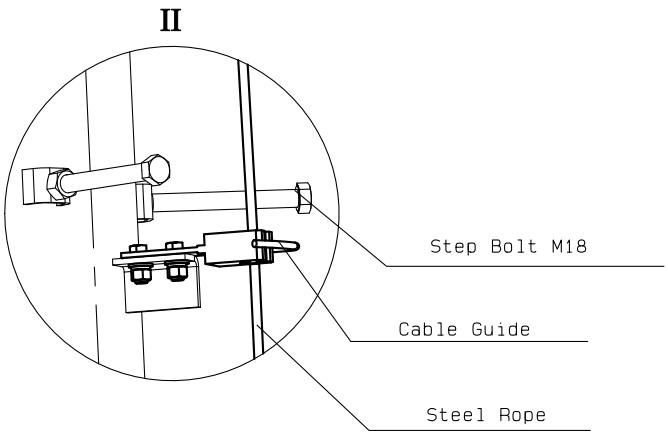
CLIENT	Homeland Towers
TITLE	135ft of 155ft.114mph TIA H

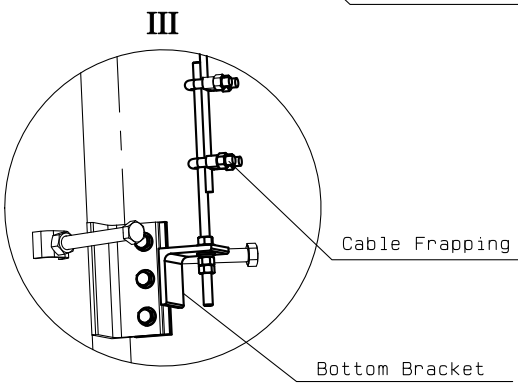
REV	ID	DATE	REVISION DESCRIPTION
A			

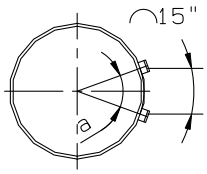
DRAWN	HY	2021/4/28	MATERIAL		MANUFACTURING ORDER	
ENGR	ZHJ	2021/4/28	THK (mm)			
CHECKED	ZHJ	2021/4/28	WT (kg)			
SPECIFICATIONS			SCALE		VERSION:	B











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.

Site No.: CT757

Site name: Kent

Site Coordinates: 41.721228°, -73.427844°

Site Address: 93 Richards Road, Kent, CT

STATE OF CONNECTICUT
THOMAS F IRELAND
No. 30273
LICENSED
PROFESSIONAL ENGINEER

5/19/2021

AMBOR Ambor Structures
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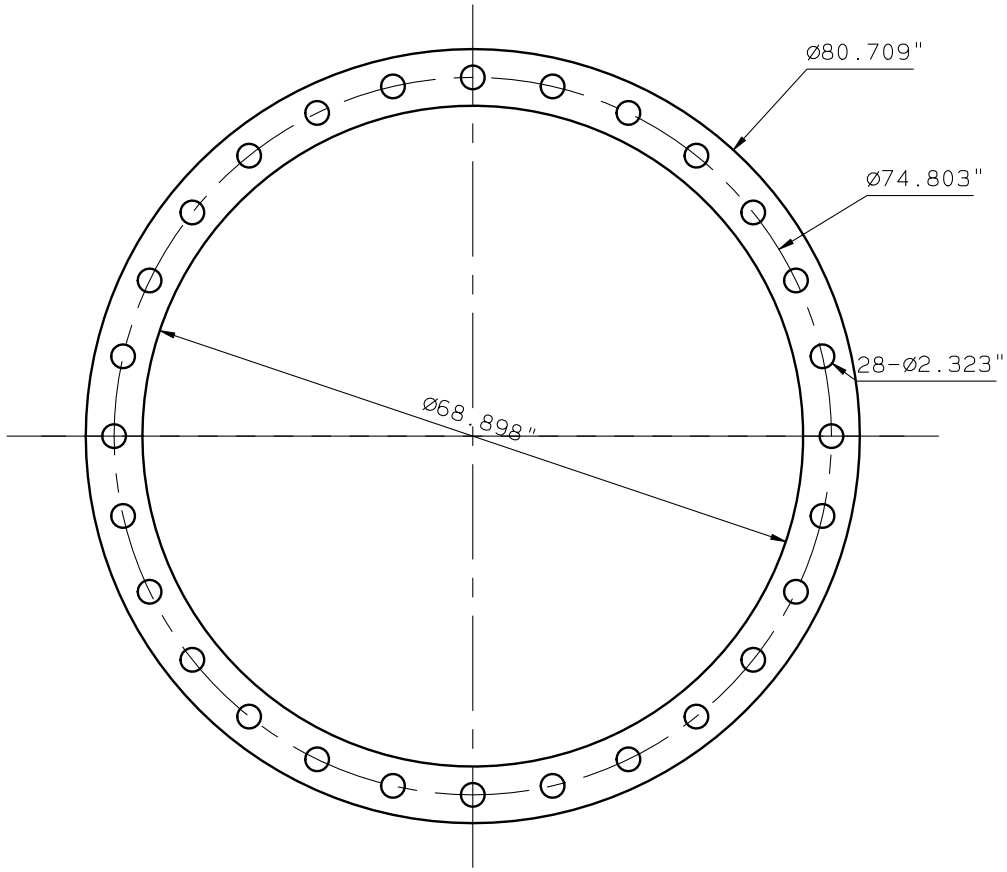
CLIENT	
TITLE	Step Bolts with Safety System

			DRAWN			MATERIAL		MANUFACTURING ORDER
			ENGR			THK (mm)		
			CHECKED			WT (kg)		
REV	ID	DATE	REVISION DESCRIPTION	SPECIFICATIONS		SCALE		P/N:

C15019070B
QUOTATION #



STATE OF CONNECTICUT
THOMAS F IRELAND
No. 30273
LICENSED
PROFESSIONAL ENGINEER

5/19/2021

Site No.: CT757
Site name: Kent
Thickness of top template: 3/8'' A36 or above
Thickness of bottom template: 1/2'' A36 or above

AMBOR Ambor Structures
amborstructures.com

CLIENT	Homeland Towers
TITLE	Template for 135ft of 155ft.114mph TIA H

REV	ID	DATE	REVISION DESCRIPTION						
				DRAWN	HY	2021/4/16	MATERIAL		MANUFACTURING ORDER
				ENGR	ZHJ	2021/4/16	THK (mm)		
A				CHECKED	ZHJ	2021/4/16	WT (kg)		VERSION: A
				SPECIFICATIONS			SCALE		

GENERAL NOTES:

1. FOUNDATION DESIGN PER 2018 CONNECTICUT STATE BUILDING CODE (2015 IBC) AND PER SOIL REPORT BY DELTA OAKS GROUP PROJECT NO. GEO20-07686-08 DATED DECEMBER 31, 2020.

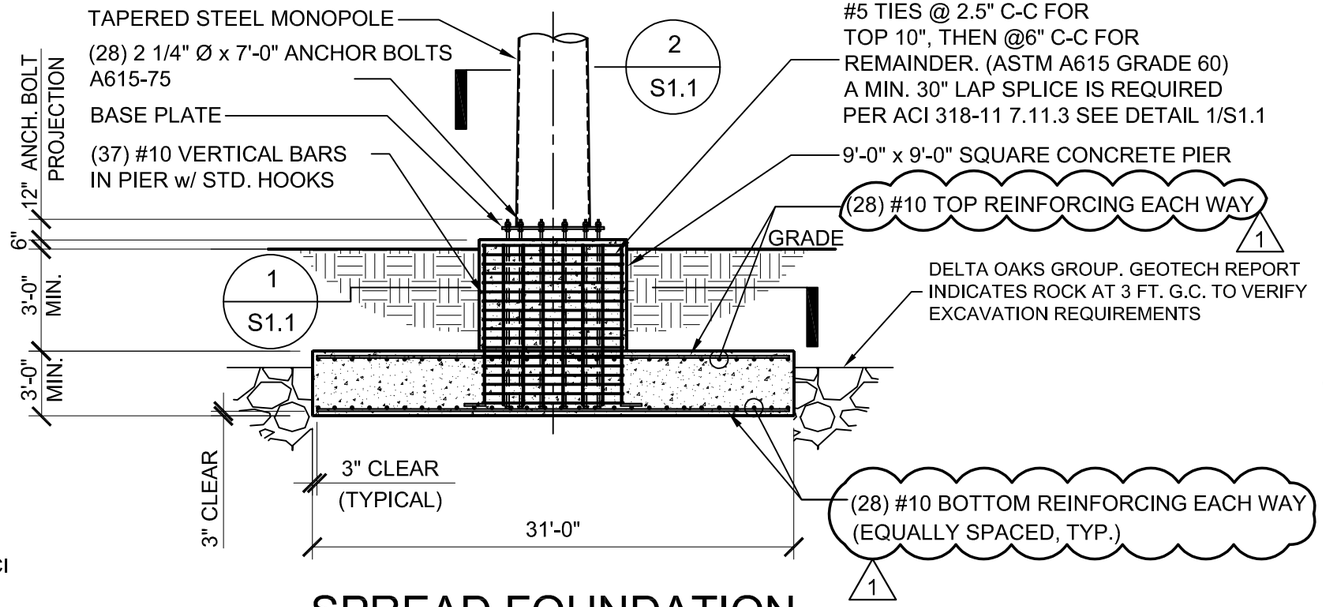
SOIL PARAMETERS:

TOP (FT)	BOT. (FT)	UNIT WT. (PCF)	ULTIMATE BEARING (PSF)	COHESION (PSF)	FRICTION ANGLE[1] (DEG.)
0.0	0.3	105*	-	0	0
0.3	3.0	130*	-	0	0
3.0	3.3	140*	-	0	0
3.3	10.0	140	30,000	12,000	0

* NOTE: BACKFILL REQUIREMENTS PER GEOTECH ARE 110 PCF. VALUES SHOWN ARE AS MEASURED IN FIELD PER GEOTECH REPORT.

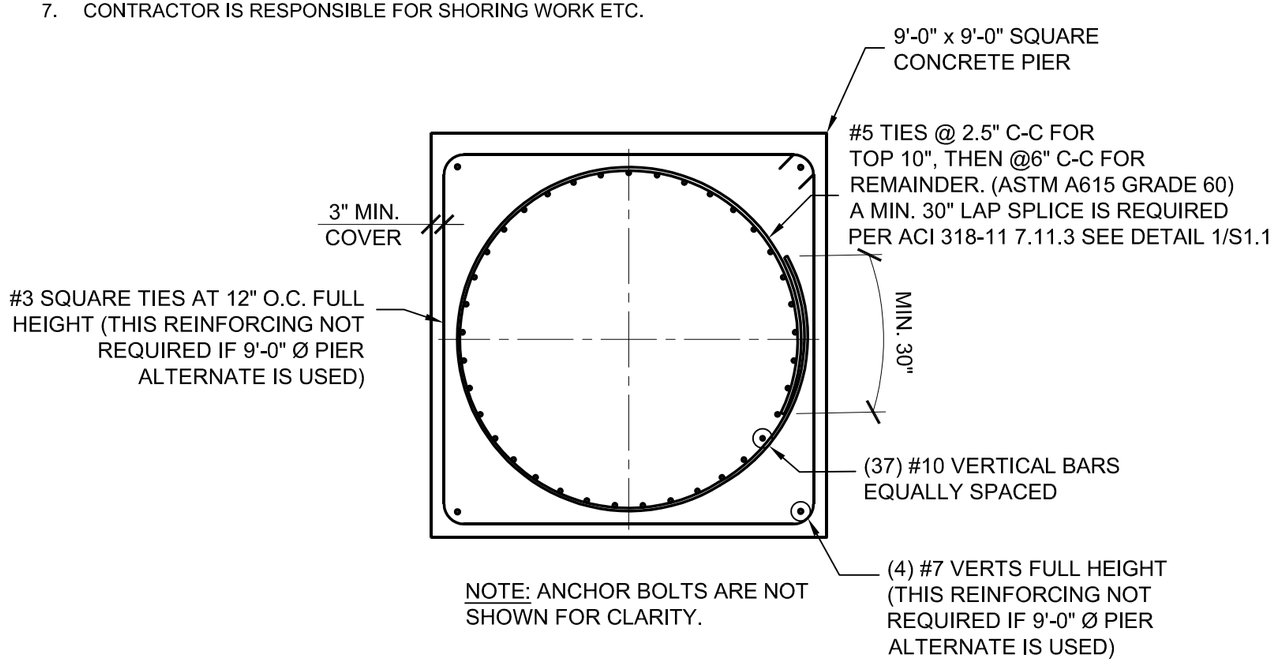
1

2. CONCRETE SHALL BE 4500 P.S.I. (MINIMUM) @ 28 DAYS COMPRESSIVE STRENGTH.
3. FOUNDATION INSTALLATION SHALL BE OBSERVED BY AN ENGINEER FROM DELTA OAKS GROUP.
4. MAT/PIER FOUNDATION INSTALLATION SHALL BE IN ACCORDANCE WITH ACI 318 LATEST EDITION.
5. ALL REINFORCING SHALL BE A.S.T.M. A615 GRADE 60.
6. ESCAVATED FILL SHALL NOT BE USED FOR BEARING NOR FOR BACKFILL. DESIGN OF PAD AND PIER FOUNDATION REQUIRES ENGINEERED FILL. REFER TO SOIL REPORT FOR PROPER PREPARATION AND INSTALLATION REQUIREMENTS.
7. CONTRACTOR IS RESPONSIBLE FOR SHORING WORK ETC.



SPREAD FOUNDATION

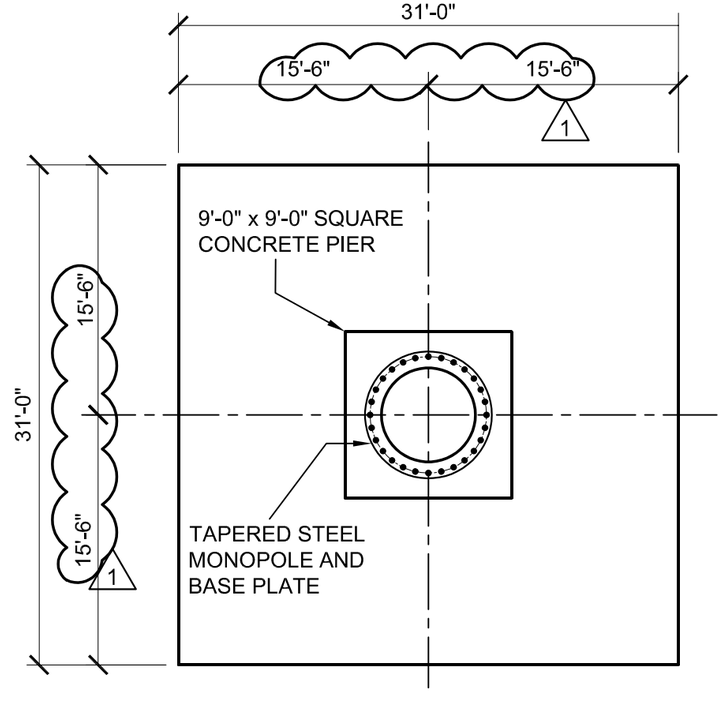
NOT TO SCALE



SECTION

NOT TO SCALE

1 / S1.1



SECTION

NOT TO SCALE

2 / S1.1

AMBER STRUCTURES

bennett&pless

Experience Structural Expertise
Atlanta, Georgia • Chattanooga, Tennessee
Boca Raton, Florida

750 Park of Commerce Dr., Suite 200
Boca Raton, Florida 33487
Tel 561 282 2676

B & P Job Number 21.03.008.007

STATE OF CONNECTICUT · THOMAS F IRELAND · No. 30273 · LICENSED PROFESSIONAL ENGINEER

5/19/2021

Revisions:

NO:	DESCRIPTION:	DATE:
1	Bldg Dept Cmts	5/19/21

DATE: 04/30/2021

SITE NAME (LOCATION): CT 757 KENT
93 RICHARDS ROAD, KENT, CT 06785

JOB NAME: MONOPINE CELL TOWER - FOUNDATION DESIGN

DRAWING TITLE: SPREAD FOUNDATION DETAIL AND SECTION

SCALE: NOT TO SCALE

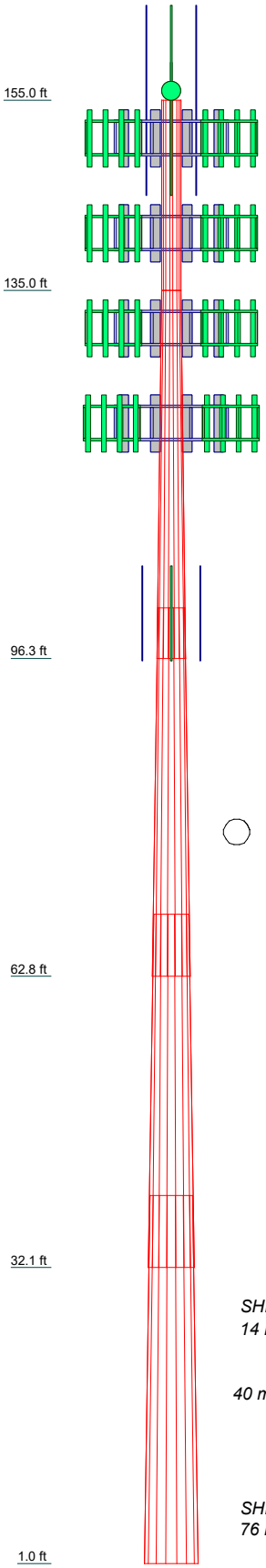
REVIEWED BY: TFI

DRAWN BY: MH

SHEET NUMBER:

S-1.1

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	20.000	18	0.197		23.622	23.622		1.0
2	38.714	18	0.354	5.269	23.622	36.972		4.4
3	38.714	18	0.433	6.499	34.447	47.799	A572-65	7.4
4	37.205	18	0.472	7.578	44.691	57.524		9.6
5	38.714	18	0.472		53.965	67.323		11.9
								34.3



ALL REACTIONS ARE FACTORED

AXIAL 78 K

SHEAR 14 K *MOMENT 1510 kip-ft*

TORQUE 0 kip-ft
40 mph WIND - 1.000 in ICE

AXIAL 62 K

SHEAR 76 K *MOMENT 8646 kip-ft*

TORQUE 0 kip-ft
REACTIONS - 114 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Microwave Mount	156	200 sq ft	141
2ft Dish	156	150 sq ft	131
20' Whip	155	150 sq ft	121
20' Whip	155	10' Whip	101
20' Whip	155	10' Whip	101
4' Lignting Rod	155	10' Whip	101
200 sq ft	151		

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Litchfield County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-H Standard.
3. Tower designed for a 114 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 40 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 5 with Crest Height of 400.000 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. Top of baseplate is 1ft AGL.
11. TOWER RATING: 97.8%

STATE OF CONNECTICUT
THOMAS F IRELAND
No. 30273
LICENSED PROFESSIONAL ENGINEER

5/19/2021

Bennett & Pless
750 Park of Commerce Blvd. Ste 200
Boca Raton
Phone: (561) 452-3316
FAX:
Experience Structural Expertise

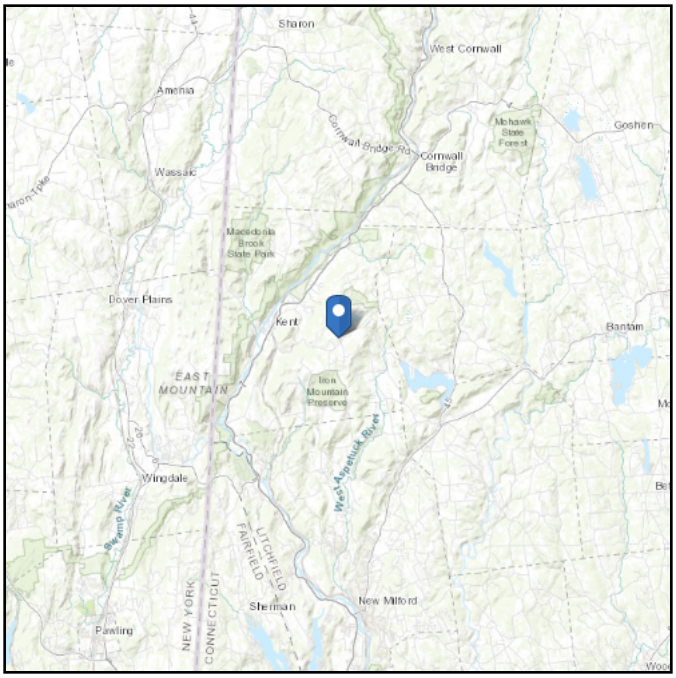
Job:	***135ft of 155ft.114mph TIA-H***		
Project:	***CT757 Kent***		
Client: Insite	Drawn by: jbozzetto		App'd:
Code: TIA-222-H	Date: 05/19/21		Scale: NTS
Path:			Dwg No. E-1

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: 41.721228
Longitude: -73.427844



Wind

Results:

Wind Speed:	114 Vmph
10-year MRI	75 Vmph
25-year MRI	84 Vmph
50-year MRI	89 Vmph
100-year MRI	95 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:	Fri Apr 30 2021

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.

Ice

Results:

Ice Thickness:	1.00 in.
Concurrent Temperature:	15 F
Gust Speed:	40 mph
Data Source:	Standard ASCE/SEI 7-16, Figs. 10-2 through 10-8
Date Accessed:	Fri Apr 30 2021

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.

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 Litchfield County, Connecticut.
Tower base elevation above sea level: 1354.000 ft.
Basic wind speed of 114 mph.
Risk Category II.
Exposure Category C.
Crest Height: 400.000 ft.
Rigorous Topographic Factor Procedure for wind speed-up calculations is used.
Topographic Feature: Flat Topped Hill.
Slope Distance L: 1900.000 ft.
Distance from Crest x: 0.000 ft.
Horizontal Distance Downwind: No.
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 40 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..
Top of baseplate is 1ft AGL..
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	155.000-135.000	20.000	0.00	18	23.622	23.622	0.197	0.787	A572-65 (65 ksi)
L2	135.000-96.286	38.714	5.27	18	23.622	36.972	0.354	1.417	A572-65 (65 ksi)
L3	96.286-62.841	38.714	6.50	18	34.447	47.799	0.433	1.732	A572-65 (65 ksi)
L4	62.841-32.136	37.205	7.58	18	44.691	57.524	0.472	1.890	A572-65 (65 ksi)
L5	32.136-1.000	38.714		18	53.965	67.323	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	23.956	14.636	1014.681	8.316	12.000	84.557	2030.697	7.319	3.811	19.36
	23.956	14.636	1014.681	8.316	12.000	84.557	2030.697	7.319	3.811	19.36
L2	23.932	26.168	1789.842	8.260	12.000	149.154	3582.040	13.086	3.534	9.973
	37.488	41.182	6976.559	12.999	18.782	371.449	13962.299	20.595	5.884	16.605
L3	36.757	46.754	6833.843	12.075	17.499	390.529	13676.678	23.382	5.300	12.239
	48.470	65.108	18454.722	16.815	24.282	760.017	36933.728	32.560	7.650	17.666
L4	47.584	66.308	16380.185	15.698	22.703	721.491	32781.923	33.160	7.034	14.889
	58.338	85.550	35179.193	20.253	29.222	1203.860	70404.675	42.783	9.293	19.669
L5	57.380	80.214	28998.276	18.990	27.414	1057.782	58034.708	40.114	8.666	18.344
	68.289	100.244	56598.363	23.732	34.200	1654.923	113271.199	50.132	11.017	23.32

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 155.000-135.000				1	1	1			
L2 135.000-96.286				1	1	1			
L3 96.286-62.841				1	1	1			
L4 62.841-32.136				1	1	1			
L5 32.136-1.000				1	1	1			

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	155.000 - 5.000	4	No Ice	0.000	0.00
							1/2" Ice	0.000	0.00
							1" Ice	0.000	0.00
LDF-50A (1 5/8 FOAM)	C	No	Yes	Inside Pole	151.000 - 5.000	14	No Ice	0.000	0.00
							1/2" Ice	0.000	0.00
							1" Ice	0.000	0.00
LDF-50A (1 5/8 FOAM)	C	No	Yes	Inside Pole	141.000 - 5.000	12	No Ice	0.000	0.00
							1/2" Ice	0.000	0.00
							1" Ice	0.000	0.00
LDF-50A (1 5/8 FOAM)	C	No	Yes	Inside Pole	131.000 - 5.000	16	No Ice	0.000	0.00
							1/2" Ice	0.000	0.00
							1" Ice	0.000	0.00
LDF-50A (1 5/8 FOAM)	C	No	Yes	Inside Pole	121.000 - 5.000	16	No Ice	0.000	0.00
							1/2" Ice	0.000	0.00
							1" Ice	0.000	0.00
LDF-50A (1 5/8 FOAM)	C	No	Yes	Inside Pole	101.000 - 5.000	3	No Ice	0.000	0.00
							1/2" Ice	0.000	0.00
							1" Ice	0.000	0.00
Safety line 3/8	C	No	Yes	CaAa (Out Of Face)	155.000 - 1.000	1	No Ice	0.037	0.00
							1/2" Ice	0.137	0.00
							1" Ice	0.238	0.00
Step pegs	C	No	Yes	CaAa (Out Of Face)	155.000 - 1.000	1	No Ice	0.075	0.00
							1/2" Ice	0.175	0.00
							1" Ice	0.275	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	155.000-135.000	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	2.250	0.34

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
L2	135.000-96.286	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	4.355	1.81
L3	96.286-62.841	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	3.763	1.84
L4	62.841-32.136	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	3.454	1.69
L5	32.136-1.000	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	3.503	1.50

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	155.000-135.000	A	1.332	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	12.909	0.45
L2	135.000-96.286	A	1.324	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	24.851	2.02
L3	96.286-62.841	A	1.304	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	21.469	2.02
L4	62.841-32.136	A	1.266	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	19.469	1.85
L5	32.136-1.000	A	1.166	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	19.272	1.66

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
Microwave Mount	C	None		0.00	156.000	No Ice	2.500	2.500	0.08
						1/2" Ice	0.000	0.000	0.10
						1" Ice	0.000	0.000	0.13
******									
4' Ligntning Rod	C	From Face	0.000	0.00	155.000	No Ice	0.420	0.420	0.02
			0.00			1/2" Ice	0.000	0.000	0.01
			2.00			1" Ice	0.000	0.000	0.02
20' Whip	A	From Face	2.000	0.00	155.000	No Ice	4.380	4.380	0.06
			0.00			1/2" Ice	0.000	0.000	0.08
			0.00			1" Ice	0.000	0.000	0.10
20' Whip	B	From Face	2.000	0.00	155.000	No Ice	4.380	4.380	0.06

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
			0.00			1/2" Ice	0.000	0.000	0.08
			0.00			1" Ice	0.000	0.000	0.10
20' Whip	C	From Face	2.000	0.00	155.000	No Ice	4.380	4.380	0.06
			0.00			1/2" Ice	0.000	0.000	0.08
			0.00			1" Ice	0.000	0.000	0.10
******									
200 sq ft	C	None		0.00	151.000	No Ice	200.000	200.000	2.90
						1/2" Ice	220.000	220.000	3.10
						1" Ice	240.000	240.000	3.30
******									
200 sq ft	C	None		0.00	141.000	No Ice	200.000	200.000	2.90
						1/2" Ice	220.000	220.000	3.10
						1" Ice	240.000	240.000	3.30
******									
150 sq ft	C	None		0.00	131.000	No Ice	150.000	150.000	2.20
						1/2" Ice	170.000	170.000	2.40
						1" Ice	190.000	190.000	2.60
******									
150 sq ft	C	None		0.00	121.000	No Ice	150.000	150.000	2.20
						1/2" Ice	170.000	170.000	2.40
						1" Ice	190.000	190.000	2.60
******									
10' Whip	A	From Face	2.000	0.00	101.000	No Ice	2.200	2.200	0.03
			0.00			1/2" Ice	0.000	0.000	0.05
			0.00			1" Ice	0.000	0.000	0.07
10' Whip	B	From Face	2.000	0.00	101.000	No Ice	2.200	2.200	0.03
			0.00			1/2" Ice	0.000	0.000	0.04
			0.00			1" Ice	0.000	0.000	0.05
10' Whip	C	From Face	2.000	0.00	101.000	No Ice	2.200	2.200	0.03
			0.00			1/2" Ice	0.000	0.000	0.04
			0.00			1" Ice	0.000	0.000	0.05

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
2ft Dish		Paraboloid w/Shroud (HP)	None		0.00		156.000	2.000	No Ice	3.140	0.03
									1/2" Ice	3.410	0.05
									1" Ice	3.680	0.07

Load Combinations

Comb. No.	Description
1	Dead Only

Comb. No.	Description
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	155 - 135	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-11.19	0.00	-0.02
			Max. Mx	8	-4.39	-356.24	-0.02
			Max. My	14	-4.39	0.00	-356.26

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	8	31.39	-356.24	-0.02
			Max. Vx	14	31.39	0.00	-356.26
			Max. Torque	8			-0.03
L2	135 - 96.2861	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-25.79	0.00	-0.02
			Max. Mx	8	-15.02	-1987.09	-0.02
			Max. My	14	-15.02	0.00	-1987.11
			Max. Vy	8	56.72	-1987.09	-0.02
			Max. Vx	14	56.72	0.00	-1987.11
			Max. Torque	8			-0.03
L3	96.2861 - 62.8412	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-38.79	0.08	0.02
			Max. Mx	8	-27.13	-3915.79	-0.02
			Max. My	14	-27.13	0.00	-3915.82
			Max. Vy	8	62.64	-3915.79	-0.02
			Max. Vx	14	62.64	0.00	-3915.82
			Max. Torque	8			-0.03
L4	62.8412 - 32.1358	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-54.47	0.08	0.02
			Max. Mx	8	-41.28	-5856.40	-0.02
			Max. My	14	-41.28	0.00	-5856.42
			Max. Vy	8	68.31	-5856.40	-0.02
			Max. Vx	14	68.31	0.00	-5856.42
			Max. Torque	8			-0.03
L5	32.1358 - 1	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-77.97	0.08	0.02
			Max. Mx	8	-62.45	-8645.53	-0.02
			Max. My	14	-62.45	0.00	-8645.55
			Max. Vy	8	75.60	-8645.53	-0.02
			Max. Vx	14	75.60	0.00	-8645.55
			Max. Torque	8			-0.03

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	33	77.97	0.00	-13.86
	Max. H_x	20	62.50	75.57	0.00
	Max. H_z	2	62.50	0.00	75.57
	Max. M_x	2	8645.51	0.00	75.57
	Max. M_z	8	8645.53	-75.57	0.00
	Max. Torsion	20	0.03	75.57	0.00
	Min. Vert	13	46.87	-37.78	-65.44
	Min. H_x	8	62.50	-75.57	0.00
	Min. H_z	14	62.50	0.00	-75.57
	Min. M_x	14	-8645.55	0.00	-75.57
	Min. M_z	20	-8645.53	75.57	0.00
	Min. Torsion	8	-0.03	-75.57	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	52.08	0.00	0.00	0.02	0.00	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	62.50	0.00	-75.57	-8645.51	0.00	0.00
0.9 Dead+1.0 Wind 0 deg - No Ice	46.87	0.00	-75.57	-8588.75	0.00	0.00
1.2 Dead+1.0 Wind 30 deg - No Ice	62.50	37.78	-65.44	-7487.23	-4322.77	0.02
0.9 Dead+1.0 Wind 30 deg - No Ice	46.87	37.78	-65.44	-7438.07	-4294.38	0.01
1.2 Dead+1.0 Wind 60 deg - No Ice	62.50	65.44	-37.78	-4322.74	-7487.25	0.03
0.9 Dead+1.0 Wind 60 deg - No Ice	46.87	65.44	-37.78	-4294.36	-7438.09	0.03
1.2 Dead+1.0 Wind 90 deg - No Ice	62.50	75.57	0.00	0.02	-8645.53	0.03
0.9 Dead+1.0 Wind 90 deg - No Ice	46.87	75.57	0.00	0.02	-8588.76	0.03
1.2 Dead+1.0 Wind 120 deg - No Ice	62.50	65.44	37.78	4322.79	-7487.25	0.03
0.9 Dead+1.0 Wind 120 deg - No Ice	46.87	65.44	37.78	4294.40	-7438.09	0.03
1.2 Dead+1.0 Wind 150 deg - No Ice	62.50	37.78	65.44	7487.28	-4322.77	0.02
0.9 Dead+1.0 Wind 150 deg - No Ice	46.87	37.78	65.44	7438.11	-4294.38	0.01
1.2 Dead+1.0 Wind 180 deg - No Ice	62.50	0.00	75.57	8645.55	0.00	0.00
0.9 Dead+1.0 Wind 180 deg - No Ice	46.87	0.00	75.57	8588.78	0.00	0.00
1.2 Dead+1.0 Wind 210 deg - No Ice	62.50	-37.78	65.44	7487.28	4322.77	-0.02
0.9 Dead+1.0 Wind 210 deg - No Ice	46.87	-37.78	65.44	7438.11	4294.38	-0.01
1.2 Dead+1.0 Wind 240 deg - No Ice	62.50	-65.44	37.78	4322.79	7487.25	-0.03
0.9 Dead+1.0 Wind 240 deg - No Ice	46.87	-65.44	37.78	4294.40	7438.09	-0.03
1.2 Dead+1.0 Wind 270 deg - No Ice	62.50	-75.57	0.00	0.02	8645.53	-0.03
0.9 Dead+1.0 Wind 270 deg - No Ice	46.87	-75.57	0.00	0.02	8588.76	-0.03
1.2 Dead+1.0 Wind 300 deg - No Ice	62.50	-65.44	-37.78	-4322.74	7487.25	-0.03
0.9 Dead+1.0 Wind 300 deg - No Ice	46.87	-65.44	-37.78	-4294.36	7438.09	-0.03
1.2 Dead+1.0 Wind 330 deg - No Ice	62.50	-37.78	-65.44	-7487.23	4322.77	-0.02
0.9 Dead+1.0 Wind 330 deg - No Ice	46.87	-37.78	-65.44	-7438.07	4294.38	-0.01
1.2 Dead+1.0 Ice+1.0 Temp	77.97	0.00	0.00	-0.02	0.08	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	77.97	0.00	-13.86	-1510.37	0.08	-0.00
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	77.97	6.93	-12.01	-1308.02	-755.09	-0.00
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	77.97	12.01	-6.93	-755.20	-1307.91	-0.00
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	77.97	13.86	0.00	-0.02	-1510.26	0.00
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	77.97	12.01	6.93	755.15	-1307.91	0.00

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
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	77.97	6.93	12.01	1307.97	-755.09	0.00
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	77.97	0.00	13.86	1510.32	0.08	0.00
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	77.97	-6.93	12.01	1307.97	755.25	0.00
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	77.97	-12.01	6.93	755.15	1308.08	0.00
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	77.97	-13.86	0.00	-0.02	1510.42	-0.00
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	77.97	-12.01	-6.93	-755.20	1308.08	-0.00
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	77.97	-6.93	-12.01	-1308.02	755.25	-0.00
Dead+Wind 0 deg - Service	52.08	0.00	-18.73	-2139.16	0.00	0.00
Dead+Wind 30 deg - Service	52.08	9.36	-16.22	-1852.57	-1069.59	0.00
Dead+Wind 60 deg - Service	52.08	16.22	-9.36	-1069.57	-1852.59	0.01
Dead+Wind 90 deg - Service	52.08	18.73	0.00	0.02	-2139.19	0.01
Dead+Wind 120 deg - Service	52.08	16.22	9.36	1069.61	-1852.59	0.01
Dead+Wind 150 deg - Service	52.08	9.36	16.22	1852.61	-1069.59	0.00
Dead+Wind 180 deg - Service	52.08	0.00	18.73	2139.21	0.00	0.00
Dead+Wind 210 deg - Service	52.08	-9.36	16.22	1852.61	1069.59	-0.00
Dead+Wind 240 deg - Service	52.08	-16.22	9.36	1069.61	1852.59	-0.01
Dead+Wind 270 deg - Service	52.08	-18.73	0.00	0.02	2139.19	-0.01
Dead+Wind 300 deg - Service	52.08	-16.22	-9.36	-1069.57	1852.59	-0.01
Dead+Wind 330 deg - Service	52.08	-9.36	-16.22	-1852.57	1069.59	-0.00

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.00	-52.08	0.00	0.00	52.08	0.00	0.000%
2	0.00	-62.50	-75.57	0.00	62.50	75.57	0.000%
3	0.00	-46.87	-75.57	0.00	46.87	75.57	0.000%
4	37.78	-62.50	-65.44	-37.78	62.50	65.44	0.000%
5	37.78	-46.87	-65.44	-37.78	46.87	65.44	0.000%
6	65.44	-62.50	-37.78	-65.44	62.50	37.78	0.000%
7	65.44	-46.87	-37.78	-65.44	46.87	37.78	0.000%
8	75.57	-62.50	0.00	-75.57	62.50	0.00	0.000%
9	75.57	-46.87	0.00	-75.57	46.87	0.00	0.000%
10	65.44	-62.50	37.78	-65.44	62.50	-37.78	0.000%
11	65.44	-46.87	37.78	-65.44	46.87	-37.78	0.000%
12	37.78	-62.50	65.44	-37.78	62.50	-65.44	0.000%
13	37.78	-46.87	65.44	-37.78	46.87	-65.44	0.000%
14	0.00	-62.50	75.57	0.00	62.50	-75.57	0.000%
15	0.00	-46.87	75.57	0.00	46.87	-75.57	0.000%
16	-37.78	-62.50	65.44	37.78	62.50	-65.44	0.000%
17	-37.78	-46.87	65.44	37.78	46.87	-65.44	0.000%
18	-65.44	-62.50	37.78	65.44	62.50	-37.78	0.000%
19	-65.44	-46.87	37.78	65.44	46.87	-37.78	0.000%
20	-75.57	-62.50	0.00	75.57	62.50	0.00	0.000%
21	-75.57	-46.87	0.00	75.57	46.87	0.00	0.000%
22	-65.44	-62.50	-37.78	65.44	62.50	37.78	0.000%
23	-65.44	-46.87	-37.78	65.44	46.87	37.78	0.000%
24	-37.78	-62.50	-65.44	37.78	62.50	65.44	0.000%
25	-37.78	-46.87	-65.44	37.78	46.87	65.44	0.000%
26	0.00	-77.97	0.00	0.00	77.97	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
27	0.00	-77.97	-13.86	0.00	77.97	13.86	0.000%
28	6.93	-77.97	-12.01	-6.93	77.97	12.01	0.000%
29	12.01	-77.97	-6.93	-12.01	77.97	6.93	0.000%
30	13.86	-77.97	0.00	-13.86	77.97	0.00	0.000%
31	12.01	-77.97	6.93	-12.01	77.97	-6.93	0.000%
32	6.93	-77.97	12.01	-6.93	77.97	-12.01	0.000%
33	0.00	-77.97	13.86	0.00	77.97	-13.86	0.000%
34	-6.93	-77.97	12.01	6.93	77.97	-12.01	0.000%
35	-12.01	-77.97	6.93	12.01	77.97	-6.93	0.000%
36	-13.86	-77.97	0.00	13.86	77.97	0.00	0.000%
37	-12.01	-77.97	-6.93	12.01	77.97	6.93	0.000%
38	-6.93	-77.97	-12.01	6.93	77.97	12.01	0.000%
39	0.00	-52.08	-18.73	0.00	52.08	18.73	0.000%
40	9.36	-52.08	-16.22	-9.36	52.08	16.22	0.000%
41	16.22	-52.08	-9.36	-16.22	52.08	9.36	0.000%
42	18.73	-52.08	0.00	-18.73	52.08	0.00	0.000%
43	16.22	-52.08	9.36	-16.22	52.08	-9.36	0.000%
44	9.36	-52.08	16.22	-9.36	52.08	-16.22	0.000%
45	0.00	-52.08	18.73	0.00	52.08	-18.73	0.000%
46	-9.36	-52.08	16.22	9.36	52.08	-16.22	0.000%
47	-16.22	-52.08	9.36	16.22	52.08	-9.36	0.000%
48	-18.73	-52.08	0.00	18.73	52.08	0.00	0.000%
49	-16.22	-52.08	-9.36	16.22	52.08	9.36	0.000%
50	-9.36	-52.08	-16.22	9.36	52.08	16.22	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	4	0.00000001	0.00012664
3	Yes	4	0.00000001	0.00004978
4	Yes	6	0.00000001	0.00001034
5	Yes	5	0.00000001	0.00014483
6	Yes	6	0.00000001	0.00001033
7	Yes	5	0.00000001	0.00014469
8	Yes	4	0.00000001	0.00012719
9	Yes	4	0.00000001	0.00005008
10	Yes	6	0.00000001	0.00001035
11	Yes	5	0.00000001	0.00014487
12	Yes	6	0.00000001	0.00001034
13	Yes	5	0.00000001	0.00014473
14	Yes	4	0.00000001	0.00012664
15	Yes	4	0.00000001	0.00004978
16	Yes	6	0.00000001	0.00001034
17	Yes	5	0.00000001	0.00014473
18	Yes	6	0.00000001	0.00001035
19	Yes	5	0.00000001	0.00014487
20	Yes	4	0.00000001	0.00012719
21	Yes	4	0.00000001	0.00005008
22	Yes	6	0.00000001	0.00001033
23	Yes	5	0.00000001	0.00014469
24	Yes	6	0.00000001	0.00001034
25	Yes	5	0.00000001	0.00014483
26	Yes	4	0.00000001	0.00000001
27	Yes	5	0.00000001	0.00007229

28	Yes	5	0.00000001	0.00008454
29	Yes	5	0.00000001	0.00008454
30	Yes	5	0.00000001	0.00007228
31	Yes	5	0.00000001	0.00008454
32	Yes	5	0.00000001	0.00008454
33	Yes	5	0.00000001	0.00007229
34	Yes	5	0.00000001	0.00008455
35	Yes	5	0.00000001	0.00008455
36	Yes	5	0.00000001	0.00007230
37	Yes	5	0.00000001	0.00008455
38	Yes	5	0.00000001	0.00008455
39	Yes	4	0.00000001	0.00005790
40	Yes	5	0.00000001	0.00002627
41	Yes	5	0.00000001	0.00002625
42	Yes	4	0.00000001	0.00005792
43	Yes	5	0.00000001	0.00002629
44	Yes	5	0.00000001	0.00002626
45	Yes	4	0.00000001	0.00005790
46	Yes	5	0.00000001	0.00002626
47	Yes	5	0.00000001	0.00002629
48	Yes	4	0.00000001	0.00005792
49	Yes	5	0.00000001	0.00002625
50	Yes	5	0.00000001	0.00002627

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection ft	Gov. Load Comb.	Tilt °	Twist °
L1	155 - 135	2.90	45	2.25	0.00
L2	135 - 96.2861	2.13	45	2.07	0.00
L3	101.555 - 62.8412	1.11	45	1.38	0.00
L4	69.3406 - 32.1358	0.48	45	0.82	0.00
L5	39.7139 - 1	0.15	45	0.42	0.00

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection ft	Tilt °	Twist °	Radius of Curvature ft
156.000	2ft Dish	45	2.90	2.25	0.00	12492
155.000	4' Ligntning Rod	45	2.90	2.25	0.00	12492
151.000	200 sq ft	45	2.74	2.22	0.00	12492
141.000	200 sq ft	45	2.35	2.14	0.00	4461
131.000	150 sq ft	45	1.99	2.01	0.00	3068
121.000	150 sq ft	45	1.65	1.82	0.00	2937
101.000	10' Whip	45	1.09	1.37	0.00	2752

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection ft	Gov. Load Comb.	Tilt °	Twist °
L1	155 - 135	11.68	14	9.06	0.00
L2	135 - 96.2861	8.59	14	8.36	0.00
L3	101.555 - 62.8412	4.46	14	5.59	0.00
L4	69.3406 - 32.1358	1.94	14	3.31	0.00
L5	39.7139 - 1	0.61	14	1.72	0.00

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection ft	Tilt °	Twist °	Radius of Curvature ft
156.000	2ft Dish	14	11.68	9.06	0.00	3251
155.000	4' Ligntning Rod	14	11.68	9.06	0.00	3251
151.000	200 sq ft	14	11.04	8.96	0.00	3251
141.000	200 sq ft	14	9.48	8.65	0.00	1158
131.000	150 sq ft	14	8.02	8.12	0.00	792
121.000	150 sq ft	14	6.68	7.35	0.00	752
101.000	10' Whip	14	4.41	5.54	0.00	695

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	28	2.250	158.46 243.58 0.65	3.64 6.12 0.60	32.90 45.00 0.73		Plate	0.73 ✔

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	155 - 135 (1)	TP23.622x23.622x0.197	20.000	0.000	0.0	14.636	-4.39	856.21	0.005
L2	135 - 96.2861 (2)	TP36.972x23.622x0.354	38.714	0.000	0.0	39.139	-15.02	2289.63	0.007
L3	96.2861 - 62.8412 (3)	TP47.799x34.447x0.433	38.714	0.000	0.0	62.027	-27.13	3628.56	0.007
L4	62.8412 - 32.1358 (4)	TP57.524x44.691x0.472	37.205	0.000	0.0	81.631	-41.28	4775.38	0.009

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L5	32.1358 - 1 (5)	TP67.323x53.965x0.472	38.714	0.000	0.0	100.244	-62.45	5864.28	0.011

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	155 - 135 (1)	TP23.622x23.622x0.197	356.26	492.09	0.724	0.00	492.09	0.000
L2	135 - 96.2861 (2)	TP36.972x23.622x0.354	1987.11	2059.71	0.965	0.00	2059.71	0.000
L3	96.2861 - 62.8412 (3)	TP47.799x34.447x0.433	3915.82	4170.92	0.939	0.00	4170.92	0.000
L4	62.8412 - 32.1358 (4)	TP57.524x44.691x0.472	5856.42	6440.43	0.909	0.00	6440.43	0.000
L5	32.1358 - 1 (5)	TP67.323x53.965x0.472	8645.58	9052.92	0.955	0.00	9052.92	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	155 - 135 (1)	TP23.622x23.622x0.197	31.39	256.86	0.122	0.02	526.95	0.000
L2	135 - 96.2861 (2)	TP36.972x23.622x0.354	56.72	686.89	0.083	0.00	2093.43	0.000
L3	96.2861 - 62.8412 (3)	TP47.799x34.447x0.433	62.64	1088.57	0.058	0.00	4301.78	0.000
L4	62.8412 - 32.1358 (4)	TP57.524x44.691x0.472	68.31	1432.61	0.048	0.02	6829.78	0.000
L5	32.1358 - 1 (5)	TP67.323x53.965x0.472	75.60	1759.28	0.043	0.02	10299.58	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	155 - 135 (1)	0.005	0.724	0.000	0.122	0.000	0.744 ✔	1.000	4.8.2 ✔
L2	135 - 96.2861 (2)	0.007	0.965	0.000	0.083	0.000	0.978 ✔	1.000	4.8.2 ✔
L3	96.2861 - 62.8412 (3)	0.007	0.939	0.000	0.058	0.000	0.950 ✔	1.000	4.8.2 ✔
L4	62.8412 - 32.1358 (4)	0.009	0.909	0.000	0.048	0.000	0.920 ✔	1.000	4.8.2 ✔
L5	32.1358 - 1 (5)	0.011	0.955	0.000	0.043	0.000	0.967 ✔	1.000	4.8.2 ✔

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

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	155 - 135	Pole	TP23.622x23.622x0.197	1	-4.39	856.21	74.4	Pass
L2	135 - 96.2861	Pole	TP36.972x23.622x0.354	2	-15.02	2289.63	97.8	Pass
L3	96.2861 - 62.8412	Pole	TP47.799x34.447x0.433	3	-27.13	3628.56	95.0	Pass
L4	62.8412 - 32.1358	Pole	TP57.524x44.691x0.472	4	-41.28	4775.38	92.0	Pass
L5	32.1358 - 1	Pole	TP67.323x53.965x0.472	5	-62.45	5864.28	96.7	Pass
							Summary	
						Pole (L2)	97.8	Pass
						Base Plate	73.1	Pass
						RATING =	**97.8**	**Pass**

Base/Flange Plate	Plate Type	***Baseplate***	
	Pole Diameter	67.323	in
	Pole Thickness	0.472	in
	Plate Diameter	80.709	in
	Plate Thickness	3.15	in
	Plate Fy	50	ksi
	Weld Length	0.3125	in
	ϕ_s Resistance	843.20	k-in
	Applied	422.10	k-in
Stiffeners	#	***0***	

Bolts	#	***28***	
	Bolt Circle	74.803	in
	(R)adial / (S)quare	R	
	Diameter	2.25	in
	Hole Diameter	2.64	in
	Type	A615-75	
	Fy	75	ksi
	Fu	100	ksi
	ϕ_s Resistance	259.82	k
	Applied	200.28	k
Reinforcement ●	#	***0***	
Extra Bolts O	#	***0***	

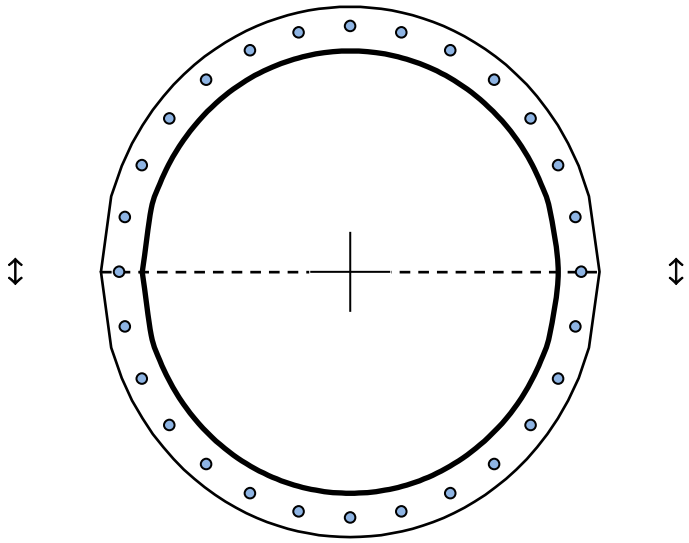
Code Rev. **G**

Moment	8646.0 k-ft
Axial	62.0 k
Shear	76.0 k

Date	5/19/2021
Engineer	MH
Site #	CT 757
Site Name	Kent

Plate Stress Ratio:
0.50 (Pass)

Bolt Stress Ratio:
0.77 (Pass)



ANNEX Q CALCS

$D_e = D_T + w$

$D_e = 67.573$

$D_{oe} = 80.709$

$\Theta_1 = \pi/n$

$\Theta_1 = 0.1122$

$\Theta_2 = \sin^{-1}(12(tTP)/D_{BC})$

$\Theta_2 = 0.52976$

$\Theta_3 = \cos^{-1}((D_{BC}+D_e)/(2*D_{BC}))$

$\Theta_3 = 0.31216$

Min 0.1122

$x = 0.5*(D_{BC}-D_e)$

$x = 3.615$

$B_{et} = D_{BC}(\sin\Theta)$

$B_{et} = 8.37528$

$B_{er} = (D_{oe}-D_e)*(\sin\Theta)$

$B_{er} = 1.47077$

$B_{eff} = B_{et}+B_{er}$

$B_{eff} = 9.84604$

$\Phi P = (t_{TP}^2*\Phi_b*F_{yf}*B_{eff})/(4*x)$

$\Phi P = 304.037$

$P_u = ((n_c*\pi*M_u)/(n*D_{BC}))+(R_u/n)$

$P_u = 157.836$

$P_u/\Phi P = 51.9\%$ Base Plate

$P_u/\Phi R = 64.8\%$ Anchor Rods

Anchor bolt length calculation

PROJECT/ POLE TYPE: **Monopole**

Reference: According to the code ACI 318-14 (25.4.2.3), 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
>
> $$\ell_d = \frac{(60{,}000)(1.0)(1.0)}{20(1.0)\sqrt{4000}} d_b = 47 d_b$$
>
> or
>
> $$\ell_d = \frac{3(60{,}000)(1.0)(1.0)}{40(1.0)\sqrt{4000}} d_b = 71 d_b$$
>
> 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, then $\ell_d = 47 d_b$. The penalty for spacing bars closer or providing less cover is the requirement that $\ell_d = 71 d_b$.
>
> 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 $28 d_b$ 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,

Rebar size	d_b =	1.270	in
Grade of bar	Fy=	60	ksi
Usage of bar	=	1.00	
The required development length of rebars:			
ld= Fy/60*usage*db*28	=	35.56	in
Clear cover	=	3.0	in
Tie size	=	0.625	in
Anchor bolt size	=	2.250	in
Anchor bolt circle diameter	=	74.803	in
Anchor bolt template diameter	=	80.803	in
Seismic Design Category	=	B	
Min. inside bend dia. plus standard/seismic hook length (ACI 318-14 25.3.2)	=	0.000	
Min. Rebar cage diameter	=	86.073	in
Min. Caisson Diameter	=	7.883	ft
Caisson diameter used	=	**8.0**	ft
Clear spacing between rebar and anchor bolt	=	3.875	in
The req'd minimum anchor bolt length with 12" length protrusion	=	**53.27**	in
	Calculate by :	MH	
	Date:	4/30/2021	

Base/Flange Plate	Plate Type	***Flange***	***@ 135.0 ft***
	Pole Diameter	23.62	in
	Pole Thickness	0.354	in
	Plate Diameter	29.13	in
	Plate Thickness	1.181	in
	Plate Fy	50	ksi
	Weld Length	0.3125	in
	ϕ_s Resistance	29.11	k-in
	Applied	17.01	k-in
Stiffeners	#	***0***	

Bolts	#	***40***	
	Bolt Circle	27.17	in
	(R)adial / (S)quare	R	
	Diameter	0.625	in
	Hole Diameter	0.748	in
	Type	A325	
	Fy	92	ksi
	Fu	120	ksi
	ϕ_s Resistance	20.34	k
	Applied	15.62	k
Reinforcement ●	#	***0***	
Extra Bolts O	#	***0***	

Code Rev. ***G***

Moment	356.3 k-ft
Axial	4.4 k
Shear	31.4 k

Required Flange Thickness:

0.90 in OK

Date	5/19/2021
Engineer	MH
Site #	CT 757
Site Name	Kent

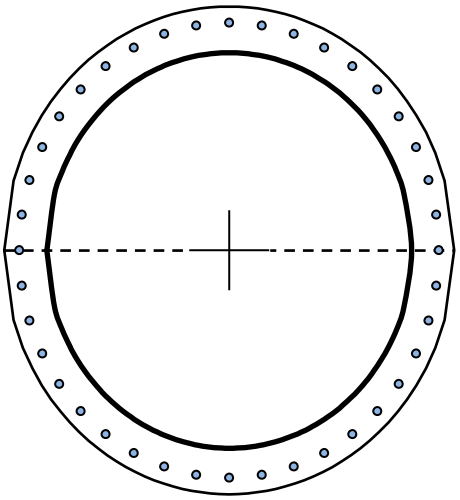


Plate Stress Ratio:

0.58 (Pass)

Bolt Stress Ratio:

0.77 (Pass)

PROJECT No:	21.03.008.007	**ENG:**	MH
PROJECT NAME:	CT 757 - Kent Ambor	**CHK:**	TFI
DATE:	5/19/2021 17:20	**PAGE:**	of

TIA-222-H

SINGLE GLOBAL FOUNDATION WITH PIER(s) CHECKS - MONOPOLE

Global Tower Reactions	*Factored Loads*			*Calculated Reactions*	**Factored Resistance**				SF=2.23
Code Rev TIA-H	Maximum Moment	8,646.00	k-ft	Disturbing Moment	9,140.0	10,188.6	k-ft	PASS	89.7% [GOVERNS]
	Axial Load	62.00	kips	Maximum Bearing	3.27	22.50	kips	PASS	14.5%
	Shear Load	76.00	kips	Lateral (Sliding)	76.00	9,514.25	kips	PASS	0.8%
				Pad Shear	521.7	1,165.1	kips	PASS	44.8%
				Punching Shear	102.1	2,737.7	kips	PASS	3.7%
	Pier Rebar Check	8,912.0	k-ft	Flexural Capacity		10,139.1	k-ft	PASS	87.9%
	Pad Rebar Required	(24) # 10 @ 15.91 in		Actual Pad Rebar		(28) # 10 bars		PASS	84.7%
				*Note: TIA-222-H Section 9.4.2 controls				PASS	96.4%

Soil Parameters	Soils Report		**Pier Geometry**			**Pad Geometry**	
Cohesion	12000.0	psf (574.6 kPa)	Qty of Piers	1		Width (Bm)	31.00 ft
ϕ	0.0	°	Width (Bp)	9.00	ft	Width (Wm)	31.00 ft
Frost/Ignored Depth	3.30	ft (1.01 m)	Height (Hp)	3.50	ft	Height (Hm)	3.00 ft
Water Level	99.00	ft (30.18 m)	Pier above grade	0.50	ft	Depth (D)	6.00 ft
Soil Dry Density (γ_{dry})	0.135	kcf (21.2 kN/m^3)	Pier Type	R	(Rnd or Sq)	CofG Diff.	- ft
Soil Sub Density (γ_{sub})	0.073	kcf (11.4(kN/m^3)	☐ (use equivalent square for pad flexure)				
All. Bearing Pressure	15.000	ksf (718.2 kPa)	**Rebar**	**Pier**			**Pad**
Bearing Safety Factor	2		Rebar Type	ASTM			ASTM
Concrete Parameters			Cover to Tie	3.00	inches	Bar Size	10
f'c	4.500	ksi (31.0 MPa)	Pier Tie Size	5		Bar Qty	28
fy	60.00	ksi (413.7 MPa)	Pier Vertical Size	10		Pad bar qty is one layer in one direction	
Dry Density (γ_{dry})	0.150	kcf (23.6 kN/m^3)	Pier Vertical Qty	37	0.51%		
Sub Density (γ_{sub})	0.088	kcf (13.8 kN/m^3)					

Volume of Concrete/Soil	Concrete (115.0cuyd) 1 Pier	Mat	Soil	
Depth (above)	0.50	--	--	ft
Depth (dry)	3.00	3.00	3.00	ft
Depth (submerged)	0.00	0.00	0.00	ft
Volume (above)	31.81	--	--	ft^3
Volume (dry)	190.85	2,883.00	2692.15	ft^3
Volume (submerged)	0.00	0	0.00	ft^3
Total	223	2883	2692	ft^3

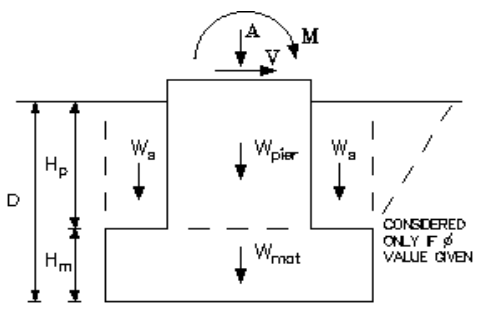
Pad Flexure				
Distance *(edge to pier)*	11.000	ft		
B' = 3/2(B-2e)	11.916	ft		
Force	691.0	kips		
Disturbing Moment	4116.96	kip-ft		
Ku	137.09		**Wgt of Rebar**	
ρ	0.00259		15,722	lbs
4/3•ρ if ρ < ρ min	0.00345			
ρ min ≥ 0.0018	0.00180		24	Qty
As Required (based on ρ)	29.963	in²	15.91	in c/c
As Actual	35.560	in² ϕMn=	4,861	kip-ft
			84.7%	

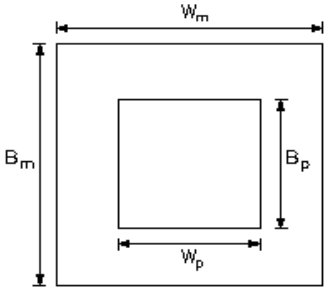
Note: The moment is derived from a moment diagram that considers the ortho qmax trapezoidal distribution underneath the pad to edge of square pier.

Calculations		*TIA-H Method*	*EIA-F Method*	
Axial Download	(factored)	62.0	--	kips
Wgt of Concrete	(not factored)	465.8	--	kips
Wgt of Soil	(not factored)	363.4	--	kips
Total Download (P_1)	(1.2D No wdg)	1057.1	--	kips
Total Download (P_2)	(0.9D No wdg)	792.9	--	kips
Passive Force Moment		494.0	--	k-ft
Bearing Capacity Check				
Calculate ecc e = M/P_1	(1.2D+1.6W)	8.18	--	ft
1) q_{max} = Ortho Direction		2.33	--	ksf
2) q_{max} = Diagonal Direction		2.80	--	ksf
Calculate ecc e = M/P_1	(0.9D+1.6W)	10.90	--	ft
1) q_{max} = Ortho Direction		2.78	--	ksf
2) q_{max} = Diagonal Direction		3.27	--	ksf
q factored		22.50	--	ksf
		(2 • 0.75)		
Overturning Stability Check				
a) Resisting Moment Arm (d)		15.5	--	ft
a) Moment Resistance = P_2 x d		10188.6	--	k-ft
a) Disturbing Moment	(about edge)	9140.0	--	k-ft
b) Moment Resistance	(ortho)	12332.7	--	k-ft
b) Moment Resistance	(diagonal)	14545.7	--	k-ft
b) Disturbing Moment	(about center)	9140.0	--	k-ft

Check for 1-Way Shear			
Shear Area (b x d) =	80.41	--	ft²
Factored shear force =	521.68	--	kips
Factored shear resistance	1165.1	--	kips

Check for 2-Way Shear (Punching)			
Shear Area (b_o x d)	94.47	--	ft²
Factored Shear Force	102.08	--	kips
Factored Shear Resistance	2737.7	--	kips





M =	8646.0	k-ft
A =	62.0	kips
V =	76.0	kips
Bp =	9.00	ft
Wp =	9.00	ft
Hp =	3.50	ft
Bm =	31.00	ft
Wm =	31.00	ft
Hm =	3.00	ft
D =	6.00	ft

TIA-222-H Section 9.4.2 Calculations

Two-Way Shear (Compression)

Pier Diameter:	d_{pier1} = d_{pier} * 12 in / ft	d_{pier1} =	108.00	in	
Equivalent Square Pier Diameter:	d_{pier_sq} = √π / 2 * dpier	d_{pier_sq} =	95.71	in	
Avg. Effective Depth for Punching Shear:	d_{c_2} = T - cc_{pad} - AVERAGE(0.5 * d_{b_pad} , 1.5 * d_{b_pad})	d_{c_2} =	31.73	in	
Area of Concrete in Shear:	A_c = ((dpier1 + dc_2)*PI()) * dc_2	A_c =	13928.67	in^2	
Eq. Square Area of Concrete in Shear:	A_{c_sq} = (4*(dpier_sq+dc_2))*dc_2	A_{c_sq} =	16175.00	in^2	
Factor of transfer of Moment:	Y_f = 1/(1+(2/3)*√(dpier1/dpier1))	Y_f =	0.60		
Factor of transfer of eccentricity of Shear:	Y_v = 1 - Y_f	Y_v =	0.40		
Moment applied at base of Pier:	M_v = M_{u_comp} * 12 in / ft	M_v =	106944.00	kip*in	

Two-Way Shear (Compression, Flexural Component) [TOP REINFORCEMENT]

Bar Spacing:	$B_{s\_pad\_top}$ = (W.dir2*12 - 2 * ccpad - VLOOKUP(IF(RectangularPadBoolean=TRUE,spt	$B_{s\_pad\_top}$ =	13.51	in	
Fraction of Bars in Effective Width:	$m_{effective\_top}$ = IF(b_pad=W.dir2,mptop,12*b_pad/Bs_pad_top)	$m_{effective\_top}$ =	15.99		
Area of Steel in Effective Width:	$A_{s\_effective\_top}$ = VLOOKUP(IF(RectangularPadBoolean=TRUE,sptop2,sptop),Ref!A2:$C	$A_{s\_effective\_top}$ =	20.31	in^2	
Depth of Equivalent Rectangular Stress Block:	$a_{effective\_top}$ = $A_{s\_effective\_top}$ * Fy / (0.85 * F'c * b_{slab}*12)	$a_{effective\_top}$ =	1.47	in	
Distance from Top to Nuetral Axis:	$c_{effective\_top}$ = $a_{effective\_top}$ / β_{pad}	$c_{effective\_top}$ =	1.74		
Effective depth:	d_{c_top} = T *12 - ccpad - 1.5 * VLOOKUP(IF(RectangularPadBoolean=TRUE,sptop2	d_{c_top} =	31.095	in	
Strain in Steel:	$\varepsilon_{s\_effective\_top}$ = 0.003 * (dc_top - c_effective_top) / c_effective_top	$\varepsilon_{s\_effective\_top}$ =	0.05077	in/in	
Flexure Strength Reduction Factor:	$\phi flex_{effective\_top}$ = IF(εs_top>=εt,0.9,IF(εs_top<=εc,0.65,0.65+(0.9-0.65)*(((εs_top-εc)/(εt-εc))))	$\phi flex_{effective\_top}$ =	0.9		
Nominal Flexural Strength:	$M_{n\_effective\_top}$ = $A_{s\_effective\_top}$ * (F_y) * (dc_top - $a_{effective\_top}$ / 2) * (1/12)	$M_{n\_effective\_top}$ =	3082.39	ft-kips	
Design Flexural Strength:	$\phi M_{n\_effective\_top}$ = φflex_effective * Mn_effective	$\phi M_{n\_effective\_top}$ =	2774.15	ft-kips	
Applied Moment:	Yf'M_{u_comp} = Yf'M_{u_comp}	Yf'M_{u_comp} =	5347.2	ft-kips	

Check	$\phi M_{n\_effective}$ =	5548.30	ksi	>=	Yf'M_{u_comp} =	5347.20	ksi	RATING:	96.38%	OK

8340-100 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.

Intertek 4003706
Conforms to UL STD 2200
Certified to CSA STD C22.2 No. 100

Meets EPA Emission Regulations
CA/MA Emissions Compliant

2 year standard warranty

Available Models:

- **8340-100-LP-15-03** LPG 15 kW -48 VDC

Made in USA

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 LPG, 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
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
- No transfer switch
- 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
- 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
Stator	3 phase/32 poles
Overcurrent Protection (A)	350
Disconnect Means	Pull fuse block, sized for each generator kW
Voltage Range (VDC)	44 to 62
Alternator Exhaust Flow (cfm/cmm)	130 to 180 / 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 / -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

SOUND EMISSIONS

Contact us for current sound data.

SPECIFICATIONS NATURAL GAS and LPG

Engine Model	Natural Gas - Kubota DG972 LPG - Kubota WG972
Cylinders	3 In-line
Displacement (L)	0.962
Bore (in./mm)	2.93/74.5
Stroke (in./mm)	2.9/73.6
Intake Air System	Naturally Aspirated
Engine HP	18
Emissions Compliance	EPA and CARB Certified
Variable RPM	2650 to 3150

ENVIRONMENTAL

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

PROPANE ENGINE FUEL CONSUMPTION

	Output (kW)	gal/hr	L/hr
Kubota 972	4	0.97	3.67
	5	1.1	4.16
	6	1.26	4.77
	7	1.475	5.58
	8	1.69	6.4
	9	1.945	7.36
	10	2.2	8.33
	12	2.52	9.54
	15	3.55	13.44

ENGINE LUBRICATION SYSTEM

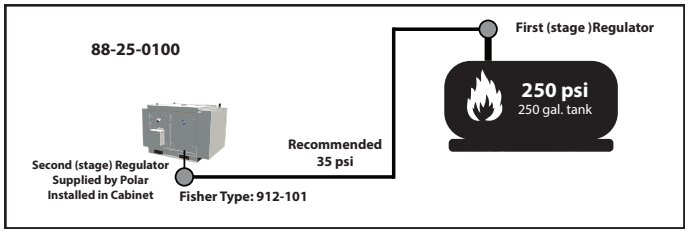
Oil Filter Type	Full flow spin-on canister
Oil Capacity	3.7 L - DG972/WG972
Oil Pressure Switch	Yes
Oil Pressure Transducer	Optional

ENGINE COOLING SYSTEM

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

FUEL SYSTEM

Type	Natural Gas or Propane
Fuel Tank/Line	Supplied By Customer
Max Fuel Flow Rate (BTU/hr)	15 kW - 340,000



Pressure Chart

Minimum	Recommended	Maximum
0.14 psi	0.39 psi	0.5 psi
4 in H2O	11 in H2O	13.9 in H2O
10 mbar	27.4 mbar	34.5 mbar

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)	680/308
Dimensions (LxWxH) (in/cm)	54 x 38 x 38/137 x 97 x 97

POLAR POWER INC.

OPERATING DATA

ENGINE COOLING

System coolant capacity (gal/L)	2.2/8.3
Maximum operation air temperature on radiator (°C/°F)	54/129
Maximum ambient temperature (°C/°F)	49/120

COMBUSTION REQUIREMENTS

Flow at rated power (cfm/cmm)	47/1.34

EXHAUST

Exhaust flow at rated output (cfm/cmm)	90/2.55
Exhaust temperature at rated output (°C/°F)	480/900

CONTROLLER FEATURES

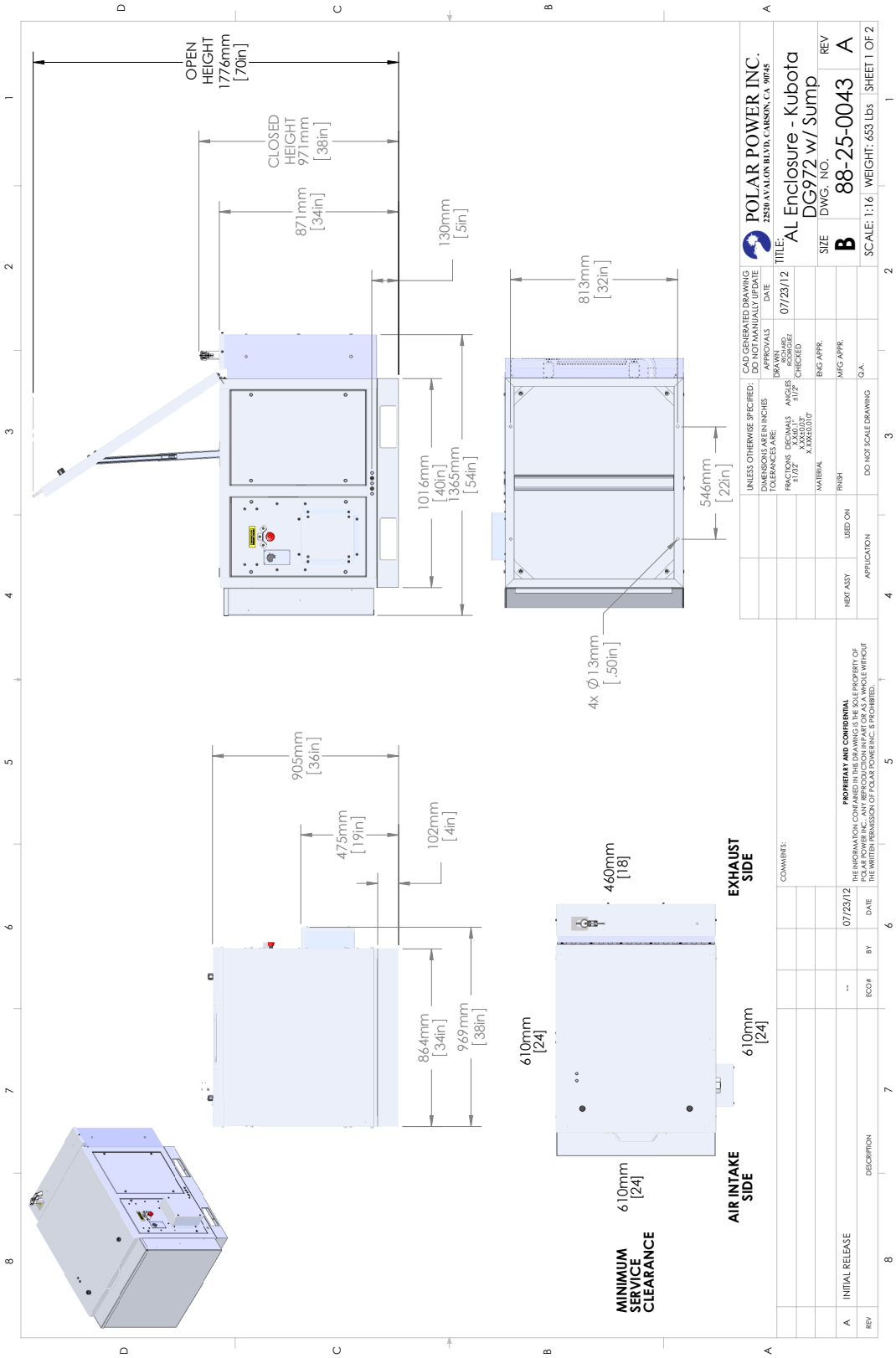
Controller Type.....Supra Model 250
4-Line Plain Text LCD Display.....Simple user interface for ease of operation
Engine Run Hours Indication.....Standard
Programmable Start Delay.....Standard
Run/Alarm/Maintenance Logs.....Standard
Engine Start Sequence.....Cyclic cranking: 5 sec on, 45 sec rest (3 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/High Supercapacitor Voltage.....Standard
High Water Temperature.....Standard
Low Oil Pressure.....Standard

CONTACT CLOSURE FOR REMOTE INDICATION (PN 84-12-0640)

Shutdown Alarm.....Optional
Warning Alarm.....Optional
Engine Run.....Optional
E-Stop Depressed.....Optional


OPEN HEIGHT 1776mm [70in]
CLOSED HEIGHT 971mm [38in]
871mm [34in]
130mm [5in]
1016mm [40in]
1365mm [54in]
813mm [32in]
546mm [22in]
4x Ø13mm [.50in]
905mm [36in]
475mm [19in]
102mm [4in]
864mm [34in]
969mm [38in]
460mm [18]
610mm [24]
610mm [24]
610mm [24]
EXHAUST SIDE
AIR INTAKE SIDE
MINIMUM SERVICE CLEARANCE
POLAR POWER INC.
22530 AVALON BLVD, CARSON, CA 90745
TITLE: AL Enclosure - Kubota DG972 w/ Sump
SIZE B
DWG. NO. 88-25-0043
REV A
SCALE: 1:16
WEIGHT: 653 Lbs
SHEET 1 OF 2
CAD GENERATED DRAWING DO NOT MANUALLY UPDATE
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DATE 07/23/12
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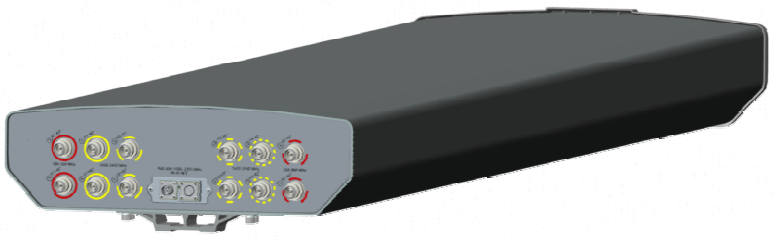
EPBQ-654L8H8-L2

12-Port Multi-Band Antenna / 8' / 65˚

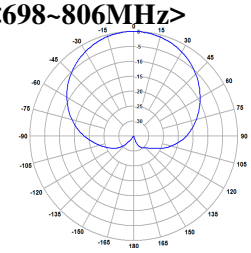
698 ~ 894MHz, XX-pol., H67˚ / V9.3˚, ET:2~12˚
1695 ~ 2400MHz, XXXX-pol., H61˚ / V8.1˚, ET: 2~12˚

Electrical Specification

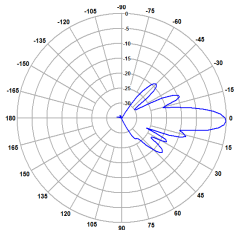
Frequency(MHz)		698~806	806~894	1695~1850	1850~1910	1910~2180	2300~2400
Impedance(Ω)		50	50	50	50	50	50
Polarization		±45˚	±45˚	±45˚	±45˚	±45˚	±45˚
Gain(dBi)		15.9	16.2	16.9	17.3	17.7	17.8
Beam width	**Horizontal**	67˚	66˚	61˚	60˚	60˚	60˚
	Vertical	9.3˚	8.7˚	8.1˚	7.8˚	7.4˚	6.8˚
VSWR		≤1.5:1	≤1.5:1	≤1.5:1	≤1.5:1	≤1.5:1	≤1.5:1
Front-to-Back Ratio(dB)		>25	>25	>25	>25	>25	>25
Electrical Down tilt		2˚ ~ 12˚	2˚ ~ 12˚	2˚ ~ 12˚	2˚ ~ 12˚	2˚ ~ 12˚	2˚ ~ 12˚
Isolation Ports(dB)		≥25	≥25	≥25	≥25	≥25	≥25
Isolation Frequency(dB)		≥30	≥30	≥30	≥30	≥30	≥30
Cross Pole Discrimination		7 dB @ ±60˚ 15.0 dB @ 0˚	7 dB @ ±60˚ 15.0 dB @ 0˚	7 dB @ ±60˚ 15.0 dB @ 0˚	7 dB @ ±60˚ 15.0 dB @ 0˚	7 dB @ ±60˚ 15.0 dB @ 0˚	7 dB @ ±60˚ 15.0 dB @ 0˚
Side Lobe Suppression (Up to 10˚ from Boresight)		> 16dB	> 16dB	> 16dB	> 16dB	> 16dB	> 16dB
PIM (2x20w, dBc)		≤ -150	≤ -150	≤ -150	≤ -150	≤ -150	≤ -150
Input Power(W)		400	400	300	300	300	300



<698~806MHz>

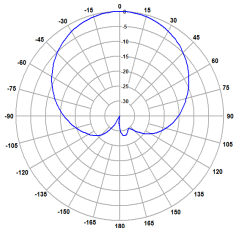


Horizontal Pattern

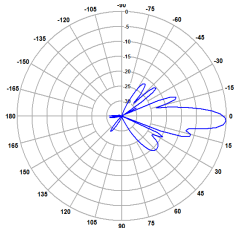


Vertical Pattern (2°)

<806~894MHz>

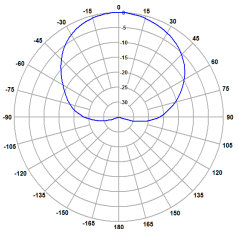


Horizontal Pattern

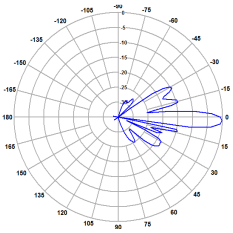


Vertical Pattern (2°)

<1695~2400MHz (Y1,Y2)>

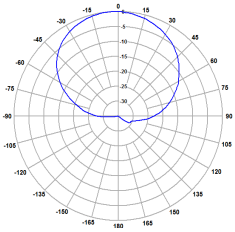


Horizontal Pattern

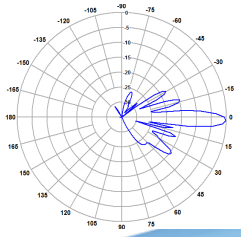


Vertical Pattern (2°)

<1695~2400MHz (Y3,Y4)>



Horizontal Pattern



Vertical Pattern (2°)

EPBQ-654L8H8-L2

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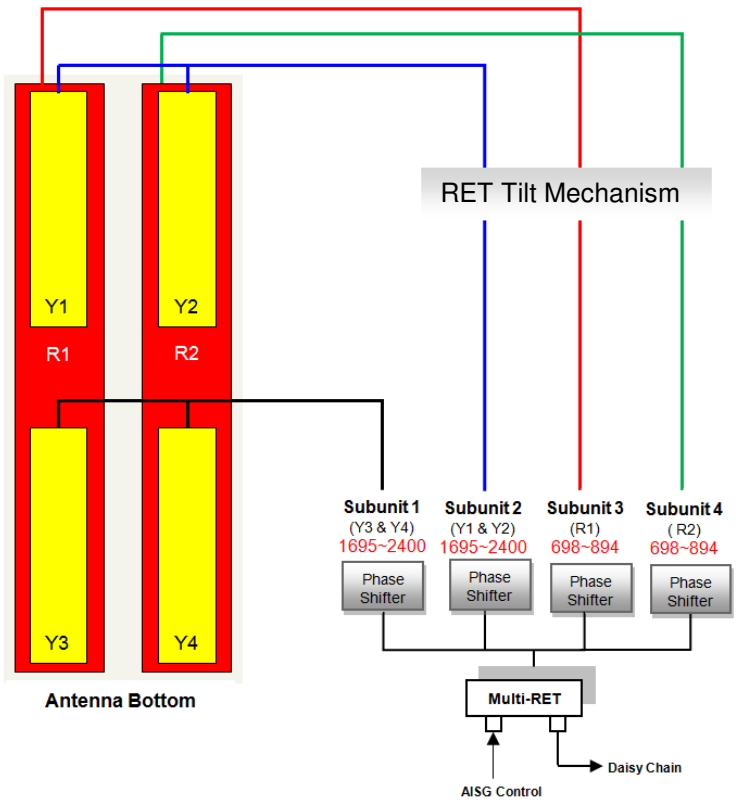
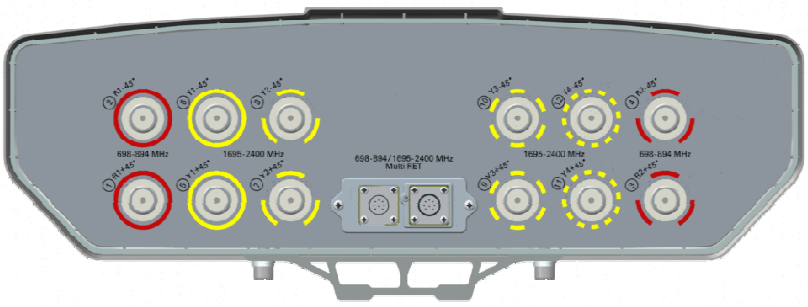


Mechanical Specification

Dimension (W×D×H)	21.0×6.3×96.0 inches (533×160×2438 mm)
Weight (Without clamp)	86.0lbs (39.0kg)
Connector	12 x 4.3-10 (Female), Long Neck (4 x 698-894 8 x 1695-2400MHz)
Max Wind Speed	150 mph
WindLoad (@100 mph)	1994N, 598N, 1994N (Front , Side , Rear)



Correlation Table

Frequency range	Array	Connector
698-894 MHz	R1	4.3-10 Female
698-894 MHz	R2	4.3-10 Female
1695-2400 MHz	Y1	4.3-10 Female
1695-2400 MHz	Y2	4.3-10 Female
1695-2400 MHz	Y3	4.3-10 Female
1695-2400 MHz	Y4	4.3-10 Female

***Note**

- Gain can vary and the values stated are typical
- Environmental Compliance: IP 65 for Radome & IP 67 for Connectors
- RET Motor Configuration: Field Replaceable RET Electronic Control Module RET Motor is internal to antenna & not field replaceable
- Compliant with AISG: AISG2.0
- Accessory: Standard Mounting Kit is included (Mechanical Down Tilt, KCLDM1B30000 is sold separately)

RRUS 4449 B5, B12 DATA SHEET

For Turf Vendors

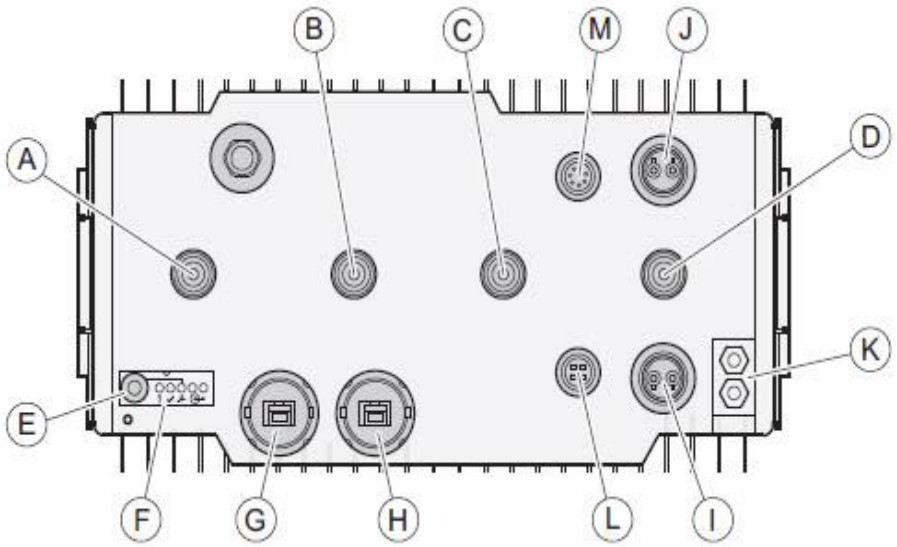
2018-10-18 Rev B

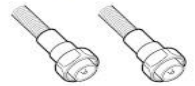
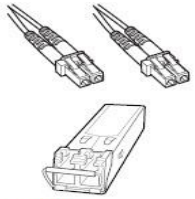
RRUS 4449 B5, B12

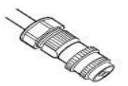
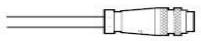
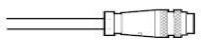
- B5, B12
  - B5 TX = 869 – 894 MHz, B12 TX = 729 – 746 MHz
  - B5 RX = 824 – 849 MHz, B12 RX = 699 – 716 MHz

  Both frequency bands are combined to transmit/receive out the same RF connectors.
- CPRI 2 ports x 2.5/4.9/9.8/10.1 Gbps. Install 2 SFP7s and connect 2 fiber pair to the RRUS 4449 during initial install. 2nd CPRI is reserved for 5G NR deployment later. Do not connect SFP7 to DUL20.
- Only use Ericsson supplied and approved SFP7s RDH10265/25.
  - Install 2 SFP RDH 10265/3 for CPRI length 1.4 km – 10 km
  - Install SFP7 (pair): RDH 102 70/1 and RDH 102 70/2 (bi-directional SFP7 for CPRI length > 10 km
- 2 external alarm inputs
- Max wind load @ 50m/sec = 260 N
- Breaker size = 2x25A, DC Power Consumption = 1440 W (for dimensioning). Both power connections must be connected and operational for the radio to operate. Each power feed must support 900W.
- 40mm horizontal separation required for side by side mounting
- 200mm separation required from antenna backplane to radio
- 400mm vertical outdoor/indoor separation required between 2 radios
- 500mm vertical separation below antenna
- Min, Max DC cable size from squid to radio = 10,8 AWG
  - Adapter is required for 2-wire connection
  - Shielded DC cable is required
- Ground cable size = 2AWG
- Dimensions (incl. handles, feet and sunshield, w/o fan unit)
  - Height: 17.9” (455 mm)
  - Width: 13.19” (335 mm)
  - Depth: 9.44” (240 mm)
- Weight, excl. mounting hardware = 71 lbs (32 kg)

RRUS 4449 B5,12 CONNECTION INTERFACES

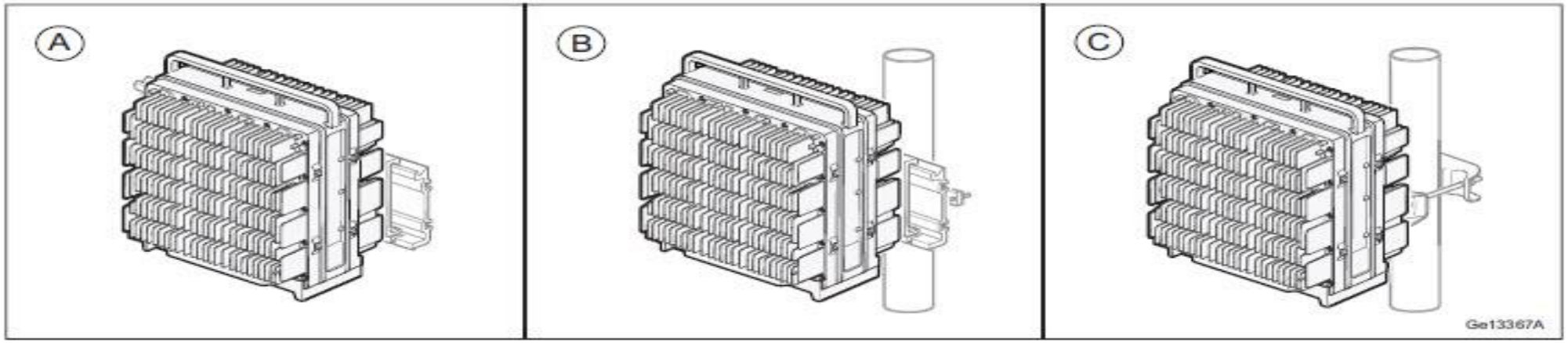


Position	Description	Marking	Connector Types	Cable Types
A	Antenna A	A	4.3-10 connector	
B	Antenna B	B		
C	Antenna C	C		
D	Antenna D	D		
E	Maintenance button	–	–	–
F	Optical indicators	! ✓ 1, 2	–	–
G	Optical cable 1	1	LC (On SFP) with support for FullAXS	
H	Optical cable 2	2		

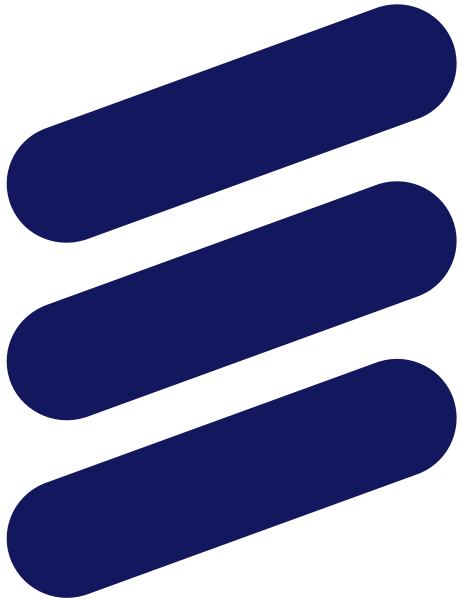
Position	Description	Marking	Connector Types	Cable Types
I	–48 V DC power supply	POWER	Power connector	
J	–48 V DC power supply	POWER	Power connector	
K	Grounding	⏚	2 x M6 bolt	
L	External alarm and control	🔔	Mini-DIN connector, 14 pin	
M	ALD (used for a RET unit for example)	ALD	Mini-DIN connector, 8 pin	

CPRI, RET/AISG port, and ALD port caps have lanyards attached to the radio. DC and RF ports have protective caps to be removed when DC, RF connected to radio.

RRUS 4449 MOUNTING OPTIONS



Installation Method	Description
A	Wall installation
B	Pole installation
C	Pole installation with single pole clamp



ERICSSON

RRUS 4478 B14 DATA SHEET

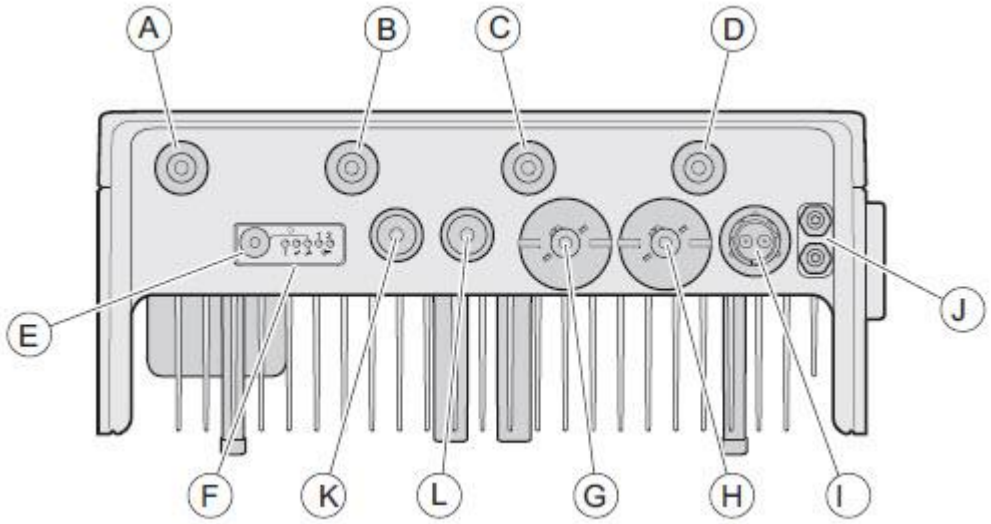
For Turf Vendors

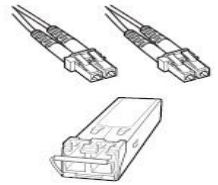
2017-11-01 Rev F

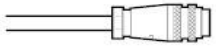
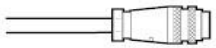
RRUS 4478 B14

- B14
  - TX = 758 – 768 MHz
  - RX = 788 – 798 MHz
- CPRI 2 ports x 2.5/4.9/9.8/10.1 Gbps. Install 1 SFP and connect 1 fiber pair to the RRUS 4478 during initial install.
- Only use Ericsson supplied and approved SFPs RDH10265/25 until 12/1/2017, after use RDH10247/25
- 2 external alarm inputs
- Max wind load @ 50m/sec = 260N
- Breaker size = 25A, DC Power Consumption = 650W (for dimensioning)
- 200mm horizontal separation required for side by side mounting
- 200mm separation required from antenna backplane to radio
- 500mm/800mm vertical outdoor/indoor separation required
- Min, Max DC cable size from squid to radio = 10,8 AWG
  - Adapter is required for 2-wire connection
  - Shielded DC cable is required
- Ground cable size = 2AWG
- Dimensions (incl. handles, feet and fan unit)
  - Height: 18.1” (460 mm)
  - Width: 13.4” (342 mm)
  - Depth: 8.26” (210 mm)
- Weight, excl. mounting hardware = 59.4 lbs (27 kg)

RRUS 4478 B14 CONNECTION INTERFACES

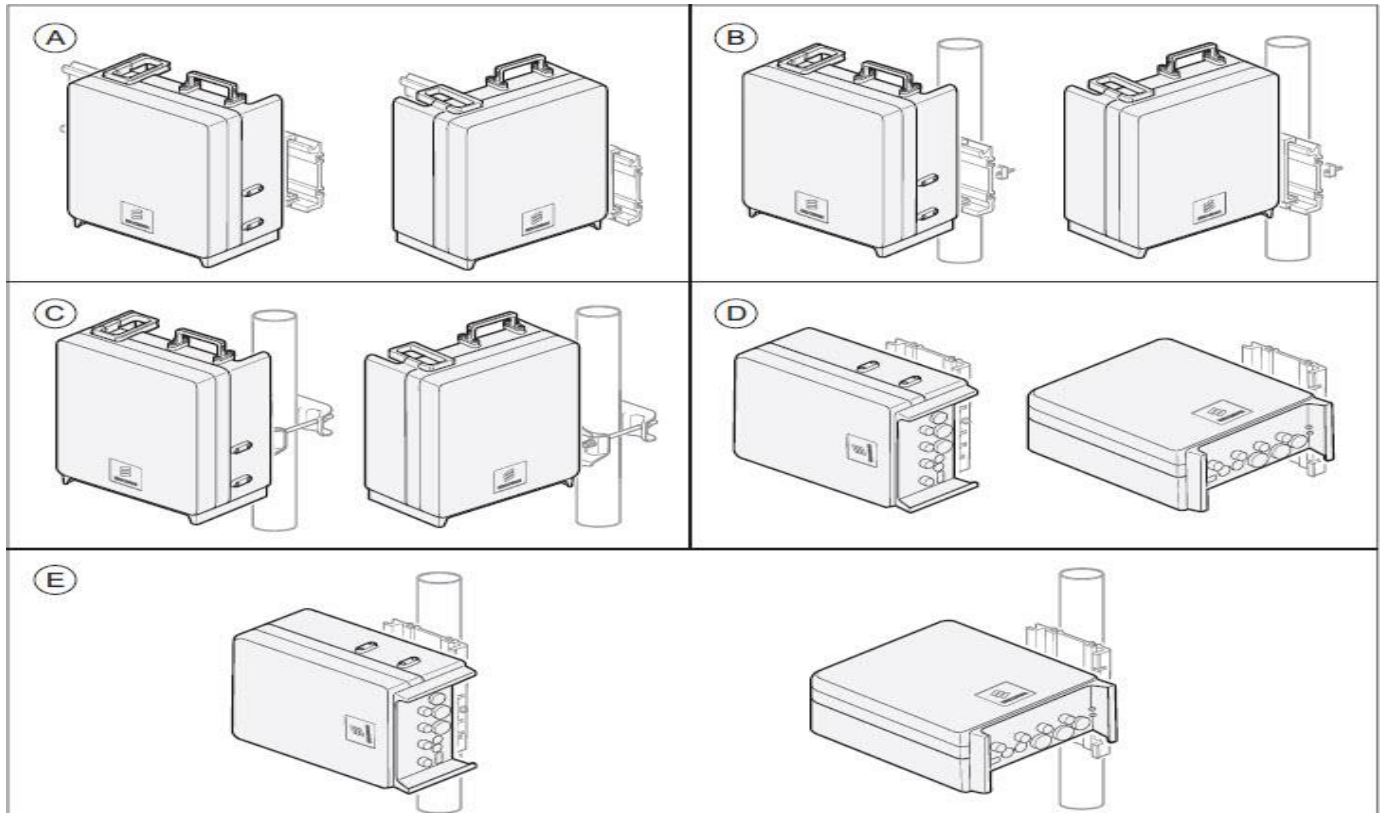


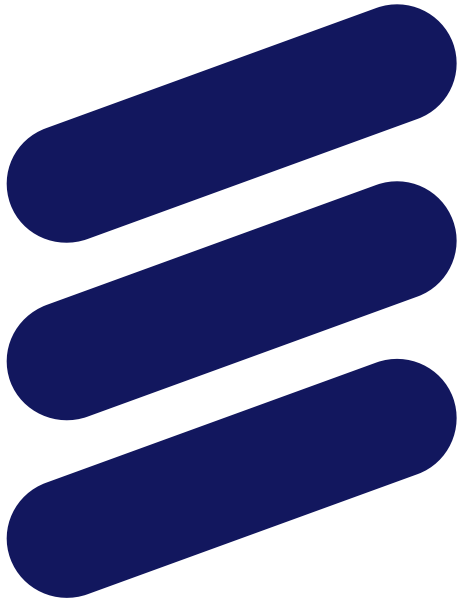
Position	Description	Marking	Connector Types	Cable Types
A	Antenna A	A	4.3-10 connector	
B	Antenna B	B		
C	Antenna C	C		
D	Antenna D	D		
E	Maintenance button	–	–	–
F	Optical indicators	! ✓ 1, 2	–	–
G	Optical cable 1	1	LC (On SFP) with support for FullAXS	
H	Optical cable 2	2		

Position	Description	Marking	Connector Types	Cable Types
I	–48 V DC power supply	POWER	Power connector	
J	Grounding	⏚	2 x M6 bolt	
K	External alarm and fan unit power supply and control		Mini-DIN connector, 14 pin	
L	ALD (used for a RET unit for example)	ALD	Mini-DIN connector, 8 pin	

CPRI, RET/AISG port, and ALD port caps have lanyards attached to the radio. DC and RF ports have protective caps to be removed when DC, RF connected to radio.

RRUS 4478 B14 MOUNTING OPTIONS





ERICSSON

RRUS 4415 B30 DATA SHEET

For Turf Vendors

2019-10-03 Rev C

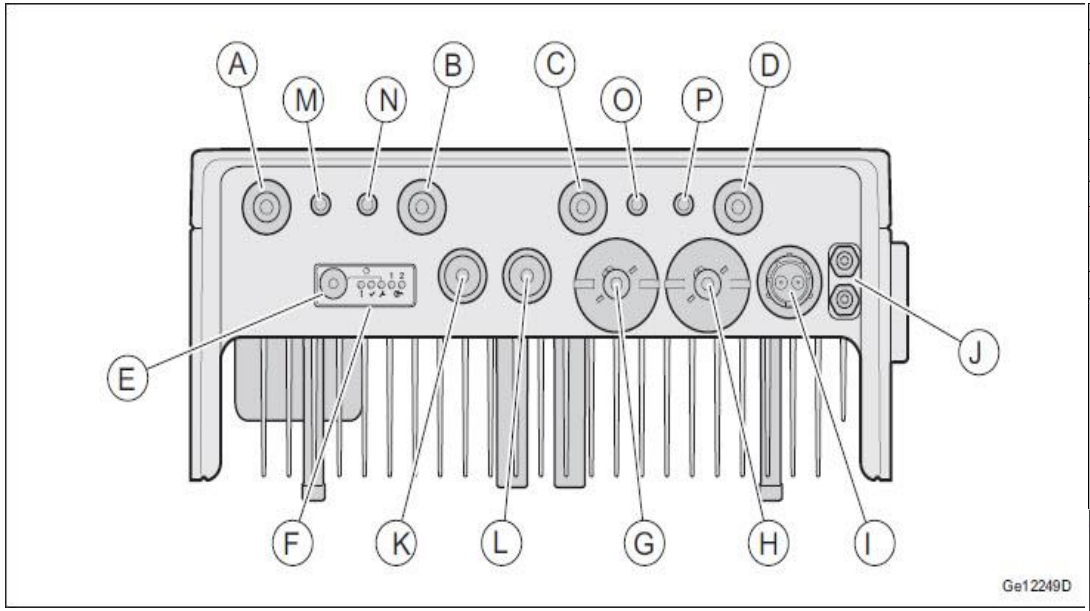
RRUS 4415 B30

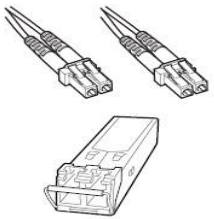
- B30 A+ B
  - TX = 2350 – 2360 MHz
  - RX = 2305 – 2315 MHz
- CPRI 2 ports x 2.5/4.9/9.8/10.1 Gbps. Install 2 SFPs and connect 2 fiber pair to the RRUS 4415 during initial install.
- Only use Ericsson supplied and approved SFP3 RDH10247/25

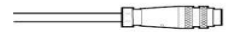
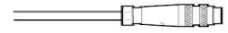
  Exception: SFP7 RDH 10265/3 for CPRI 1.4km to 10km

  Exception: SFP7 (pair): RDH 102 70/1 and RDH 102 70/2 for CPRI > 10km
- 2 external alarm inputs
- Max wind load @ 50m/sec = 260N
- Breaker size = 25A, DC Power Consumption = 670 W (for dimensioning)
- 200mm horizontal minimum separation required for side by side mounting
- 200mm separation minimum required from antenna backplane to radio
- 400mm vertical minimum outdoor/indoor separation required between 2 radios
- 500mm vertical separation below antenna
- Min, Max DC cable size from squid to radio = 10,8 AWG
  - Adapter is required for 2-wire connection
  - Shielded DC cable is required
- Ground cable size = 2AWG
- Dimensions (incl. handles, feet and sunshield, w/o fan unit)
  - Height:16.5” (420 mm)
  - Width: 13.4” (342 mm)
  - Depth: 5.9” (123 mm)
- Weight, excl. mounting hardware = 47.4 lbs (21.5 kg)

RRUS 4415 B30 CONNECTION INTERFACES

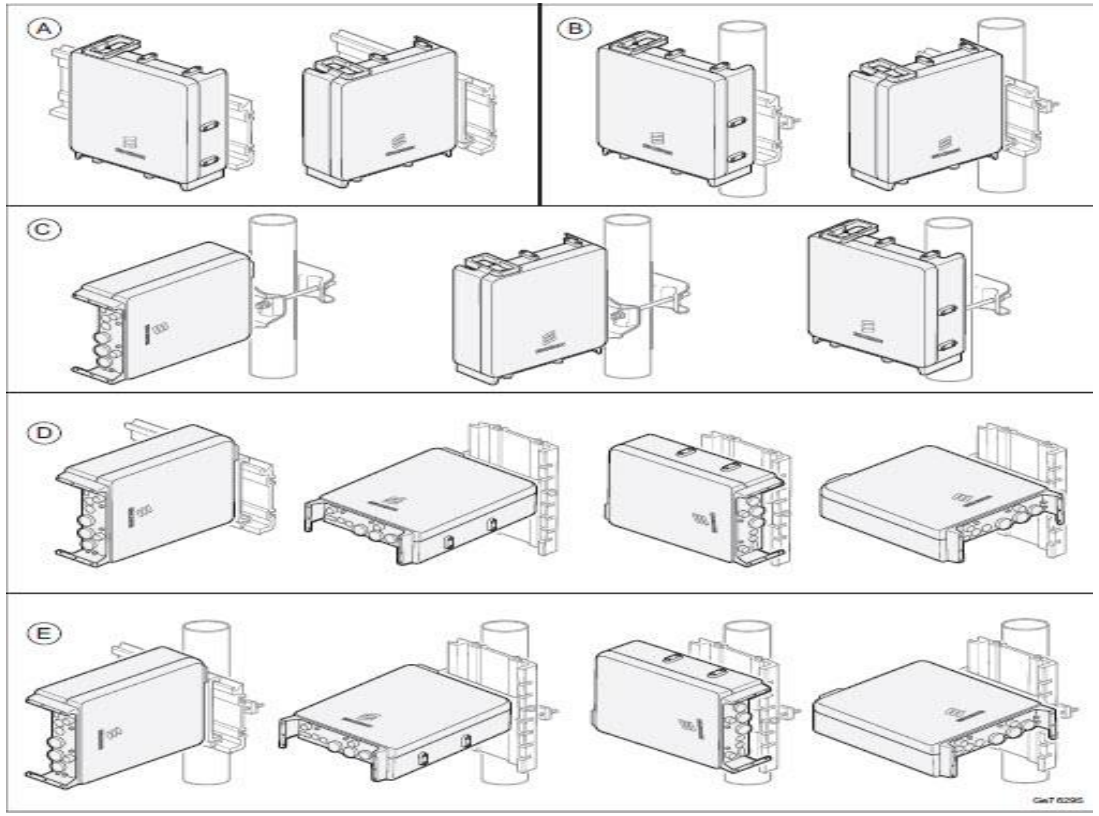


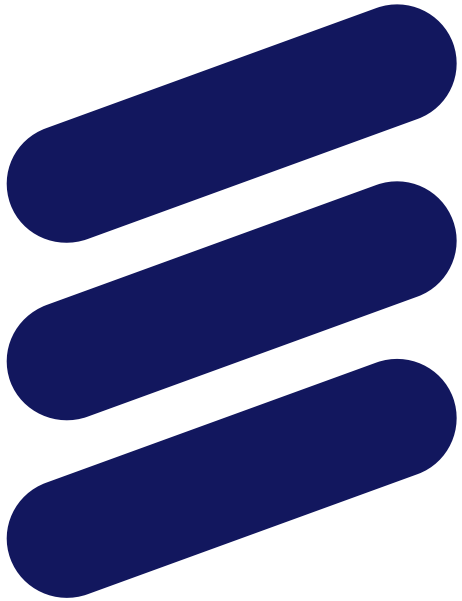
Position	Description	Marking	Connector Types	Cable Types
A	Antenna A	A	4.3-10 connector	
B	Antenna B	B		
C	Antenna C	C		
D	Antenna D	D		
E	Maintenance button	–	–	–
F	Optical indicators	! , ✓ , 1, 2	–	–
G	Optical cable 1	1	LC (On SFP) with support for FullAXS	
H	Optical cable 2	2		

Position	Description	Marking	Connector Types	Cable Types
I	–48 V DC power supply	POWER	Power connector	
J	Grounding		2 x M6 bolt	
K	External alarm and fan unit power supply and control		Mini-DIN connector, 14 pin	
L	ALD (used for a RET unit for example)	ALD	Mini-DIN connector, 8 pin	
M(1)	TX monitor A	A	SMA connector	
N(1)	TX monitor B	B		
O(1)	TX monitor C	C		
P(1)	TX monitor D	D		

CPRI, RET/AISG port, and ALD port caps have lanyards attached to the radio. DC and RF ports have protective caps to be removed when DC, RF connected to radio.

RRUS 4415 MOUNTING OPTIONS





ERICSSON

DATA SHEET

DC Surge Protection Solutions

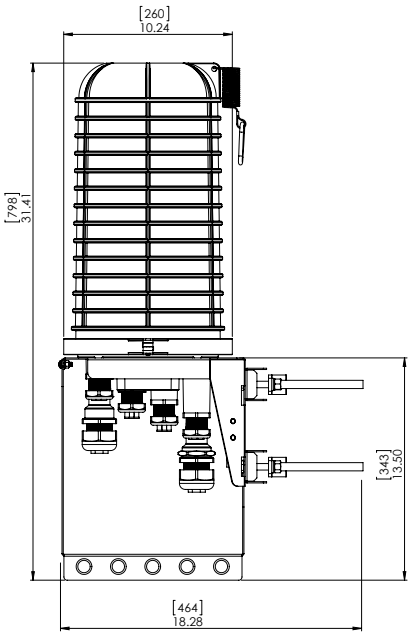
DC9-48-60-24-8C-EV

Overvoltage Protection and Fiber Distribution/Cable Management Solution

Rooftop / Towertop

The DC9-48-60-24-8C-EV is designed to provide the ultimate coordination between the SPD and the RRH/RRU by offering industry-leading low-clamping voltage of 160V and extremely robust protection for use in a high DC voltage environment. Capable of providing 12.5kA (10/350 µs) max per circuit surge capacity for up to 9 -48V DC circuits.

powered by **Strikesorb®**



Features

- Provides discrete protection for nine individual -48V DC circuits
- Maximum impulse current 12.5kA 10/350 µs
- Fiber connections for up to 24 fiber pair
- Simplifies inter-connectivity and cable management for DC conductors
- UL 1449 4th Edition Type 2 protective device for DC applications
- IEC 61643-11 Class I protection
- Copper-coated lid to reduce power line interference
- Patented design
- Patented Strikesorb technology ensures lowest let-through voltage available in the industry, providing enhanced coordination with the RRH/RRU
- Raycap recommends that DC protection system be installed within 5 meters of the radio

Benefits

- Strikesorb modules are fully recognized to UL 1449 4th Edition, and IEC 61643-11 Safety Standards, meeting all intermediate and high current fault requirements to facilitate use in original equipment manufacturers (OEM) applications
- Strikesorb offers unique maintenance-free protection against direct lightning currents
- Design provides maximum flexibility for installation
- NEMA 4X enclosure

G02-01-515 190212

Raycap

www.raycap.com

SPECIFICATIONS

DC Surge Protection Solutions

DC9-48-60-24-8C-EV

Overvoltage Protection and Fiber Distribution/Cable Management Solution

powered by **Strikesorb®**

Electrical		
Model Number		DC9-48-60-24-8C-EV
CEQ / ANT Number		CEQ.21427
Number of Circuits Protected		9
Surge Protective Device (SPD) Type per UL 1449 4th Edition		Type 2
Surge Protection Class as per IEC 61643-11		Class I
Nominal Operating DC Voltage [U_n]		-48 VDC
Nominal Discharge Current [I_n] per UL 1449 4th Edition		20 kA 8/20 µs
Maximum Impulse (Lightning) Current [I_{imp}] per IEC 61643-11		12.5 kA 10/350 µs
Maximum Continuous Operating DC Voltage [U_c] (MCOV)		60 VDC
Voltage Protection Level [U_p] at 12.5kA per IEC 61643-11		160 V
Voltage Protection Level [U_p] at 5kA per IEC 61643-11		145 V
Voltage Protection Rating (VPR) per UL 1449 4th Edition		330 V
Suppression Technology		MOV
Strikesorb Module Type 2CA (UL 1449 4th edition)		30-V1-2CEV
Protection Modes:	Normal Mode	-48V to Return
	Common Mode	Return to Ground
Mechanical		
Connection Terminal (Suppression) Method (for all power cables)		Compression lug 2 hole, #10, 5/8 pitch, #12 – #4 AWG [3.3 – 21.15 mm²]
Connection Terminal (Terminal Block) Method	Copper	#12 to #4 AWG [3.3 – 21.15 mm²]
Fiber Connection Method		LC-LC Single Mode
Environmental Ingress Protection (IP) Rating		IP 68
Operating Temperature (°C)		-40° C to +100° C
Storage Temperature (°C)		-70° C to +80° C
Cold Temperature Cycling IEC 61300-2-22		-30° C to +60° C 200 hrs @5 PSI
Resistance to Aggressive Materials CEI IEC 61073-2		Including Acids and Bases
UV Protection ISO 4892-2 Method A		Xenon-Arc 2160 hrs
Enclosure Type		Outdoor NEMA 4X
Enclosure Dimensions (L x W x H)		18.28" × 10.24" × 31.4" [464 × 260 × 797 mm]
Weight*		System: 18.5 lbs [8.39 kg] Mount: 10.2 lbs [4.62 kg] Total: 28.7 lbs [13.02 kg]
Combined Wind Loading	Sustained | Gust	150 mph Sustained: 105.7 lbs [470 N] | 195 mph Gust: 213.6 lbs [950 N]

Optional Kits Available		
Trunk Gland Kit A	CEQ.21428	Oval Gasket for 4AWG and 6AWG Trunk
Trunk Gland Kit B	CEQ.21429	Oval Gasket for (2) 4AWG Trunks
Trunk Gland Kit C	CEQ.21434	Oval Gasket for (2) 8AWG Trunks

Standards Compliance & Certifications

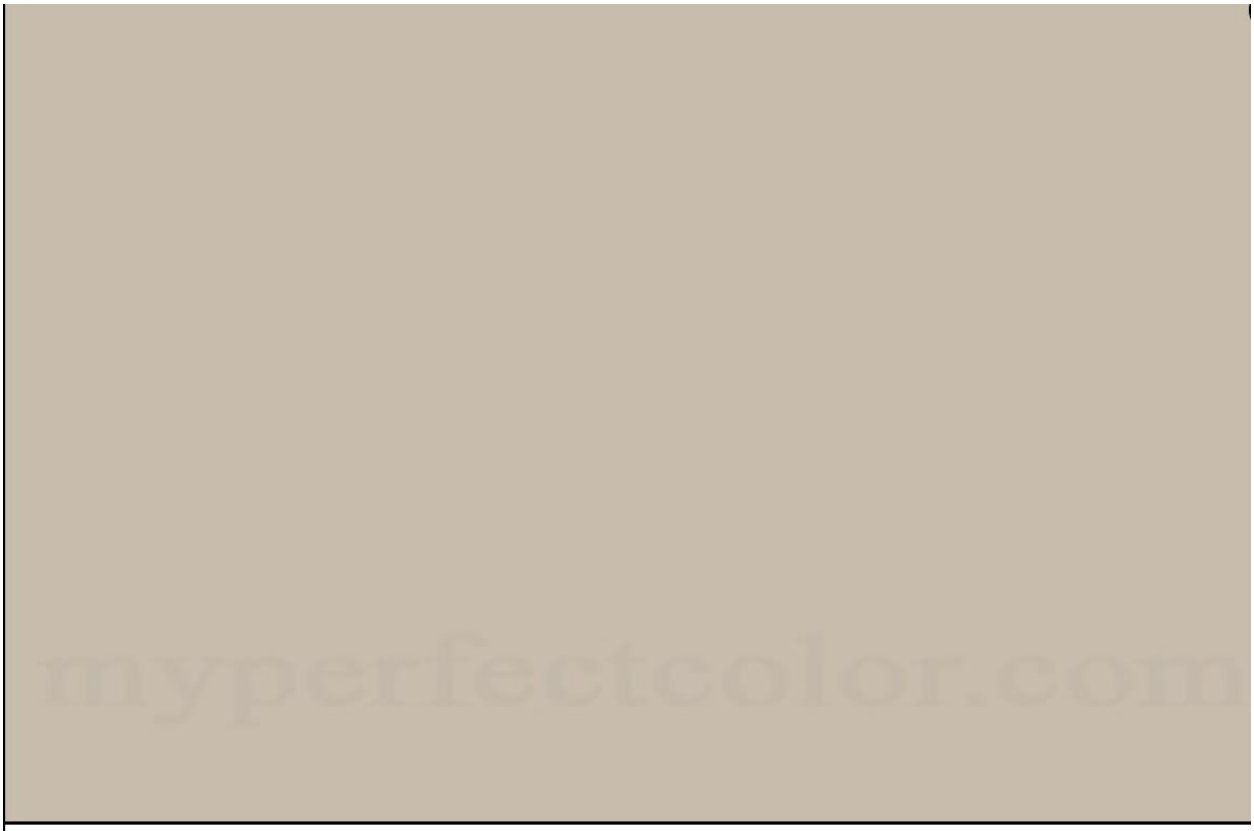
NEBS certified to: GR-63-CORE Issue 4, GR-1089-CORE Issue 6, GR-3108-CORE Issue 3, GR-487-CORE Issue 4, ATT-TP-76200 Issue 18

Strikesorb modules are compliant to the following Surge Protection Device Standards:

Standards: UL 1449 4th Edition: 2011, IEC 61643-11: 2011, EN 61643-11: 2012, IEEE C62.11: 2005, IEEE C62.41: 2002, IEEE C62.45: 2002, NEMA-LS-1

Certifications: UL, VDE, CE

AWG=American Wire Gauge



Match of Pratt and Lambert™ 2257 Shadow Beige *

PL1201 – White Smoke

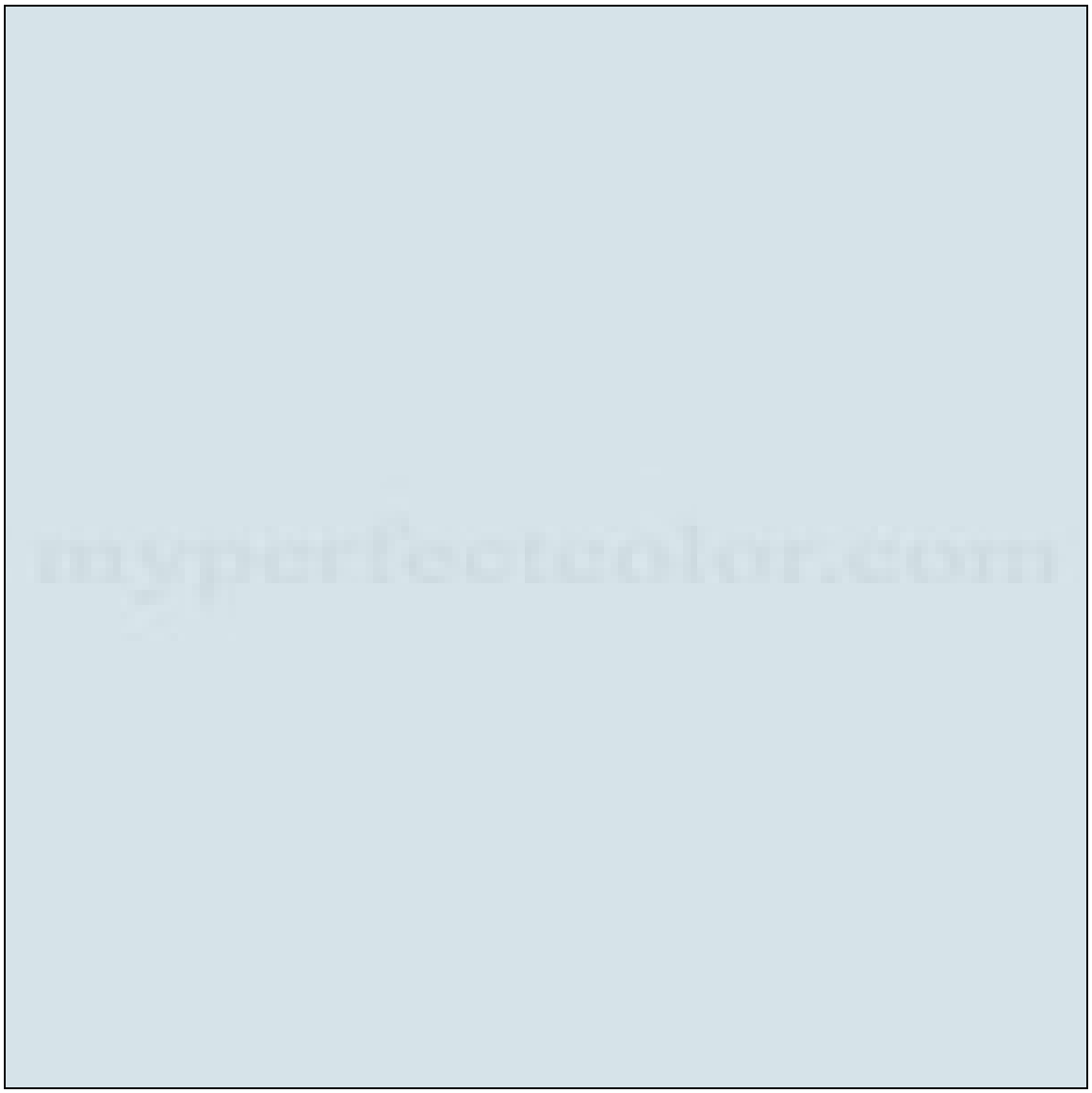
Color Name: White Smoke
Color Number: 26-02

Color Collection (s):
Clean Colors

Color Information:
Pratt & Lambert (1201)

RGB Value:
R: 218
G: 229
B: 235

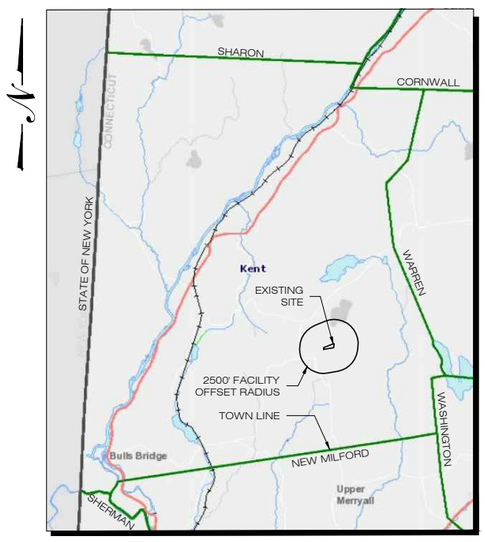
Hex Value:
dae5eb



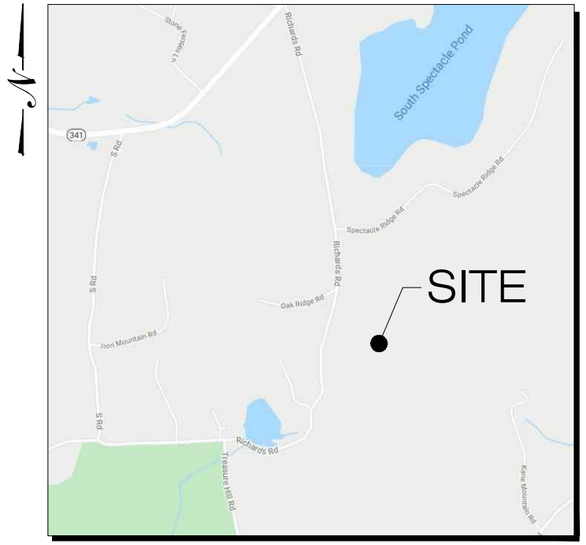
HOMELAND TOWERS, LLC

WIRELESS TELECOMMUNICATIONS FACILITY

KENT
93 RICHARDS ROAD
KENT, CT 06785



MUNICIPAL NOTIFICATION LIMIT MAP
SCALE : 1" = 1.5 Miles



VICINITY MAP
SCALE: 1" = 500'

DRAWING INDEX

T-1	TITLE SHEET & INDEX
EX-1	EXISTING CONDITIONS SURVEY
SP-1	SITE PLAN & ABUTTERS MAP
CP-1	COMPOUND PLAN
GR-1	GRADING & LANDSCAPING PLANS
A-1	TOWER ELEVATION
C-1	SITE DETAILS
C-2	SITE DETAILS
C-3	AT&T EQUIPMENT PLAN & DETAILS
C-4	AT&T ANTENNA PLAN & DETAILS
C-5	MUNICIPAL ANTENNA PLANS & DETAILS
S-1	STRUCTURAL PLAN & DETAILS
EC-1	EROSION CONTROL NOTES
N-1	NOTES & SPECIFICATIONS

SITE INFORMATION

PROJECT LOCATION: 93 RICHARDS ROAD
KENT, CT 06785

PROJECT DESCRIPTION: RAWLAND SITE W/ GROUND EQUIPMENT WITHIN 6,075 SF TELECOMMUNICATIONS LEASE AREA W/ NEW 135'± AGL 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) 582-2036

LATITUDE: 41° 42' 31.000"N
LONGITUDE: 73° 25' 13.710"W
ELEVATION: 1,345.5'± AMSL

MAP: 17
BLOCK: 25
LOT: 1
ZONE: RURAL DISTRICT

OWNER:
JASON & JENNIFER DUBRAY
93 RICHARDS ROAD
KENT, CT 06785

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: (860) 496-5234
UTILITY APPLICATION #4944909

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 VAUXHAUL STREET EXTENSION - SUITE 311
WATERFORD, CT 06385 PHONE: (860)-663-1697
WWW.ALLPOINTSTECH.COM FAX: (860)-663-0935

D&M DOCUMENTS

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4		
5		
6		

DESIGN PROFESSIONALS OF RECORD

PROF: ROBERT C. BURNS P.E.
COMP: ALL-POINTS TECHNOLOGY CORPORATION, P.C.
ADD: 567 VAUXHAUL STREET EXTENSION - SUITE311 WATERFORD, CT 06385

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

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

HOMELAND TOWERS KENT

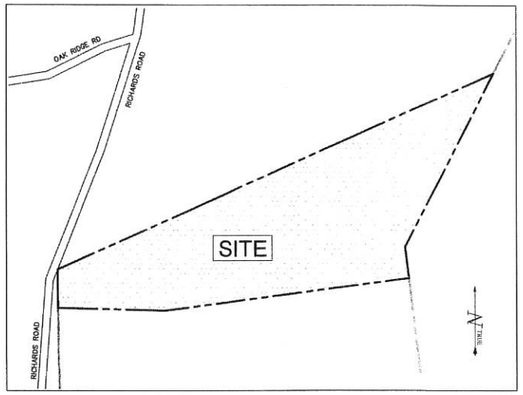
SITE ADDRESS: 93 RICHARDS ROAD KENT, CT 06785

APT FILING NUMBER: CT283180

DATE: 05/18/21 | DRAWN BY: CSH | CHECKED BY: RCB

SHEET TITLE:
TITLE SHEET & INDEX

SHEET NUMBER:
T-1



LOCATION MAP
(NOT IN SCALE)

NOTES

1) NORTH ORIENTATION AND COORDINATES REFER TO NAD 83.

2) ELEVATIONS BASED ON NAVD 1988.

1) PARCEL OWNER OF RECORD: JENNIFER DUBRAY & JASON
93 RICHARDS RD
KENT, CT
VOL. 94 PAG. 579

4) PARCEL AREA: 297,100.54SQ. FT., 6.821 ACRES.

5) PARCEL IS IN THE RURAL ZONING DISTRICT

6) PARCEL ID: MAP 17, BLOCK 25, LOT 01 PER THE TOWN OF KENT ASSESSOR MAPPING

7) PARCEL IS IN ZONE C FIRM FLOOD INSURANCE RATE MAP, TOWN OF KENT, CONNECTICUT LITCHFIELD COUNTY, PANEL 12 OF 15, COMMUNITY PANEL NUMBER 09018600012B, EFFECTIVE DATE: MARCH 4, 1980 BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY.

MAP REFERENCES

1) HOMELAND TOWERS: CT 757 – KENT, CT 757 – KENT, RICHARDS ROAD, SOUTH KENT, CT 06785–1319, SITE PLAN, SCALE: 1" = 200'–0"

2) SUBDIVISION PLAN PREPARED FOR MARJORIE E. RICHARDS, RICHARDS ROAD, KENT, CONNECTICUT, SCALE 1' = 100', NOV. 1989, REVISED DEC. 6, 1989.

3) SUBDIVISION PLAN PREPARED FOR CAMP KENT ASSOCIATES, RICHARDS ROAD, KENT, CONNECTICUT, SCALE 1"= 100', FEBRUARY, 1985

4) MAP PREPARED FOR MARJORIE E. RICHARDS ET AL , RICHARDS ROAD AND TREASURE HILL ROAD, KENT, CONNECTICUT, SCALE 1"= 100', JUNE, 194.

5) PROPERTY OF LINO P. RIDOLFI & LOUIS J. SKROVANEK, KENT HOLLOW, KENT, CONNECTICUT, DECEMBER, 1965.

SYMBOLS LEGEND

Traverse	Property Line
Deciduous Tree	Existing Road
Coniferous Tree	Fence Line
Iron Pin	Stone Wall
"CL" Catch Basin	Tree Line
Manhole	Contour Line
Hand hole	Spot Grade
Stone Pile	

THIS SURVEY AND MAP HAS BEEN PREPARED IN ACCORDANCE WITH SECTIONS 20–300B–1 THRU 20–300B–20 OF THE REGULATIONS OF CONNECTICUT STATE AGENCIES – "MINIMUM STANDARDS FOR SURVEYS AND MAPS IN THE STATE OF CONNECTICUT" AS ENDORSED BY THE CONNECTICUT ASSOCIATION OF LAND SURVEYORS, INC. ON SEPT. 26, 1996. IT IS A LIMITED TOPOGRAPHIC / BOUNDARY SURVEY AND IS BASED UPON A DEPENDENT RESURVEY CONFORMING TO HORIZONTAL ACCURACY CLASS A–2 AND A VERTICAL ACCURACY OF CLASS T–2 AND IS INTENDED TO BE USED FOR THE PURPOSE OF SHOWING EXISTING CONDITIONS AND PROPERTY LINE INFORMATION. TO BEST OF MY KNOWLEDGE AND BELIEF THIS MAP IS SUBSTANTIALLY CORRECT AS NOTED HEREON.

10/21/19

A. RAFAEL MARTINEZ / LICENSED LAND SURVEYOR / DATE

STATE OF CONNECTICUT
ABEL R. MARTINEZ
No. 18833
LICENSED
LAND SURVEYOR

HOMELAND TOWERS SITE NUMBER:
CT-757-KENT

APT FILING NUMBER:
CT-283-180

PERMITTING DOCUMENTS

CT-757-KENT
93 RICHARDS ROAD
SOUTH KENT, CT 06785

DESIGN TYPE:

RAW LAND

REVISIONS:

REV.0:
REV.1:
REV.2:
REV.3:
REV.4:
REV.5:

EXISTING CONDITIONS SURVEY

APT FILING NUMBER: CT-283-180
APT DRAWING NUMBER: CT - 757 - KENT
DRAWN BY: KKS | SCALE: 1"=40'
CHECKED BY: JPB | DATE: 10/21/19

SHEET NUMBER:

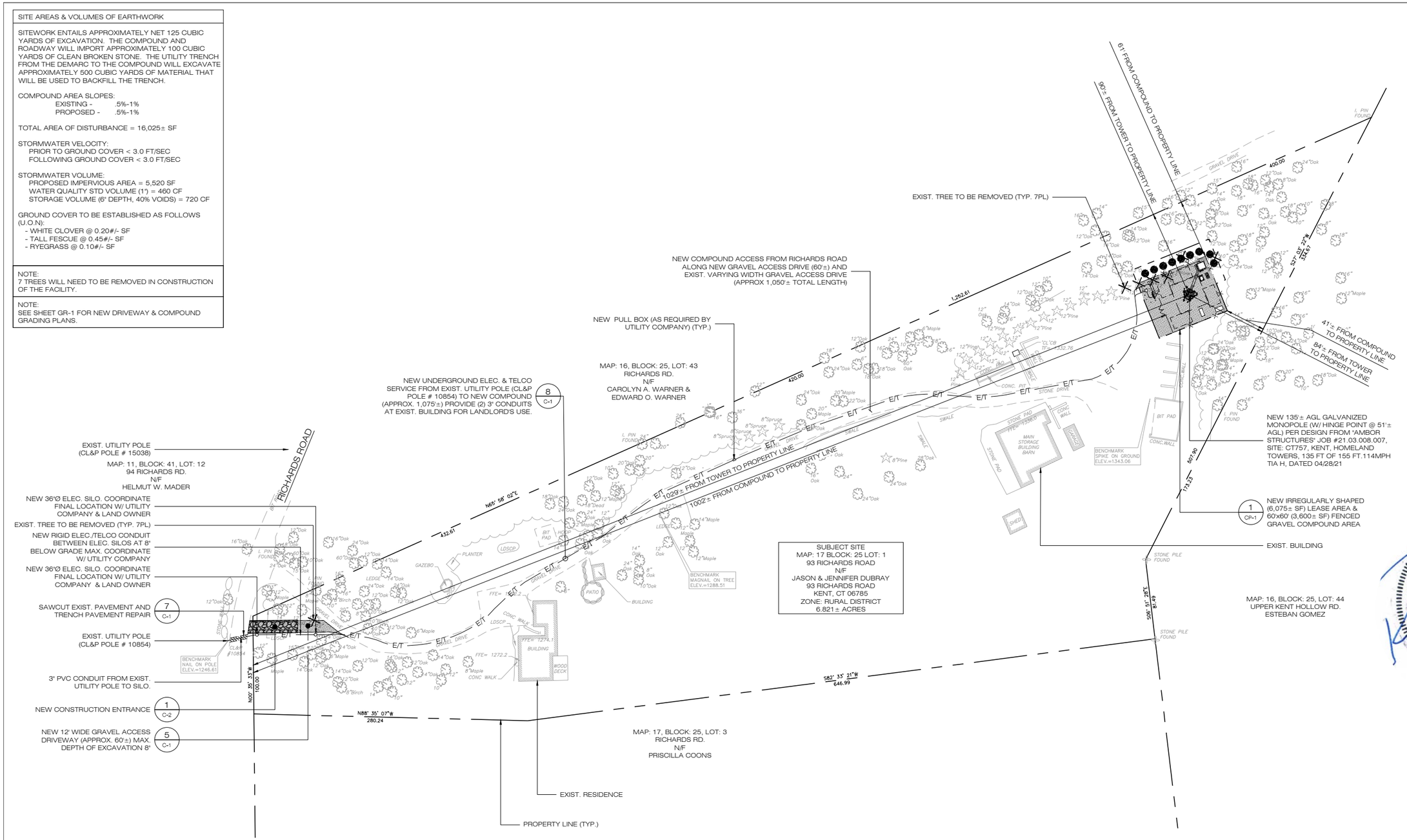
EX-1

ALL-POINTS TECHNOLOGY CORPORATION
3 SADDLEBROOK DRIVE
KILLINGWORTH, CT 06419
WWW.ALLPOINTSTECH.COM
PHONE: (860)-663-1697
FAX: (860)-663-0935

SITE AREAS & VOLUMES OF EARTHWORK
SITEWORK ENTAILS APPROXIMATELY NET 125 CUBIC YARDS OF EXCAVATION. THE COMPOUND AND ROADWAY WILL IMPORT APPROXIMATELY 100 CUBIC YARDS OF CLEAN BROKEN STONE. THE UTILITY TRENCH FROM THE DEMARC TO THE COMPOUND WILL EXCAVATE APPROXIMATELY 500 CUBIC YARDS OF MATERIAL THAT WILL BE USED TO BACKFILL THE TRENCH. COMPOUND AREA SLOPES: EXISTING - .5%-1% PROPOSED - .5%-1% TOTAL AREA OF DISTURBANCE = 16,025± SF STORMWATER VELOCITY: PRIOR TO GROUND COVER < 3.0 FT/SEC FOLLOWING GROUND COVER < 3.0 FT/SEC STORMWATER VOLUME: PROPOSED IMPERVIOUS AREA = 5,520 SF WATER QUALITY STD VOLUME (1") = 460 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

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

NOTE:
SEE SHEET GR-1 FOR NEW DRIVEWAY & COMPOUND GRADING PLANS.



LEGEND

- PROPERTY LINE
- E/T — NEW UNDERGROUND ELECTRICAL/TELCO.
- SF — NEW SILT FENCE
- REMOVE EXIST. TREE

MAP REFERENCES:
1. "EX-1, EXISTING CONDITIONS SURVEY PLAN", SHEET 1 OF 1, PREPARED BY MARTINEZ COUCH & ASSOCIATES, LLC, DATED 10/21/19

1 SP-1 **SITE PLAN**
SCALE : 1" = 50'-0"

50 0 25 50 100
(IN FEET) 1 inch = 50 ft.

ENGINEERING ANALYSIS AND CERTIFICATION

IN ACCORDANCE WITH THE 2018 CONNECTICUT STATE BUILDING CODE AND THE TELECOMMUNICATIONS INDUSTRY ASSOCIATION STANDARD TIA-222-H "STRUCTURAL STANDARD FOR ANTENNA SUPPORT STRUCTURES AND ANTENNAS" FOR FAIRFIELD COUNTY, THE TOWER WOULD BE DESIGNED TO WITHSTAND PRESSURES EQUIVALENT TO A MAXIMUM 125 MPH ULTIMATE BASIC WIND SPEED EQUIVALENT TO 97 MPH NOMINAL BASIC WIND SPEED PER REPORT PREPARED BY AMBOR STRUCTURES" JOB #21.03.008.007, SITE: CT757, KENT, HOMELAND TOWERS, 135 FT OF 155 FT.114MPH TIA H, DATED 04/28/21. THE FOUNDATION DESIGN WOULD BE BASED ON SOIL CONDITIONS AT THE SITE.

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

at&t
340 MOUNT KEMBLE AVENUE
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APT FILING NUMBER: CT283180

DATE: 05/18/21 | DRAWN BY: CSH
CHECKED BY: RCB

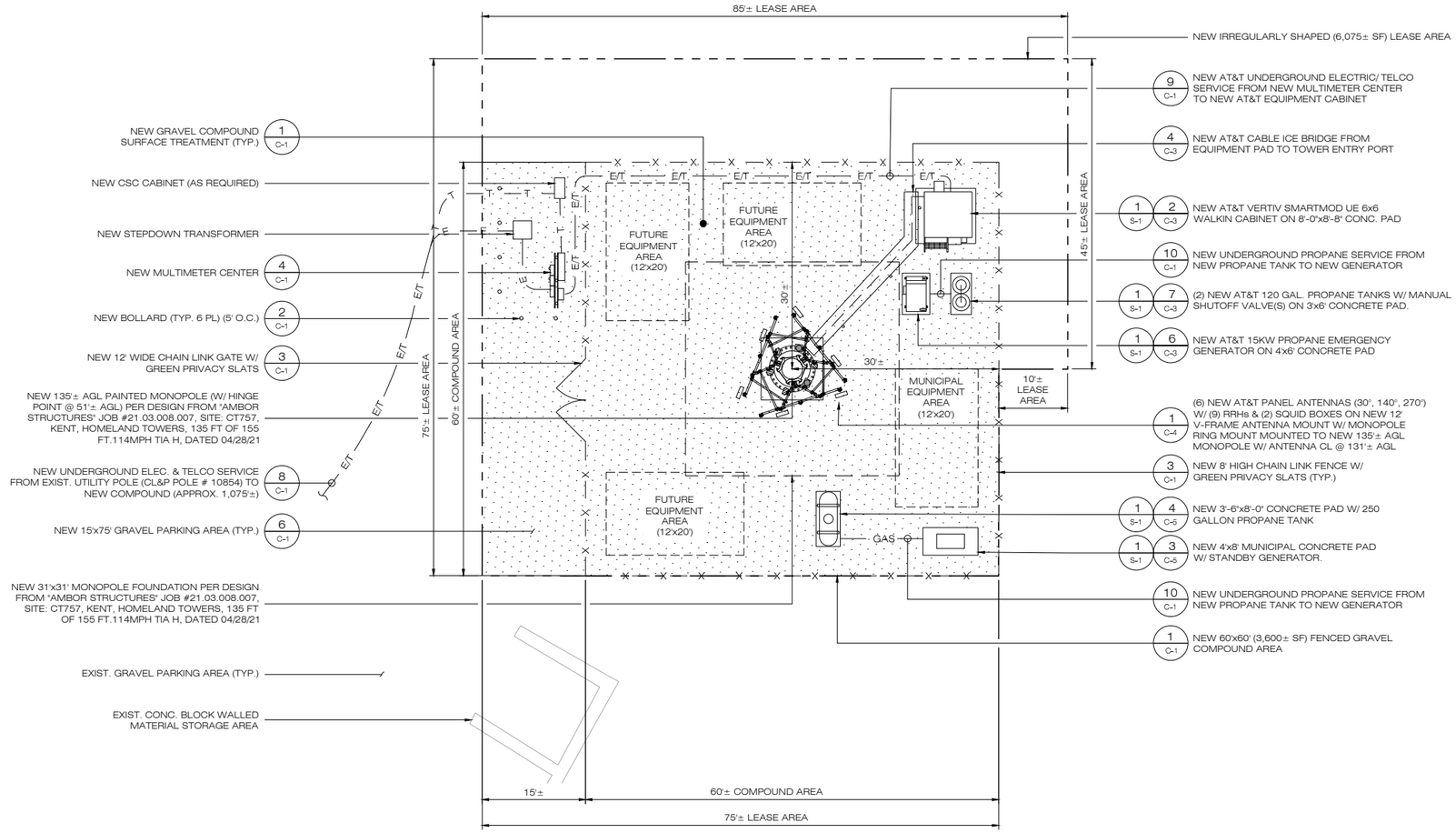
SHEET TITLE:
SITE PLAN & ABUTTERS MAP

SHEET NUMBER:
SP-1

TOWER PAINTING NOTE:
LOWER PORTION OF TOWER TO BE PAINTED A BROWN-GRAY COLOR AND THE UPPER PORTION A GRAY-BLUE COLOR.

LEGEND

- PROPERTY LINE
- NEW LEASE LINE
- X X X X — 8' HIGH CHAIN LINK FENCE W/ GREEN PRIVACY SLATS
- E/T E/T — NEW ELEC./TELCO LINE
- GAS GAS — NEW PROPANE SERVICE



1 A-1

1 CP-1 COMPOUND PLAN

SCALE : 1" = 10'-0"

10 0 5 10 20
(IN FEET) 1 inch = 10 ft.

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APT FILING NUMBER: CT283180

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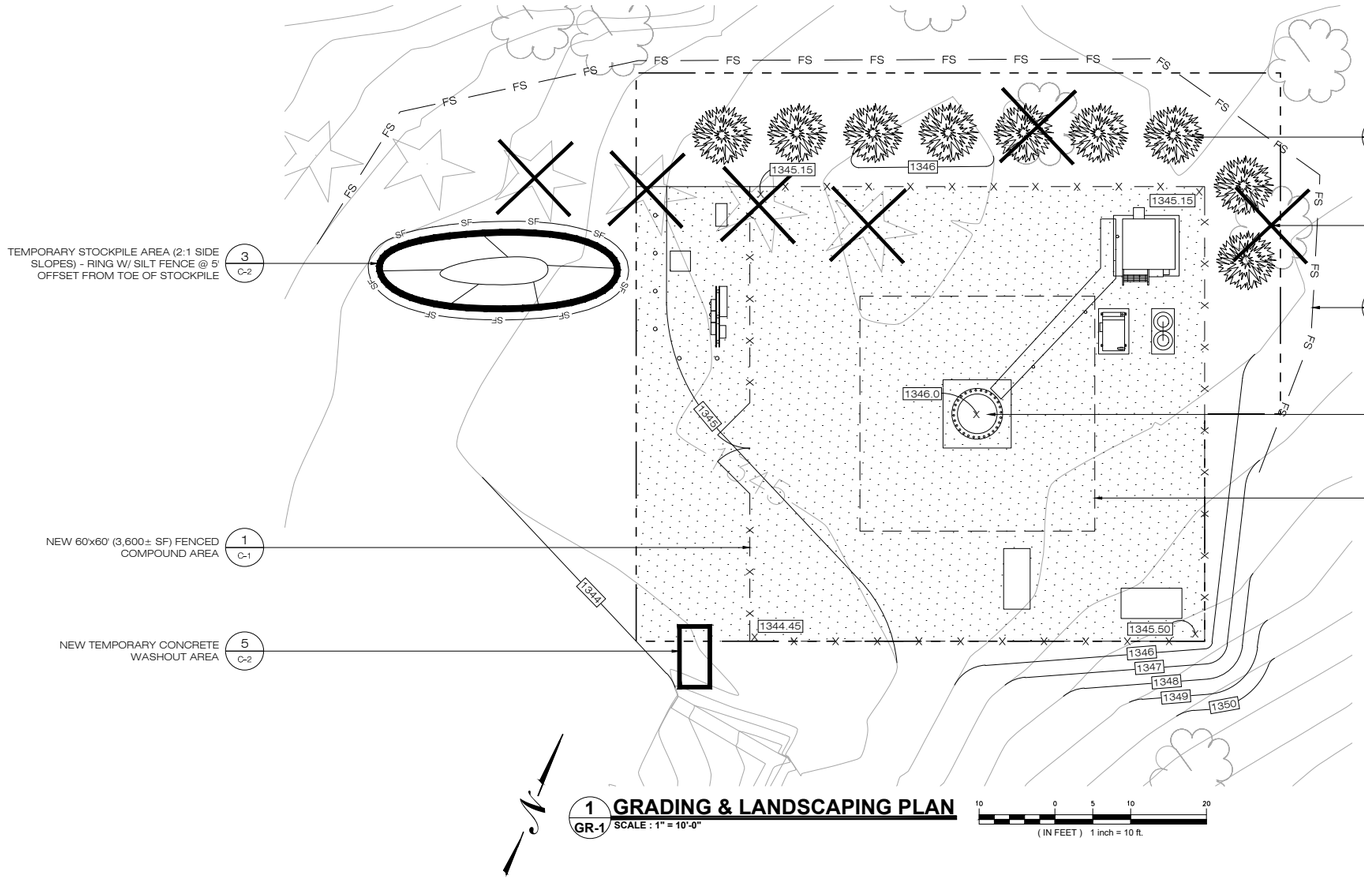
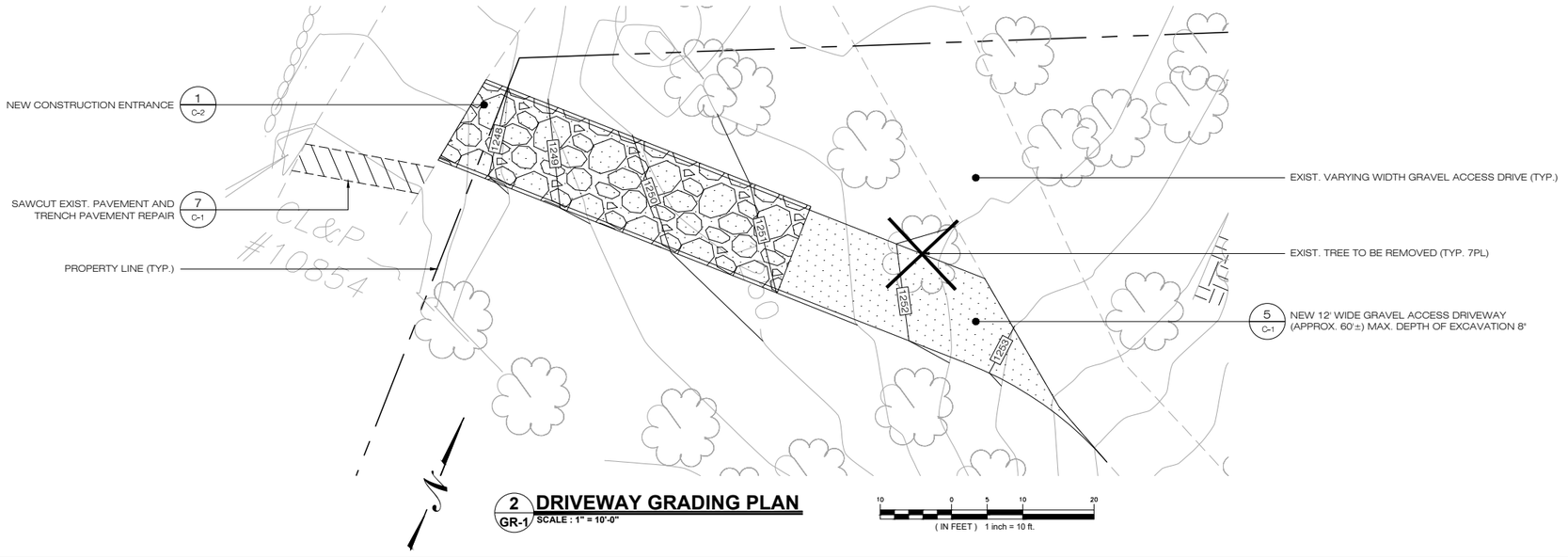
SHEET TITLE: **COMPOUND PLAN**

SHEET NUMBER: **CP-1**



1 GR-1 GRADING & LANDSCAPING PLAN

SCALE : 1" = 10'-0"



2 GR-1 DRIVEWAY GRADING PLAN

SCALE : 1" = 10'-0"

LEGEND

- PROPERTY LINE
- 8' HIGH CHAIN LINK FENCE W/ GREEN PRIVACY SLATS
- FILTER SOCK
- EXIST. TREE TO REMAIN
- EXIST. TREE TO BE REMOVED
- NEW 8'-10' TALL EMERALD GREEN ARBORVITAE

LANDSCAPE NOTE:
ALL NEW LANDSCAPING WILL BE FULLY WARRANTED FOR 3 YEARS

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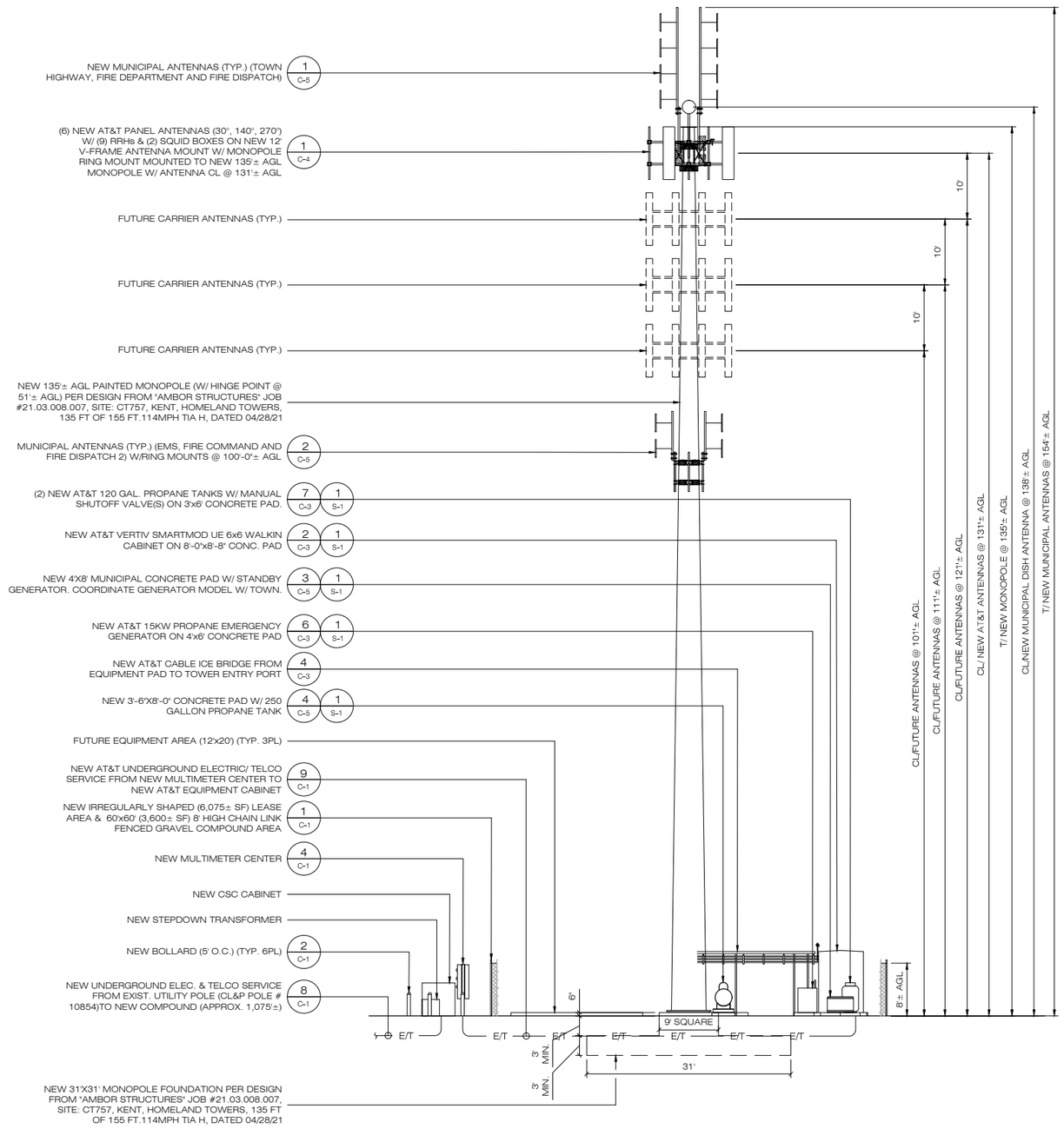
SHEET TITLE:
GRADING & LANDSCAPING PLANS

SHEET NUMBER:
GR-1



TOWER PAINTING NOTE:
LOWER PORTION OF TOWER TO BE PAINTED A BROWN-GRAY COLOR AND THE UPPER PORTION A GRAY-BLUE COLOR.

1 A-1 **SOUTEAST ELEVATION**
SCALE : 1" = 10'-0"

10 0 5 10 20
(IN FEET) 1 inch = 10 ft.

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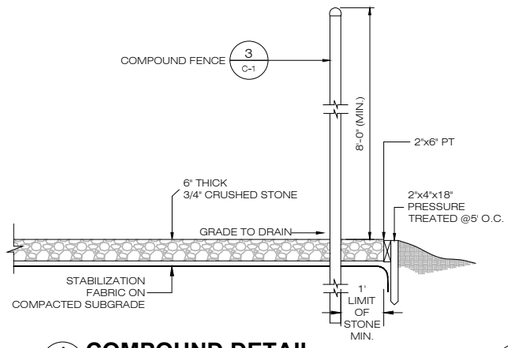
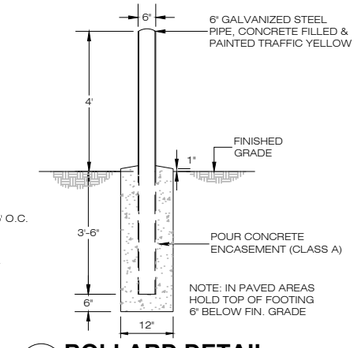
SHEET TITLE:
TOWER ELEVATION

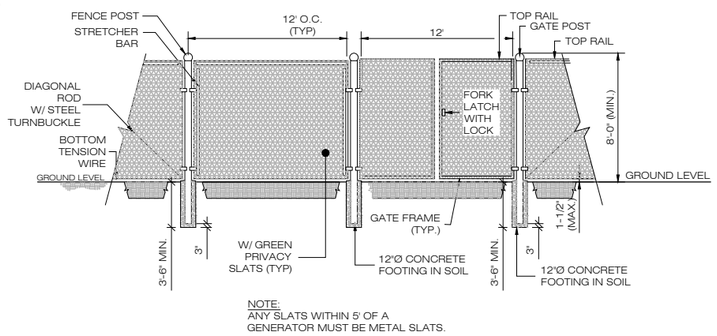
SHEET NUMBER:
A-1



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

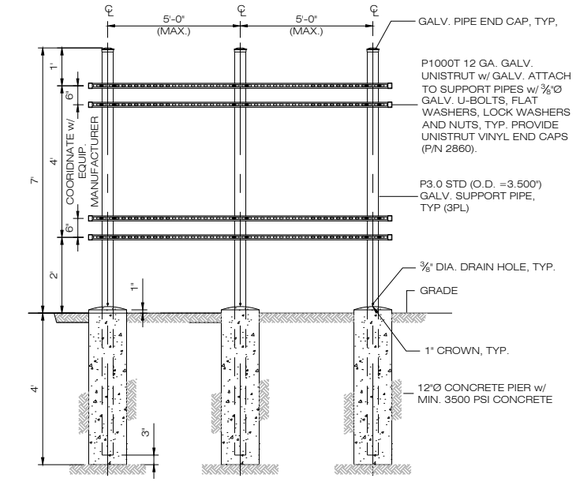


2 C-1 BOLLARD DETAIL
SCALE : N.T.S.

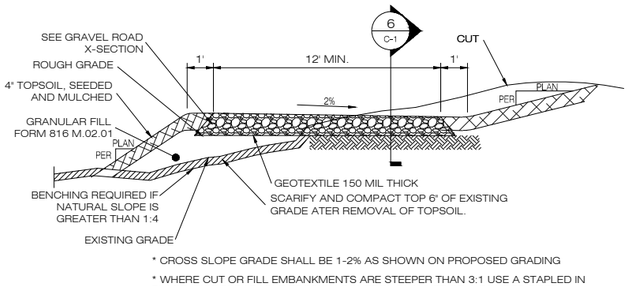


NOTE:
ANY SLATS WITHIN 5' OF A
GENERATOR MUST BE METAL SLATS.

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



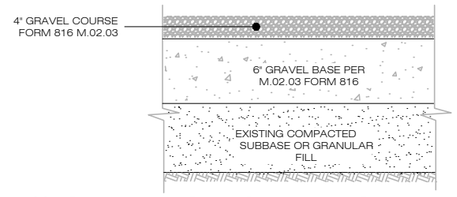
4 C-1 UTILITY BACKBOARD FRAME DETAIL
SCALE : N.T.S.



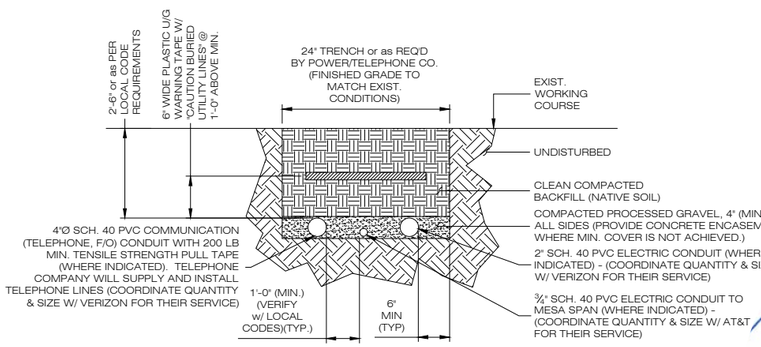
* CROSS SLOPE GRADE SHALL BE 1-2% AS SHOWN ON PROPOSED GRADING

* WHERE CUT OR FILL EMBANKMENTS ARE STEEPER THAN 3:1 USE A STAPLED IN PLACE, BIODEGRADABLE EROSION CONTROL BLANKET OR A BONDED FIBER MATRIX HYDROSEED APPLICATION.

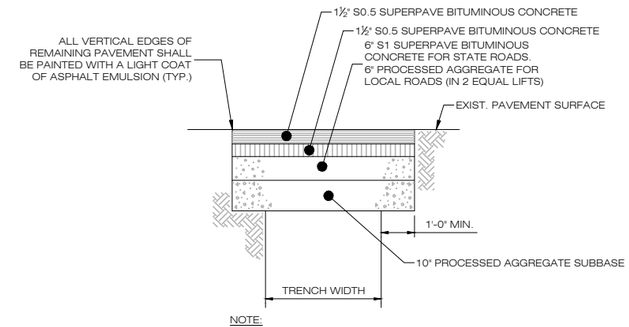
5 C-1 TYPICAL ROAD CROSS SECTION
SCALE : N.T.S.



6 C-1 GRAVEL ROAD & PARKING AREA SECTION
SCALE : N.T.S.

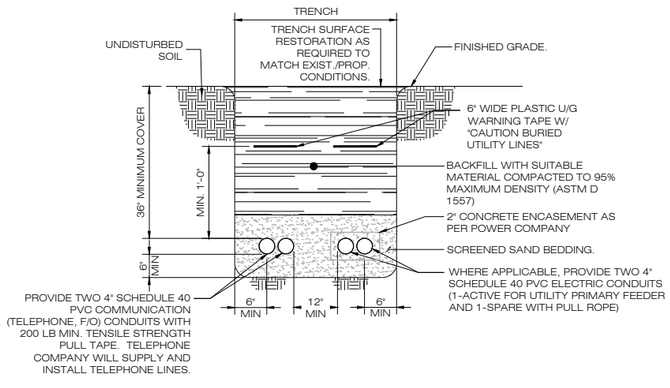


9 C-1 SECONDARY TRENCH DETAIL
SCALE : N.T.S.



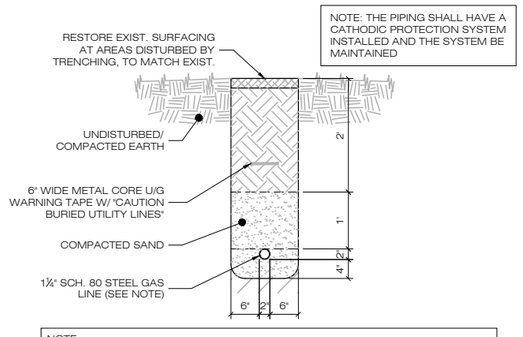
NOTE:
REFER TO SECTION M.04 OF CTDOT FORM 817
FOR BITUMINOUS CONCRETE MATERIALS.

7 C-1 PAVEMENT REPAIR OVER TRENCH
SCALE : N.T.S.



NOTES:
1. THE CLEAN FILL SHALL PASS THROUGH A 3/8" MESH SCREEN AND SHALL NOT CONTAIN SHARP STONES. OTHER BACKFILL SHALL NOT CONTAIN ASHES, CINDERS, SHELLS, FROZEN MATERIAL, LOOSE DERBIES OR STONES LARGER THAN 2" IN MAXIMUM DIMENSION. WHERE EXISTING UTILITIES ARE LIKELY TO BE ENCOUNTERED.
2. CONTRACTOR SHALL HAND DIG AND PROTECT EXISTING UTILITIES.
3. EXISTING PAVEMENT SHALL BE SAW-CUT PRIOR TO TRENCH EXCAVATION

8 C-1 PRIMARY UTILITY TRENCH
SCALE : N.T.S.



NOTE:
STEEL PIPE INSTALLED UNDERGROUND SHALL BE INSTALLED IN ACCORDANCE WITH NFPA54. UNDERGROUND PIPING SHALL COMPLY WITH ONE OR MORE OF THE FOLLOWING:
1. THE PIPING SHALL BE MADE OF CORROSION RESISTANT MATERIAL THAT IS SUITABLE FOR BURIAL
2. PIPE SHALL HAVE A FACTORY APPLIED ELECTRICALLY INSULATING COATING. FITTINGS AND JOINTS BETWEEN SECTIONS OF COATED PIPE SHALL BE COATED IN ACCORDANCE WITH COATING MANUFACTURER'S INSTRUCTIONS
3. SEE 7/M-1 FOR PIPING STUB-UP LOCATIONS.

10 C-1 PROPANE GAS TRENCH
SCALE : N.T.S.

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HOMELAND TOWERS
KENT

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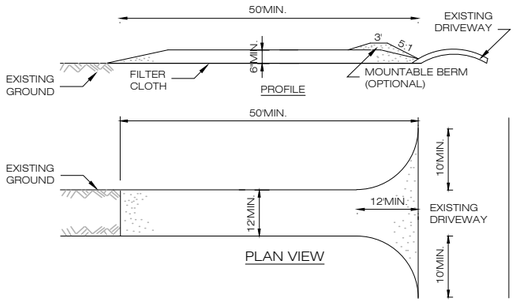
SITE DETAILS

SHEET NUMBER:
C-1

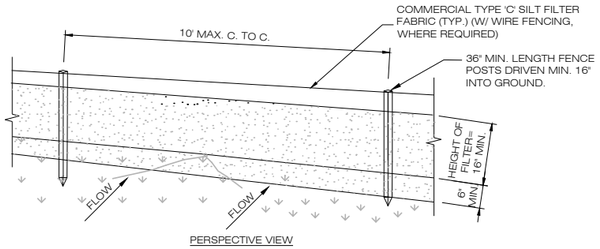


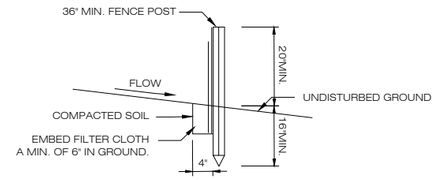
CONSTRUCTION SPECIFICATIONS:

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.

1 C-2 (CE) CONSTRUCTION ENTRANCE DETAIL

SCALE : NTS





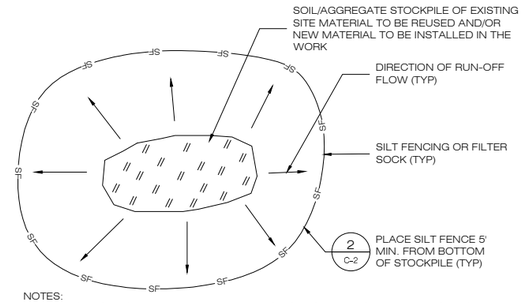
SECTION VIEW

CONSTRUCTION SPECIFICATIONS

1. POSTS SHALL BE STEEL EITHER "T" OR "U" TYPE OR HARDWOOD.
2. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVERLAPPED BY SIX INCHES AND FOLDED. FILTER CLOTH SHALL BE EITHER FILTER X, MIRAFI 100X, STABILINKA T140N, OR APPROVED EQUIVALENT.
3. PREFABRICATED UNITS SHALL BE GEOFAB, ENVIROFENCE, OR APPROVED EQUIVALENT.
4. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE.

2 C-2 GEOTEXTILE SILT FENCE DETAIL

SCALE : NTS

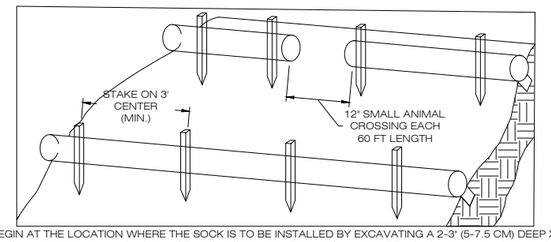


NOTES:

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.

3 C-2 TEMPORARY STOCKPILE DETAIL

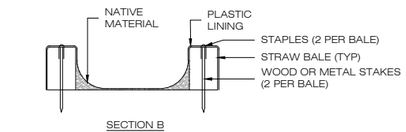
SCALE : N.T.S.



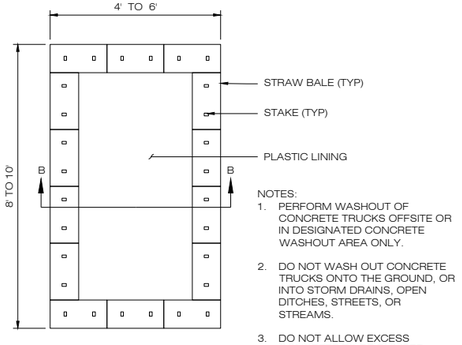
1. BEGIN AT THE LOCATION WHERE THE SOCK IS TO BE INSTALLED BY EXCAVATING A 2-3" (5-7.5 CM) DEEP X 9" (22.9 CM) WIDE TRENCH ALONG THE CONTOUR OF THE SLOPE. EXCAVATED SOIL SHOULD BE PLACED UP SLOPE FROM THE ANCHOR TRENCH.
2. PLACE THE SOCK IN THE TRENCH SO THAT IT CONTOURS TO THE SOIL SURFACE. COMPACT 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.

4 C-2 COMPOST FILTER SOCK SEDIMENTATION CONTROL BARRIER

SCALE : N.T.S.



SECTION B



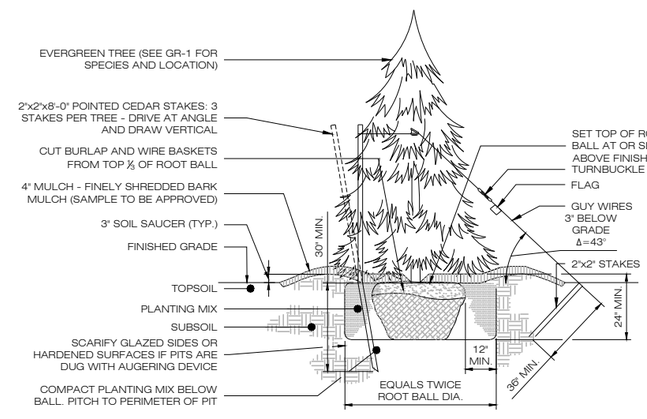
PLAN VIEW

NOTES:

1. PERFORM WASHOUT OF CONCRETE TRUCKS OFFSITE OR IN DESIGNATED CONCRETE WASHOUT AREA ONLY.
2. DO NOT WASH OUT CONCRETE TRUCKS ONTO THE GROUND, OR INTO STORM DRAINS, OPEN DITCHES, STREETS, OR STREAMS.
3. DO NOT ALLOW EXCESS CONCRETE TO BE DUMPED ONSITE, EXCEPT IN DESIGNATED CONCRETE WASHOUT AREA.

5 C-2 CONCRETE WASHOUT DETAIL

SCALE : N.T.S.



STAKING

STAKING FOR EVERGREEN TREES OVER 6' HIGH

LANDSCAPE NOTE:
ALL NEW LANDSCAPING WILL BE FULLY WARRANTED FOR 3 YEARS

6 C-2 EVERGREEN TREE PLANTING

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 VAUXHAUL STREET EXTENSION - SUITE 311
WATERFORD, CT 06385 PHONE: (860)-663-1697
WWW.ALLPOINTSTECH.COM FAX: (860)-663-0935

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DESIGN PROFESSIONALS OF RECORD

PROF: ROBERT C. BURNS P.E.
COMP: ALL-POINTS TECHNOLOGY CORPORATION, P.C.
ADD: 567 VAUXHAUL STREET EXTENSION - SUITE311 WATERFORD, CT 06385

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

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

HOMELAND TOWERS KENT

SITE 93 RICHARDS ROAD
ADDRESS: KENT, CT 06785

APT FILING NUMBER: CT283180

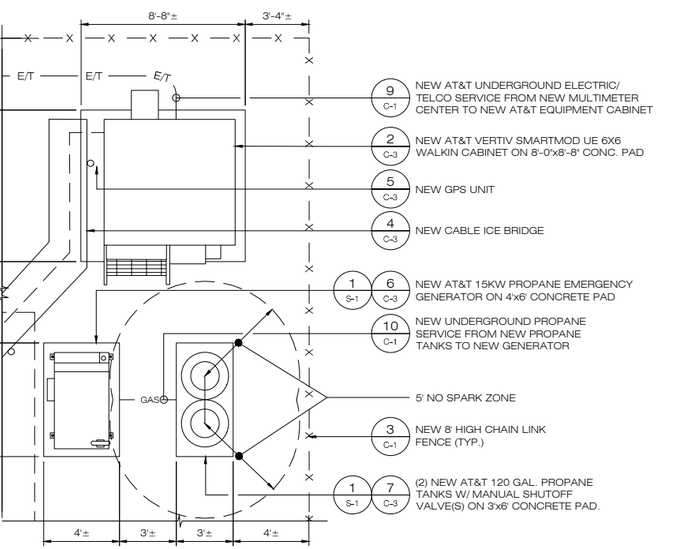
DATE: 05/18/21	DRAWN BY: CSH
	CHECKED BY: RCB

SHEET TITLE:

SITE DETAILS

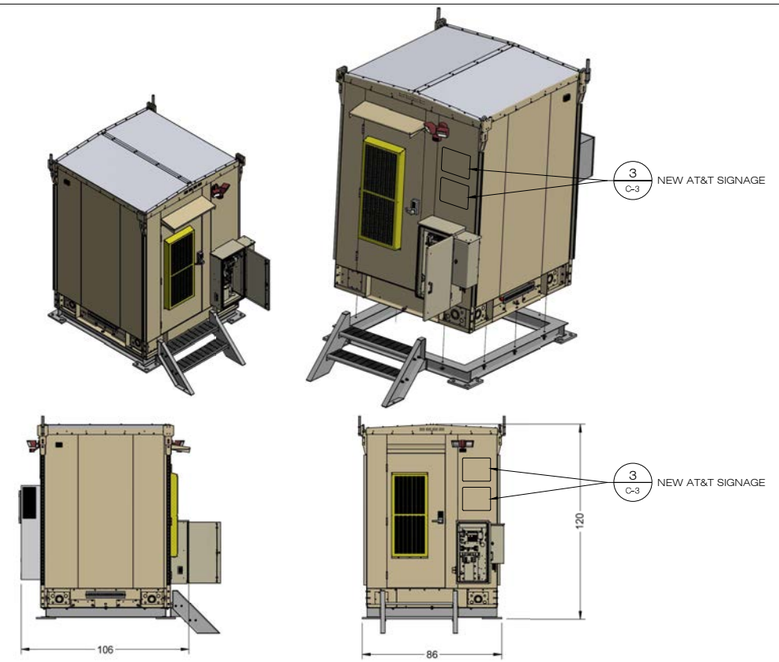
SHEET NUMBER:

C-2



1 C-3 AT&T EQUIPMENT AREA
SCALE : ¼" = 1'-0"

¼" 0 ¼" ½" ½"
1/4" = 1'-0"



2 C-3 AT&T SMARTMOD UE 6'X6' WALKIN CABINET
SCALE : ¼" = 1'-0"

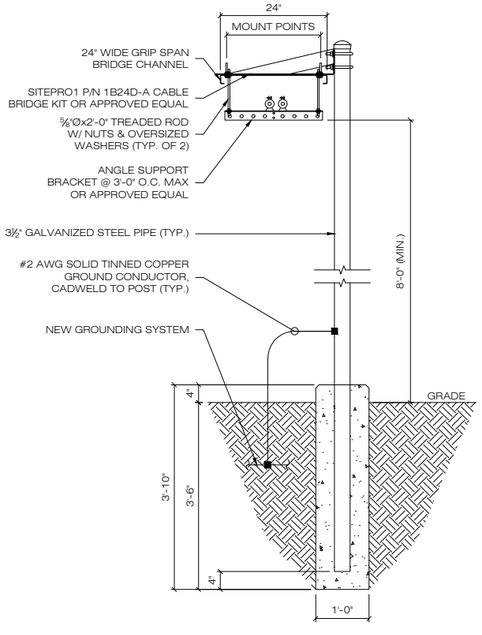
(WHITE METAL SIGN W/ BLACK LETTERING)

RF NOTICE SIGN

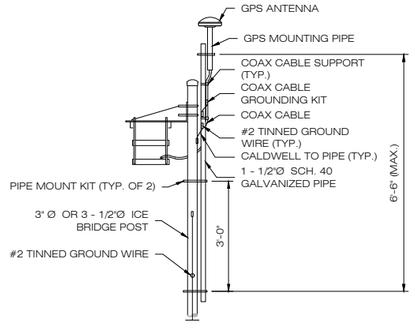
(WHITE METAL SIGN W/ BLUE LETTERING)

EMERGENCY SIGN

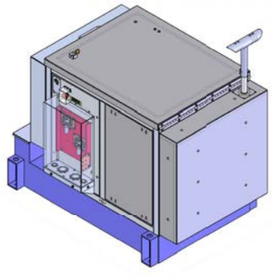
3 C-3 TYPICAL SIGNAGE
SCALE : N.T.S.



4 C-3 CABLE BRIDGE DETAIL
SCALE : N.T.S.



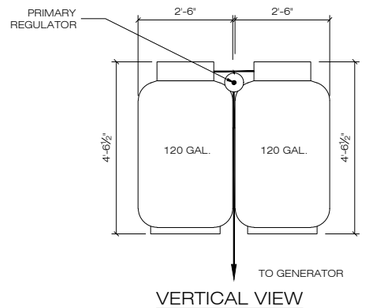
5 C-3 GPS MOUNT
SCALE : N.T.S.



POLAR POWER, INC.,
15KW 48VDC GENERATOR
HORIZONTAL ALUMINUM ENCLOSURE

6 C-3 GENERATOR
SCALE : N.T.S.

NOTES:
1. A FILL VALVE WITH A MANUAL SHUTOFF WILL BE USED. (2) MODELS ARE LISTED BELOW:
   REGO MODELS 7501L & 7502L
   MARSHALL EXCELSIOR MODELS ME600-6 & ME600-10.
2. ALL ABOVE-GROUND GAS SERVICE LINES MUST MEET CONNECTICUT STATE BUILDING CODE REGULATIONS.



VERTICAL VIEW

7 C-3 ABOVE GROUND PROPANE TANK DETAIL
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

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567 VAUXHAUL STREET EXTENSION - SUITE 311
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DEVELOPER: HOMELAND TOWERS, LLC
ADDRESS: 9 HARMONY STREET 2ND FLOOR DANBURY, CT 06810

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

HOMELAND TOWERS
KENT

SITE 93 RICHARDS ROAD
ADDRESS: KENT, CT 06785

APT FILING NUMBER: CT283180

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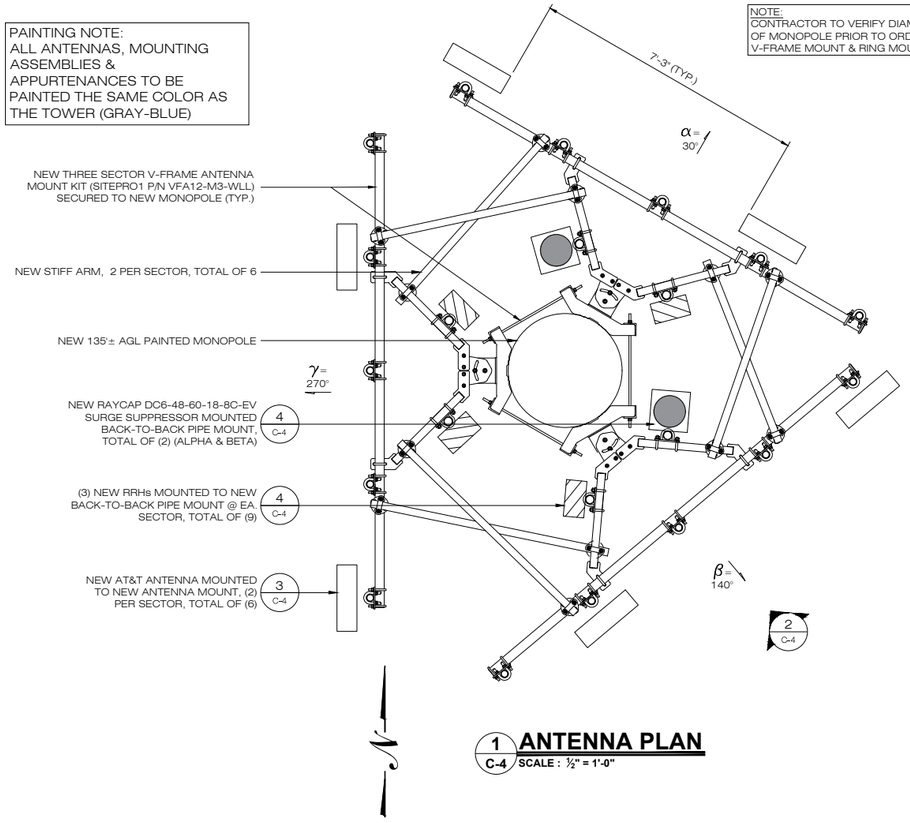
SHEET TITLE:
AT&T EQUIPMENT PLAN & DETAILS

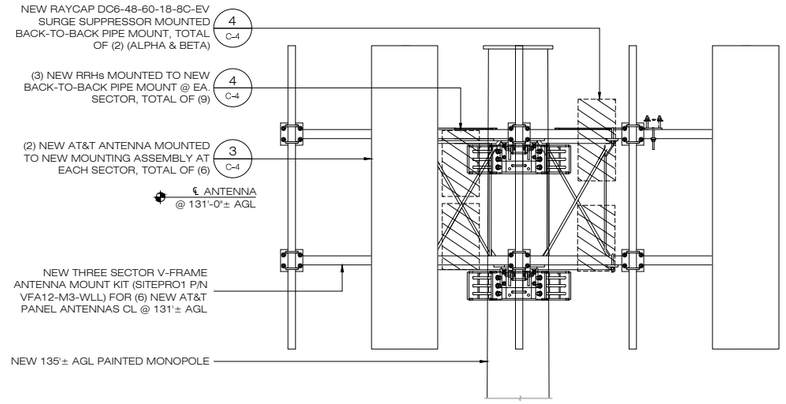
SHEET NUMBER:
C-3

PAINTING NOTE:
ALL ANTENNAS, MOUNTING ASSEMBLIES & APPURTENANCES TO BE PAINTED THE SAME COLOR AS THE TOWER (GRAY-BLUE)

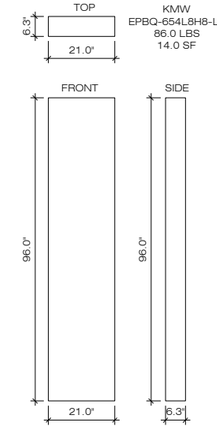
NOTE:
CONTRACTOR TO VERIFY DIAMETER OF MONOPOLE PRIOR TO ORDERING V-FRAME MOUNT & RING MOUNT



1 C-4 ANTENNA PLAN
SCALE : ½" = 1'-0"

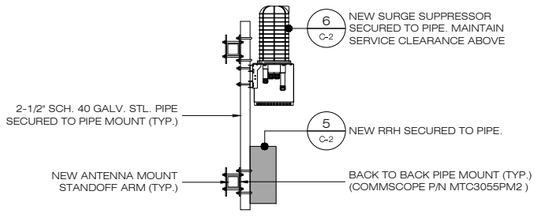


2 C-4 ANTENNA MOUNTING DETAIL
SCALE : ½" = 1'-0"

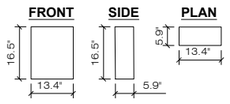


PANEL ANTENNAS

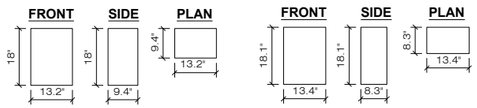
3 C-4 ANTENNA DETAIL
SCALE : ½" = 1'-0"



4 C-2 MDB/RRH MOUNT
SCALE : ½" = 1'-0"



ERICSSON B30 4415 (OR EQUAL)
REMOTE RADIO UNIT (RRU)
WxDxH=16.5"x5.9"x13.4" (46.0Lbs)

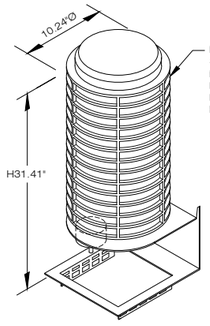


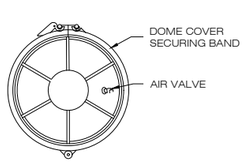
ERICSSON B5/B12 4449 (OR EQUAL)
REMOTE RADIO UNIT (RRU)
WxDxH=13.2"x9.4"x18.0" (75.0Lbs)

ERICSSON B14 4478 (OR EQUAL)
REMOTE RADIO UNIT (RRU)
WxDxH=13.4"x8.3"x18.1" (59.4Lbs)

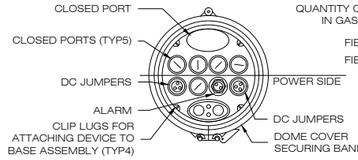
NOTES:
1. DIMENSIONS SUBJECT TO CHANGE BASED UPON AVAILABILITY AT TIME OF CONSTRUCTION.
2. MANUFACTURER'S RECOMMENDED RRH CLEARANCES: FRONT: 36"; SIDES: 12"; BOTTOM: 24"
3. SFPs ARE PROTOCOL SPECIFIC. THE CONNECTIONS BETWEEN RRHs AND BBUs ARE CPRI CONNECTIONS, AND REQUIRE CPRI SFP (ON BOTH ENDS). THE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

5 C-4 RRU EQUIPMENT
SCALE : ½" = 1'-0"

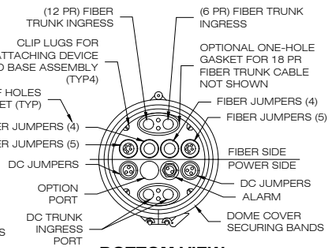




TOP VIEW



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 C-4 TYPICAL SURGE SUPPRESSOR
SCALE : N.T.S.

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

at&t
340 MOUNT KEMBLE AVENUE
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DEVELOPER: HOMELAND TOWERS, LLC
ADDRESS: 9 HARMONY STREET 2ND FLOOR DANBURY, CT 06810

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

HOMELAND TOWERS KENT

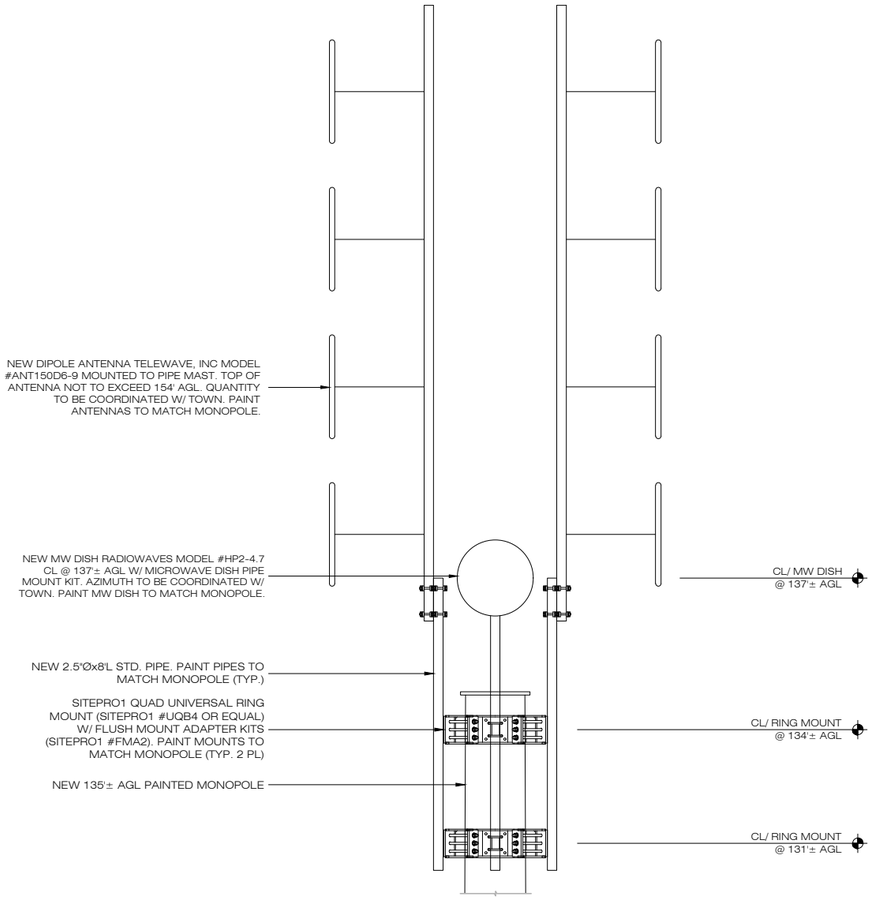
SITE ADDRESS: 93 RICHARDS ROAD KENT, CT 06785

APT FILING NUMBER: CT283180

DATE: 05/18/21 | DRAWN BY: CSH | CHECKED BY: RCB

SHEET TITLE:
AT&T ANTENNA PLAN & DETAILS

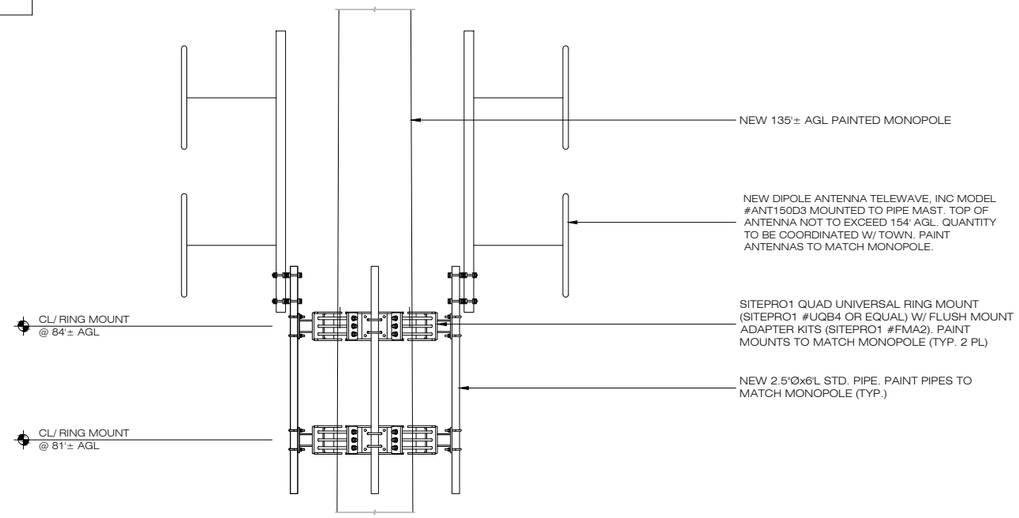
SHEET NUMBER:
C-4



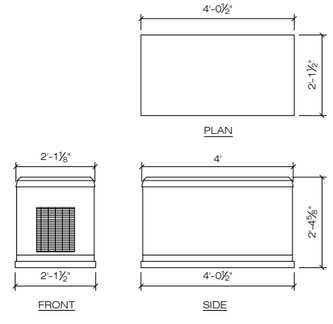
MUNICIPAL MOUNT NOTE:
THE MUNICIPAL RING MOUNTS TO BE ROTATED 60° TO THE AT&T ANTENNA MOUNT TO ALLOW THE VERTICAL PIPES TO PASS THROUGH THE AT&T ANTENNA MOUNT UNOBSTRUCTED.

1 C-5 MUNICIPAL ANTENNA MOUNT (UPPER)
SCALE : ½" = 1'-0"

PAINTING NOTE:
ALL ANTENNAS, MOUNTING ASSEMBLIES & APPURTENANCES TO BE PAINTED THE SAME COLOR AS THE TOWER (GRAY-BLUE)

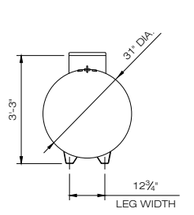


2 C-5 MUNICIPAL ANTENNA MOUNT (LOWER)
SCALE : ½" = 1'-0"

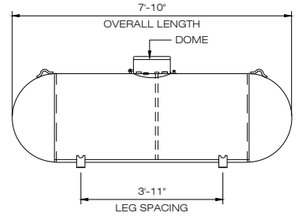


GENERAC GUARDIAN SERIES RESIDENTIAL STANDBY GENERATOR, 16/20/22 kW
W/ SOUND ENCLOSURE

3 C-5 MUNICIPAL GENERATOR
SCALE : N.T.S.



FRONT VIEW



SIDE VIEW

1. 250 USWG AMSE VIII, DIV. 1 ABOVE GROUND LPG TANK WEIGHT (EMPTY) = 1,729 lbs
2. LPG TANK TO BE BOLTED TO CONCRETE SLAB PER SUPPLIERS REQUIREMENTS.

NOTE:
PROVIDE TANK MANUFACTURER SHOP DRAWING FOR REVIEW BY ENGINEER OF RECORD PRIOR TO PURCHASE

NOTES:
1. PROPANE TANKS SHALL BE REFILLED FROM HOSE PULLED FROM A REFILLING VEHICLE PARKED AT THE NEW PARKING AREA.

2. PER NFPA 58 TABLE 5.9.4.1(B) FILLER VALVE REQUIRED ON ALL TANKS BUT MAY BE MANUAL OR BACKFLOW CHECK VALVE, NFPA 58 5.9.4.1(C)(7).

3. ALL ABOVE-GROUND GAS SERVICE LINES MUST MEET NYS CODE REGULATIONS.

4 C-5 MUNICIPAL 250 GALLON PROPANE TANK
SCALE : N.T.S.

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ALL-POINTS TECHNOLOGY CORPORATION
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D&M DOCUMENTS

NO	DATE	REVISION
0	05/18/21	FOR REVIEW: RCB
1	06/03/21	CLIENT REVS: RCB
2	06/09/21	CLIENT REVS: RCB
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DESIGN PROFESSIONALS OF RECORD

PROF: ROBERT C. BURNS P.E.
COMP: ALL-POINTS TECHNOLOGY CORPORATION, P.C.
ADD: 567 VAUXHAUL STREET EXTENSION - SUITE311 WATERFORD, CT 06385

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

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

HOMELAND TOWERS KENT

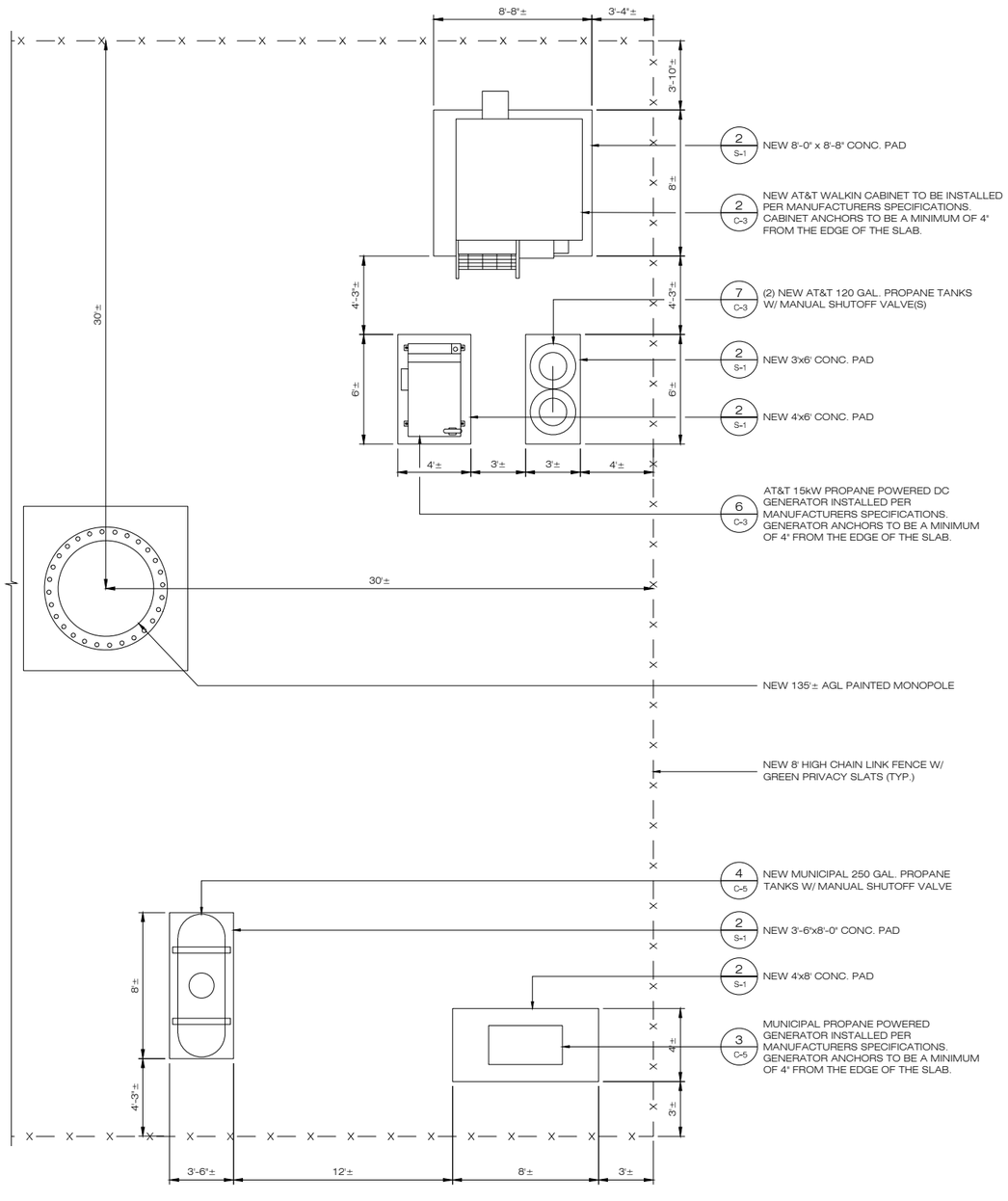
SITE 93 RICHARDS ROAD
ADDRESS: KENT, CT 06785

APT FILING NUMBER: CT283180

DATE: 05/18/21 DRAWN BY: CSH
CHECKED BY: RCB

SHEET TITLE:
MUNICIPAL ANTENNA PLANS & DETAILS

SHEET NUMBER:
C-5

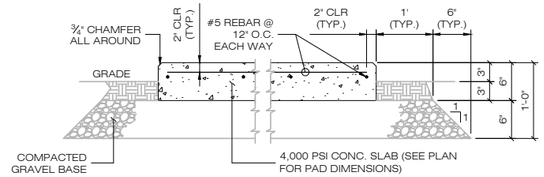


1 S-1 PARTIAL COMPOUND PLAN

SCALE : 1/4" = 1'-0"

4' 0 2' 4' 8'

1/4" SCALE: 1 INCH= 4'-0"



2 S-1 CONCRETE PAD

SCALE : N.T.S.

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

HOMELAND TOWERS KENT

SITE ADDRESS: 93 RICHARDS ROAD KENT, CT 06785

APT FILING NUMBER: CT283180

DATE: 05/18/21 | DRAWN BY: CSH | CHECKED BY: RCB

SHEET TITLE:

STRUCTURAL PLAN & DETAILS

SHEET NUMBER:

S-1

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 WATERTOWN, 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 (SEE SITE DETIALS SHEET DN-1), OR APPROVED EQUAL BY OWNER.

SEDIMENT & EROSION CONTROL NARRATIVE

1. THE PROJECT INCLUDES THE INSTALLATION OF A 135'± AGL PAINTED 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 135' MONOPOLE.
   C. CONSTRUCTION OF 60'x60' (3,600± SF) FENCED EQUIPMENT COMPOUND W/ GRAVEL SURFACE TREATMENT AND ASSOCIATED UTILITIES.
   D. CONSTRUCTION OF 60'± 12' WIDE GRAVEL ACCESS DRIVE.
   E. CONSTRUCTION OF 8'-0"x8'-8" CONCRETE EQUIPMENT PAD, 4'x6' CONCRETE EQUIPMENT PAD, 3'x6' CONCRETE EQUIPMENT PAD, 3'-6"x8'-0" CONCRETE EQUIPMENT PAD & 4'x8' CONCRETE PAD WITH 250 GALLON PROPANE TANK.
   F. THE STABILIZATION OF PERVIOUS DISTURBED AREAS WITH PERMANENT GRASS TREATMENTS.

2. FOR THIS PROJECT, THERE ARE APPROXIMATELY 16,025± 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-2 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 GRADE NEW ACCESS DRIVE.

9. EXCAVATE AND ROUGH GRADE EQUIPMENT COMPOUND.

10. EXCAVATE FOR TOWER FOUNDATION & EQUIPMENT PADS.

11. FINALIZE ACCESS ROAD GRADES.

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

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

14. BACKFILL TOWER FOUNDATION.

15. ERECT MONOPOLE.

16. INSTALL TELECOMMUNICATIONS EQUIPMENT ON TOWER & COMPOUND.

17. INSTALL COMPOUND GRAVEL SURFACES.

18. FINALIZE GRADES. INSTALL GRAVEL SURFACES. PAVE ACCESS DRIVE.

19. INSTALL FENCING.

20. CONNECT GROUNDING LEADS & LIGHTNING PROTECTION

21. FINAL GRADE AROUND COMPOUND.

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

23. TEST ALL NEW EQUIPMENT.

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

25. 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	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.

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HOMELAND TOWERS KENT

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DATE: 05/18/21 | DRAWN BY: CSH | CHECKED BY: RCB

SHEET TITLE:

EROSION CONTROL NOTES

SHEET NUMBER:

EC-1

DESIGN BASIS:

GOVERNING CODES/DESIGN STANDARDS:

- 2015 IBC/2018 CONNECTICUT STATE BUILDING CODE
- NATIONAL ELECTRIC CODE
- TIA-222-H

DESIGN CRITERIA:

RISK CATEGORY :	II	(2018 CSBC TABLE 1604.5) (TIA-222-H, TABLE 2-1)

SNOW LOAD:

GROUND, P_g:	30 PSF	(2018 CSBC APPENDIX N)
MINIMUM FLAT ROOF, P_{fmin} :	30 PSF	(2018 CSBC SECT. 1608.1.1)

WIND LOADS:

ULTIMATE BASIC WIND SPEED, V_{ULT}: (3-SECOND GUST)	114 MPH	(TIA-222-H, ANNEX B)
EXPOSURE CATEGORY	C	(2015 IBC SECT. 1609.4)

ICE LOADS:

ICE THICKNESS, t_i:	1.00 IN	(TIA-222-H, ANNEX B)
ICE THICKNESS IMPORTANCE FACTOR, I_i:	1.0	(TIA-222-H, ANNEX B)
NOMINAL BASIC WIND SPEED W/ ICE, Vi (3-SECOND GUST)	40 MPH	(TIA-222-H, ANNEX B)

SEISMIC LOAD:

REFER TO SECTION 1613 OF THE 2015 IBC/2018 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	HILTI HY 70
MASONRY	ADHESIVE WITH SCREEN TUBE
HOLLOW /	HILTI HY 70 ADHESIVE WITH
MULTI-WIDTH	HILTI HY 70 ADHESIVE WITH
MASONRY	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 MANUFACTURER'S 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	05/18/21	FOR REVIEW: RCB
1	06/03/21	CLIENT REVS: RCB
2	06/09/21	CLIENT REVS: RCB
3		
4		
5		
6		

DESIGN PROFESSIONALS OF RECORD

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APT FILING NUMBER: CT283180

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NOTES & SPECIFICATIONS

SHEET NUMBER:

N-1