

PETITION TO THE CONNECTICUT SITING COUNCIL
FOR A DECLARATORY RULING OF
NO SUBSTANTIAL ADVERSE ENVIRONMENTAL EFFECT
FOR THE PROPOSED INSTALLATION OF ONE OMNI-
DIRECTIONAL ANTENNA FOR COMMUNICATIONS IN
THE TOWN OF BRANFORD, CONNECTICUT

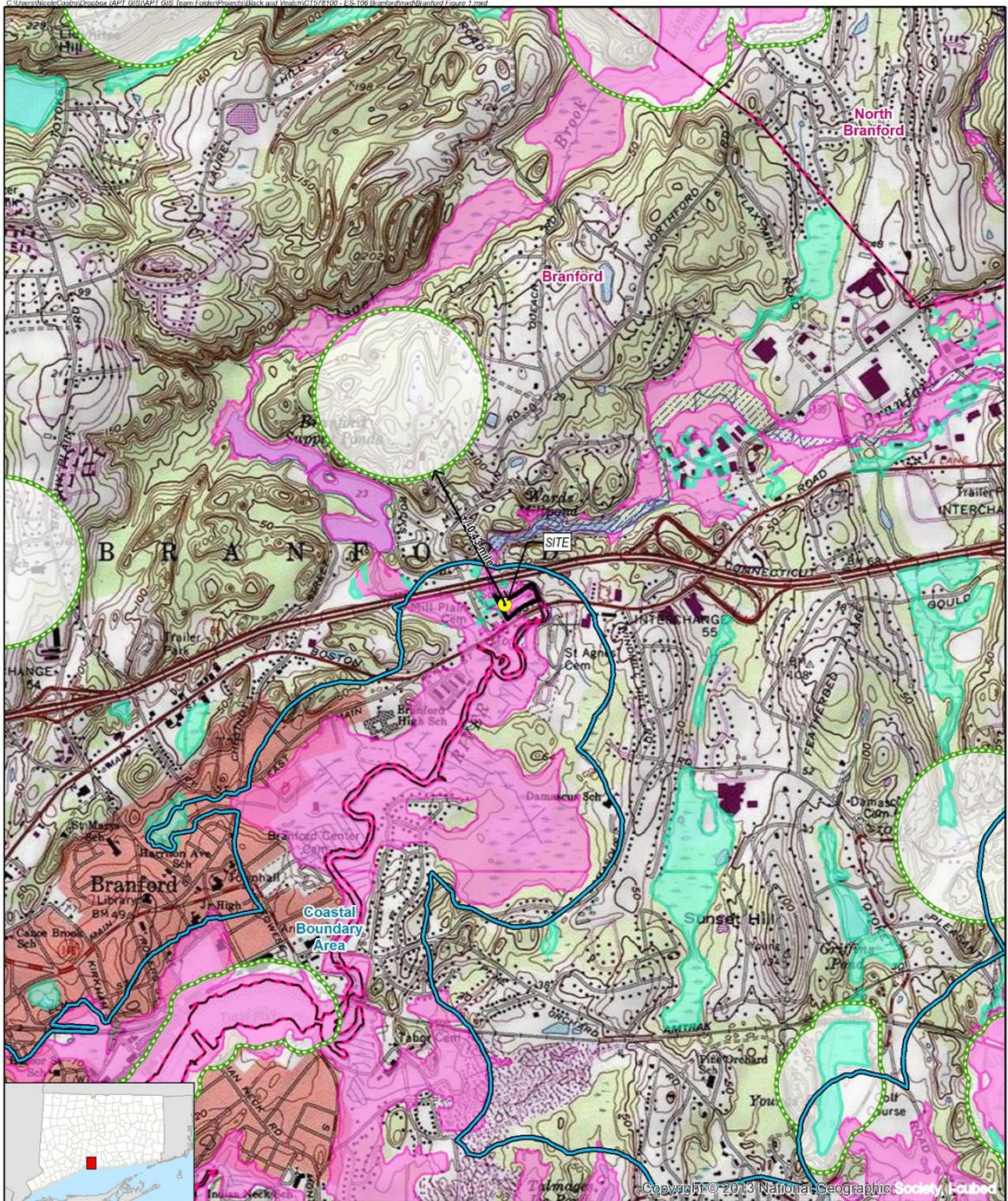
A. Introduction

Pursuant to Sections 16-50j-38 and 16-50j-39 of the Regulations of Connecticut State Agencies, The Connecticut Light and Power Company doing business as Eversource Energy (“Eversource” or the “Company”), hereby petitions the Connecticut Siting Council (the “Council”) for a declaratory ruling (“Petition”) that no Certificate of Environmental Compatibility and Public Need (“Certificate”) is required under Section 16-50k(a) of the Connecticut General Statutes (“C.G.S.”) to install a new omni-directional antenna on an existing wood pole (“Proposed Facility”) to enhance communications at its Branford Substation. See Figure 1, *Overview Map*.

B. Background

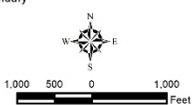
Eversource currently owns the 3.5-acre parcel at 272 East Main Street in Branford, Connecticut (the “Site”). The Company operates an existing communications facility within a fenced substation compound, consisting of a ±50-foot tall wooden pole that currently supports multiple omni-directional antennas and cabling, and associated radio equipment within a free-standing shelter.

Eversource is in the process of reconfiguring its communications system throughout the State. The proposed installation is part of Eversource’s program to update the current obsolete analog voice radio communications system to a modern digital voice communications system. The new system will enable the highest level of voice communications under all operating conditions, including during critical emergency and storm restoration activities. The new radio system will also provide for remote control of distribution safety equipment.



- Legend**
- Site
 - Subject Property
 - Natural Diversity Database (updated 12/2019)
 - Municipal Boundary
 - FEMA 100-Year Flood Zone
 - FEMA 500-Year Flood Zone
 - Floodway
 - CT DEEP Coastal Boundary

Map Notes:
 Base Map Source: USGS 7.5 Minute Topographic
 Quadrangle Map, Branford, CT (1984)
 Map Scale: 1:24,000
 Map Date: April 2020



**Figure 1
 Overview Map**
 Proposed Communications Facility
 Branford 11J
 272 East Main Street
 Branford, Connecticut



C. Description of the Project

The Company proposes to install a single new omni-directional antenna on the existing wooden pole. The new antenna would be mounted about a foot below the top of the pole and extend the total height of the Proposed Facility to approximately 72 feet above ground level (“AGL”). The pole is located approximately five feet northeast of the existing radio shelter within the fenced substation compound. The ground elevation at this portion of the Site is approximately 11 feet above mean sea level (“AMSL”). *See Figure 2, Detailed Site Map and Attachment 1, Site Plans (completed by Black & Veatch on May 21, 2020).* An ice bridge and associated cabling will run from the wooden pole to the radio shelter that will house the radio equipment. The Company also proposes to extend the southern portion of the compound by approximately 550 square feet to accommodate a new 1,000-gallon propane tank and 24kW emergency backup generator.



- Legend**
- Existing Eversource Communications Wood Pole
 - Proposed Eversource Ice Bridge and Coax Cables
 - Proposed Eversource 24kW Generator
 - Proposed Eversource 1,000 Gallon LPG Tank
 - ▭ Proposed Eversource Fenced Equipment Compound
 - Existing Eversource Structure
 - - - Overhead Eversource Line
 - Existing Eversource Right-of-Way (ROW)

- ▭ Subject Property
- Wetland Flag
- Delineated Wetland Boundary Outline
- Perennial Watercourse
- Field Delineated Wetland
- Open Water (not delineated; CTDEEP)
- ▭ Parcel Boundary

100 50 0 100 Feet

Map Notes:
 Base Map Source: 2019 Aerial Photograph (CTECO)
 Map Scale: 1 inch = 100 feet
 Map Date: April 2020

Figure 2
Detailed Site Map
 Proposed Communications Facility
 Branford 11J
 272 East Main Street
 Branford, Connecticut



Specifications for the Company's new antenna are included in Attachment 2, *Antenna Specifications*. The Company would maintain its radio equipment and electrical power supply connections inside the existing radio shelter. The backup generator would be connected within an underground trench through the existing substation compound, terminating in the existing radio shelter.

Table 1, *Antenna Schedule* summarizes the existing and proposed antennas and locations on the existing pole that together will provide the enhanced communications in the Branford area.

TABLE 1 - ANTENNA SCHEDULE

Antenna Type	Antenna Make/Model	Antenna Center Line Elevation (ft. AGL)	Comments	Frequency
24' – 3" Omni	DB Spectra DS2C03F36D	±60.0	Eversource	217 MHz
9' – 2" Omni*	<i>DB589-Y</i>	± 41.0	<i>Eversource</i>	935.4 MHz
15' – 0" Omni*	<i>Kreco CO-41A</i>	± 55.0	<i>Eversource</i>	49.36 MHz (Receive only)

**Existing Antennas*

For additional elevation information and location drawings of the proposed installation, please refer to the *Site Plans* in Attachment 1.

A structural loading analysis has been performed to ensure that the wooden pole would be structurally capable of supporting the loading from the proposed additional antenna system. A review of the design and structural analysis for the Proposed Facility performed by Black & Veatch, dated April 10, 2020 is included in Attachment 3, *Structural Analysis Report*.

D. Environmental Discussion

The Proposed Facility would not have a substantial adverse environmental effect because construction will occur within previously disturbed and developed areas.

1) Wetlands and Watercourses

The Proposed Facility will require the installation of footings for the ice bridge and trenching within the existing substation compound. In addition, limited work would be required to install the fence posts and concrete pads in the proposed fenced gravel expansion area. No wetlands are located within or immediately adjacent to the proposed work activities. The

nearest wetland area is located off the northwest corner of the substation security fence along the Branford River. The nearest construction activities associated with the Proposed Facility would be approximately 78 feet south of the wetland boundary. Therefore, development of the Proposed Facility would not result in a likely adverse impact to wetlands due to the presence and separating distance of the intervening substation, as well as the installation and maintenance of erosion controls during construction.

The Site is located within a designated Coastal Boundary. A Coastal Resources Inspection was performed to determine the potential impact to the Coastal Boundary resources. No coastal resources are located on the Site. The nearest coastal resources are located to the south of the Site and are associated with the tidally influenced Branford River. The Proposed Facility would not have a direct impact to coastal resources and downstream coastal resources would not be adversely impacted. Therefore, the Proposed Facility meets the requirements of the Connecticut Coastal Management Act.

Please refer to *Attachment 4, Wetlands and Coastal Resources Inspection Report* for additional information.

2) Soil Erosion, Sediment Control, and Soil Remediation

Limited ground disturbance would be associated with the installation of the Proposed Facility. This work will be limited to areas within the existing substation compound and a level, maintained lawn area south of the existing southern substation fence, and the access drive on the western portion of the property. Appropriate erosion and sediment controls will be installed and maintained in accordance with the *2002 Connecticut Guidelines for Soil Erosion and Sediment Control*.

3) Wildlife and Vegetation

The Proposed Facility is not anticipated to have an adverse effect on wildlife or vegetation because the ice bridge, trenching, propane tank and generator would be within the previously disturbed areas of the Site. Ground disturbance beyond the existing substation would be limited to a small lawn area (± 550 sq. ft.) to accommodate the proposed fence expansion. Because the Site is completely developed with the substation, access drive and maintained lawn, it does not support any significant wildlife habitat. Therefore, the Proposed Facility would not result in an adverse impact to wildlife.

No migratory bird species are anticipated to be impacted by the Project. The Proposed Facility is not proximate to any Important Bird Area (“IBA”); the nearest IBA, Quinnipiac River Tidal Marsh in New Haven, is located approximately 5.5 miles to the west. Further, the design and siting of the Proposed Facility would comply with the U.S. Fish and Wildlife Service (“USFWS”) guidelines for minimizing potential impacts to bird species. Therefore, no migratory bird species are anticipated to be impacted by the Proposed Facility.

According to the available Connecticut Department of Energy & Environmental Protection (“DEEP”) Wildlife Division Natural Diversity Data Base (“NDDB”) maps, the nearest NDDB buffer area is located approximately 0.42-mile to the northwest. Since the Site is not located within 0.25-mile of an NDDB buffer area, consultation with DEEP is not required.

Two federally-listed threatened species are known to occur in the general vicinity of the Site, documented as the northern long-eared bat (“NLEB”; *Myotis septentrionalis*) and the roseate tern (*Sterna dougallii*). Northern long-eared bat’s range encompasses the entire State of Connecticut. Based on available NLEB data the Site is not within 150 feet of a known occupied maternity roost tree and is not within 0.25 mile of a known NLEB hibernaculum. The nearest NLEB habitat resource to the proposed activity is a hibernaculum located in North Branford ±4.5 miles to the north of the Project. The facility would not require the removal of any trees that could potentially support a NLEB habitat.

Roseate terns are exclusively marine and typically nest in various habitats on offshore islands or mainland beaches. They prefer sandy, gravelly, or rocky areas with shelter provided by vegetation, debris or rocks. The Site neither contains nor is located near any coastal sandy beaches or offshore islands. Therefore, the Site does not support roseate tern habitat.

The Proposed Facility would have no effect on NLEB or roseate tern or on their potential habitat. As such, no consultation with USFWS is required. Additional information is provided in Attachment 5, *USFWS and NDDB Compliance Determination*.

4) Noise

No noise audible to exterior locations would be emitted by the Proposed Facility. Electrical components and other supporting telecommunication equipment will be installed within the radio shelter. The proposed 24kW generator would only emit audible noise during emergency situations. The unit would also be exercised once per week for approximately 30 minutes during a weekday for maintenance purposes. As a result, noise emissions would be consistent with present day levels.

5) Safety and Health

The Proposed Facility would not create any safety or health hazards to persons or property. Eversource does not anticipate the need for special traffic control measures during construction on the Site or equipment and materials delivery. Subsequent to completion of construction, the Proposed Facility would not generate any additional traffic to the area other than continued periodic maintenance visits.

Radio-signal emissions from operation of the proposed equipment would not exceed the total radio-frequency ("RF") electromagnetic power density level permitted by the Federal Communications Commission ("FCC"). To ensure compliance with the applicable standard, the Company commissioned C Squared Systems to conduct RF power density calculations for the Proposed Facility using site-specific data and the methodology prescribed by the FCC's Office of Engineering and Technology Bulletin No. 65, Edition 97-01 (August 1997). The calculations indicate that the cumulative power density level for the proposed installation would be 5.17% of the FCC Standard for public exposure to RF emissions. Please refer to Attachment 6, *Calculated Radio Frequency Emissions Report*, dated May 26, 2020, for a copy of the methodology and calculations.

6) Visual

The Proposed Facility would not result in a substantial change to existing conditions nor would it have a significant adverse visual impact on the environment or character of the community. The Proposed Facility would extend 11 feet above the top of the existing omnidirectional antenna, bringing the total height of the facility to 72-feet AGL. The addition of the proposed omni-directional antenna would not substantially alter the current views of the

Site. The existing wooden pole is shielded from East Main Street by mixed deciduous trees to the east and west, and by the substation equipment to the south. Numerous wooden utility poles and steel substation equipment are present throughout the Site and along East Main Street. Photo-simulations have been produced to provide a visual representation of the Facility from the vicinity of the Site. Please refer to *Attachment 7, Photographic Documentation and Simulations*.

7) Historical and Archaeological Resources

All-Points Technology Corporation, P.C. conducted a review of relevant historic and archaeological information on file with the Connecticut State Historic Preservation Office (“SHPO”) to determine whether the Project area holds potential significance. This review identified five such properties within the Area of Potential Effect (APE – 0.5-mile) for Direct Effects. Please refer to *Attachment 8, Cultural Resources Screen*.

A Phase 1A Archaeological Assessment was performed by Heritage Consultants, LLC (“Heritage”). The objectives of the Phase 1A were to gather and present data regarding previously identified cultural resources and to investigate the proposed project area in terms of its natural and historical characteristics to evaluate the need for completing additional cultural resources investigations. The investigation determined that the five historic properties would not be impacted as a result of the Proposed Facility. In addition, the soils on the Site have been heavily reworked, retain no archaeological potential and therefore do not possess any archaeological sensitivity. Please refer to *Attachment 9, Preliminary Archaeological Assessment*.

8) Forests and Parks

The Site contains no areas of recreation or public interest administered by any federal, state, local, or private agencies. No State or locally-designated scenic roads or other scenic areas are located proximate to the Project. Branford Supply Pond Park and the Branford Wildlife Management Area are located approximately 0.39-mile northwest and 0.12-mile northeast, respectively, of the Site. No views are anticipated from either of these locations. The locations of non-residential resources within one mile of the Site are listed in Table 2 on the following page and depicted on Figure 3, *Surrounding Features Map*.

9) Physical Environmental Effects

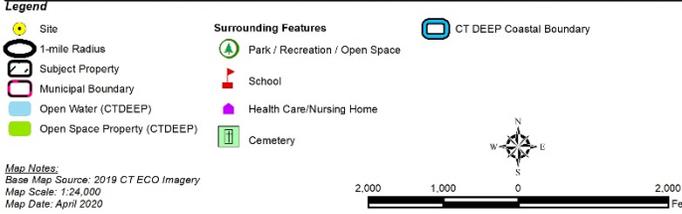
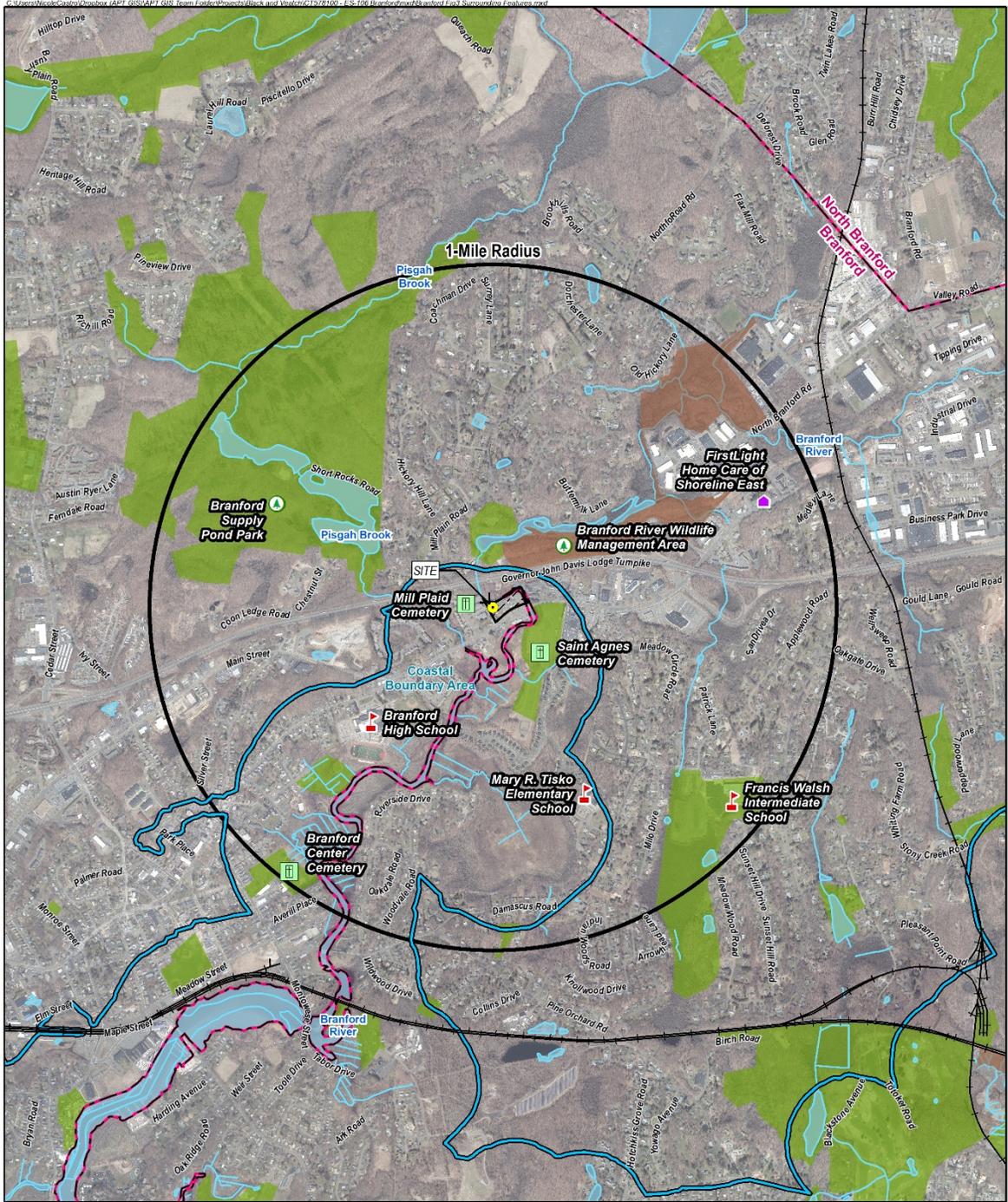
Construction of the Proposed Facility would not involve a significant alteration in the physical or environmental characteristics of the Site or the surrounding area. Ground disturbance has been minimized by limiting construction to areas located within the existing substation compound and an adjacent, previously disturbed grassy area. The proposed development would require minimal earthwork and no trees or vegetation would need to be removed to accommodate construction. Coaxial cables would be routed into the existing radio shelter such that no supporting equipment would be located outside. Vehicular access to the Company's substation would not change in any way.

10) Federal Aviation Administration ("FAA") Registration

The Proposed Facility's coordinates, height, and structure type were reviewed by the FCC through its on-line antenna structure registration screening tool to determine if it requires FAA registration and lighting or marking. The results of this screening (February 13, 2020) concluded that the proposed structure does not require registration. A copy of the screening results can be found in Attachment 10, *TOWAIR Determination Results*.

Table 2: SURROUNDING FEATURES WITHIN 1 MILE OF THE SITE

Resource Type	Name	Address	Distance from Site
Daycare	None		
Community Center	None		
Senior Center	FirstLight Home Care of Shoreline East	388 East Main Street, Branford, CT	0.81 Mile NE
Airport	None		
Hospital	None		
School	Branford High School	185 East Main Street, Branford, CT	0.43 Mile SW
	Mary R. Tisko Elementary School	118 Damascus Road, Branford, CT	0.58 Mile SE
	Francis Walsh Intermediate School	185 Damascus Road, Branford, CT	0.79 Mile SE
Park / Recreational	Branford Supply Pond Park	Short Rocks Road, Branford, CT	0.39 Mile NW
	Branford River Wildlife Management Area	Branford River, Branford, CT	0.12 Mile NE
National Register of Historic Places	Solomon Tyler House	260 East Main Street, Branford, CT	230 ft S
	John Tyler House	250 East Main Street, Branford, CT	410 ft SW
Youth Camp	None		



**Figure 3
Surrounding Features**

Proposed Communications Facility
 Branford 11J
 272 East Main Street
 Branford, Connecticut



11) Location of Nearest Residence

The Site is accessed from East Main Street which is developed primarily with commercial businesses. The nearest residential property is located approximately 145 feet to the west at the Omega Estates Apartments. See Figure 4, *Nearest Residence*.

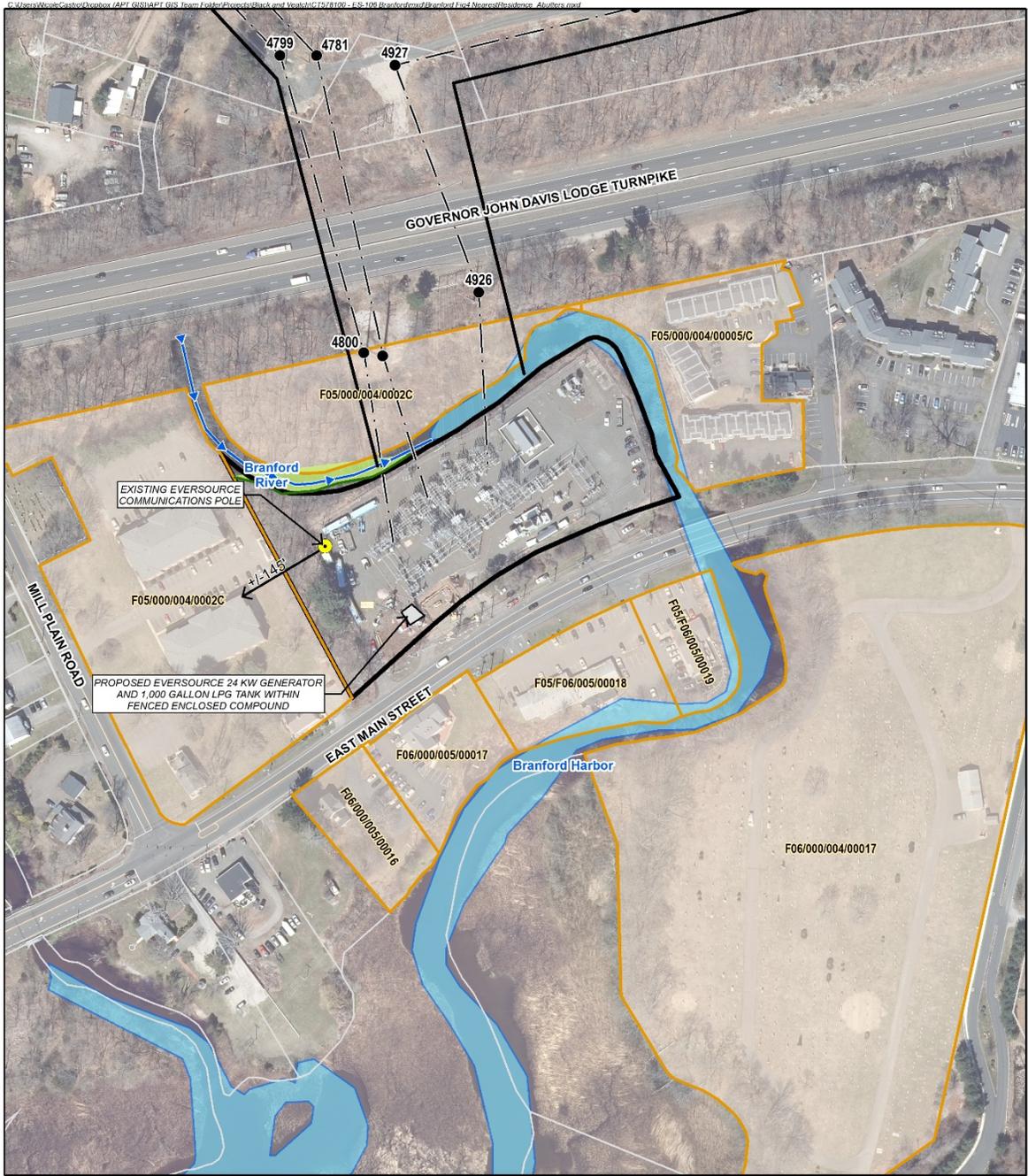
Direct abutters were served notice of this Petition concurrent with its submission to the Council. Those abutters are depicted on Figure 4 and are included in Table 3, *Direct Abutters*.

TABLE 3 – DIRECT ABUTTERS

Parcel ID	Owner Name	Site Address	Town	State
F05/000/004/00005/1	NARDINI RONALD A + MARY NARDINI	1 RIVERS EDGE	BRANFORD	CT
F05/000/004/00005/10	BUSTOS TERESA	10 RIVERS EDGE	BRANFORD	CT
F05/000/004/00005/11	BODIN WILLIAM R JR + BODIN ANDREA M SUR	11 RIVERS EDGE	BRANFORD	CT
F05/000/004/00005/12	KOIRALA HOM + SAPKOTA SHREEJANA SUR	12 RIVERS EDGE	BRANFORD	CT
F05/000/004/00005/13	BARBARA SALLY ANN	13 RIVERS EDGE	BRANFORD	CT
F05/000/004/00005/14	RUBINO LILLIAN J	14 RIVERS EDGE	BRANFORD	CT
F05/000/004/00005/15	FAIELLA MARK + FAIELLA LUZ E	15 RIVERS EDGE	BRANFORD	CT
F05/000/004/00005/16	KIERNAN STEPHEN	16 RIVERS EDGE	BRANFORD	CT
F05/000/004/00005/17	TAD ASSOCIATES C/O JUDITH A DOBUZINSKY	17 RIVERS EDGE	BRANFORD	CT
F05/000/004/00005/18	SCIAMBRA PETER	18 RIVERS EDGE	BRANFORD	CT
F05/000/004/00005/19	BOMBRIANT JAMES	19 RIVERS EDGE	BRANFORD	CT
F05/000/004/00005/2	PETRILLO LEANNE + CRISCUOLO GARY	2 RIVERS EDGE	BRANFORD	CT
F05/000/004/00005/20	BORGIA VIRGINIA C + BORGIA PHILIP B SUR	20 RIVERS EDGE	BRANFORD	CT
F05/000/004/00005/21	LANGAN GLENN WILLIAM + LANGAN MARLISE SUR	21 RIVERS EDGE	BRANFORD	CT
F05/000/004/00005/22	MELILLO JANET	22 RIVERS EDGE	BRANFORD	CT
F05/000/004/00005/23	SCIVOLETTI JOSEPH + SCIVOLETTI MARGARET SUR	23 RIVERS EDGE	BRANFORD	CT
F05/000/004/00005/24	PIERCE KIMBERLY A	24 RIVERS EDGE	BRANFORD	CT
F05/000/004/00005/25	CHARBONNEAU WILLIAM V	25 RIVERS EDGE	BRANFORD	CT
F05/000/004/00005/3	BERTIER DANIEL + KRISTEN GORECKI	3 RIVERS EDGE	BRANFORD	CT
F05/000/004/00005/4	MARSTON SUZANNE	4 RIVERS EDGE	BRANFORD	CT
F05/000/004/00005/5	FERRIOLO ELAINE E	5 RIVERS EDGE	BRANFORD	CT
F05/000/004/00005/6	MCCLOSKEY JAMES	6 RIVERS EDGE	BRANFORD	CT
F05/000/004/00005/7	HUNTER MARY BETH	7 RIVERS EDGE	BRANFORD	CT
F05/000/004/00005/8	FALCONE PHILIP + FALCONE CAROLANN (SUR)	8 RIVERS EDGE	BRANFORD	CT

TABLE 3 – DIRECT ABUTTERS CONTINUED

Parcel ID	Owner's Name	Site Address	Town	State
F06/000/004/00017	SAINT JOHN BOSCO PARISH CORP.	295 EAST MAIN STREET	BRANFORD	CT
F05/000/004/00005/C	RIVERS EDGE	1025 RIVERS EDGE	BRANFORD	CT
F05/000/004/00005/9	ELY-MASKAL NANCY	9 RIVERS EDGE	BRANFORD	CT
F05/000/004/0002C	OMEGA NCM LLC + 335 BEHNAM NAVCAPMAN LLC TIC	7 - 11 MILL PLAIN ROAD	BRANFORD	CT
F06/000/005/00016	FLORENTINE JANICE E	261 EAST MAIN STREET	BRANFORD	CT
F06/000/005/00017	MORDO LLC	265 EAST MAIN STREET	BRANFORD	CT
F05/F06/005/00018	SKY NAILS SPA LLC	267 EAST MAIN STREET	BRANFORD	CT
F05/F06/005/00019	MASCOT PROPERTIES LLC	269 EAST MAIN STREET	BRANFORD	CT



Legend

- Existing Eversource Communications Wood Pole
- Proposed Eversource Fenced Equipment Compound
- Existing Eversource Structure
- Overhead Eversource Line
- Existing Eversource Right-of-Way (ROW)
- Subject Property
- Abutting Property
- Delineated Wetland Boundary Outline
- Perennial Watercourse
- Field Delineated Wetland
- Open Water (not delineated; CTDEEP)
- Parcel Boundary

Map Notes:
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 Map Scale: 1 inch = 200 feet
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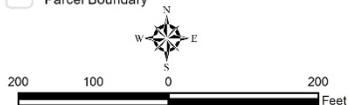


Figure 4
Abutters Map & Nearest Residence
 Proposed Communications Facility
 Branford 11J
 272 East Main Street
 Branford, Connecticut



E. Schedule

Construction would begin as soon as practical after issuance of the requested declaratory ruling by the Council and would be approximately six weeks in duration. Eversource anticipates that construction would be completed in 2020.

F. Conclusion

Connecticut General Statutes Section 16-50k(a) provides that a Certificate of Environmental Compatibility and Public Need is needed for a proposed installation of a facility that the Council determines would have a "substantial adverse environmental effect." Based on our evaluation, Eversource respectfully submits that the installation of the Proposed Facility would not result in a substantial adverse effect on the environment or ecology, nor would it damage existing scenic, historical or recreation values.

Accordingly, Eversource requests that the Council issue a declaratory ruling that no Certificate is required because the Proposed Facility would not have a substantial adverse environmental effect.

G. Communications with Company

Communications regarding this Petition for a Declaratory Ruling should be directed to:

Kathleen M. Shanley
Manager – Transmission Siting
Eversource Energy
56 Prospect Street
Hartford, CT 06103
Telephone: (860) 728-4527

EVERSOURCE ENERGY by:



Kathleen M. Shanley
Manager – Transmission Siting

Attachment 1 – Site Plans

EVERSOURCE ENERGY

EVERSOURCE ENERGY

107 SELDEN STREET
BERLIN, CT 06037
PHONE: (800) 286-2000



BLACK & VEATCH

6800 W 115TH ST, SUITE 2292
OVERLAND PARK, KS 66211
PHONE: (913) 458-3595

PROJECT SUMMARY

- THE GENERAL SCOPE OF WORK CONSISTS OF THE FOLLOWING:
1. RELOCATE EXISTING ANTENNAS MOUNTED AT ELEVATION 47'-0"± TO PROPOSED MOUNTING SYSTEM AT SAME ELEVATION
 2. INSTALL (1) NEW RACK WITH DMR EQUIPMENT IN EXISTING RADIO SHELTER
 3. INSTALL NEW ICE BRIDGE AT ELEVATION 0'-0"± AGL
 4. INSTALL NEW GENERATOR AT ELEVATION 0'-0"± AGL
 5. INSTALL NEW PROPANE TANK AT ELEVATION 0'-0"± AGL
 6. INSTALL NEW COMPOUND FENCING AT ELEVATION 0'-0"± AGL
 7. INSTALL NEW SILT FENCING AT ELEVATION 0'-0"± AGL
 8. INSTALL (1) NEW OMNI/WHIP ANTENNA AT ELEVATION 72'-0"± AGL

BRANFORD 11J 272 EAST MAIN ST BRANFORD, CT 06405

GOVERNING CODES

2018 CONNECTICUT STATE BUILDING CODE (2015 IBC BASIS)
2017 NATIONAL ELECTRIC CODE
TIA-222-H

GENERAL NOTES

THE FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION. A TECHNICIAN WILL VISIT THE SITE AS REQUIRED FOR ROUTINE MAINTENANCE. THE PROJECT WILL NOT RESULT IN ANY SIGNIFICANT DISTURBANCE OR EFFECT ON DRAINAGE; NO SANITARY SEWER SERVICE, POTABLE WATER, OR TRASH DISPOSAL IS REQUIRED AND NO COMMERCIAL SIGNAGE IS PROPOSED.

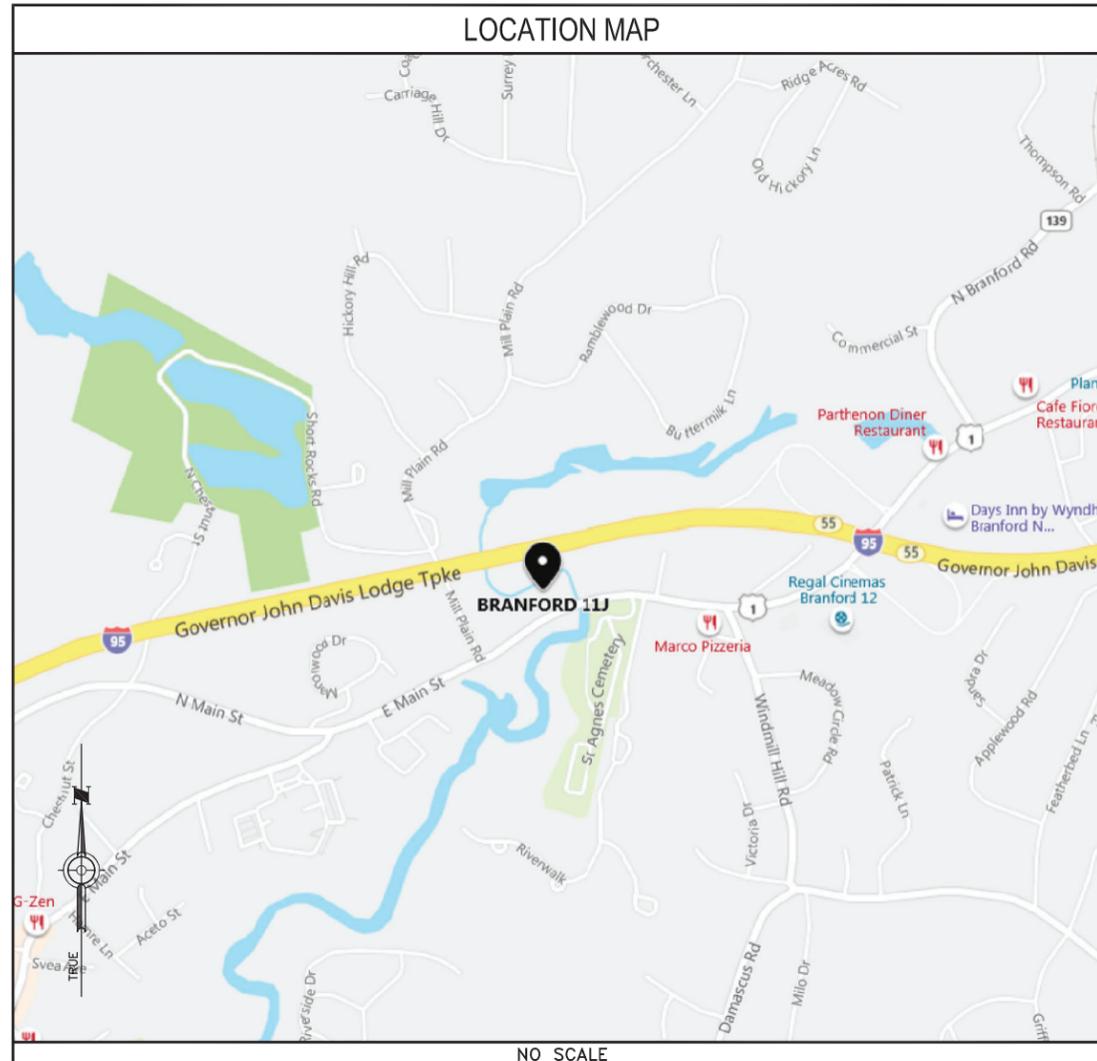
SITE INFORMATION

SITE NAME: BRANFORD 11J
SITE ID NUMBER: #5343
SITE ADDRESS: 272 EAST MAIN ST
BRANFORD, CT 06405
MAP: 5
BLOCK: 4
LOT: 4
ZONE: BL
LATITUDE: 41° 17' 33.13" N
LONGITUDE: 72° 47' 40.62" W
ELEVATION: 11'± AMSL
FEMA/FIRM DESIGNATION: AE
ACREAGE: 3.5± AC (BOOK: 0691, PAGE: 0043)

CONTACT INFORMATION

APPLICANTS:
EVERSOURCE ENERGY
107 SELDEN STREET
BERLIN, CT 06037
POWER PROVIDER:
EVERSOURCE ENERGY
(800) 286-2000
PROPERTY OWNER:
EVERSOURCE ENERGY
107 SELDEN STREET
BERLIN, CT 06037
TELCO PROVIDER:
FRONTIER
(800) 921-8102
EVERSOURCE ENERGY
PROJECT MANAGER:
NIKOLL PRECI
(860) 655-3079
CALL BEFORE YOU DIG:
(800) 922-4455

LOCATION MAP



NO SCALE

DESIGN TYPE

SITE UPGRADE
WOOD POLE

DRAWING INDEX

SHEET NO:	SHEET TITLE
T-1	TITLE SHEET
C-1	ABUTTERS MAP
C-2	PARTIAL SITE PLAN
C-3	SITE PLAN
C-4	TOWER ELEVATION & ANTENNA EQUIPMENT
C-5	ICE BRIDGE DETAILS
C-6	CHAINLINK FENCE DETAILS
C-7	EARTHWORK DETAILS
S-1	GENERATOR & PROPANE TANK CONCRETE PAD DETAILS
M-1	GENERATOR & PROPANE TANK EQUIPMENT DETAILS
M-2	GENERATOR & PROPANE TANK EQUIPMENT DETAILS
E-1	UTILITY PLAN & DETAILS
G-1	GROUNDING PLAN
G-2	GROUNDING DETAILS
G-3	GROUNDING DETAILS
G-4	GROUNDING DETAILS
G-5	GROUNDING DETAILS
N-1	NOTES & SPECIFICATIONS
N-2	NOTES & SPECIFICATIONS
N-3	NOTES & SPECIFICATIONS

DO NOT SCALE DRAWINGS

SUBCONTRACTOR SHALL VERIFY ALL PLANS & EXISTING DIMENSIONS & CONDITIONS ON THE JOB SITE & SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME



UNDERGROUND SERVICE ALERT
UTILITIES PROTECTION CENTER, INC.
811

48 HOURS BEFORE YOU DIG

PROJECT NO: 403093
DRAWN BY: TYW
CHECKED BY: CAG

REV	DATE	DESCRIPTION
0	05/21/20	ISSUED FOR FILING



IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

BRANFORD 11J
272 EAST MAIN ST
BRANFORD, CT 06405

SHEET TITLE
TITLE SHEET

SHEET NUMBER
T-1



PROJECT NO:	403093
DRAWN BY:	TYW
CHECKED BY:	CAG

REV	DATE	DESCRIPTION
0	05/21/20	ISSUED FOR FILING



IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

BRANFORD 11J
272 EAST MAIN ST
BRANFORD, CT 06405

SHEET TITLE
ABUTTERS MAP

SHEET NUMBER
C-1

Town of Branford, Connecticut - Assessment Parcel Map

Parcel: F05-000-004-00004

Address: 272-276 EAST MAIN ST



MUNICIPALITY NOTIFICATION LIMIT MAP

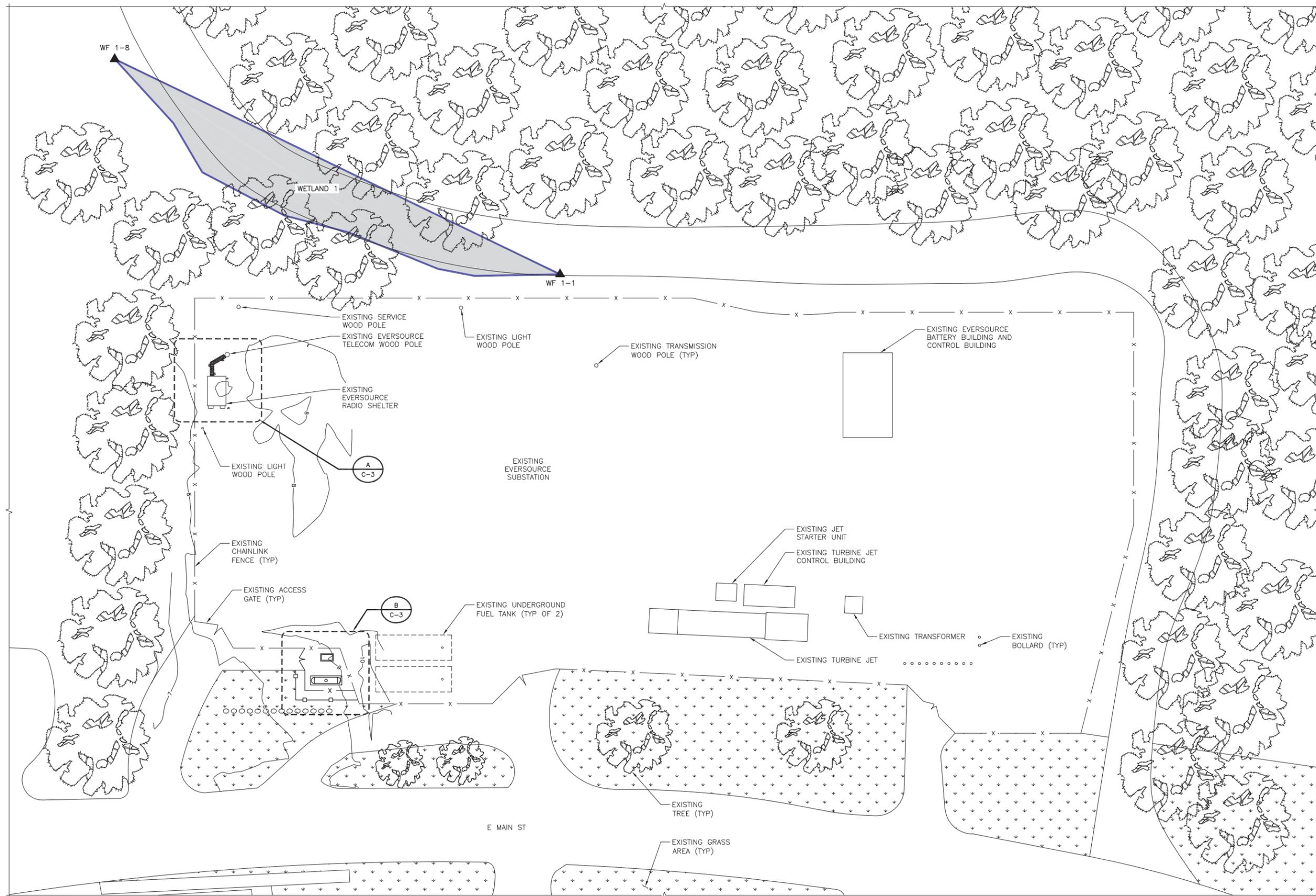
Approximate Scale: 1 inch : 100 feet

Grand List Date October 2018



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

ABUTTERS MAP



PARTIAL SITE PLAN
NO SCALE

NOTE
CONTOUR LINES WERE DETERMINED BY
EVERSOURCE ENERGY. BLACK & VEATCH DOES NOT
ASSUME ANY RESPONSIBILITY FOR ITS ACCURACY.

EVERSOURCE
ENERGY

107 SELDEN STREET
BERLIN, CT 06037
PHONE: (800) 286-2000



BLACK & VEATCH

6800 W 115TH ST, SUITE 2292
OVERLAND PARK, KS 66211
PHONE: (913) 458-3595

PROJECT NO: 403093
DRAWN BY: TYW
CHECKED BY: CAG

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BRANFORD 11J
272 EAST MAIN ST
BRANFORD, CT 06405

SHEET TITLE
PARTIAL SITE PLAN

SHEET NUMBER
C-2

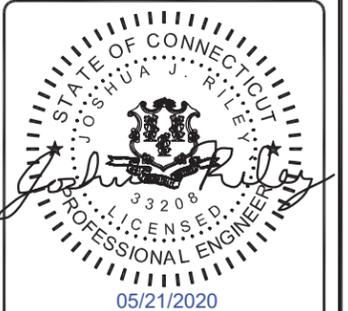


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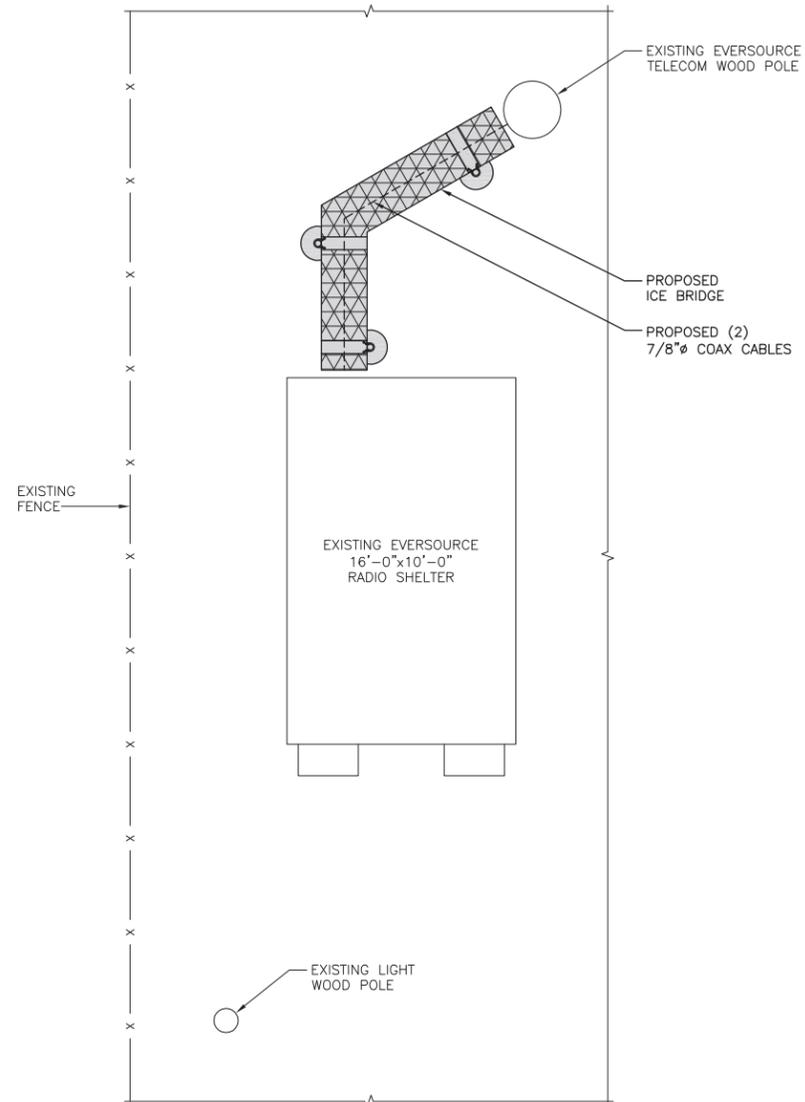
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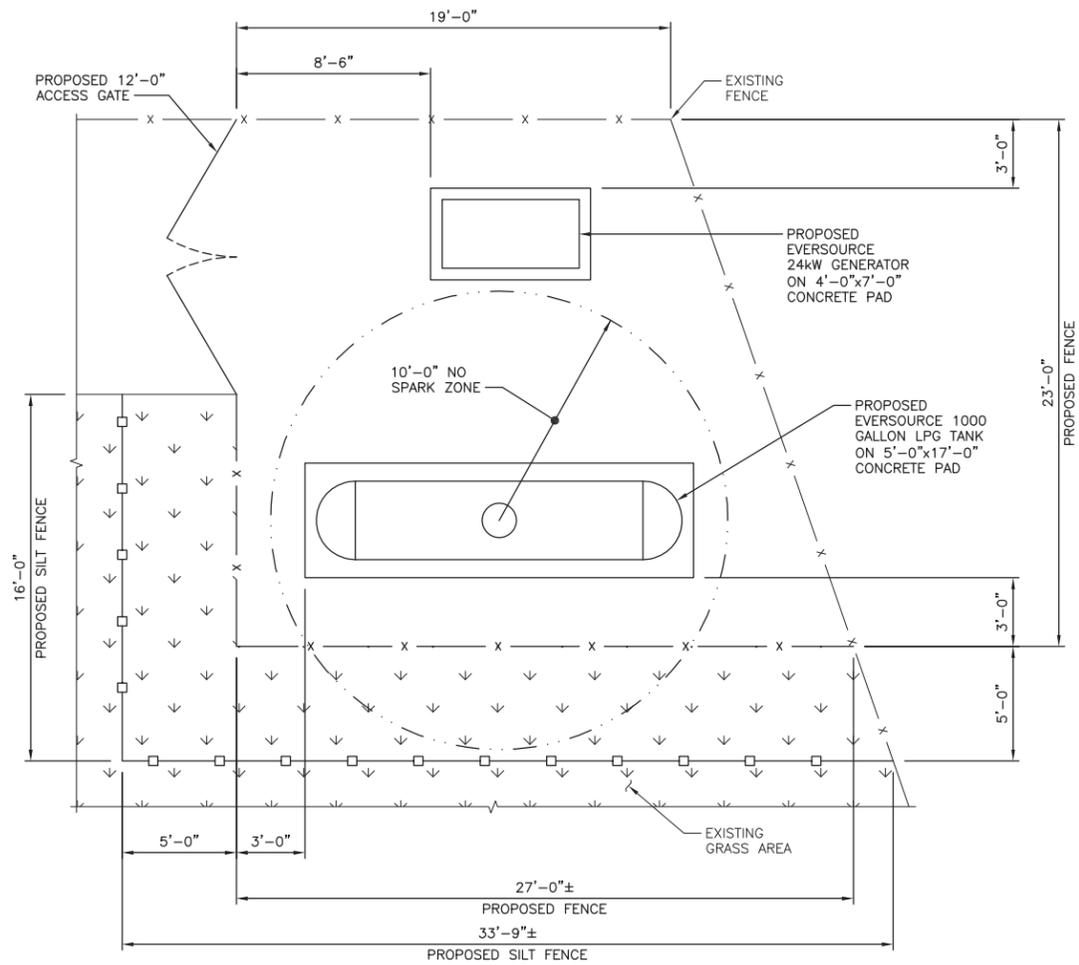
SHEET TITLE
SITE PLAN

SHEET NUMBER

C-3



DETAIL A
NO SCALE



DETAIL B
NO SCALE

SITE PLAN
NO SCALE



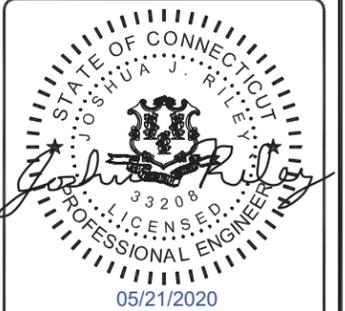


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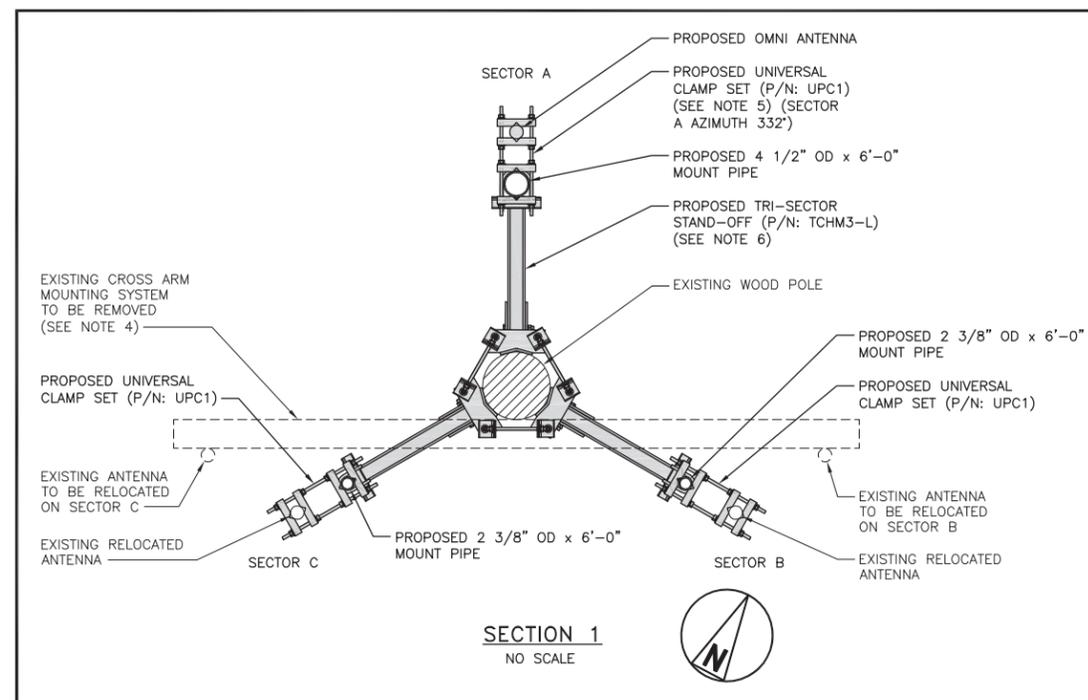
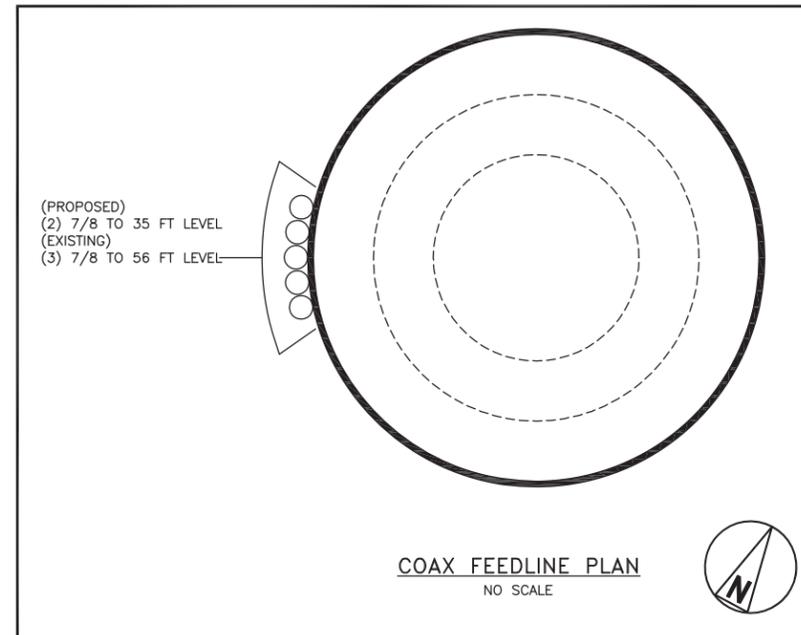
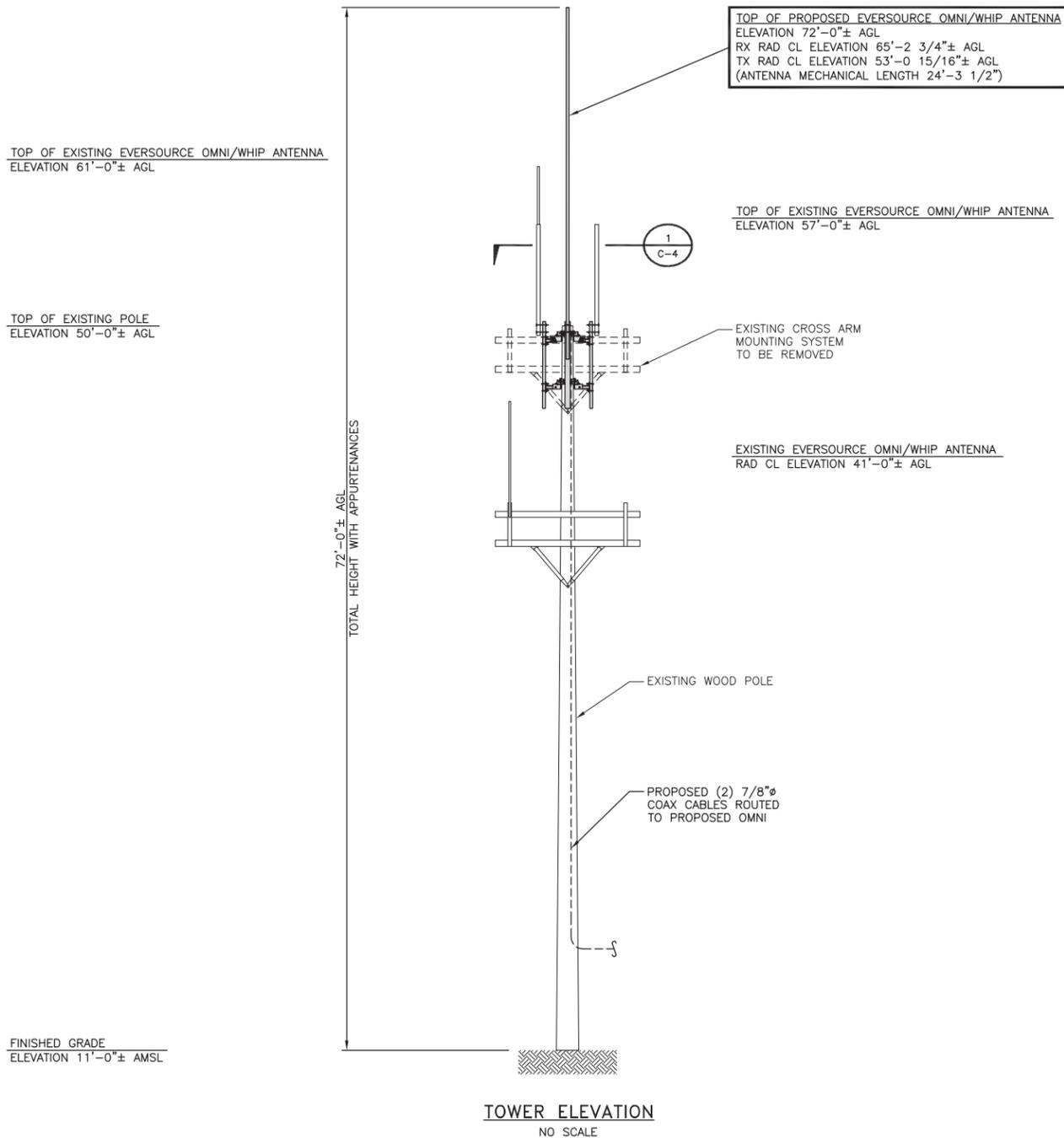
SHEET TITLE
**TOWER ELEVATION &
ANTENNA EQUIPMENT**

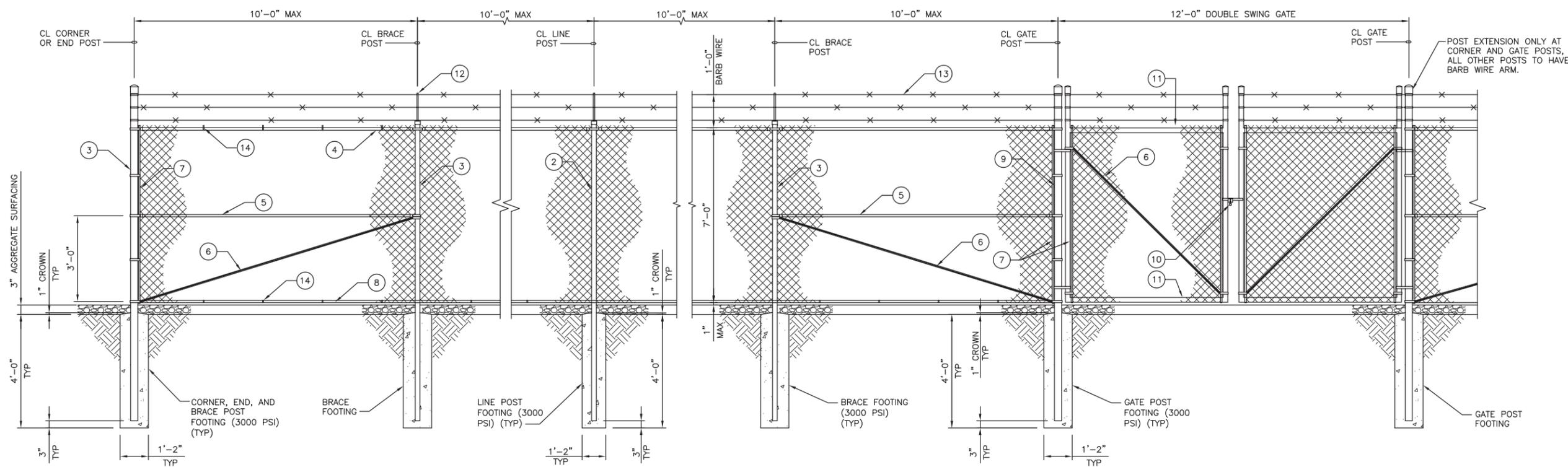
SHEET NUMBER

C-4

NOTES

1. ALL COAXIAL CABLE TO BE SECURED TO THE SUPPORT STRUCTURE AT DISTANCES NOT TO EXCEED 4'-0" OC.
2. CONTRACTOR MUST FOLLOW ALL MANUFACTURER'S RECOMMENDATIONS REGARDING THE INSTALLATION OF COAXIAL CABLES, CONNECTORS AND ANTENNAS.
3. TREAT ALL FIELD DRILLED HOLES AND CUTS WITH PRESERVATIVE FLUID BEFORE INSTALLING HARDWARE. ALL OPEN HOLES SHALL BE PLUGGED.
4. EXISTING ANTENNAS TO BE RELOCATED AT THEIR ORIGINAL CENTER LINE ELEVATION ON THE PROPOSED MOUNTING SYSTEM.
5. PROPOSED OMNI/WHIP ANTENNA SHALL BE INSTALLED USING PROPOSED CLAMP SET SITE PRO 1 P/N: UPC1. SPACE CLAMPS PER ANTENNA MANUFACTURER'S RECOMMENDATIONS, (3) ATTACHMENT POINTS (CLAMPS) REQUIRED (TOTAL OF 2 CLAMP SETS ON SECTOR A).
6. PROPOSED TRI-SECTOR STAND-OFF (P/N: TCHM3-L) MOUNT SHALL BE INSTALLED WITH A 3'-0" MINIMUM VERTICAL SEPARATION BETWEEN TOP AND BOTTOM POLE CONNECTIONS.

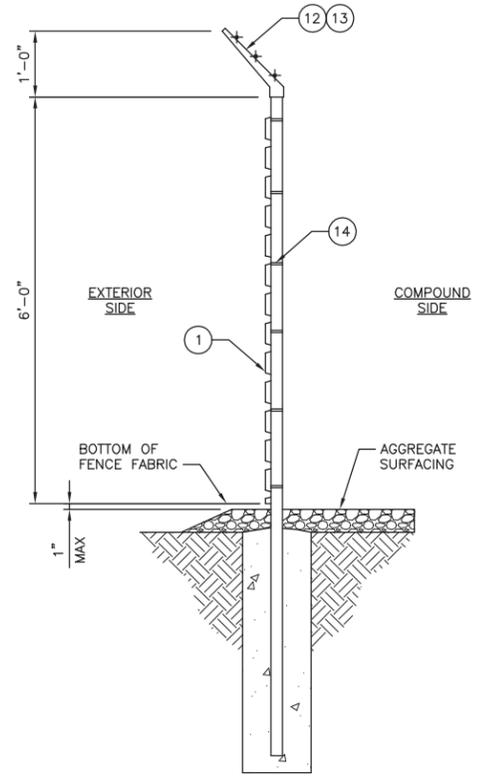




TYPICAL FENCE ELEVATION
NO SCALE

MATERIAL DESCRIPTION

- 1 CHAIN LINK FABRIC: 9 AWG, 1 1/4" MESH; ALUMINIZED STEEL, TWISTED SELVAGE ON TOP, KNUCKLED ON BOTTOM PER ASTM-A491.
- 2 LINE POSTS: 2 3/8" OD PIPE, 16 GAUGE (GALVANIZED) PER ASTM-F1083.
- 3 CORNER, END AND BRACE POSTS: 2 7/8" OD PIPE, SCHEDULE 40 (GALVANIZED).
- 4 TOP RAIL: 1.66" OD SCHEDULE 40 (GALVANIZED) PER ASTM-F1083.
- 5 BRACE RAIL: 1 5/8" OD 17 GAUGE PIPE (GALVANIZED).
- 6 DIAGONAL TRUSS ROD: 3/8" GALVANIZED ROD WITH TURNBUCKLE.
- 7 TENSION BAR: 3/16"x3/4" GALVANIZED FLAT BAR.
- 8 BOTTOM TENSION WIRE: GALVANIZED OR ALUMINUM COATED COIL SPRING WIRE, 7 GAUGE.
- 9 GATE POSTS: 4" OD SCHEDULE 40 PIPE (GALVANIZED).
- 10 COMBINATION PADLOCK ACCORDING TO EVERSORUCE REQUIREMENTS.
- 11 GATE FRAMES: 1 7/8" OD SCHEDULE 40 PIPE (GALVANIZED).
- 12 BARBED WIRE SUPPORT ARM: SINGLE ARM TYPE (GALVANIZED). ARM SHALL BE INCLINED OUTWARD AT AN ANGLE OF 45 DEGREES BARBED WIRE SHALL BE SPACED 6"± APART.
- 13 BARBED WIRE: GALVANIZED, ASTM A121 CLASS 3; THREE 14 GAUGE MINIMUM STEEL WIRES WITH 4 POINT ROUND 14 GAUGE BARBS SPACED 4" APART. BARBED WIRE MUST HAVE ENOUGH STRENGTH TO WITHSTAND A WEIGHT OF 250 POUNDS APPLIED AT THE OUTER STRAND OF BARBED WIRE, WITH A DEFLECTION OF LESS THAN 1/4".
- 14 FABRIC TIES: ALUMINUM BANDS OR WIRES. FABRIC SHALL BE ATTACHED TO THE TOP RAIL AND BOTTOM TENSION WIRE AT 24" CENTERS AND TO THE POSTS AT 15" CENTERS, ALL ON THE COMPOUND SIDE OF THE FENCE.
- 15 MISCELLANEOUS:
 - A. RAIL COUPLINGS: SLEEVE TYPE, 6" LONG EXPANSION SPRING EVERY FIFTH COUPLING.
 - B. POST TOPS: PRESSED STEEL, MALLEABLE IRON WITH PRESSED STEEL EXTENSION ARM, OR ONE-PIECE ALUMINUM CASTING; WITH HOLE FOR TOP, ALL DESIGNED TO FIT OVER THE OUTSIDE OF THE POSTS AND TO PREVENT ENTRY OF MOISTURE INTO TUBULAR POSTS.
 - C. LATCHES SHALL BE FORKED TYPE AND SHALL BE ARRANGED FOR PADLOCKING WITH THE PADLOCK ACCESSIBLE FROM BOTH SIDES OF THE GATE.
 - D. KEEPERS SHALL CONSIST OF MECHANICAL DEVICES FOR SECURING AND SUPPORTING THE FREE END OF THE GATES WHEN IN THE FULL OPEN POSITION. KEEPERS SHALL BE MOUNTED ON 2 7/8" O.D. PIPE POSTS FILLED WITH CONCRETE AND SET IN CONCRETE FOUNDATIONS.
 - E. INSTALL FENCING PER ASTM-F567.
 - F. INSTALL SWING GATES PER ASTM-F900.
 - G. LOCAL ORDINANCE OF BARBED WIRE PERMIT REQUIREMENT SHALL BE COMPLETED IF REQUIRED.
 - H. USE GALVANIZED HIG-RING WIRE TO MOUNT ALL SIGNS.
 - I. ALL SIGNS MUST BE MOUNTED ON INSIDE OF FENCE.
 - J. ALL POSTS SHALL HAVE "MUSHROOM" SLEEVE EMBEDDED IN CONCRETE.
 - K. BOTTOM TENSION WIRE SHALL BE WEAVED THROUGH THE FENCE FABRIC AND THEN SECURED.
 - L. BOTTOM TENSION WIRE AND THE PIPE RAIL ELEVATION ABOVE THE GRADE LINE SHALL CORRESPOND WITH THE MIDDLE OF THE BOTTOM FABRIC DIAMOND.
 - M. ANY UNGALVANIZED AREAS REMAINING AFTER GATE FABRICATION SHALL BE REPAIRED PER ASTM-A780.



TYPICAL FENCE SECTION
NO SCALE

EVERSORUCE ENERGY

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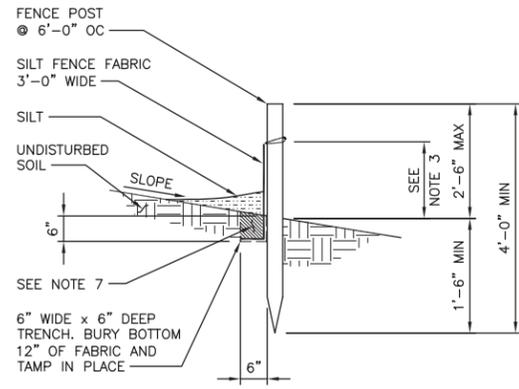


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SHEET TITLE
CHAINLINK FENCE DETAILS

SHEET NUMBER
C-6



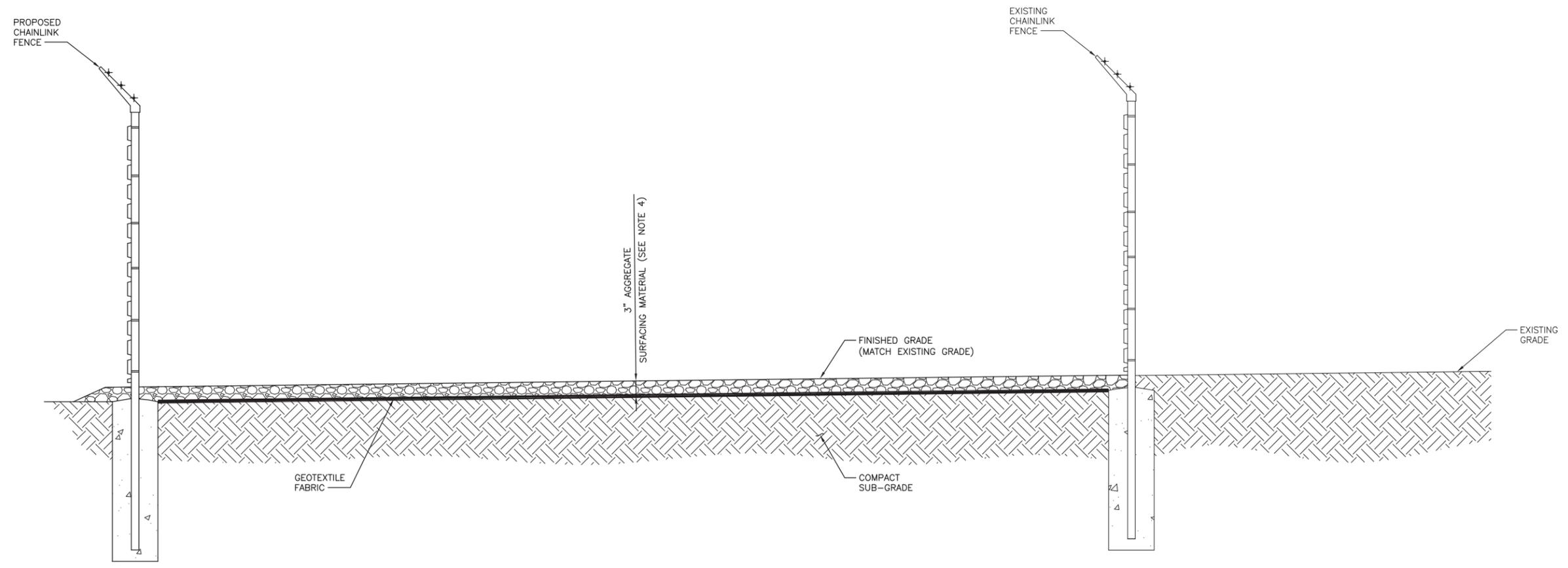
SILT FENCE DETAIL
NO SCALE

NOTES

1. EVERSOURCE TO SEED DISTURBED SOIL AROUND PROPOSED GRAVEL FINISH GRADE.
2. EVERSOURCE TO REPLACE TOP SOIL WITH COMPACTED SUBGRADE AND FINISH TO MATCH EXISTING GRADE.
3. EVERSOURCE TO SLOPE GRADE AWAY FROM SUBSTATION.
4. AGGREGATE SURFACING MATERIAL TO BE FOUR (4) LAYERS OF 3/4 INCH, ANGULAR BASALT TRAP ROCK.
5. AGGREGATE SURFACING MATERIAL SHALL EXTEND A MINIMUM OF THREE (3) FEET OUT FROM THE FENCE LINE WHERE POSSIBLE.

SILT FENCE NOTES

1. INSTALL SILT FENCE WHERE SHOWN PRIOR TO ANY ON SITE GRADING OR DISTURBANCE OF EXISTING SURFACE MATERIAL.
2. CONSTRUCT THE SILT FENCE OF FABRIC WITH A MINIMUM TENSILE STRENGTH OF 50LB/LINEAR IN.
3. SILT FENCE HEIGHT SHALL BE A MINIMUM OF 15 INCHES ABOVE GROUND HEIGHT, BUT SHALL NOT EXCEED 18".
4. CONSTRUCT SILT FENCE OF A CONTINUOUS ROLL CUT THE LENGTH OF THE BARRIER TO AVOID JOINTS. FABRIC TO BE FASTENED SECURELY TO FENCE POSTS WITH 1 INCH STAPLES OR TIE WIRES.
5. SUPPORT FABRIC WITH WOVEN WIRE MESH 14.5 GAUGE, 6" MAX. MESH OPENING. WOVEN WIRE FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH 1 INCH STAPLES OR TIE WIRES.
6. POSTS FOR SILT FENCE SHALL BE 4 INCH DIAMETER PINE, 2 INCH DIAMETER OAK OR 1.33 LB/LINEAR FOOT STEEL.
7. BACKFILL THE TRENCH WITH COMPACTED SOIL OR GRAVEL PLACED OVER THE SILT FENCE FABRIC.
8. DO NOT ATTACH SILT FENCE FABRIC TO EXISTING FENCES, TREES, ETC.
9. IF THE SILT FENCE FABRIC SHOULD DECOMPOSE OR BECOME INEFFECTIVE DURING THE EXPECTED LIFE OF THE FENCE, THE FABRIC SHALL BE REPLACED IMMEDIATELY.
10. SEDIMENT DEPOSITS THAT ARE REMOVED OR LEFT IN PLACE AFTER SILT FENCE HAS BEEN REMOVED SHALL BE GRADED TO CONFORM WITH THE EXISTING TOPOGRAPHY AND VEGETATION.
11. UPON ESTABLISHMENT OF VEGETATION OF ALL DISTURBED AREAS AND UPON COMPLETION OF CONSTRUCTION, SILT FENCE SHALL BE REMOVED FROM SITE.



TYPICAL COMPOUND GRADING
NO SCALE



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SHEET TITLE
EARTHWORK DETAILS

SHEET NUMBER
C-7



PROJECT NO: 403093

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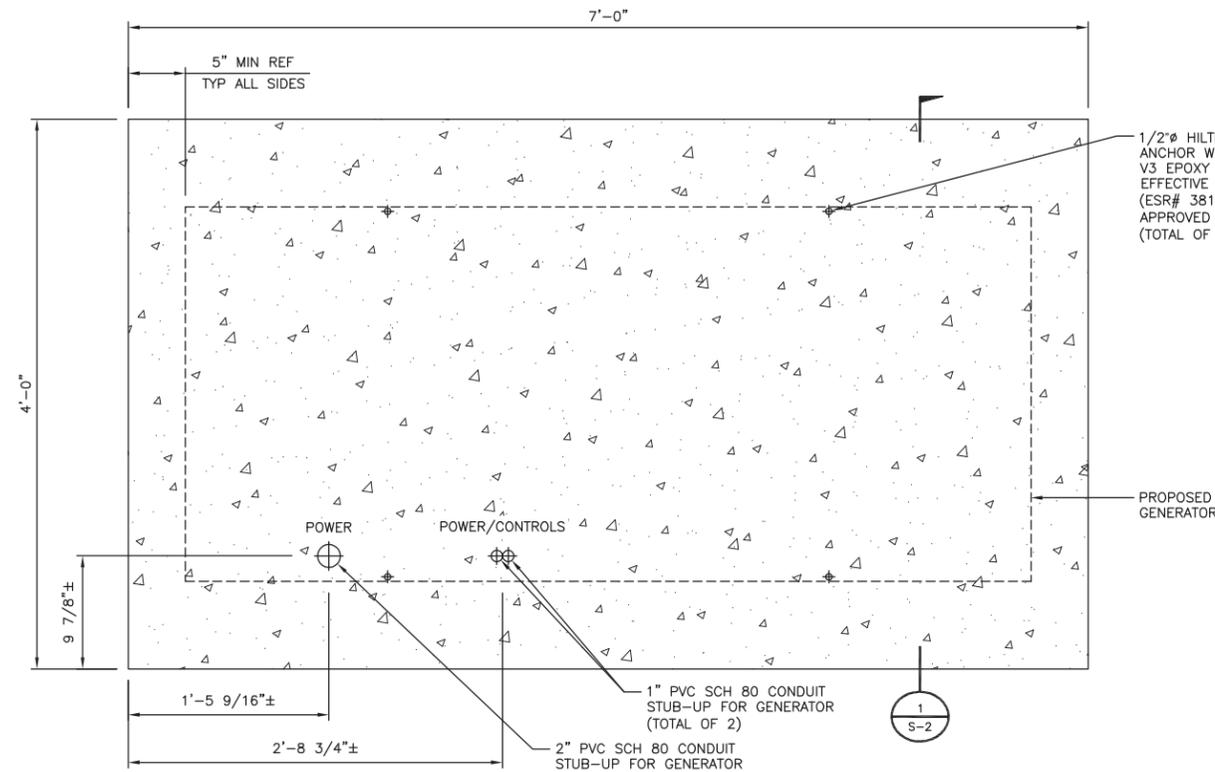
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272 EAST MAIN ST
BRANFORD, CT 06405

SHEET TITLE
GENERATOR & PROPANE TANK
CONCRETE PAD DETAILS

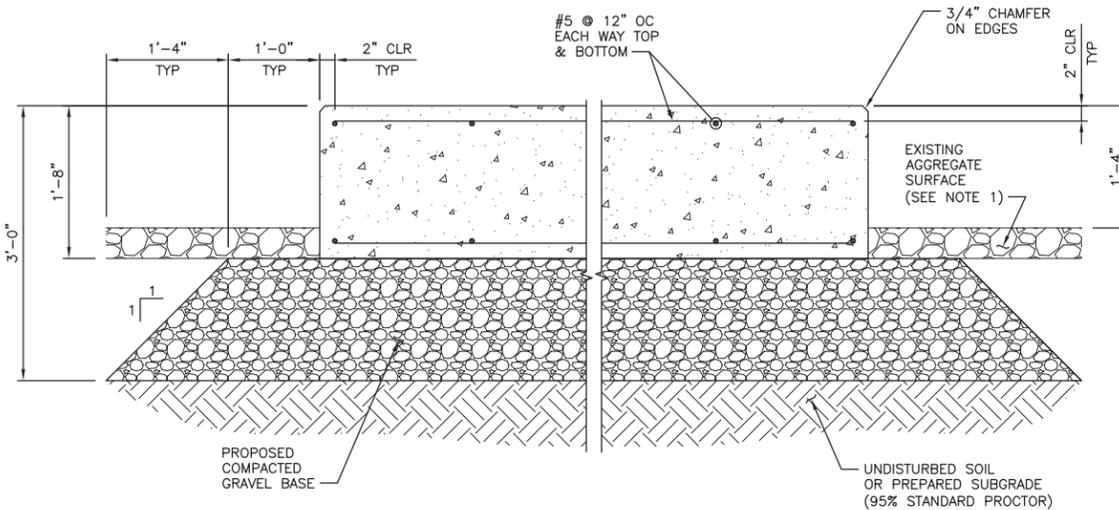
SHEET NUMBER
S-1

NOTES

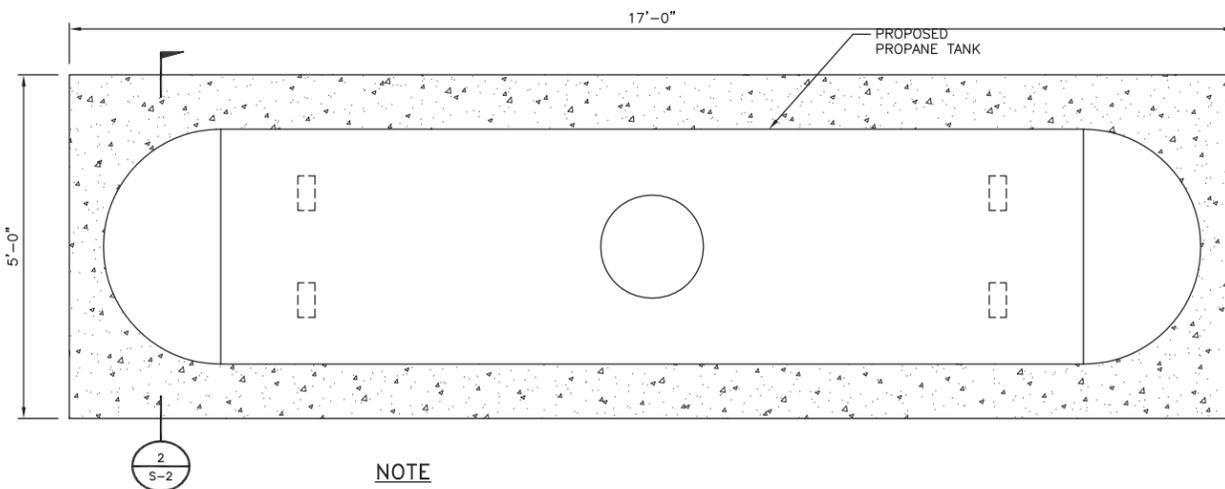
1. MATCH THICKNESS OF EXISTING AGGREGATE SURFACE WHEN CONSTRUCTION IS COMPLETE.
2. CONTRACTOR TO REPLACE TOP SOIL WITH COMPACTED SUBGRADE AND FINISH TO MATCH EXISTING GRADE.



GENERATOR FOUNDATION PLAN
NO SCALE



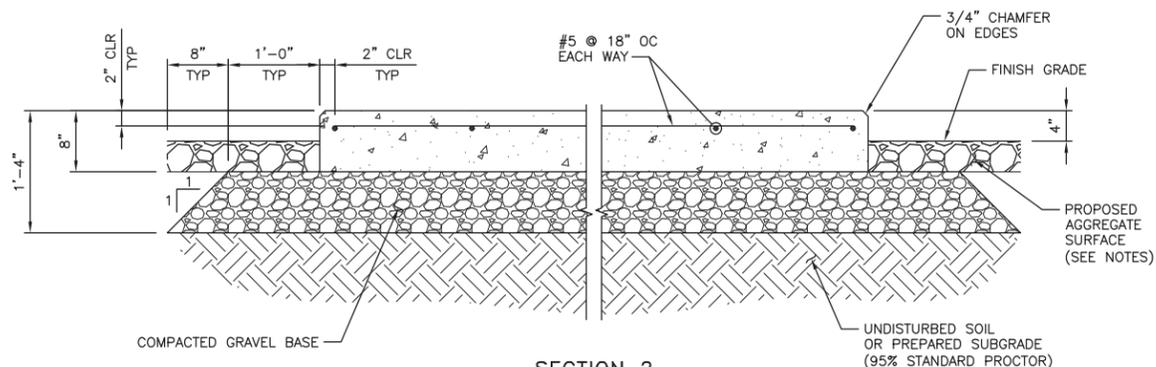
SECTION 1
FOUNDATION DETAIL
NO SCALE



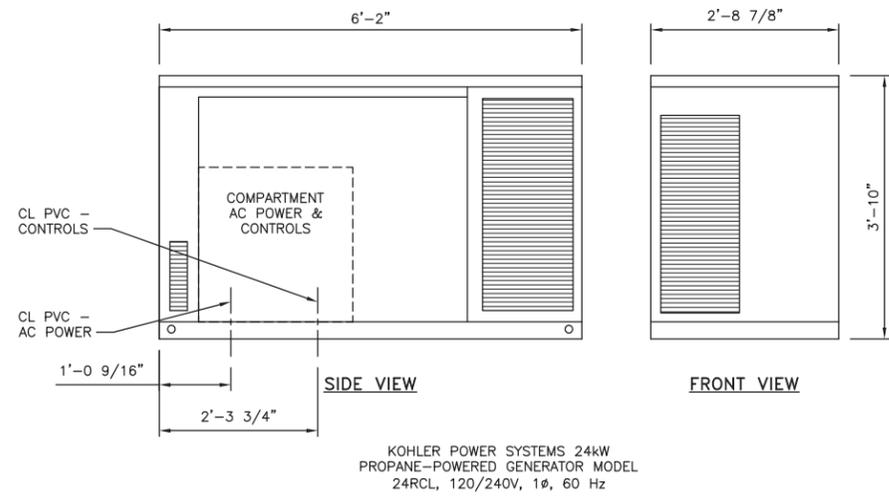
NOTE

1. ANCHORAGE TO BE (1) 5/8" HAS-R 316 SS ANCHOR PER LEG WITH HILTI-RE 500 V3 EPOXY & MINIMUM EFFECTIVE EMBEDMENT OF 5" (ESR# 3814) OR ENGINEER APPROVED EQUAL (TYP) (TOTAL OF 4).

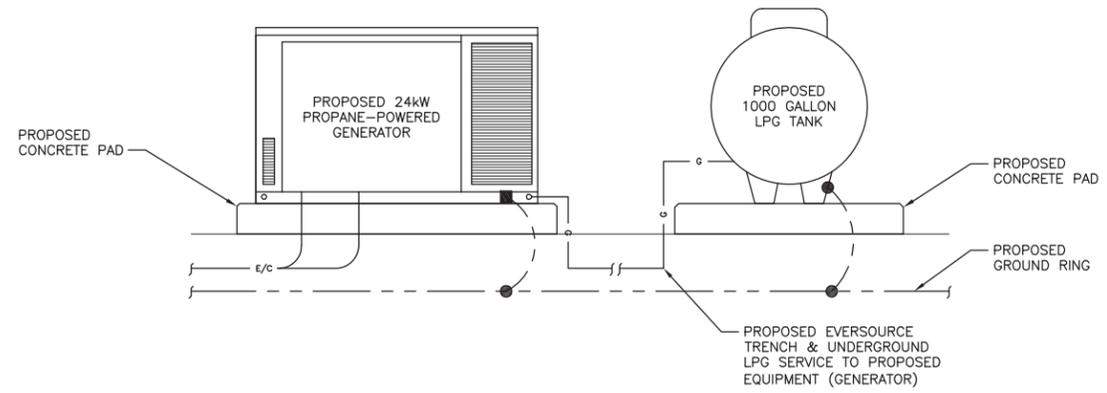
PROPANE TANK FOUNDATION PLAN
NO SCALE



SECTION 2
FOUNDATION DETAIL
NO SCALE



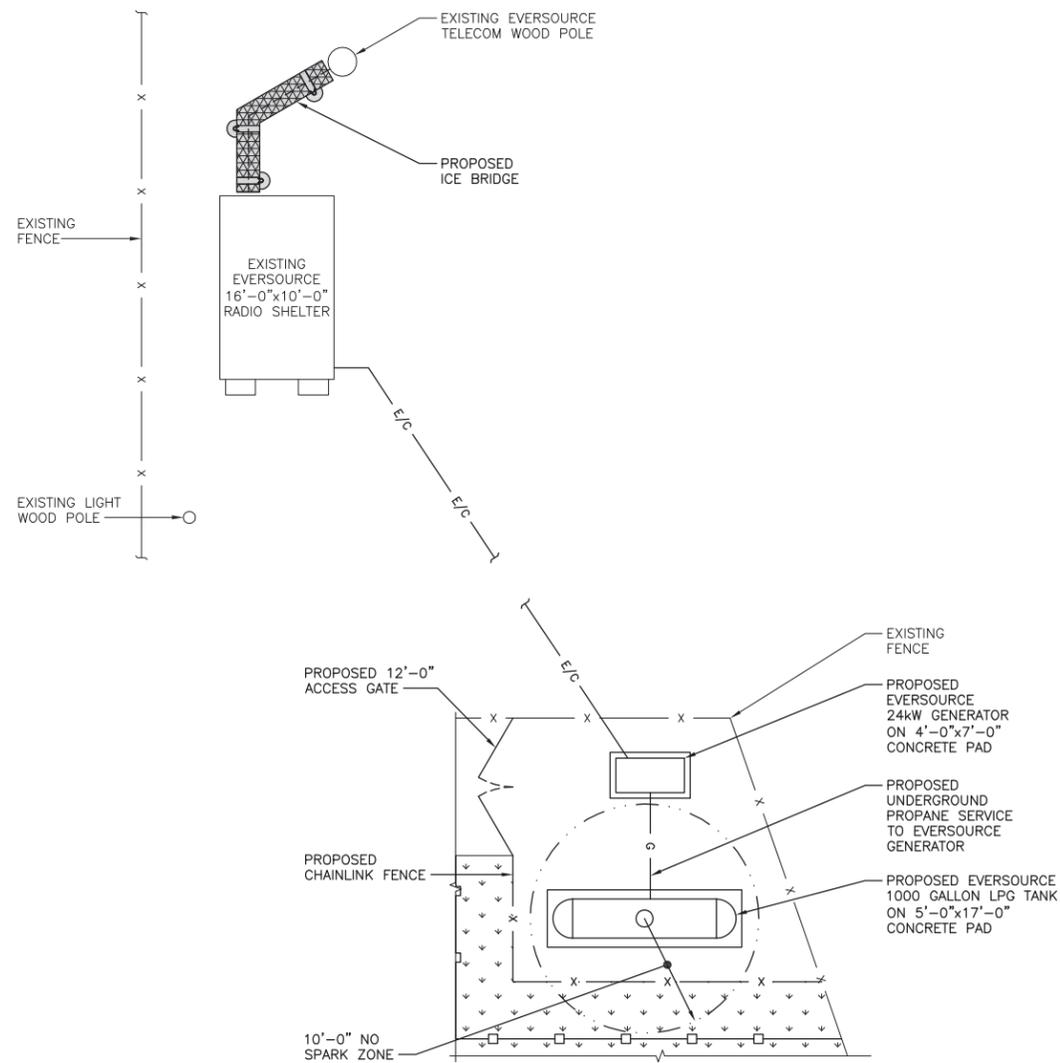
PROPANE GENERATOR SCHEMATICS
NO SCALE



NOTES

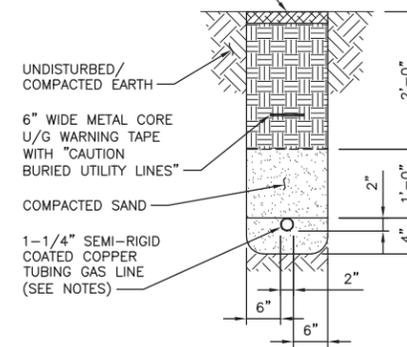
1. ALL VALVES USED IN METALLIC PIPING SYSTEMS MUST HAVE PRESSURE CONTAINING PARTS OF STEEL, DUCTILE (NODULAR) IRON, MALLEABLE IRON OR BRASS.
2. ALL MATERIALS USED, INCLUDING VALVE SEAT DISCS, PACKING, SEALS AND DIAPHRAGMS MUST BE RESISTANT TO THE ACTION OF LP GAS UNDER SERVICE CONDITIONS. MANY VALVES ARE LISTED BY INDEPENDENT TESTING LABORATORIES FOR USE IN LP GAS SERVICE. THESE CAN BE USED AS RECOMMENDED BY THE MANUFACTURER. OTHER VALVES CAN BE USED, BUT MUST COMPLY WITH THE REQUIREMENTS OF NFPA 58 AND SHOULD BE RECOMMENDED BY THE MANUFACTURER FOR LP GAS SERVICE TO BE SURE THAT ALL THE COMPONENT PARTS OF THE VALVE ARE APPROVED FOR LP GAS SERVICE.
3. GROUND GENERATOR AND TANK TO GND RING. REFER TO SHEET G-1 FOR WIRE SIZES.

PROPANE CONNECTION DIAGRAM
NO SCALE



MECHANICAL PLAN
NO SCALE

RESTORE EXISTING SURFACING AT AREAS DISTURBED BY TRENCHING, MATCH EXISTING



NOTES

SEMI-RIGID COATED COPPER TUBING GAS LINE INSTALLED UNDERGROUND SHALL BE INSTALLED IN ACCORDANCE WITH NFPA54. UNDERGROUND PIPING SHALL COMPLY WITH 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. THE PIPING SHALL HAVE A DIALECTIC UNION INSTALLED ON BOTH SIDES.

PROPANE GAS TRENCH
NO SCALE

EVERSOURCE ENERGY

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BRANFORD, CT 06405

SHEET TITLE
**GENERATOR & PROPANE TANK
EQUIPMENT DETAILS**

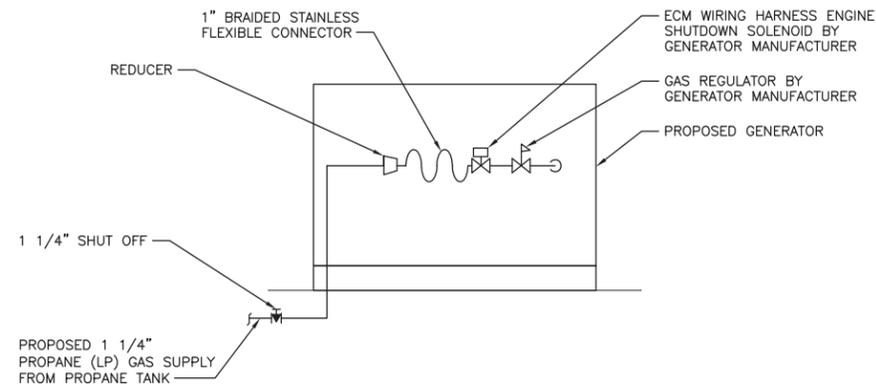
SHEET NUMBER
M-1





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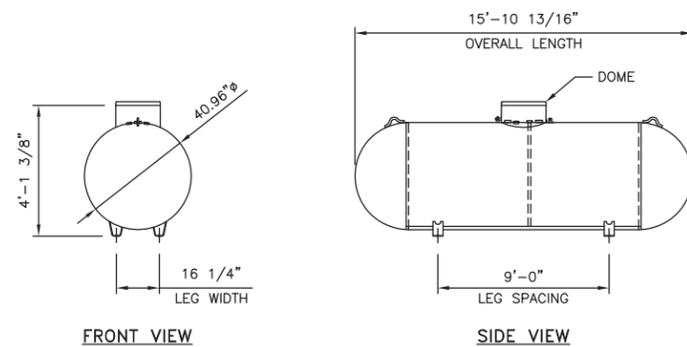
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NOTE

1. INSTALL COMPONENTS IN ACCORDANCE WITH GENERATOR MANUFACTURER'S INSTRUCTIONS.

PROPANE CONNECTION DIAGRAM
NO SCALE



NOTES

1. 1000 USWG AMSE VIII, DIV. 1 ABOVE GROUND LPG TANK AS MANUFACTURED BY ARCOSA TANK, LLC.
 * WWW.ARCOSATANK.COM
 * PH: 1-214-202-9258
 * WEIGHT (EMPTY) = 1729 lbs
2. LPG TANK TO BE BOLTED TO CONCRETE SLAB.
3. GROUND TANK STAND (SHEET G-1).
4. PROVIDE TANK MANUFACTURER SHOP DRAWING FOR REVIEW BY ENGINEER OF RECORD PRIOR TO PURCHASE.

PROPANE TANK SCHEMATICS
NO SCALE



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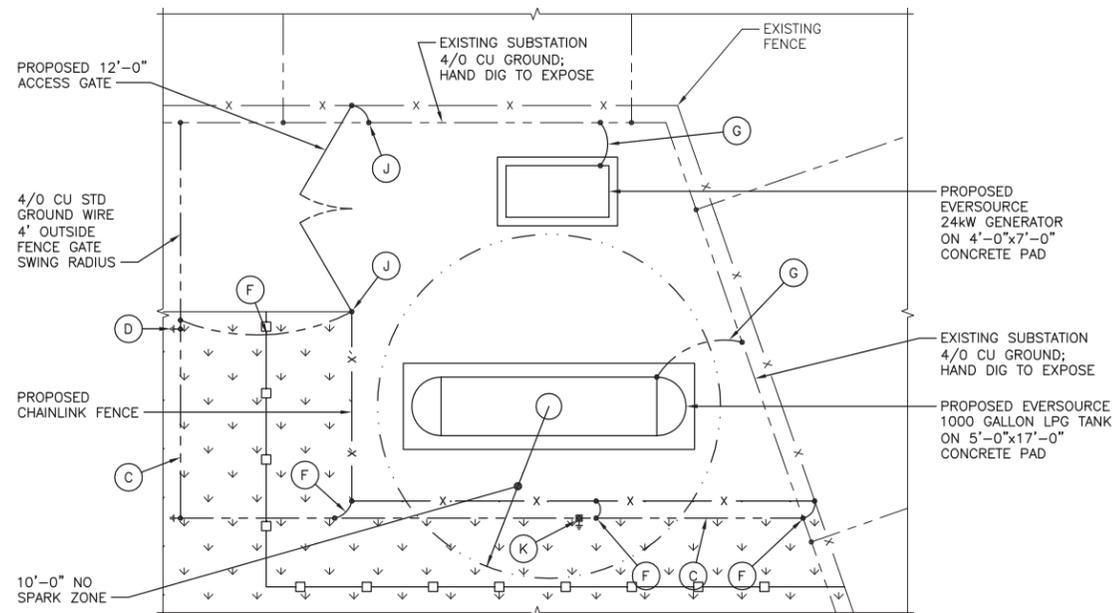
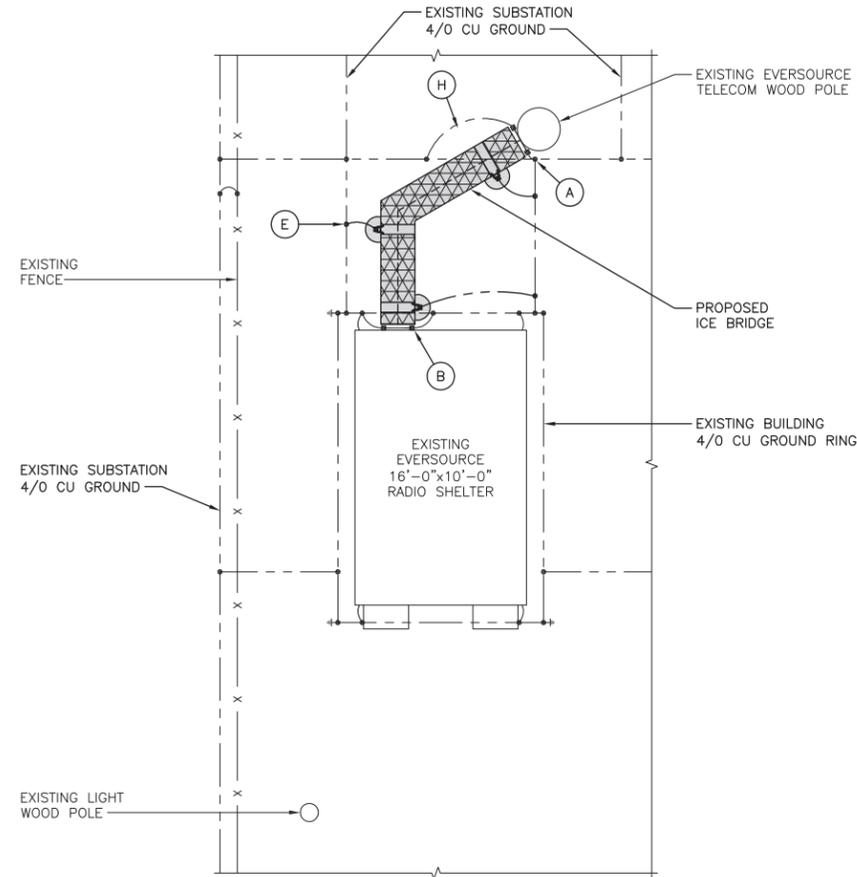
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SHEET TITLE
GENERATOR & PROPANE TANK EQUIPMENT DETAILS

SHEET NUMBER
M-2

LEGEND

- EXOTHERMIC (UNLESS NOTED OTHERWISE).
- COMPRESSION CONNECTION (TWO HOLE LUG OR EQUIVALENT).
- ⊕ 5/8"Øx10'-0" COPPER CLAD STEEL GROUND ROD.
- ⊕ 5/8"Øx10'-0" COPPER CLAD STEEL GROUND ROD WITH INSPECTION SLEEVE.
- GROUND WIRE.



GROUNDING PLAN
NO SCALE

KEY NOTES

- (A) **POLE_GROUNDING:** #2 TINNED CU WIRE FROM EXISTING GROUND RING TO EXISTING POLE.
- (B) **EXTERIOR_GROUND_BAR:** EXISTING #2 TINNED CU WIRE FROM BURIED GROUND RING TO THE EXTERIOR GROUND BAR.
- (C) **SITE_GROUNDING:** ADD 4/0 CU GROUND WIRE FROM EXISTING SUBSTATION GROUND AROUND FENCED AREAS AND CONNECT EXOTHERMICALLY. PLACE 3'-0" OUT FROM FENCE.
- (D) **GROUND_ROD:** COPPER CLAD STEEL 5/8"Ø TEN (10) FEET LONG.
- (E) **ICE_BRIDGE_SUPPORT_POST_GROUNDING:** EXTEND #2 TINNED CU WIRE FROM BURIED GROUND RING TO ALL ICE BRIDGE SUPPORT POSTS AND EXOTHERMICALLY WELD.
- (F) **FENCE_GROUNDING:** IF FENCE IS WITHIN 6' OF GROUND RING, EXTEND 4/0 CU WIRE FROM BURIED GROUND RING TO FENCE CORNER POSTS AND EXOTHERMICALLY WELD. BOND INTERMEDIATE POST IF REQUIRED TO MAINTAIN 25' MAX SPACING. REFER TO SHEET G-5.
- (G) **GENERATOR/TANK_GROUNDING:** EXTEND 4/0 CU WIRE FROM BURIED GROUND RING TO EACH GENERATOR/TANK AND EXOTHERMICALLY WELD.
- (H) **POLE_GROUND_BAR:** EXTEND TWO #2 TINNED CU WIRE FROM BURIED GROUND RING UP TO THE TOWER GROUND BAR AND EXOTHERMICALLY WELD.
- (J) **GATE_GROUNDING:** EXTEND 4/0 TINNED CU WIRE FROM BURIED GROUND RING TO GATE POSTS AND EXOTHERMICALLY WELD. USE FLEXIBLE BRAID TO CONNECT SWING GATE TO GATE POSTS.
- (K) **GROUND_ROD_WITH_INSPECTION_SLEEVE:** COPPER CLAD STEEL 5/8"Ø TEN (10) FEET LONG WITH INSPECTION SLEEVE.

NOTES

1. ALL GROUNDING SYSTEM CONDUCTORS AND CONNECTIONS BELOW GRADE SHALL BE THERMAL WELDS AT GROUND RODS AND AT A MINIMUM OF 36" BELOW GRADE, OR 6" BELOW FROST LINE, WHICH EVER IS GREATER OF THE TWO DIMENSIONS.
2. ALL INSTALLATIONS SHALL BE FIELD VERIFIED.
3. ALL GROUND WIRE SHALL BE 4/0 STD BARE COPPER TINNED UNLESS NOTED OTHERWISE.
4. ALL GROUND WIRES SHALL PROVIDE A STRAIGHT DOWNWARD PATH TO GROUND WITH GRADUAL BEND AS REQUIRED. GROUND WIRES SHALL NOT BE LOOPED OR SHARPLY BENT.
5. THE CONTRACTOR SHALL COORDINATE INSTALLATION OF GROUND RODS AND GROUND RING WITH FOUNDATION AND UNDERGROUND CONDUIT.
6. EACH EQUIPMENT CABINET SHALL BE CONNECTED WITH #2 AWG INSULATED SOLID TINNED COPPER WIRE TO GROUND BAR. EQUIPMENT CABINETS SHALL EACH HAVE (2) LUG CONNECTIONS.
7. KOPR-SHIELD ANTI-OXIDATION COMPOUND SHALL BE USED ON ALL COMPRESSION GROUNDING CONNECTIONS.
8. ALL EXOTHERMIC CONNECTIONS SHALL BE INSTALLED UTILIZING THE PROPER CONNECTION/MOLD AND MATERIALS FOR THE PARTICULAR APPLICATION.
9. ALL BOLTED GROUNDING CONNECTIONS SHALL BE INSTALLED WITH AN EXTERNAL TOOTHED LOCK WASHER. GROUNDING BUS BARS MAY HAVE PRE PUNCHED HOLES OR TAPPED HOLES. ALL HARDWARE SHALL BE 3/8" STAINLESS STEEL.
10. EXTERNAL GROUNDING CONDUCTOR SHALL NOT BE INSTALLED OR ROUTED THROUGH HOLES IN ANY METAL OBJECTS, CONDUITS, OR SUPPORTS TO PRECLUDE ESTABLISHING A MAGNETIC CHOKE POINT.
11. PLASTIC CLIPS SHALL BE USED TO FASTEN AND SUPPORT GROUNDING CONDUCTORS. FERROUS METAL CLIPS WHICH COMPLETELY SURROUND THE GROUNDING CONDUCTOR SHALL NOT BE USED.
12. STANDARD BUS BARS MGB, GWB, IGB, TELCO GB, FIBER GB, AND POWER GB SHALL BE FURNISHED AND INSTALLED BY THE SUBCONTRACTOR. THEY SHALL NOT BE FABRICATED OR MODIFIED IN THE FIELD. ALL GROUNDING BUSES SHALL BE IDENTIFIED WITH MINIMUM 3/4" LETTERS BY WAY OF STENCILING OR DESIGNATION PLATE.
13. THE CONTRACTOR SHALL MEASURE GROUND RESISTANCE AT INSPECTION SLEEVE K. USE A CLAMP-ON METER AND TEST AFTER ALL GROUNDING IS COMPLETE. RECORD THE MEASUREMENT IN THE TEST PLAN DOCUMENT AND PROVIDE RESULTS TO THE PROJECT MANAGER FOR REVIEW. THE GROUND SYSTEM RESISTANCE TO EARTH GROUND SHALL NOT EXCEED FIVE (5) OHMS. IF THE GROUND TEST EXCEEDS THE MAXIMUM OF 5 OHMS, THE CONTRACTOR SHALL BE RESPONSIBLE TO PROVIDE ADDITIONAL GROUND CONNECTIONS AS REQUIRED TO MEET THE 5 OHMS MAXIMUM.
14. IF COAX ON ICE BRIDGE IS MORE THAT 6' FROM THE GROUND BAR AT THE BASE OF THE TOWER, A SECOND GROUND BAR WILL BE NEEDED AT THE END OF THE ICE BRIDGE RUN TO GROUND THE COAX GROUND KIT AND THE IN-LINE SURGE ARRESTORS.
15. CONTRACTOR SHALL REPAIR/PLACE EXISTING GROUNDING SYSTEM COMPONENTS DAMAGED DURING CONSTRUCTION AT THE CONTRACTORS EXPENSE.

EVERSOURCE ENERGY

107 SELDEN STREET
BERLIN, CT 06037
PHONE: (800) 286-2000



BLACK & VEATCH

6800 W 115TH ST, SUITE 2292
OVERLAND PARK, KS 66211
PHONE: (913) 458-3595

PROJECT NO:	403093
DRAWN BY:	TYW
CHECKED BY:	CAG

REV	DATE	DESCRIPTION
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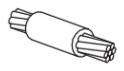
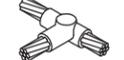
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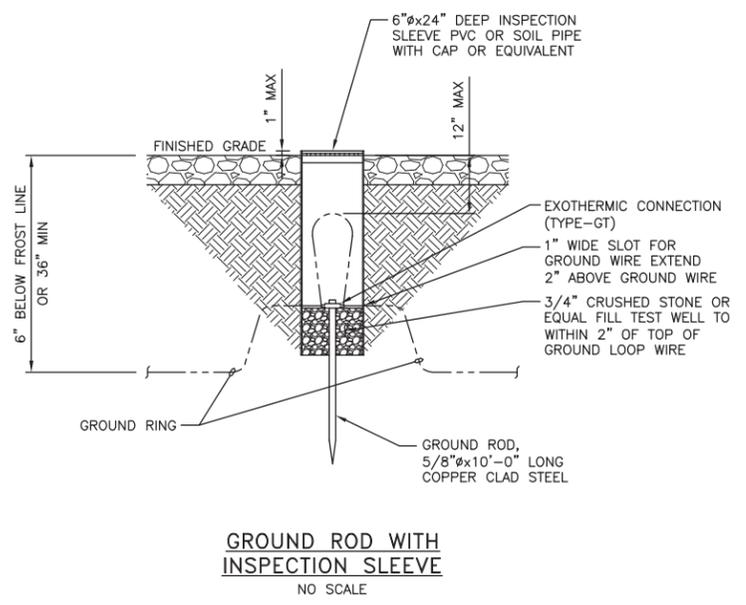
SHEET TITLE
GROUNDING PLAN

SHEET NUMBER

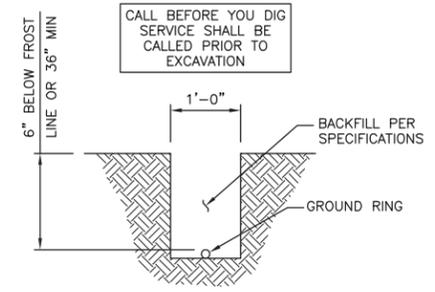
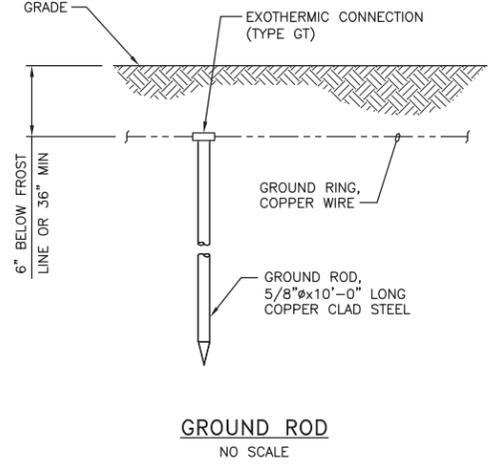
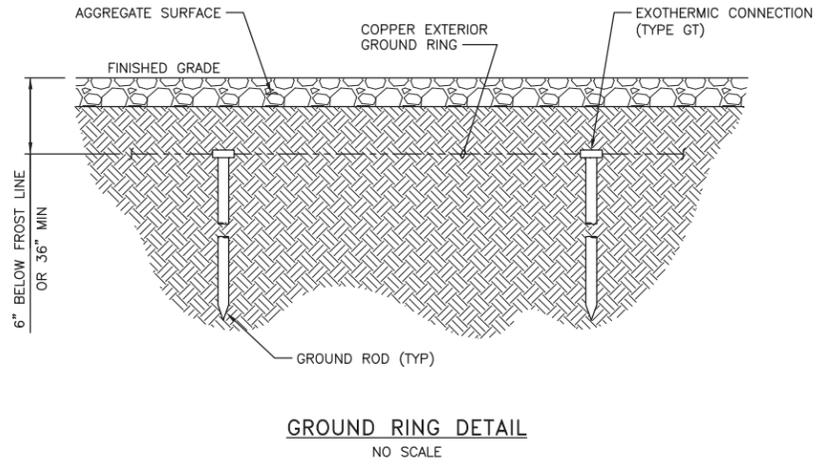
G-1



CADWELD CONNECTIONS OR APPROVED EQUAL		BURNDY CONNECTIONS OR APPROVED EQUAL	
 HORIZONTAL SPLICE SPLICE OF HORIZONTAL CABLES TYPE SS	 PARALLEL HORIZONTAL CONDUCTORS PARALLEL THROUGH CONNECTION OF HORIZONTAL CABLES TYPE PT	 VERTICAL PIPE CABLE DOWN AT 45° TO RANGE OF VERTICAL PIPES TYPE VS	 BOND JUMPER FIELD FABRICATED GREEN STRANDED INSULATED TYPE 2-YA-2
 HORIZONTAL STEEL SURFACE TO FLAT STEEL SURFACE OR HORIZONTAL PIPE TYPE HS	 PARALLEL HORIZONTAL CONDUCTORS PARALLEL DEAD END TAP OR HORIZONTAL THRU CONDUCTOR TYPE PC	 VERTICAL STEEL SURFACE CABLE DOWN AT 45° TO VERTICAL STEEL SURFACE INCLUDING PIPE TYPE VS	 COPPER LUGS TWO HOLE - LONG BARREL LENGTH TYPE YA-2
 HORIZONTAL TEE TEE OF HORIZONTAL RUN AND TAP CABLES TYPE TA	 THROUGH CABLE TO GROUND ROD THROUGH CABLE TO TOP OF GROUND ROD TYPE GT		



NOTES
1. REFER TO SHEET G-1 FOR WIRE SIZES.



NOTES
1. ALL EXOTHERMIC WELD CONNECTIONS SHALL BE BELOW FROST LINE.

EVERSOURCE ENERGY

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SHEET TITLE
GROUNDING DETAILS

SHEET NUMBER
G-2



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SHEET TITLE
GROUNDING
DETAILS

SHEET NUMBER
G-3

NOTES

- ALL LUGS SHALL BE 2-HOLE, LONG BARREL, TINNED SOLID COPPER UNLESS OTHERWISE SPECIFIED, USING THE PROPER U.L. TOOL AND CIRCUMFERENTIAL HEXAGON DIE. LUGS SHALL BE THOMAS AND BETTS SERIES 548##BE, BURNDY, ERICO OR EQUIVALENT. BOLT HOLE DIAMETER AND SPACING ON ALL GROUND LUGS SHALL MATCH HOLE DIAMETER AND SPACING OF THE GROUND BAR. ANGLE LUGS MAY BE USED IF CONSTRUCTION CONDITIONS DICTATE. REFER TO DETAIL "G".
- AN ANTI-OXIDATION COMPOUND SHALL BE APPLIED BETWEEN THE LUG AND GROUND BAR ONLY. DO NOT COVER THE LUG. THE ANTI-OXIDATION COMPOUND SHALL BE THOMAS AND BETTS "KOPR-SHIELD" OR BURNDY PENETROX-E.
- GROUND BARS SHALL BE ATTACHED TO THE ANTENNA SUPPORT STRUCTURES WITH U.L. APPROVED MOUNTING DEVICES. GROUND CLAMPS MAY BE USED TO MOUNT THE GROUND BAR TO AVAILABLE FLANGES, COAX PORT RIMS, ETC. STEEL STRAPS MAY BE USED TO ATTACH GROUND BAR TO A MONOPOLE IF NO CONVENIENT CLAMPING SURFACES ARE PRESENT. ALL CONNECTING SURFACES SHALL BE CLEAN AND FREE OF DIRT, OIL AND CORROSION. GALVANIZED SURFACES SHALL BE POLISHED WITH A STEEL BRUSH. DO NOT DRILL HOLES OR USE EXOTHERMIC WELDS TO CONNECT GROUND LEADS TO A STEEL TOWER EXCEPT ON STEEL TABS OR FLANGES SPECIFICALLY DESIGNED FOR THAT PURPOSE.

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

SECTION "P" - SURGE PROTECTORS

- CELL REFERENCE GROUND BAR (IF CO-LOCATED)
- GENERATOR FRAMEWORK (IF AVAILABLE) (#2)
- TELCO GROUND BAR (#2)
- COMMERCIAL POWER COMMON NEUTRAL/GROUND BOND (#3/0)
- FIBER GROUND BAR (#2)

SECTION "A" - SURGE ABSORBERS

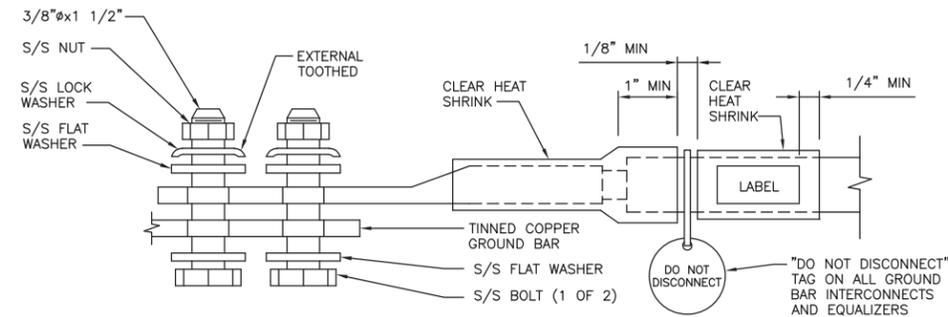
- INTERIOR GROUND RING (#2)
- EXTERNAL EARTH GROUND FIELD (BURIED GROUND RING) (#2)

SECTION "N" - NON-ISOLATED GROUND ZONE EQUIPMENT

- MISC NON-ISOLATED GROUND ZONE
- BATTERY RACK

SECTION "I" - ISOLATED GROUND ZONE

- ALL ISOLATED GROUND REFERENCE
- GROUND WINDOW BAR

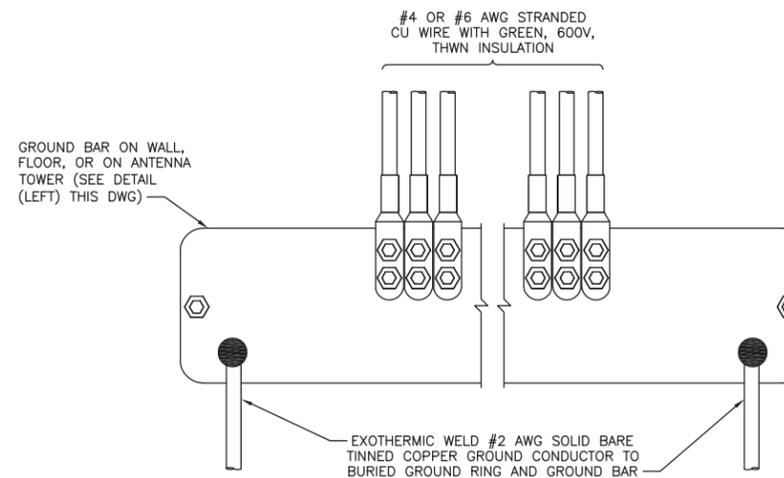


NOTES

- ALL HARDWARE 18-8 STAINLESS STEEL INCLUDING LOCK WASHERS, COAT ALL SURFACES WITH AN ANTI-OXIDANT COMPOUND BEFORE MATING.
- ALL HARDWARE SHALL BE S/S 3/8 INCH DIAMETER OR LARGER.
- FOR GROUND BOND TO STEEL ONLY: INSERT A CADMIUM FLAT WASHER BETWEEN LUG AND STEEL, COAT ALL SURFACES WITH AN ANTI-OXIDANT COMPOUND BEFORE MATING.

TWO HOLE LUG

NO SCALE

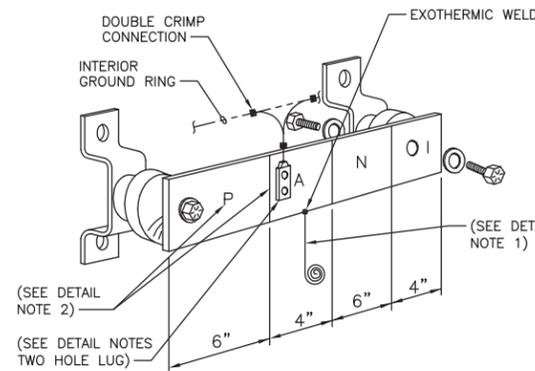


NOTE

- NUT & WASHER SHALL BE PLACED ON THE FRONT SIDE OF THE GROUND BAR AND BOLTED ON THE BACK SIDE.

INSTALLATION OF GROUND WIRE TO EXTERIOR GROUNDING BAR

NO SCALE



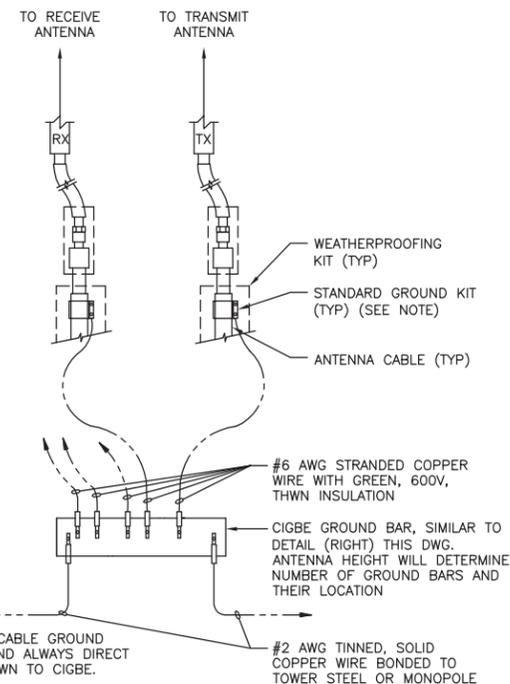
SITEPRO - 1/4"x4"x20"
TINNED GROUND BAR KIT
TINMG420U-K

DETAIL NOTES

- EXOTHERMIC ALLY WELD #2 AWG BARE TINNED SOLID COPPER CONDUCTOR TO GROUND BAR. ROUTE CONDUCTOR TO BURIED GROUND RING AND PROVIDE EXOTHERMIC WELD.
- EC SHALL USE PERMANENT MARKER TO DRAW THE LINES BETWEEN EACH SECTION AND LABEL EACH SECTION ("P", "A", "N", "I") WITH 1" HIGH LETTERS.

(MGB) REFERENCE GROUND BAR

NO SCALE



NOTE

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

CONNECTION OF GROUND WIRE TO EXTERIOR GROUNDING BAR

NO SCALE



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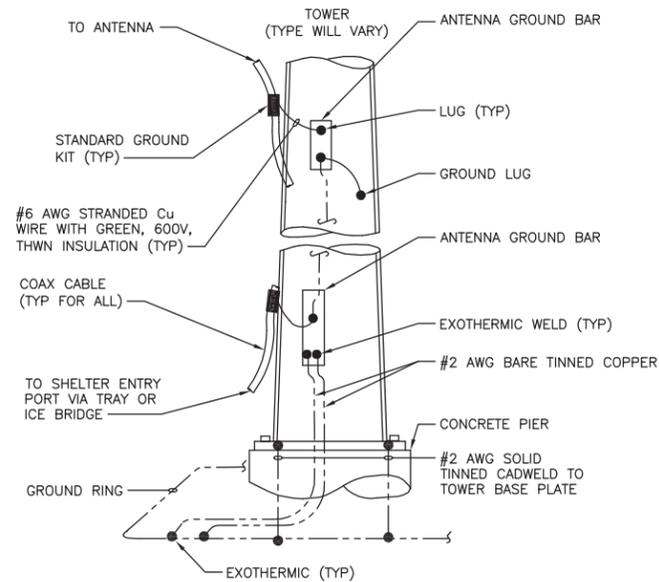
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SHEET TITLE
**GROUNDING
DETAILS**

SHEET NUMBER

G-4

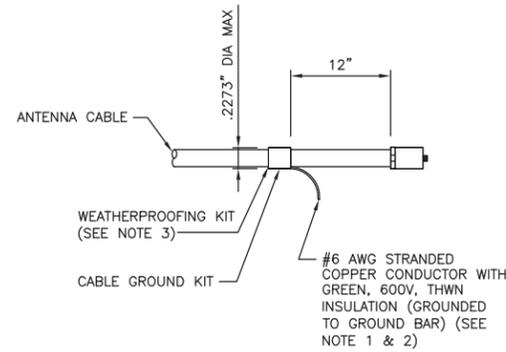


NOTE

1. NUMBER OF GROUND BARS MAY VARY DEPENDING ON THE TYPE OF TOWER, ANTENNA LOCATION AND CONNECTION ORIENTATION. PROVIDE AS REQUIRED.

ANTENNA CABLE GROUNDING

NO SCALE

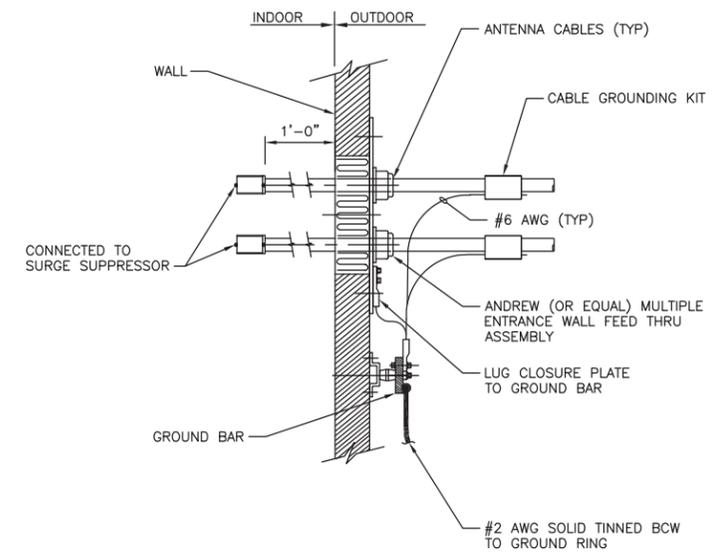


NOTES

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.
2. GROUNDING KIT SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.
3. WEATHER PROOFING SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.

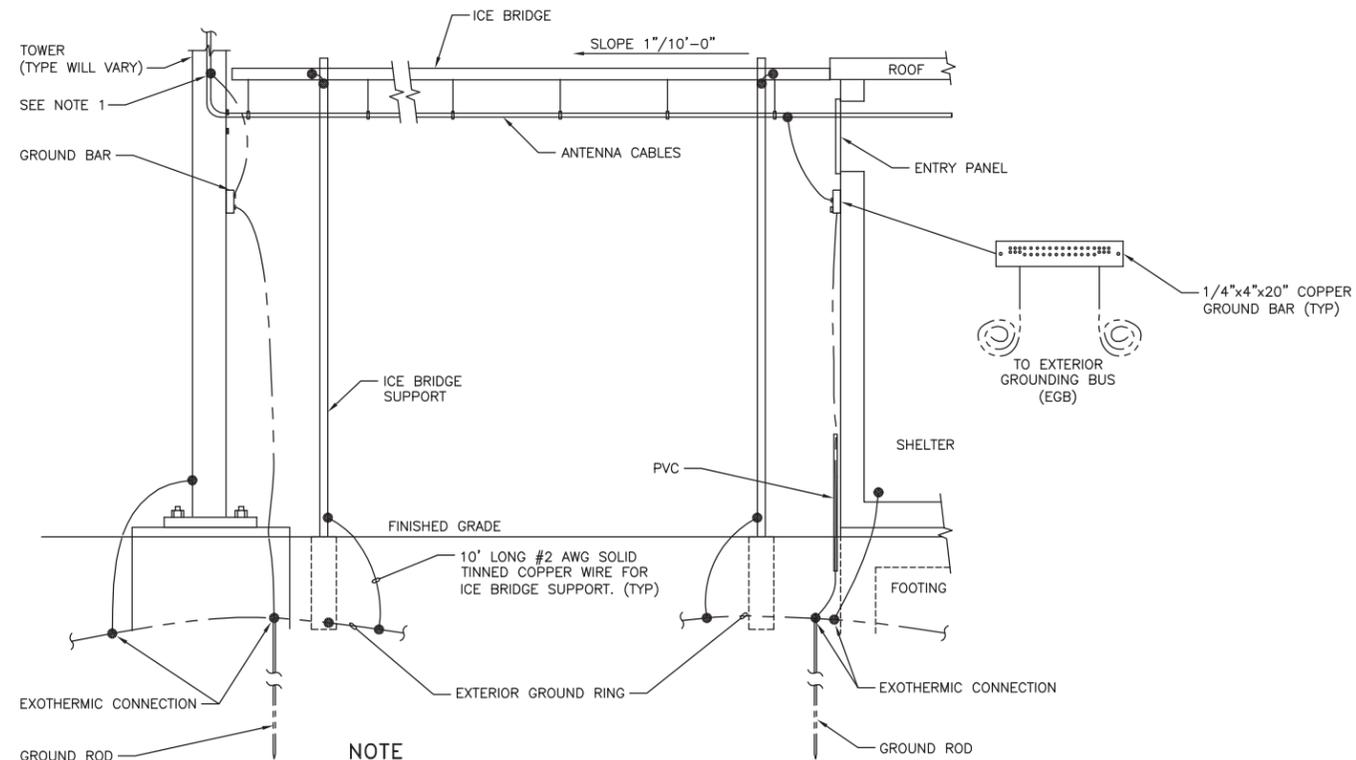
CONNECTION OF CABLE GROUND KIT TO ANTENNA CABLE

NO SCALE



CABLE INSTALLATION WITH WALL FEED THRU ASSEMBLY

NO SCALE



NOTE

1. PROVIDE GROUND KIT 6" BEFORE TURN

ICE BRIDGE AND ANTENNA CABLE DETAIL

NO SCALE



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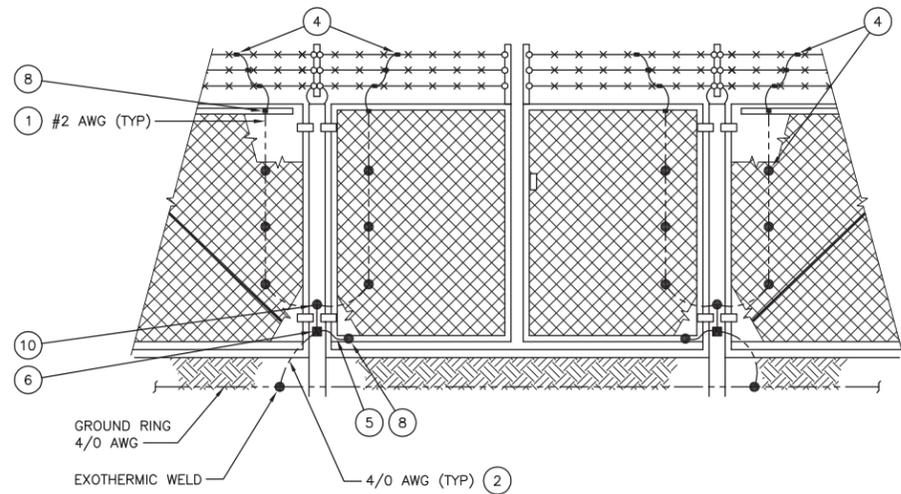


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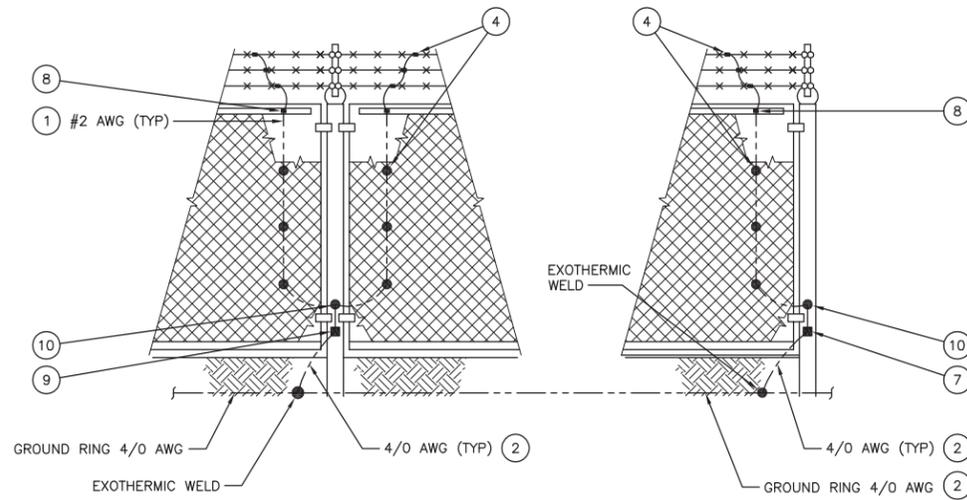
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SHEET TITLE
**GROUNDING
DETAILS**

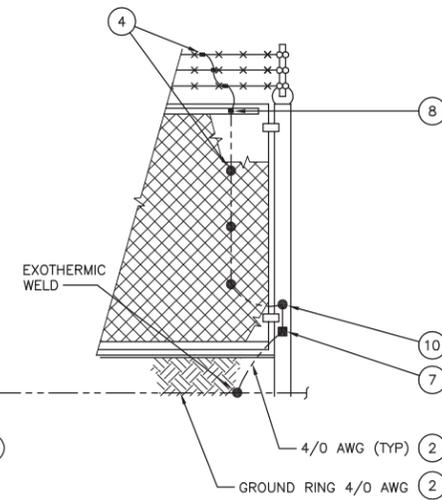
SHEET NUMBER
G-5



DETAIL A
12' GATE GROUNDING DETAIL
NO SCALE



DETAIL B
FENCE GROUNDING DETAIL
NO SCALE



DETAIL C
CORNER DETAIL
NO SCALE

CONNECTER MATERIAL DESCRIPTION

ITEM#	DESCRIPTION	STOCK#
1	CABLE, BARE COPPER, #2 SOLID TINNED FOR BARBED WIRE FABRIC GROUND	533919
2	CABLE, BARE COPPER, 4/0 FOR ATTACHING FENCE TO SUBSTATION GROUND GRID	513367
3	CONNECTER, COMPRESSION, 4/0 GROUND LEAD TO 4/0 GROUND GRID	516765
4	CONNECTOR, SPLIT BOLT, TINNED COPPER FOR ATTACHING #8-#2 COPPER CABLE TO FENCE FABRIC AND BARBED WIRE	517632
5	COPPER BRAID, FLEXIBLE, TINNED 1 1/2"	512015
6	CONNECTOR, GROUND, 4/0 COPPER CABLE TO GATE POST	501917
7	CONNECTOR, GROUND, 4/0 COPPER CABLE TO CORNER POST	517487
8	CONNECTOR, GROUND, #2 COPPER CABLE TO TOP RAIL	515108
9	CONNECTOR, GROUND, 4/0 COPPER CABLE TO LINE POST	501915
10	CONNECTOR, COPPER, PARALLEL GROOVE, #1-4/0 RUN, #6-4/0 TAP	517579

EXCAVATION

- CONTRACTOR SHALL GRADE ONLY AREAS SHOWN TO BE MODIFIED HEREIN AND ONLY TO THE EXTENT REQUIRED TO SHED OVERLAND WATER FLOW AWAY FROM SITE. SLOPES SHALL NOT BE STEEPER THAN 3:1 (HORIZONTAL:VERTICAL), UNLESS NOTED OTHERWISE. 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.
- SURPLUS MATERIAL SHALL BE REMOVED FROM THE SITE.
- TOWER FOUNDATION EXCAVATION, BACKFILL AND COMPACTION SHALL BE IN ACCORDANCE WITH THE TOWER MANUFACTURER'S DESIGNS AND SPECIFICATIONS.

MATERIAL

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

SQUARE MESH SIEVES	PERCENT PASSING BY WEIGHT		
	BANK FILL	GRAVEL BASE	GRAVEL PROCESSED AGG BASE
PASS 5"	100	100	90-100
PASS 3 1/2"	100	100	
PASS 2 1/4"	95-100		
PASS 2"	55-100		
PASS 1 1/2"			
PASS 1"			
PASS 3/4"			50-75
PASS 1/4"	25-60	25-60	25-45
PASS #10	15-45	15-45	
PASS #40	2-25	5-25	5-20
PASS #100	0-10	0-10	2-12
PASS #200	0-5	0-5	

- FILL MATERIAL SHALL BE FREE OR ORGANIC MATERIAL, ICE, TRASH AND DEBRIS.
- REFER TO MOST CURRENT GEOTECHNICAL ENGINEERING REPORT FOR ALL FILL MATERIAL REQUIREMENTS.

ELECTRICAL

- CONTRACTOR SHALL VERIFY EXISTING ELECTRIC SERVICE TYPE AND CAPACITY AND ORDER NEW ELECTRIC SERVICE FROM LOCAL ELECTRIC UTILITY, WHERE APPLICABLE.
- ALL ELECTRICAL WORK SHALL BE IN ACCORDANCE WITH ALL APPLICABLE CODES, AND SHALL BE ACCEPTABLE TO ALL AUTHORITIES HAVING JURISDICTION. WHERE A CONFLICT EXISTS BETWEEN CODES, PLAN AND SPECIFICATIONS, OR AUTHORITIES HAVING JURISDICTION, THE MORE STRINGENT AUTHORITIES SHALL APPLY.
- CONTRACTOR SHALL PROVIDE ALL LABOR, MATERIALS, INSURANCE, EQUIPMENT, INSTALLATION, CONSTRUCTION TOOLS, TRANSPORTATION, ETC, FOR A COMPLETE AND PROPERLY OPERATIVE SYSTEM ENERGIZED THROUGHOUT AND AS INDICATED ON THE DRAWINGS AND AS SPECIFIED HEREIN AND/OR OTHERWISE REQUIRED.
- ALL ELECTRICAL CONDUCTORS SHALL BE 100% COPPER AND SHALL HAVE TYPE THHN INSULATION UNLESS INDICATED OTHERWISE.
- CONDUIT SHALL BE THREADED RIGID GALVANIZED STEEL OR EMT WITH ONLY COMPRESSION TYPE COUPLINGS AND CONNECTORS, ALL MADE UP WRENCH TIGHT.
- ALL BURIED CONDUIT SHALL BE MINIMUM SCH 40 PVC UNLESS NOTED OTHERWISE, OR AS PER LOCAL CODE REQUIREMENTS.
- PROVIDE FLEXIBLE STEEL CONDUIT OR LIQUID TIGHT FLEXIBLE STEEL CONDUIT TO ALL VIBRATING EQUIPMENT, INCLUDING HVAC UNITS, TRANSFORMERS, MOTORS, ETC, OR WHERE EQUIPMENT IS PLACED UPON A SLAB ON GRADE.
- ALL BRANCH CIRCUITS AND FEEDERS SHALL HAVE A SEPARATE GREEN INSULATED EQUIPMENT GROUNDING CONDUCTOR BONDED TO ALL ENCLOSURES, PULLBOXES, ETC.
- CONDUIT AND CABLE WITHIN CORRIDORS SHALL BE CONCEALED AND EXPOSED ELSEWHERE, UNLESS NOTED OTHERWISE.
- ELECTRICAL MATERIALS INSTALLED ON ROOFTOP SHALL BE LISTED FOR NEMA 3R USE. -AND ALL WIRING WITHIN A VENTILATION DUCT SHALL BE LISTED FOR SUCH USE. IN GENERAL WIRING METHODS WITHIN A DUCT SHALL BE AN MC CABLE WITH SMOOTH OR CORRUGATED METAL JACKET AND HAVE NO OUTER COVERING OVER THE METAL JACKET. INTERLOCKED ARMOR TYPE OF MC CABLE IS NOT ACCEPTABLE FOR THIS APPLICATION. CONTRACTOR CAN ALSO USE TYPE MI CABLE IN THE VENTILATION DUCT PROVIDED IT DOES NOT HAVE ANY OUTER COVERINGS OVER THE METAL EXTERIOR.
- WIRING DEVICES SHALL BE SPECIFICATION GRADE, AND WIRING DEVICE COVER PLATES SHALL BE PLASTIC WITH ENGRAVING AS SPECIFIED.

- GROUNDING SYSTEM RESISTANCE SHALL BE MEASURED, RECORDED, AND DATED USING MEGGER DET14 OR SIMILAR INSTRUMENT. GROUND RESISTANCE SHALL NOT EXCEED 5 OHMS. IF THE RESISTANCE VALUE IS EXCEEDED, NOTIFY CONSTRUCTION MANAGER FOR FURTHER INSTRUCTION.
- COORDINATE WITH BUILDING MANAGEMENT BEFORE PERFORMING ANY WORK INVOLVING EXISTING SYSTEMS OR EQUIPMENT IN ORDER TO DETERMINE THE EFFECT, IF ANY, ON OTHER TENANTS WITHIN THE BUILDING, AND TO DETERMINE THE APPROPRIATE TIME FOR PERFORMING THIS WORK.
- THE CONTRACTOR SHALL BE REQUIRED TO VISIT THE SITE PRIOR TO SUBMITTING BID IN ORDER TO DETERMINE THE EXTENT OF THE EXISTING CONDITIONS.
- ALL CONDUCTOR ENDS SHALL BE TAGGED AND ELECTRICAL EQUIPMENT LABELED WITH ENGRAVED IDENTIFICATION PLATES.
- CONTRACTOR IS RESPONSIBLE FOR ALL CONTROL WIRING AND ALARM TIE-INS.

GROUNDING

- #6 THWN SHALL BE STRANDED #6 COPPER WITH GREEN THWN INSULATION SUITABLE FOR WET INSTALLATIONS.
- #2 THWN SHALL BE STRANDED #2 COPPER WITH THWN INSULATION SUITABLE FOR WET INSTALLATIONS.
- #2 BARE TINNED SHALL BE SOLID COPPER TINNED. ALL BURIED WIRE SHALL MEET THIS CRITERIA.
- ALL LUGS SHALL BE 2-HOLE, LONG BARREL, TINNED SOLID COPPER UNLESS OTHERWISE SPECIFIED, LUGS SHALL BE THOMAS AND BETTS SERIES 548##BE OR EQUIVALENT (IE #2 THWN - 54856BE, #2 SOLID - 54856BE, AND #6 THWN - 54852BE).
- ALL HARDWARE, BOLTS, NUTS, AND WASHERS SHALL BE 18-8 STAINLESS STEEL. EVERY CONNECTION SHALL BE BOLT-FLAT WASHER-BUSS-LUG-FLAT WASHER-BELLEVILLE WASHER-NUT IN THAT EXACT ORDER. BACK-TO-BACK LUGGING, BOLT-FLAT WASHER-LUG-BUSS-LUG-FLAT WASHER-BELLEVILLE WASHER-NUT, IN THAT EXACT ORDER, IS ACCEPTED WHERE NECESSARY TO CONNECT MANY LUGS TO A BUSS BAR. STACKING OF LUGS, BUSS-LUG-LUG, IS NOT ACCEPTABLE.
- WHERE CONNECTIONS ARE MADE TO STEEL OR DISSIMILAR METALS, A THOMAS AND BETTS DRAGON TOOTH WASHER MODEL DTWXXX SHALL BE USED BETWEEN THE LUG AND THE STEEL, BOLT-FLAT WASHER-STEEL-DRAGON TOOTH WASHER-LUG-FLAT WASHER-BELLEVILLE WASHER-NUT.
- ALL CONNECTIONS, INTERIOR AND EXTERIOR, SHALL BE MADE WITH THOMAS AND BETTS KPOR-SHIELD. COAT ALL WIRES BEFORE LUGGING AND COAT ALL SURFACES BEFORE CONNECTING.
- THE MINIMUM BEND RADIUS SHALL BE 8 INCHES FOR #6 WIRE AND SMALLER AND 12 INCHES FOR WIRE LARGER THAN #6.
- ALL CONNECTIONS TO THE GROUND RING SHALL BE EXOTHERMIC WELD.
- BOND THE FENCE TO THE GROUND RING AT EACH CORNER, AND AT EACH GATE POST WITH #2 SOLID TINNED WIRE. EXOTHERMIC WELD BOTH ENDS.
- GROUND KITS SHALL BE SOLID COPPER STRAP WITH #6 WIRE 2-HOLE COMPRESSION CRIMPED LUGS AND SHALL BE SEALED ACCORDING TO MANUFACTURER INSTRUCTIONS.
- FERROUS METAL CLIPS WHICH COMPLETELY SURROUND THE GROUNDING CONDUCTOR SHALL BE USED.
- GROUND BARS SHALL BE FURNISHED AND INSTALLED WITH PRE-DRILLED HOLE DIAMETERS AND SPACINGS. GROUND BARS SHALL NEITHER BE FIELD FABRICATED NOR NEW HOLES DRILLED. GROUND LUGS SHALL MATCH THE SPACING ON THE BAR. HARDWARE DIAMETER SHALL BE MINIMUM 3.8 INCH.
- MGB GROUND CONNECTION SHALL BE EXOTHERMIC WELDED TO THE GROUND SYSTEM.
- ALL CABLE TRAY AND/OR PLATFORM STEEL SHALL BE BONDED TOGETHER WITH JUMPERS (#6 IN EQUIPMENT ROOM, #2 ELSEWHERE AND HOMERUN).

CABLE TRAY

- 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 ACCORD 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.

ANTENNA & CABLE NOTES

- THE CONTRACTOR SHALL FURNISH AND INSTALL ALL TRANSMISSION CABLES, JUMPERS, CONNECTORS, GROUNDING STRAPS, ANTENNAS, MOUNTS 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 JUMP CABLES WITH EVERSOURCE. COORDINATE AND VERIFY ALL OF THE MATERIALS TO BE PROVIDED WITH EVERSOURCE 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 TO OBTAIN LATEST TESTING PROCEDURES FROM EVERSOURCE PRIOR TO BIDDING.
- ANTENNA CABLES SHALL BE COLOR CODED AT THE FOLLOWING LOCATIONS:
 - AT THE ANTENNAS.
 - AT THE WAVEGUIDE ENTRY PLATE ON BOTH SIDES OF THE EQUIPMENT SHELTER WALL.
 - JUMPER CABLES AT THE EQUIPMENT ENTER.
- SYSTEM INSTALLATION:
 - THE CONTRACTOR SHALL INSTALL ALL CABLES AND ANTENNAS TO THE MANUFACTURER'S SPECIFICATIONS. THE CONTRACTOR IS RESPONSIBLE FOR THE PROCUREMENT AND INSTALLATION OF THE FOLLOWING:
 - ALL CONNECTORS, ASSOCIATED CABLE MOUNTING, AND GROUNDING HARDWARE.
 - WALL MOUNTS, STANDOFFS, AND ASSOCIATED HARDWARE.
 - 1/2 INCH HELIAX ANTENNA JUMPERS OF APPROPRIATE LENGTHS.
 - MINIMUM BENDING RADIUS FOR COAXIAL CABLES:
 - 7/8 INCH, RMIN = 15 INCHES
 - 1 5/8 INCH, RMIN = 25 INCHES
 - 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 CABLE CONNECTIONS OUTSIDE SHALL BE COVERED WITH WATERPROOF SPLICING KIT.
 - CONTRACTOR SHALL VERIFY EXACT LENGTH AND DIRECTION OF TRAVEL IN FIELD PRIOR TO CONSTRUCTION.
 - CABLE SHALL BE FURNISHED WITHOUT SPLICES AND WITH CONNECTORS AT EACH END.

TYPICAL WOVEN WIRE FENCING NOTES

- INSTALL FENCING PER ASTM F567, SWING GATES PER ASTM F900.
- GATE POST, CORNER, TERMINAL OR PULL POST 2 1/2 INCH DIAMETER SCHEDULE 40 FOR GATE WIDTHS UP THROUGH 6 FEET OR 12 FEET DOUBLE SWING GATE PER ASTM F1083.
- LINE POST: 2 INCH DIAMETER SCHEDULE 40 PIPE PER ASTM F1083.
- GATE FRAME: 1 1/2 INCH DIAMETER SCHEDULE 40 PIPE PER ASTM F1083.
- TOP RAIL AND BRACE RAIL: 1 1/2 DIAMETER SCHEDULE 40 PIPE PER ASTM F1083.
- FABRIC: 12 GA CORE WIRE SIZE 2 INCH MESH, CONFORMING TO ASTM A392.
- TIE WIRE: MINIMUM 11 GA GALVANIZED STEEL POSTS AND RAILS. A SINGLE WRAP OF FABRIC TIE AND AT TENSION WIRE BY HOG RINGS SPACED MAX 24 INCH INTERVALS.
- TENSION WIRE: 7 GA GALVANIZED STEEL.
- BARBED WIRE: DOUBLE STRAND 12 - 1/2 INCH OUTSIDE DIAMETER TWISTED WIRE TO MATCH WITH FABRIC 12 GA, 4 POINT BARBS SPACED ON APPROXIMATELY 5 INCH CENTERS.
- GATE LATCH: DROP DOWN LOCKABLE FORK LATCH AND LOCK, KEYED ALIKE FOR ALL SITES.
- LOCAL ORDINANCE OF BARBED WIRE PERMIT REQUIREMENT SHALL BE COMPLIED IF REQUIRED.
- HEIGHT = 6 FEET VERTICAL + 1 FOOT BARBED WIRE VERTICAL DIMENSION.



107 SELDEN STREET
BERLIN, CT 06037
PHONE: (800) 286-2000

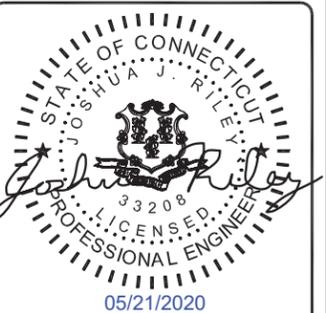


BLACK & VEATCH

6800 W 115TH ST, SUITE 2292
OVERLAND PARK, KS 66211
PHONE: (913) 458-3595

PROJECT NO:	403093
DRAWN BY:	TYW
CHECKED BY:	CAG

REV	DATE	DESCRIPTION
0	05/21/20	ISSUED FOR FILING



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BRANFORD 11J
272 EAST MAIN ST
BRANFORD, CT 06405

SHEET TITLE
**NOTES
& SPECIFICATIONS**

SHEET NUMBER
N-2

SYMBOLS

●	EXOTHERMIC CONNECTION
■	COMPRESSION CONNECTION
⊖	5/8"Øx10'-0" COPPER CLAD STEEL GROUND ROD.
⊖	TEST GROUND ROD WITH INSPECTION SLEEVE
---	GROUNDING CONDUCTOR
(A)	KEY NOTES
— X — X — X — X — X —	CHAINLINK FENCE
— □ — □ — □ — □ — □ —	WOOD FENCE
---	LEASE AREA
▨	ICE BRIDGE
▧	CABLE TRAY
— G — G — G — G — G —	GAS LINE
— E/T — E/T — E/T — E/T —	UNDERGROUND ELECTRICAL/TELCO
— E/C — E/C — E/C — E/C —	UNDERGROUND ELECTRICAL/CONTROL
— E — E — E — E — E —	UNDERGROUND ELECTRICAL
— T — T — T — T — T —	UNDERGROUND TELCO
---	PROPERTY LINE (PL)

ABBREVIATIONS

AC	ALTERNATING CURRENT	MGB	MASTER GROUNDING BAR
AIC	AMPERAGE INTERRUPTION CAPACITY	MIN	MINIMUM
ANI	AUXILIARY NETWORK INTERFACE	MW	MICROWAVE
ATM	ASYNCHRONOUS TRANSFER MODE	MTS	MANUAL TRANSFER SWITCH
ATS	AUTOMATIC TRANSFER SWITCH	NEC	NATIONAL ELECTRICAL CODE
AWG	AMERICAN WIRE GAUGE	OC	ON CENTER
AWS	ADVANCED WIRELESS SERVICES	PP	POLARIZING PRESERVING
BATT	BATTERY	PCU	PRIMARY CONTROL UNIT
BBU	BASEBAND UNIT	PDU	PROTOCOL DATA UNIT
BTC	BARE TINNED COPPER CONDUCTOR	PWR	POWER
BTS	BASE TRANSCEIVER STATION	RECT	RECTIFIER
CCU	CLIMATE CONTROL UNIT	RET	REMOTE ELECTRICAL TILT
CDMA	CODE DIVISION MULTIPLE ACCESS	RMC	RIGID METALLIC CONDUIT
CHG	CHARGING	RF	RADIO FREQUENCY
CLU	CLIMATE UNIT	RUC	RACK USER COMMISSIONING
COMM	COMMON	RRH	REMOTE RADIO HEAD
DC	DIRECT CURRENT	RRU	REMOTE RADIO UNIT
DIA	DIAMETER	RWY	RACEWAY
DWG	DRAWING	SFP	SMALL FORM-FACTOR PLUGGABLE
EC	ELECTRICAL CONDUCTOR	SIAD	SMART INTEGRATED ACCESS DEVICE
EMT	ELECTRICAL METALLIC TUBING	SSC	SITE SOLUTIONS CABINET
FIF	FACILITY INTERFACE FRAME	T1	1544KBPS DIGITAL LINE
GEN	GENERATOR	TDMA	TIME-DIVISION MULTIPLE ACCESS
GPS	GLOBAL POSITIONING SYSTEM	TMA	TOWER MOUNT AMPLIFIER
GSM	GLOBAL SYSTEM FOR MOBILE	TVSS	TRANSIENT VOLTAGE SUPPRESSION SYSTEM
HVAC	HEAT/VENTILATION/AIR CONDITIONING	TYP	TYPICAL
ICF	INTERCONNECTION FRAME	UMTS	UNIVERSAL MOBILE TELECOMMUNICATION SYSTEM
IGR	INTERIOR GROUNDING RING (HALO)	UPS	UNINTERRUPTIBLE POWER SUPPLY (DC POWER PLANT)
LTE	LONG TERM EVOLUTION		

EVERSOURCE ENERGY

107 SELDEN STREET
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BLACK & VEATCH

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272 EAST MAIN ST
BRANFORD, CT 06405

SHEET TITLE
NOTES & SPECIFICATIONS

SHEET NUMBER

N-3

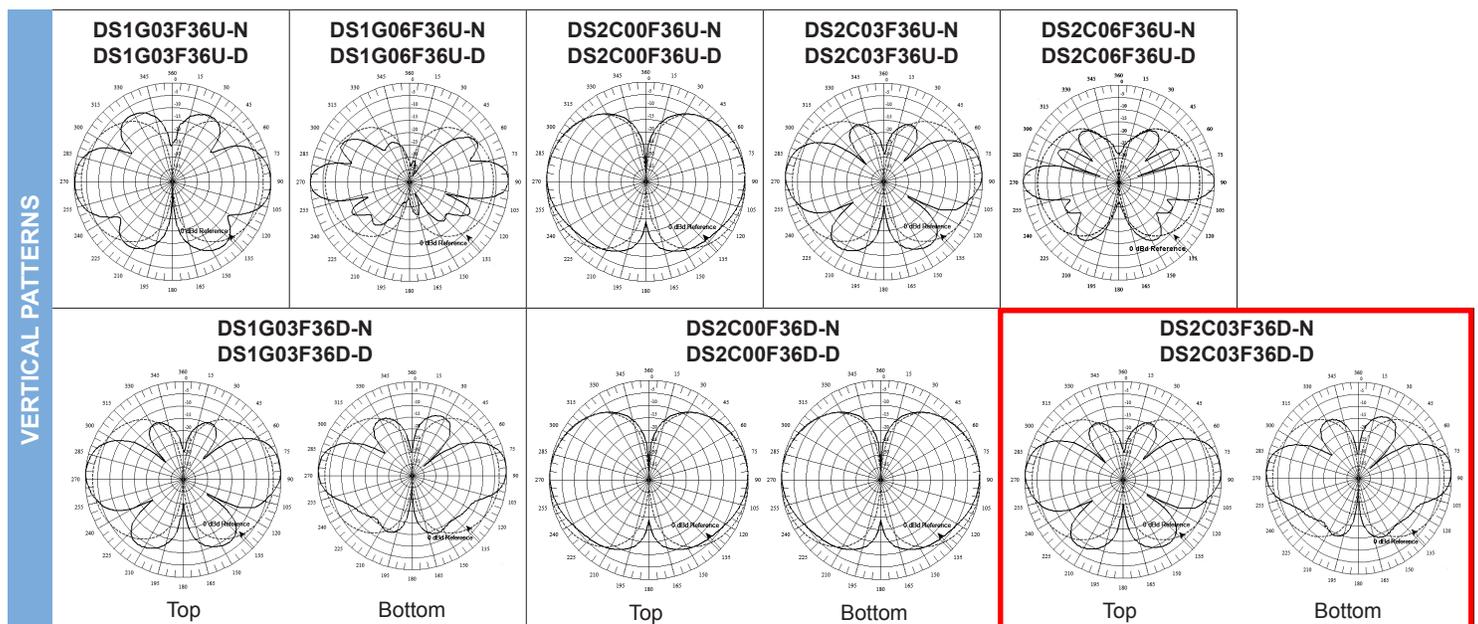
Attachment 2 – Antenna Specifications

VHF Omni Antennas (160-222 MHz)

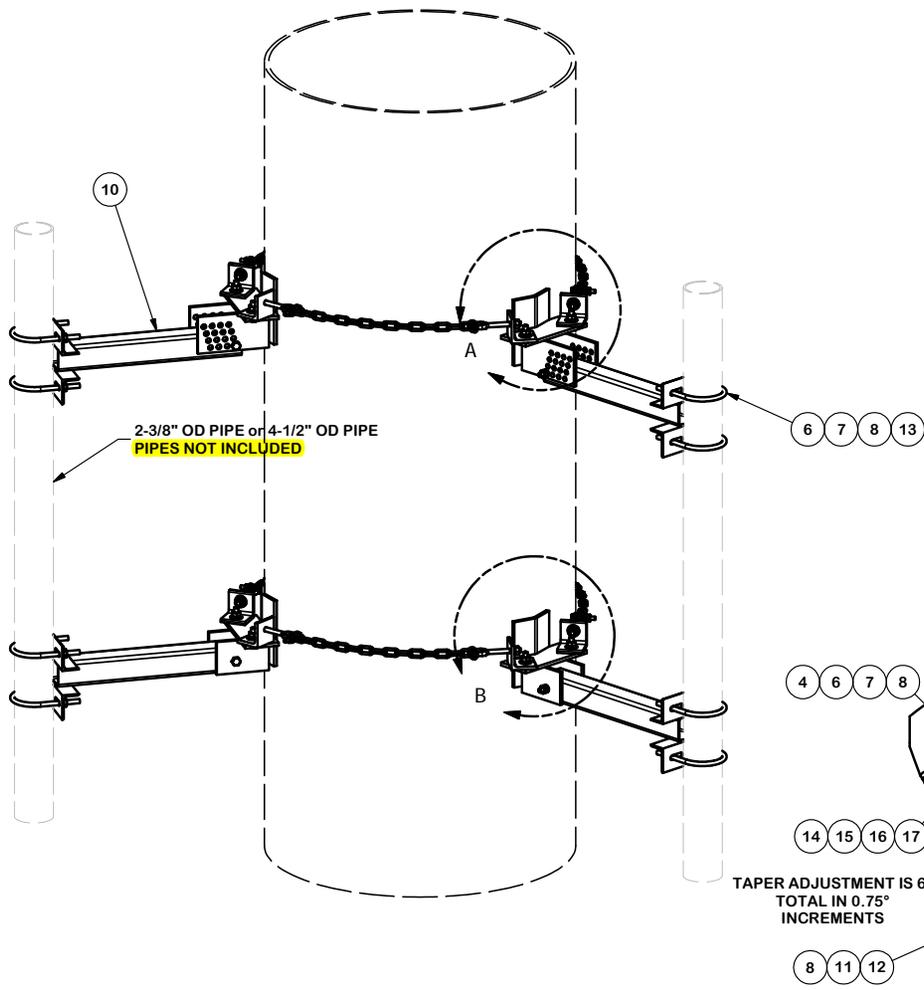


DS2C03F36D-D

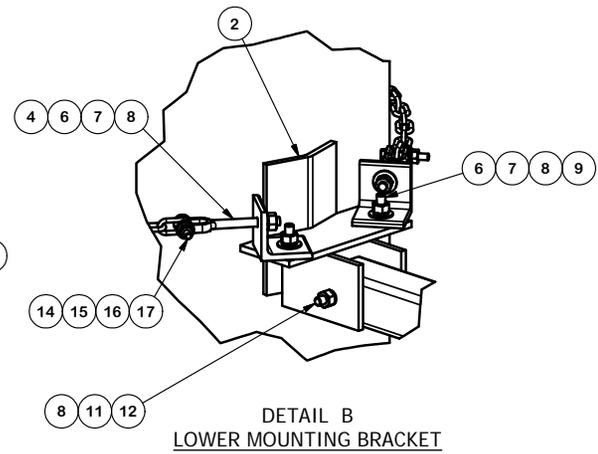
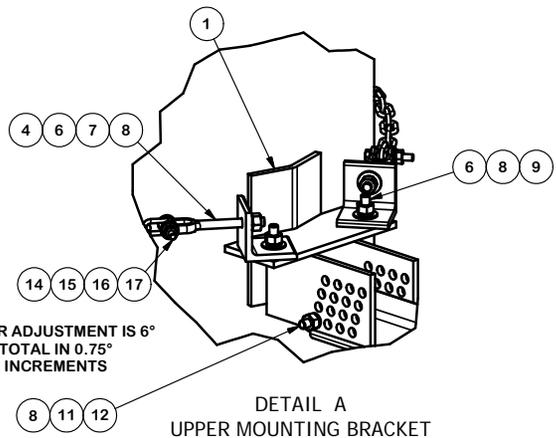
		160-174 MHz						217-222 MHz									
Model Number		DS1G03F36U-N	DS1G03F36U-D	DS1G06F36U-N	DS1G06F36U-D	DS1G03F36D-N	DS1G03F36D-D	DS2C00F36U-N	DS2C00F36U-D	DS2C03F36U-N	DS2C03F36U-D	DS2C06F36U-N	DS2C06F36U-D	DS2C00F36D-N	DS2C00F36D-D	DS2C03F36D-N	DS2C03F36D-D
Input Connector		N(F)	7/16 DIN														
Type		Single		Single		Dual		Single		Single		Single		Dual		Dual	
ELECTRICAL	Bandwidth, MHz	14		14		14		5		5		5		5		5	
	Power, Watts	500		500		350		500		500		500		350		350	
	Gain, dBd	3		6		3		0		3		6		0		3	
	Horizontal Beamwidth, degrees	360		360		360		360		360		360		360		360	
	Vertical Beamwidth, degrees	30		16		30		60		30		16		60		30	
	Beam Tilt, degrees	0		0		0		0		0		0		0		0	
	Isolation (minimum), dB	N/A		N/A		30		N/A		N/A		N/A		30		30	
MECHANICAL	Number of Connectors	1		1		2		1		1		1		2		2	
	Flat Plate Area, ft ² (m ²)	2.53 (0.24)		4.38 (0.41)		4.5 (0.42)		1.9 (0.18)		1.9 (0.18)		2.58 (0.24)		2.4 (0.22)		4.1 (0.38)	
	Lateral Windload Thrust, lbf(N)	95 (423)		164 (730)		169 (752)		53 (236)		69 (307)		108 (480)		90 (400)		169 (752)	
	Survival Wind Speed without ice, mph(kph)	110 (177)		75 (121)		75 (121)		222 (357)		172 (277)		110 (177)		130 (209)		75 (121)	
	with 0.5" radial ice, mph(kph)	93 (150)		60 (97)		65 (105)		193 (311)		150 (241)		96 (154)		115 (185)		65 (105)	
Mounting Hardware included	DSH3V3R		DSH3V3N		DSH3V3N		DSH2V3R		DSH2V3R		DSH3V3N		DSH3V3R		DSH3V3N		
DIMENSIONS	Length, ft(m)	12.7 (3.9)		21.9 (6.7)		22.3 (6.8)		7.7 (2.3)		9.9 (3)		18.1 (5.5)		13.6 (4.1)		24.3 (7.4)	
	Radome O.D., in(cm)	3 (7.6)		3 (7.6)		3 (7.6)		3 (7.6)		3 (7.6)		3 (7.6)		3 (7.6)		3 (7.6)	
	Mast O.D., in(cm)	2.5 (6.4)		2.5 (6.4)		2.5 (6.4)		2.5 (6.4)		2.5 (6.4)		2.5 (6.4)		2.5 (6.4)		2.5 (6.4)	
	Net Weight w/o bracket, lb(kg)	37 (16.8)		60 (27.2)		63 (28.6)		19 (8.6)		26 (11.8)		47 (21.3)		40 (18.1)		70 (31.8)	
	Shipping Weight, lb(kg)	67 (30.4)		90 (40.8)		93 (42.2)		39 (17.7)		56 (25.4)		77 (34.9)		70 (31.8)		100 (45.4)	



TOWER/MAST SIZE AT PROPOSED ANTENNA ATTACHMENT = 8 1/2" ± DIAMETER.
 PROPOSED CHAIN MOUNT FITS POLYGON OR ROUND POLES 5"-36" IN DIAMETER.
 NOTE: (1) 4" (4.5" OD) SCH 40 x 6'-0" AND (2) 2" (2.375" OD) SCH 40 x 6'-0" MOUNT PIPES ARE REQUIRED.



PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	3	X-UCMMH	TOP CHAIN MOUNT BRACKET		16.17	48.50
2	3	X-UCMSH	LOWER CHAIN MOUNT BRACKET		14.14	42.41
3	12	SHCM-T	CHAIN MOUNT TIGHTENER BRACKET	3.000 in	1.84	22.09
4	12	JB4	JAW BOLT GALV. 1/2" x 6"		0.51	6.11
5	6	GC40317	1/4" x GR40 GALV. CHAIN 3.17'		0.91	5.46
6	48	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	3.44
7	48	G12FW	1/2" HDG USS FLATWASHER		0.03	1.64
8	54	G12LW	1/2" HDG LOCKWASHER		0.01	0.75
9	12	G1202	1/2" x 2" HDG HEX BOLT GR5	2	0.18	2.11
10	6	X-UAPM22	UNIVERSAL ANGLE TUBE 22"		16.76	100.58
11	6	A12NUT	1/2" HDG A325 HEX NUT		0.07	0.43
12	6	A1205	1/2" x 5" A325 HDG BOLT	5 in.	0.34	2.06
13	12	X-UB1458	1/2" X 4-5/8" X 7" X 3" GALV U-BOLT		0.97	11.66
13	12	X-UB1212	1/2" X 2-1/2" X 4-1/2" X 2" GALV. U-BOLT		0.66	7.88
14	12	G38212	3/8" x 2-1/2" HDG HEX BOLT GR5		0.10	1.23
15	12	G38FW	3/8" HDG USS FLATWASHER		0.01	0.14
16	12	G38LW	3/8" HDG LOCKWASHER		0.01	0.08
17	12	G38NUT	3/8" HDG HEAVY 2H HEX NUT		0.03	0.41
					TOTAL WT. #	267.00



REV	DESCRIPTION OF REVISIONS	CPD	BY	DATE
A	REVISED DETAILS		RCH	3/09/2010
REVISION HISTORY				

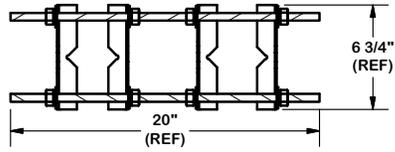
TOLERANCE NOTES
 TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
 SAWED, SHEARED AND GAS CUT EDGES (± 0.030")
 DRILLED AND GAS CUT HOLES (± 0.030") - NO CONING OF HOLES
 LASER CUT EDGES AND HOLES (± 0.010") - NO CONING OF HOLES
 BENDS ARE ± 1/2 DEGREE
 ALL OTHER MACHINING (± 0.030")
 ALL OTHER ASSEMBLY (± 0.060")

PROPRIETARY NOTE:
 THE DATA AND TECHNIQUES CONTAINED IN THIS DRAWING ARE PROPRIETARY INFORMATION OF VALMONT INDUSTRIES AND CONSIDERED A TRADE SECRET. ANY USE OR DISCLOSURE WITHOUT THE CONSENT OF VALMONT INDUSTRIES IS STRICTLY PROHIBITED.

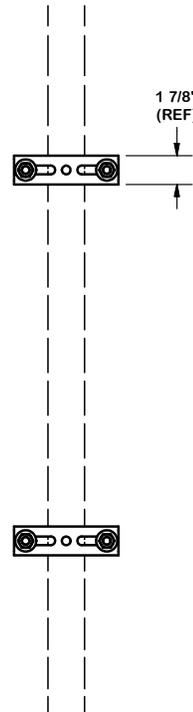
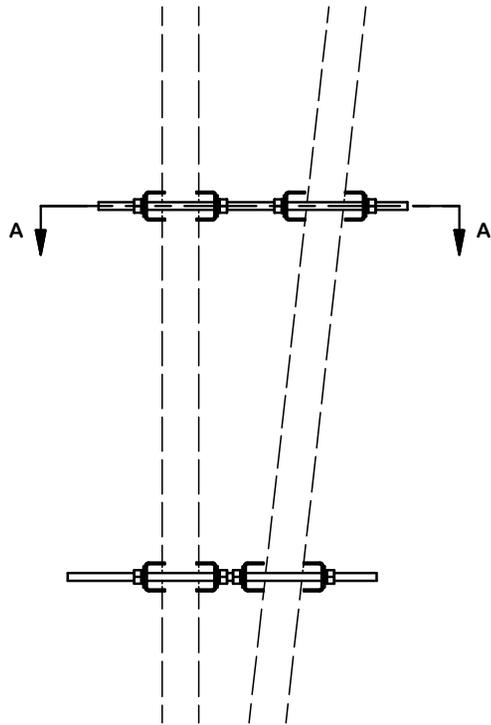
DESCRIPTION 2'-0" STAND-OFF, TRIPLE SECTOR, TAPER ADJUSTABLE CHAIN MOUNT, SITE PRO 1			
CPD NO.	DRAWN BY RH18	3/9/2010	ENG. APPROVAL
CLASS 81	SUB 01	DRAWING USAGE CUSTOMER	CHECKED BY BMC 3/15/2010

 A valmont COMPANY	Locations: New York, NY Atlanta, GA Los Angeles, CA Plymouth, IN Salem, OR Dallas, TX
	Engineering Support Team: 1-888-753-7446
PART NO.	TCHM3-L
DWG. NO.	TCHM3-L

MOUNT-PIPE-TO-ANTENNA CLAMPS (TOTAL OF 2 KITS).
 3 ANTENNA ATTACHMENT POINTS REQUIRED.
 SPACE CLAMPS PER ANTENNA MANUFACTURER'S RECOMMENDATIONS.



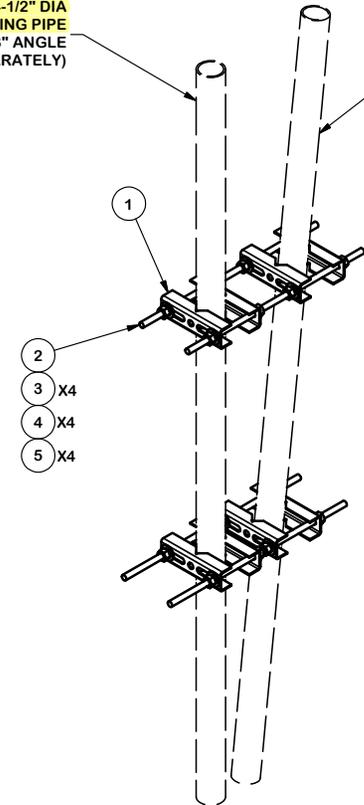
SECTION A-A



PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	8	X-UPC1	SMALL PIPE TO PIPE BRACKET		0.85	6.79
2	4	G12R-20	1/2" x 20" THREADED ROD (HDG.)	20 in	3.23	12.91
3	16	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	1.14
4	16	G12LW	1/2" HDG LOCKWASHER		0.01	0.22
5	16	G12FW	1/2" HDG USS FLATWASHER		0.03	0.54
TOTAL WT. #						13.45

1-1/4" TO 4-1/2" DIA
 ANTENNA MOUNTING PIPE
 OR 1-1/2" TO 3" ANGLE
 (ORDERED SEPARATELY)

1-1/4" TO 4-1/2" DIA
 TOWER LEG
 OR 1-1/2" TO 3" ANGLE
 (REF)



TOLERANCE NOTES

TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
 SAWED, SHEARED AND GAS CUT EDGES ($\pm 0.030"$)
 DRILLED AND GAS CUT HOLES ($\pm 0.030"$) - NO CONING OF HOLES
 LASER CUT EDGES AND HOLES ($\pm 0.010"$) - NO CONING OF HOLES
 BENDS ARE $\pm 1/2$ DEGREE
 ALL OTHER MACHINING ($\pm 0.030"$)
 ALL OTHER ASSEMBLY ($\pm 0.060"$)

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 VALMONT INDUSTRIES IS STRICTLY PROHIBITED.

DESCRIPTION
 UNIVERSAL PIPE-TO-PIPE
 CLAMP SET
 FOR SMALL PIPES (1-1/4" TO 4-1/2")



Engineering
 Support Team:
 1-888-753-7446

Locations:
 New York, NY
 Atlanta, GA
 Los Angeles, CA
 Plymouth, IN
 Salem, OR
 Dallas, TX

REV	DESCRIPTION OF REVISIONS	CPD	BY	DATE
A	REDRAWN IN INV. UPDATED VIEWS & TABLE		KC8	8/20/2012

CPD NO.	4448	DRAWN BY	CEK 3/13/2009	ENG. APPROVAL	
CLASS	81	SUB	01	DRAWING USAGE	CUSTOMER
				CHECKED BY	CEK 2/18/2013

PART NO.	UPC1	PAGE	1 OF 1
DWG. NO.	UPC1		



The Kohler® Advantage

- **High Quality Power**
Kohler home generators provide advanced voltage and frequency regulation along with ultra-low levels of harmonic distortion for excellent generator power quality to protect your valuable electronics.
- **Extraordinary Reliability**
Kohler is known for extraordinary reliability and performance and backs that up with a premium five-year or 2000 hour limited warranty.
- **All-Aluminum Sound Enclosure**
- **Quiet Operation**
Kohler home generators provide quiet, neighborhood-friendly performance.

Standard Features

- Kohler Co. provides one-source responsibility for the generating system and accessories.
- The generator set and its components are prototype-tested, factory-built, and production-tested.
- The generator set accepts rated load in one step.
- A standard five-year or 2000 hour limited warranty covers all systems and components.
- Quick-ship (QS) models with selected features are available. See your Kohler distributor for details.
- Meets 291 kph (181 mph) wind load rating.
- RDC2 Controller
 - One digital controller manages both the generator set and transfer switch functions (with optional Model RXT transfer switch).
 - Designed for today's most sophisticated electronics.
 - Electronic speed control responds quickly to varying household demand.
 - Digital voltage regulation protects your valuable electronics from harmonic distortion and unstable power quality.
 - Two-line, backlit LCD screen is easy to read in all lighting conditions, including direct sunlight and low light.
- Engine Features
 - Powerful and reliable 2.2 L liquid-cooled engine
 - Electronic engine management system.
 - Simple field conversion between natural gas and LPG fuels while maintaining emission certification.
- Innovative Cooling System
 - Electronically controlled fan speeds minimize generator set sound signature.
- Certifications
 - The 60 Hz generator set engine is certified by the Environmental Protection Agency (EPA) to conform to the New Source Performance Standard (NSPS) for stationary spark-ignited emissions.
 - UL 2200/cUL listing is available (60 Hz only).
 - CSA certification is available (60 Hz only).
 - Accepted by the Massachusetts Board of Registration of Plumbers and Gas Fitters.
- Approved for stationary standby applications in locations served by a reliable utility source.

Generator Set Ratings

Alternator	Voltage	Ph	Hz	Standby Ratings			
				Natural Gas		LPG	
				kW/kVA	Amps	kW/kVA	Amps
4E5.0	120/240	1	60	21/21	87	24/24	100
	120/208	3	60	21/26	73	23/28	80
	127/220	3	60	21/26	69	23/28	75
	120/240	3	60	21/26	63	23/28	69
4D5.0	277/480	3	60	21/26	32	23/28	35
	220/380*	3	50	16/20	30	17/22	33
	230/400	3	50	16/21	30	18/23	33
	240/416*	3	50	16/21	29	18/23	32

* 50 Hz models are factory-connected as 230/400 volts. Field-adjustable to 220/380 or 240/416 volts by an authorized service technician.

RATINGS: All three-phase units are rated at 0.8 power factor. All single-phase units are rated at 1.0 power factor. Due to manufacturing variations, the ratings tolerance is ±5%. **Standby Ratings:** Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads with an average load factor of 80% for the duration of a power outage. No overload capacity is specified for this rating. Ratings are in accordance with ISO-3046/1, BS 5514, AS 2789, and DIN 6271. **GENERAL GUIDELINES FOR DERATING:** *Altitude:* Derate 1.3% per 100 m (328 ft.) elevation above 200 m (656 ft.). *Temperature:* Derate 3.0% per 10°C (18°F) temperature above 25°C (77°F). Availability is subject to change without notice. The generator set manufacturer reserves the right to change the design or specifications without notice and without any obligation or liability whatsoever. Contact your local Kohler generator distributor for availability.

Alternator Specifications

Specifications	Alternator
Manufacturer	Kohler
Type	4-Pole, Rotating Field
Exciter type	Brushless, Wound-Field
Leads: quantity, type	
4E5.0	4, 120/240
4D5.0	12, Reconnectable
Voltage regulator	Solid State, Volts/Hz
Insulation:	NEMA MG1
Material	Class H
Temperature rise	130°C, Standby
Bearing: quantity, type	1, Sealed
Coupling	Flexible Disc
Voltage regulation, no-load to full-load	±1.0% Maximum
Unbalanced load capability	100% of Rated Standby Current
One-step load acceptance	100% of Rating
Peak motor starting kVA:	(35% dip for voltages below)
240 V	4E5.0 (4 lead) 37 (60 Hz)
480 V, 400 V	4D5.0 (12 lead) 59 (60 Hz) 44 (50 Hz)

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting.
- Sustained short-circuit current of up to 300% of the rated current for up to 10 seconds.
- Sustained short-circuit current enabling downstream circuit breakers to trip without collapsing the alternator field.
- Self-ventilated and drip-proof construction.
- Windings are vacuum-impregnated with epoxy varnish for dependability and long life.
- Superior voltage waveform from a two-thirds pitch stator and skewed rotor.
- Total harmonic distortion (THD) from no load to full load with a linear load is less than 5%.

Application Data

Engine

Engine Specifications	60 Hz	50 Hz
Manufacturer	Kohler	
Engine: model, type	Residential Powertrain KG2204, 2.2 L, 4-Cycle Natural Aspiration	
Cylinder arrangement	In-line 4	
Displacement, L (cu. in.)	2.2 (134.25)	
Bore and stroke, mm (in.)	91 x 86 (3.5 x 3.4)	
Compression ratio	10.5:1	
Piston speed, m/min. (ft./min.)	310 (1016)	258 (847)
Main bearings: quantity, type	5, plain alloy steel	
Rated rpm	1800	1500
Max. power at rated rpm, kW (HP)		
LPG	30 (40)	NA
Natural Gas	27 (36)	NA
Cylinder head material	Cast Iron	
Piston type and material	High Silicon Aluminum	
Crankshaft material	Nodular Iron	
Valve (exhaust) material	Forged Steel	
Governor type	Electronic	
Frequency regulation, no-load to full-load	Isochronous	
Frequency regulation, steady state	±1.0%	
Frequency	Fixed	
Air cleaner type	Dry	

Engine Electrical

Engine Electrical System	
Ignition system	Electronic
Battery charging alternator:	
Ground (negative/positive)	Negative
Volts (DC)	14
Ampere rating	90
Starter motor rated voltage (DC)	12
Battery, recommended rating for -18°C (0°F):	
Qty., cold cranking amps (CCA)	One, 630
Battery voltage (DC)	12
Battery group size	24

Exhaust

Exhaust System	60 Hz	50 Hz
Exhaust manifold type	Dry	
Exhaust temperature at rated kW, dry exhaust, °C (°F)	633 (1171)	
Maximum allowable back pressure, kPa (in. Hg)	7.5 (2.2)	

Fuel

Fuel System	
Fuel type	Natural Gas or LPG
Fuel supply line inlet	1 in. NPT
Natural gas fuel supply pressure, kPa (in. H ₂ O)	1.24-2.74 (5-11) <i>-0.18 psi</i>
LPG vapor withdrawal fuel supply pressure, kPa (in. H ₂ O)	1.24-2.74 (5-11) <i>0.4 psi</i>

Fuel Composition Limits *	Nat. Gas	LP Gas
Methane, % by volume	90 min.	—
Ethane, % by volume	4.0 max.	—
Propane, % by volume	1.0 max.	85 min.
Propene, % by volume	0.1 max.	5.0 max.
C ₄ and higher, % by volume	0.3 max.	2.5 max.
Sulfur, ppm mass	25 max.	
Lower heating value, MJ/m ³ (Btu/ft ³), min.	33.2 (890)	84.2 (2260)

* Fuels with other compositions may be acceptable. If your fuel is outside the listed specifications, contact your local distributor for further analysis and advice.

Lubrication

Lubricating System	
Type	Full Pressure
Oil pan capacity, L (qt.)	4.2 (4.4)
Oil added during oil change (on average), L (qt.)	3.3 (3.5)
Oil filter: quantity, type	1, Cartridge

Application Data

Cooling

Radiator System	60 Hz	50 Hz
Ambient temperature, °C (°F)	45 (113)	
Engine jacket water capacity, L (gal.)	2.65 (0.7)	
Radiator system capacity, including engine, L (gal.)	13.2 (3.5)	
Water pump type	Centrifugal	
Fan diameter, mm (in.)	qty. 3 @ 406 (16)	
Fan power requirements (powered by engine battery charging alternator)	12VDC, 18 amps each	

Operation Requirements

Air Requirements	60 Hz	50 Hz
Radiator-cooled cooling air, m ³ /min. (scfm)†	51 (1800)	51 (1800)
Combustion air, m ³ /min. (cfm)	1.4 (49)	1.2 (42)
Air over engine, m ³ /min. (cfm)	25 (900)	25 (900)

† Air density = 1.20 kg/m³ (0.075 lbm/ft³)

Fuel Consumption‡

Natural Gas, m ³ /hr. (cfh) at % load	60 Hz	50 Hz
100%	8.5 (301)	7.8 (275)
75%	6.3 (223)	6.4 (225)
50%	5.6 (199)	5.4 (192)
25%	4.0 (140)	3.3 (116)
Exercise	2.8 (97)	2.9 (103)

LP Gas, m ³ /hr. (cfh) at % load	60 Hz	50 Hz
100%	3.2 (113)	2.7 (96)
75%	2.8 (97)	2.3 (81)
50%	2.4 (84)	2.0 (72)
25%	1.8 (63)	1.7 (60)
Exercise	1.4 (51)	1.4 (48)

‡ Nominal Fuel Rating: Natural gas, 37 MJ/m³ (1000 Btu/ft³)
LP Vapor, 93 MJ/m³ (2500 Btu/ft³)

LP vapor conversion factors:
8.58 ft.³ = 1 lb.
0.535 m³ = 1 kg.
36.39 ft.³ = 1 gal.

Sound Enclosure Features

- Sound-attenuating enclosure uses acoustic insulation that meets UL 94 HF1 flammability classification and repels moisture absorption.
- Internally mounted critical silencer.
- Skid-mounted, aluminum construction with two removable access panels.
- Fade-, scratch-, and corrosion-resistant Kohler® cashmere powder-baked finish.

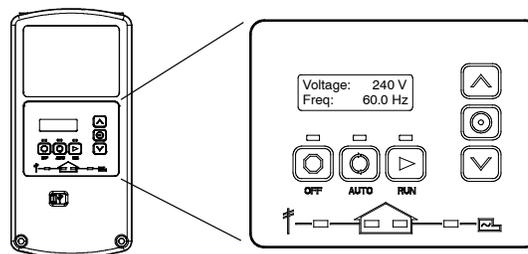
Sound Data

Model 24RCL 8 point logarithmic average sound levels are 54 dB(A) during weekly engine exercise and 61 dB(A) during full-speed generator diagnostics and normal operation. For comparison to competitor ratings, the lowest point sound levels are 52 dB(A) and 60 dB(A) respectively.*

All sound levels are measured at 7 meters with no load.

* Lowest of 8 points measured around the generator. Sound levels at other points around generator may vary depending on installation parameters.

RDC2 Controller



The RDC2 controller provides integrated control for the generator set, Kohler® Model RXT transfer switch, programmable interface module (PIM), and load management.

The RDC2 controller's 2-line LCD screen displays status messages and system settings that are clear and easy to read, even in direct sunlight or low light.

RDC2 Controller Features

- Membrane keypad
 - OFF, AUTO, and RUN push buttons
 - Select and arrow buttons for access to system configuration and adjustment menus
- LED indicators for OFF, AUTO, and RUN modes
- LED indicators for utility power and generator set source availability and ATS position (Model RXT transfer switch required)
- LCD screen
 - Two lines x 16 characters per line
 - Backlit display with adjustable contrast for excellent visibility in all lighting conditions
- Scrolling system status display
 - Generator set status
 - Voltage and frequency
 - Engine temperature
 - Oil pressure
 - Battery voltage
 - Engine runtime hours
- Date and time displays
- Smart engine cooldown senses engine temperature
- Digital isochronous governor to maintain steady-state speed at all loads
- Digital voltage regulation: ± 1.0% RMS no-load to full-load
- Automatic start with programmed cranking cycle
- Programmable exerciser can be set to start automatically on any future day and time, and to run every week or every two weeks
- Exercise modes
 - Unloaded exercise with complete system diagnostics
 - Unloaded full-speed exercise
 - Loaded full-speed exercise (Model RXT ATS required)
- Front-access mini USB connector for SiteTech™ connection
- Integral Ethernet connector for Kohler® OnCue® Plus
- Built-in 2.5 amp battery charger
- Remote two-wire start/stop capability for optional connection of a Model RDT transfer switch

See additional controller features on the next page.

Additional RDC2 Controller Features

- Diagnostic messages
 - Displays diagnostic messages for the engine, generator, Model RXT transfer switch, programmable interface module (PIM), and load management device
 - Over 70 diagnostic messages can be displayed
- Maintenance reminders
- System settings
 - System voltage, frequency, and phase
 - Voltage adjustment
 - Measurement system, English or metric
- ATS status (Model RXT ATS required)
 - Source availability
 - ATS position (normal/utility or emergency/generator)
 - Source voltage and frequency
- ATS control (Model RXT ATS required)
 - Source voltage and frequency settings
 - Engine start time delay
 - Transfer time delays
 - Fixed pickup and dropout settings
 - Voltage calibration
- Programmable interface module (PIM) status displays
 - Input status (active/inactive)
 - Output status (active/inactive)
- Load control menus
 - Load status
 - Test function

Generator Set Standard Features

- Aluminum sound enclosure with enclosed silencer
- Battery rack and cables
- Electronic, isochronous governor
- Flexible fuel line
- Gas fuel system (includes fuel mixer, electronic secondary gas regulator, two gas solenoid valves, and flexible fuel line between the engine and the skid-mounted fuel system components)
- Integral vibration isolation
- Line circuit breaker
- Oil drain extension
- OnCue® Plus Generator Management System
- Operation and installation literature
- RDC2 controller with built-in battery charger
- Standard five-year or 2000 hour limited warranty

Available Options

Approvals and Listings

- UL 2200/cUL Listing (60 Hz only)
- CSA Approval (60 Hz only)

Controller Accessories

- Lockable Emergency Stop (lockout/tagout)
- Programmable Interface Module (PIM) (provides 2 digital inputs and 6 relay outputs)

Electrical System

- Battery
- Battery Heater

Available Options, Continued

Starting Aids

- Oil Pan Heater, 120 V, 1 Ph
 - Oil Pan Heater, 240 V, 1 Ph
- Recommended for ambient temperatures below 0°C (32°F).

Automatic Transfer Switches and Accessories

- Model RDT Automatic Transfer Switch
- Model RXT Automatic Transfer Switch
- Model RXT Automatic Transfer Switch with Combined Interface/Load Management Board
- Load Shed Kit for RDT or RXT
- Power Relay Modules (use up to 4 relay modules for each load management device)

Miscellaneous

- Rated Power Factor Testing

Literature

- General Maintenance Literature Kit
- Overhaul Literature Kit
- Production Literature Kit

Warranty

- Extended 5-Year/2000 Hour Comprehensive Limited Warranty

Other Options

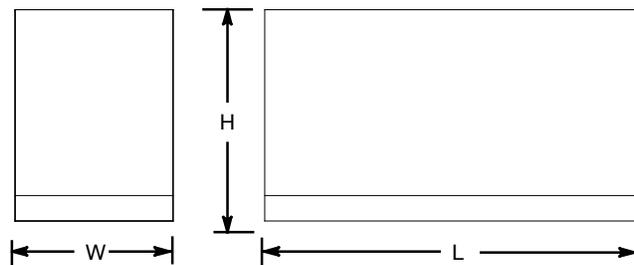
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Dimensions and Weights

Overall Size, L x W x H, mm (in.): 1880 x 836 x 1169
(74 x 32.9 x 46.0)

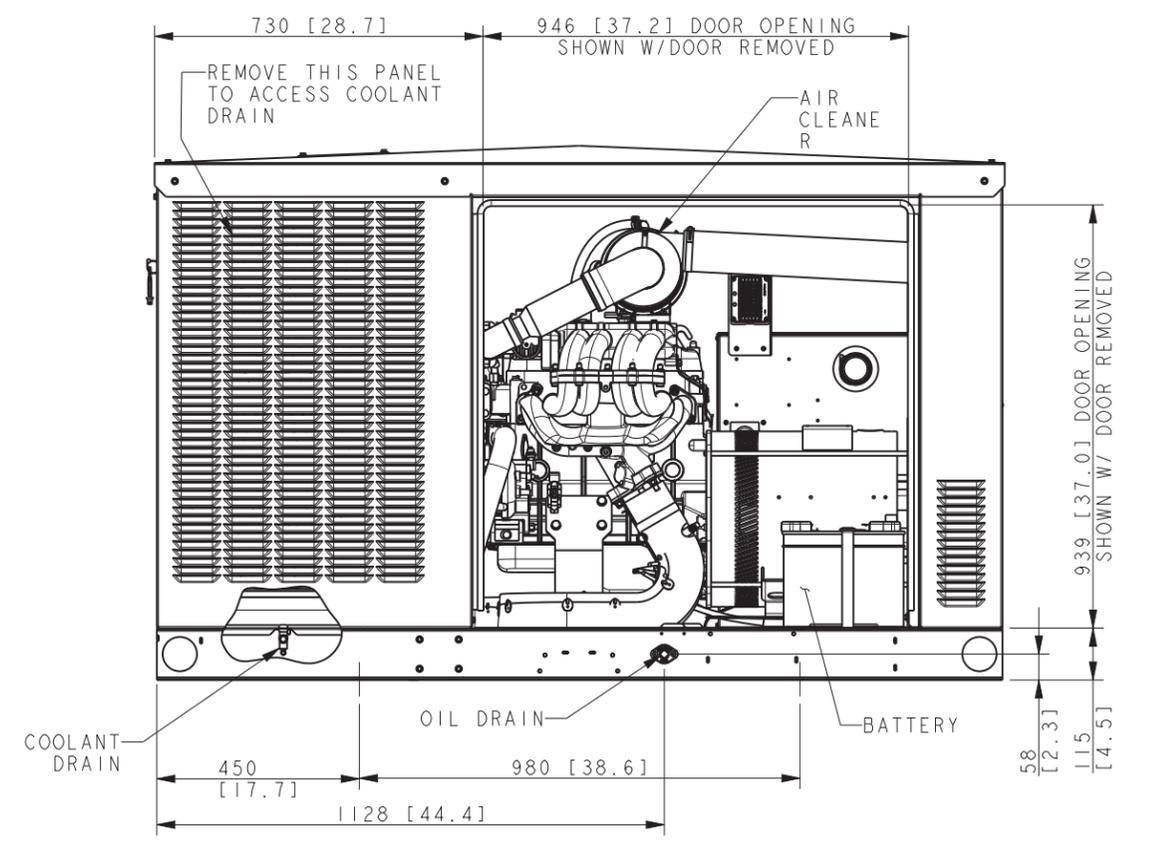
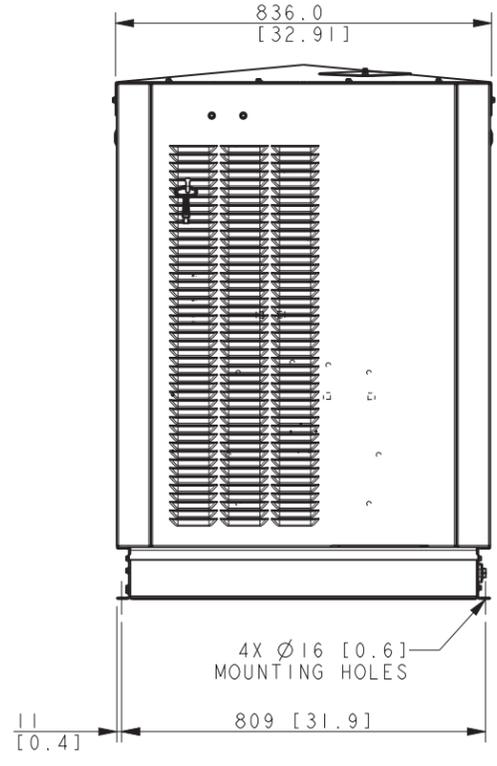
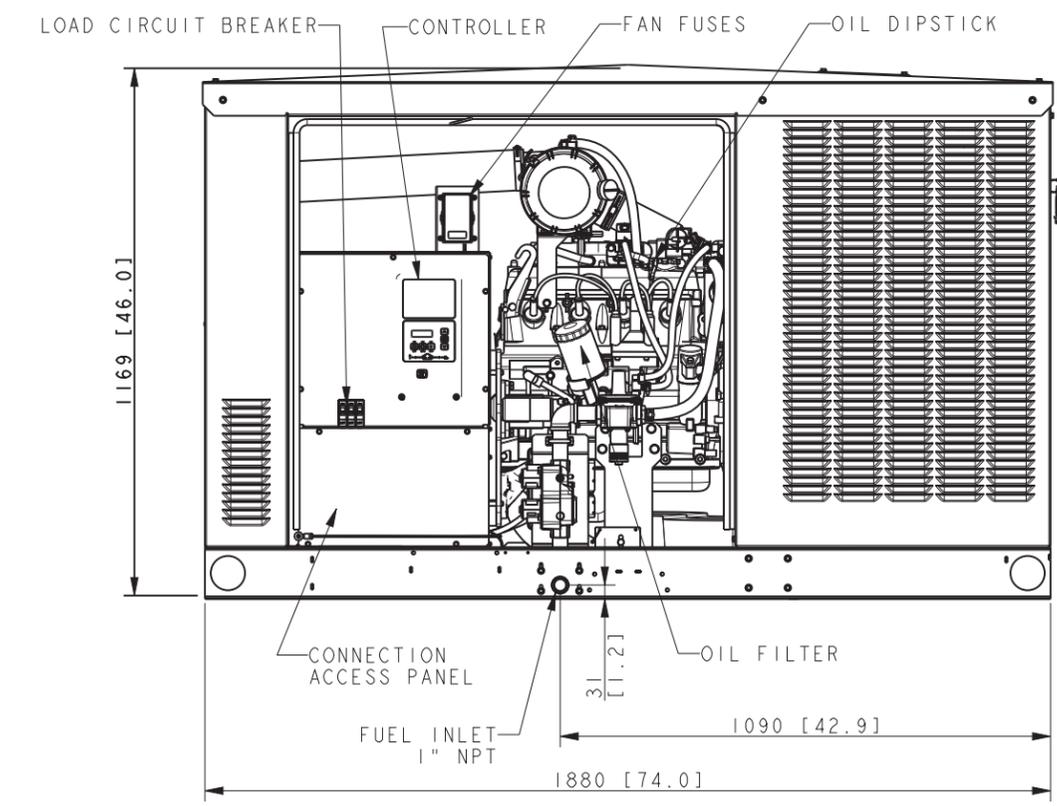
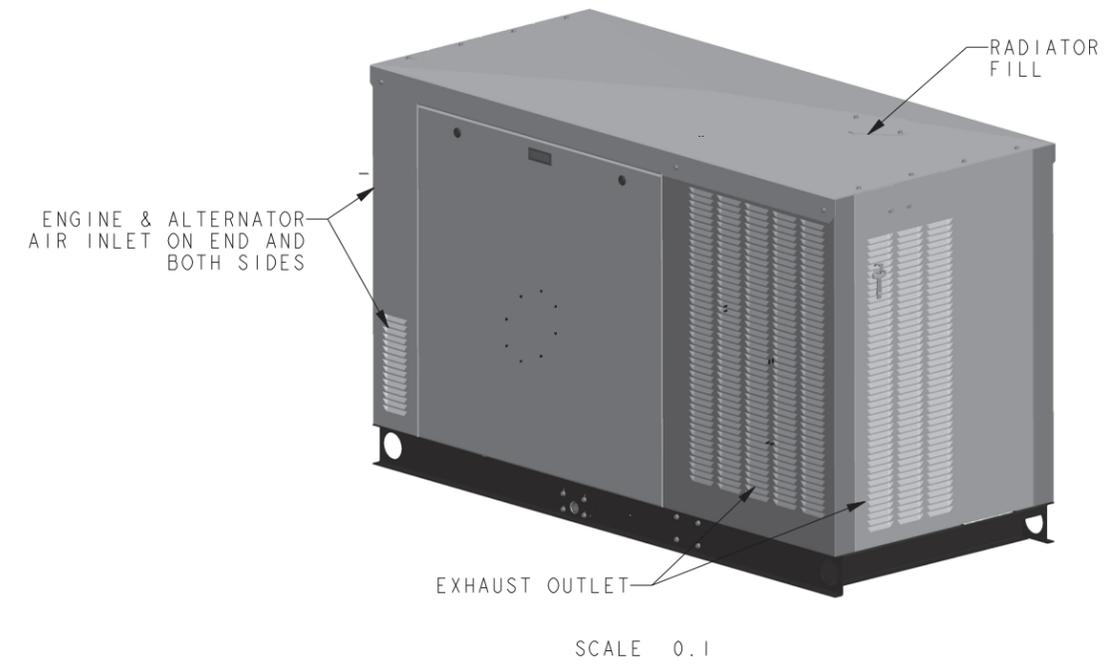
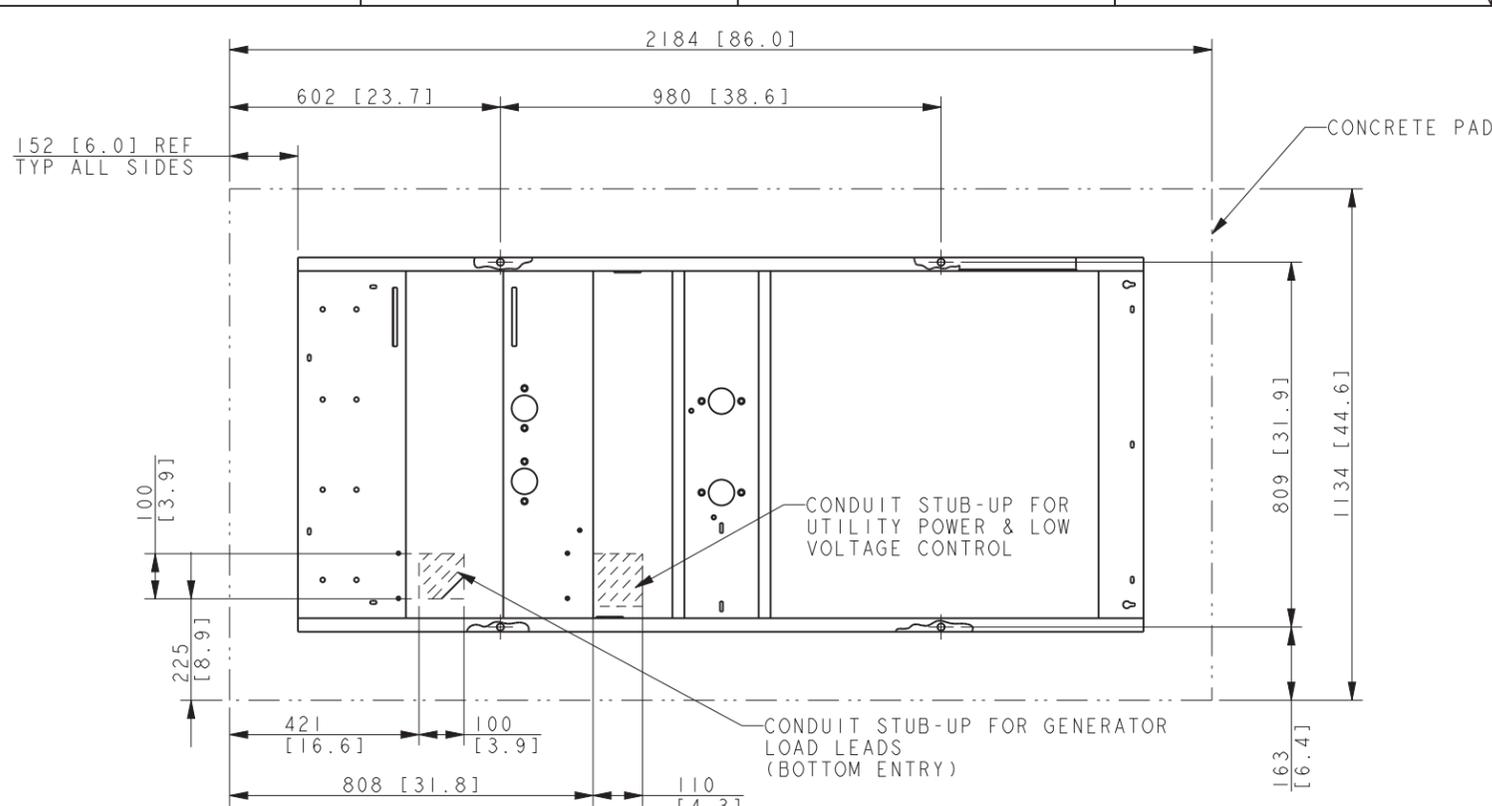
Shipping Weight, wet, kg (lb.): 572 (1260)

Weight includes generator set with engine fluids, sound enclosure, silencer, and packaging.



NOTE: This drawing is provided for reference only and should not be used for planning installation. Contact your local distributor for more detailed information.

DISTRIBUTED BY:



NOTE: DIMENSIONS IN [] ARE ENGLISH STANDARD EQUIVALENTS.

24RCL

REV	DATE	ON COMPOSITE DWGS. SEE PART NO. FOR REVISION LEVEL	BY	UNLESS OTHERWISE SPECIFIED - 1) DIMENSIONS ARE IN MILLIMETERS 2) TOLERANCES ARE:	APPROVALS	DATE
-	10-31-13	NEW DRAWING [CT79277]	DRA	X.XX ± 0.25 X.X ± 1.0 X ± 1.5 ANGLES ± 0° 30'		10-31-13
A	6-3-14	(C-8) 225 WAS 211, 100 WAS 123, (C-7) 421 WAS 392, 100 WAS 216 [CT83066]	DRA	SURFACE FINISH MAX.		10-31-13
B	6-10-15	UPDATED VIEWS TO SHOW CROSS BENT, PITCHED ROOF [CT115573]	BGP	THIRD ANGLE PROJECTION		10-31-13
C	2-25-19	SEE SHEET 2 [CT193814]	HM			10-31-13

KOHLER CO. METRIC PRO-E
POWER SYSTEMS, KOHLER, WI 53044 U.S.A.
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DIMENSION PRINT
SCALE 0.13 CAD NO. SHEET 1 of 2
ADV-8641 D

Attachment 3 – Structural Analysis Report

Date: **April 10, 2020**



Black & Veatch Corp.
6800 W. 115th St., Suite 2292
Overland Park, KS 66211
(913) 458-2522

Subject: **Structural Analysis Report**

Eversource Designation: **Site Number:** ES-106
Site Name: Branford11J

Engineering Firm Designation: **Black & Veatch Corp. Project Number:** 403093

Site Data: **272 East Main St, Branford, New Haven County, CT 06405**
Latitude: 41° 17' 33.13", Longitude: -72° 47' 40.62"
50 Foot - Round Timber Wood Pole

Black & Veatch Corp. is pleased to submit this "**Structural Analysis Report**" to determine the structural integrity of the above mentioned tower.

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

LC1: Proposed Equipment Configuration: **Sufficient Capacity –91.5%**

This analysis utilizes an ultimate 3-second gust wind speed of 140 mph as required by the 2018 Connecticut State Building Code. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Structural Analysis prepared by: Teddy Haile-Mariam / Cesar Garcia Godos

Respectfully Submitted by:

Joshua J. Riley, P.E.
Professional Engineer



04/10/2020

TABLE OF CONTENTS

1) INTRODUCTION

2) ANALYSIS CRITERIA

Table 1 – Proposed Equipment Configuration

Table 2 – Other Considered Equipment

3) ANALYSIS PROCEDURE

Table 3 – Documents Provided

3.1) Analysis Method

3.2) Assumptions

4) ANALYSIS RESULTS

Table 4 – Section Capacity (Summary)

Table 5 – Tower Component Stresses vs. Capacity

4.1) Recommendations

5) APPENDIX A

Wood Pole Tool Output

6) APPENDIX B

Base Level Drawing

7) APPENDIX C

Additional Calculations

8) APPENDIX D

Proposed Mount Replacement

1) INTRODUCTION

This tower is a 50 feet Round Timber Wood Pole.

2) ANALYSIS CRITERIA

TIA-222 Revision: TIA-222-H
Risk Category: III
Wind Speed: 140 mph ultimate
Exposure Category: C
Topographic Factor: 1
Ice Thickness: 1.5 in
Wind Speed with Ice: 50 mph
Seismic S_s: 0.179
Seismic S₁: 0.061

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
47.0	60.0	1	dbspectra	DS2C03F36D-D	2	7/8	-
	47.0	1	site pro 1	2' Stand-off Triple Sector Chain Mount (P/N: TCHM3-L)			
		1	generic	Mount Pipe 4" Sch 40 (4.5 OD) x 6'-0"			
		2	generic	Mount Pipe 2" Sch 40 (2.4 OD) x 6'-0"			
		3	site pro 1	Universal Clamp Set (P/N: UPC1)			

Table 2 – Other Considered Equipment

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
47.0	55.0	1	kreco	CO-41A	2	7/8	1
	53.0	1	generic	8.5' x 2.5" Dia. Omni			
36.0	41.0	1	generic	8.5' x 2.5" Dia. Omni	1	7/8	1
	36.0	2	generic	11' Crossarm			
		2	generic	3' x 2" Pipe Mount			

Notes:

- 1) Existing Equipment

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
GEOTECHNICAL REPORT	Clarence Welti Assoc., Inc. Dated 3/11/2016	-	Eversource
POLE GEOMETRY	Length, Diameter, and Wood Species Photos dated 10/02/2019	-	Eversource

3.1) Analysis Method

Wood Pole Tool (version 3.3.2) was used to calculate member stresses for various load cases. Selected output from the analysis is included in Appendix A. The tower and foundation have been analyzed based on the ice criteria outlined in section 2 of this report. Based on the analysis, ice loading is not governing the tower and foundation stress. Wind loading governs the tower and foundation stress.

3.2) Assumptions

- 1) Tower and structures were built and have been maintained in accordance with the manufacturer's specifications.
- 2) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
- 3) This analysis was performed under the assumption that all information provided to Black & Veatch Corp. is current and correct. This is to include site data, appurtenance loading, tower/foundation details, and geotechnical data.
- 4) Pole tip diameter assumed following ANSI-05.1 minimum dimensions.
- 5) Soil parameters provided by Eversource. Black & Veatch does not assume any responsibility for its accuracy.

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

4) ANALYSIS RESULTS

Table 4 – Section Capacity (Summary)

Elevation (ft)	Size	Controlling Direction	f _b (psi)	f _c (psi)	F' _b (psi)	F' _c (psi)	% Capacity	Pass / Fail
50	8.59	--	0.00	0.00	2000.00	31.56	0.0	Pass
47	9.18		10.68	7.37	2000.00	35.70	5.2	Pass
42	10.17	--	453.31	6.32	2000.00	44.66	31.5	Pass
41	10.37	--	517.58	6.27	2000.00	46.86	34.6	Pass
36	11.35	--	757.55	7.23	2000.00	60.69	46.3	Pass
31	12.34	--	1139.22	6.45	2000.00	81.68	63.0	Pass
26	13.33	--	1365.23	5.84	2000.00	115.69	71.9	Pass
21	14.31	--	1494.59	5.35	1961.19	176.10	78.2	Pass
16	15.30	--	1562.66	4.96	1946.71	298.48	81.2	Pass
11	16.29	--	1591.16	4.63	1933.24	597.45	82.7	Pass
7	17.08	--	1595.33	4.43	1923.10	1136.16	83.1	Pass
2	18.07	--	1585.44	4.12	1911.13	1521.01	83.0	Pass
0	18.46	--	1578.19	4.01	1906.54	1538.98	82.8	Pass
							Summary	
						Rating:	83.1	Pass

Table 5 – Tower Component Stresses vs. Capacity –LC1

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Base Foundation Structural	0	91.5%	Pass
	Base Foundation Soil Interaction	0	53.2%	Pass

Structure Rating (max from all components) =	91.5%
---	--------------

Notes:

- 2) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.

4.1) Recommendations

The tower and its foundation have sufficient capacity to carry the proposed load configuration. In order for the results of this analysis to be considered valid, the following equipment changes must be completed:

- The existing mount at the 47.0' level is to be removed. The existing antennas are to be relocated at their original center line elevation on the proposed mount listed in Table 1. See appendix D for reference.

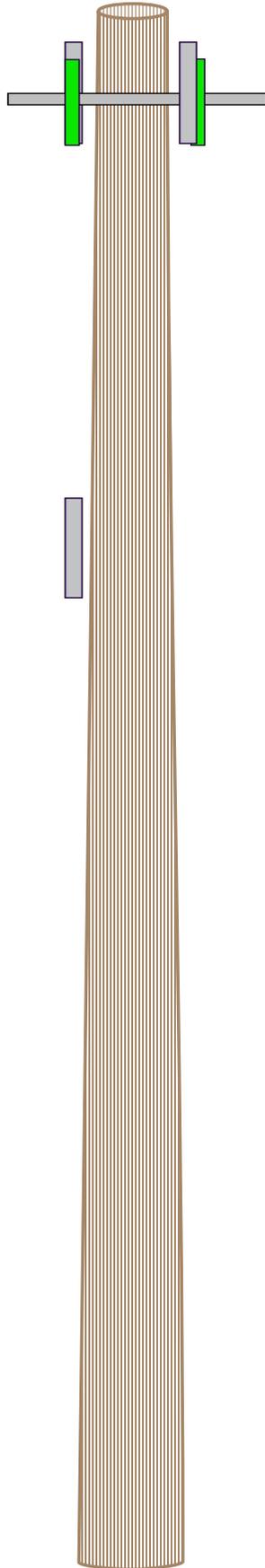
No modifications are required at this time, provided that the above-listed changes are completed.

The existing and proposed feed lines are to be stacked in accordance with the base level drawing shown in Appendix B.

APPENDIX A
WOOD POLE TOOL OUTPUT

Length (ft)	50
Top Dim (in)	8.59
Bot Dim (in)	18.46
Material	Western Red Cedar
Weight (k)	0.25

50 ft



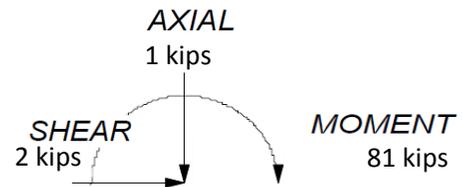
0.0 ft

TOWER ANALYSIS NOTES

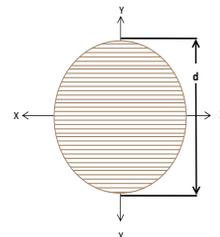
1. Tower is located in ,
2. Tower was analyzed for a 140 mph 3-second gust wind in accordance with ASCE 7-10
3. Exposure category C used in analysis
4. Topographic Kzt factor of 1 used in analysis.

TOWER RATING: 83.1%

FACTORED REACTIONS



140 mph Ultimate 3-sec Gust Wind Speed



Geometry

Pole Data:

Lumber Type:	Round Timber	
Pole Length:	50	ft
Wood Species:	Western Red Cedar	
Wood Database:		
Design Interval:	5	ft

Pole Properties:

E _{miny} =		psi	Wood Density:	0.005	kcf
F _{by} =		psi	Cond. Treatment:	Air Dried	
E _{minx} =	360000	psi	Temperature:	90	°F
F _{bx} =	1250	psi			
F _c =	875	psi			

Pole Geometry:

Diameter Top (in)	Diameter Bottom (in)	X-Axis Top Width "b" (in)	X-Axis Bottom Width "b" (in)	Raceway X-Axis Width (in)	Y-Axis Top Width "d" (in)	Y-Axis Bottom Width "d" (in)	Raceway Y-Axis Width (in)
8.59	18.46						

Discrete Loading

Mount CL Elev (ft)	Vertical Offset (ft)	Database	Model	Qty	Offset Type	Face	Azimuth	C _g A _g Front (ft ²)	C _g A _g Side (ft ²)	Weight (lb)
47	13		DS2C03F36D-D	1	From Leg	A	0	7.29	7.29	70.00
47	8		CO-41A	1	From Leg	B	0	3.15	3.15	14.00
47	6		8.5' x 2.5" Dia Omni	1	From Leg	C	0	2.13	2.13	11.50
47	0	Tower Mounts	6' x 4-1/2" Mount Pipe	1	From Leg	A	0	2.70	2.70	65.00
47	0	Tower Mounts	6' x 2" Mount Pipe	1	From Leg	B	0	1.43	1.43	22.00
47	0	Tower Mounts	6' x 2" Mount Pipe	1	From Leg	C	0	1.43	1.43	22.00
47	0	Tower Mounts	2' Stand Off Arm	1	From Leg	A	0	0.00	1.53	89.00
47	0	Tower Mounts	2' Stand Off Arm	1	From Leg	B	0	0.00	1.53	89.00
47	0	Tower Mounts	2' Stand Off Arm	1	From Leg	C	0	0.00	1.53	89.00
36	0	Tower Mounts	3' x 2" Pipe Mount	1	From Leg	A	0	0.58	0.58	10.95
36	0	Tower Mounts	3' x 2" Pipe Mount	1	From Leg	A	0	0.58	0.58	10.95
36	0	Tower Mounts	V-brace	1	From Leg	A	0	2.00	0.66	1.00
36	0	Tower Mounts	11' Crossarm	2	From Leg	A	0	8.25	0.13	66.00

Linear Loading

Start Height (ft)	End Height (ft)	Nominal Width (in)	Face	Total #	# Exposed	Diameter (in)	Weight (plf)
36	47	7/8	A	4	1	1.103	0.46
7	36	7/8	A	5	1	1.103	0.46

Results

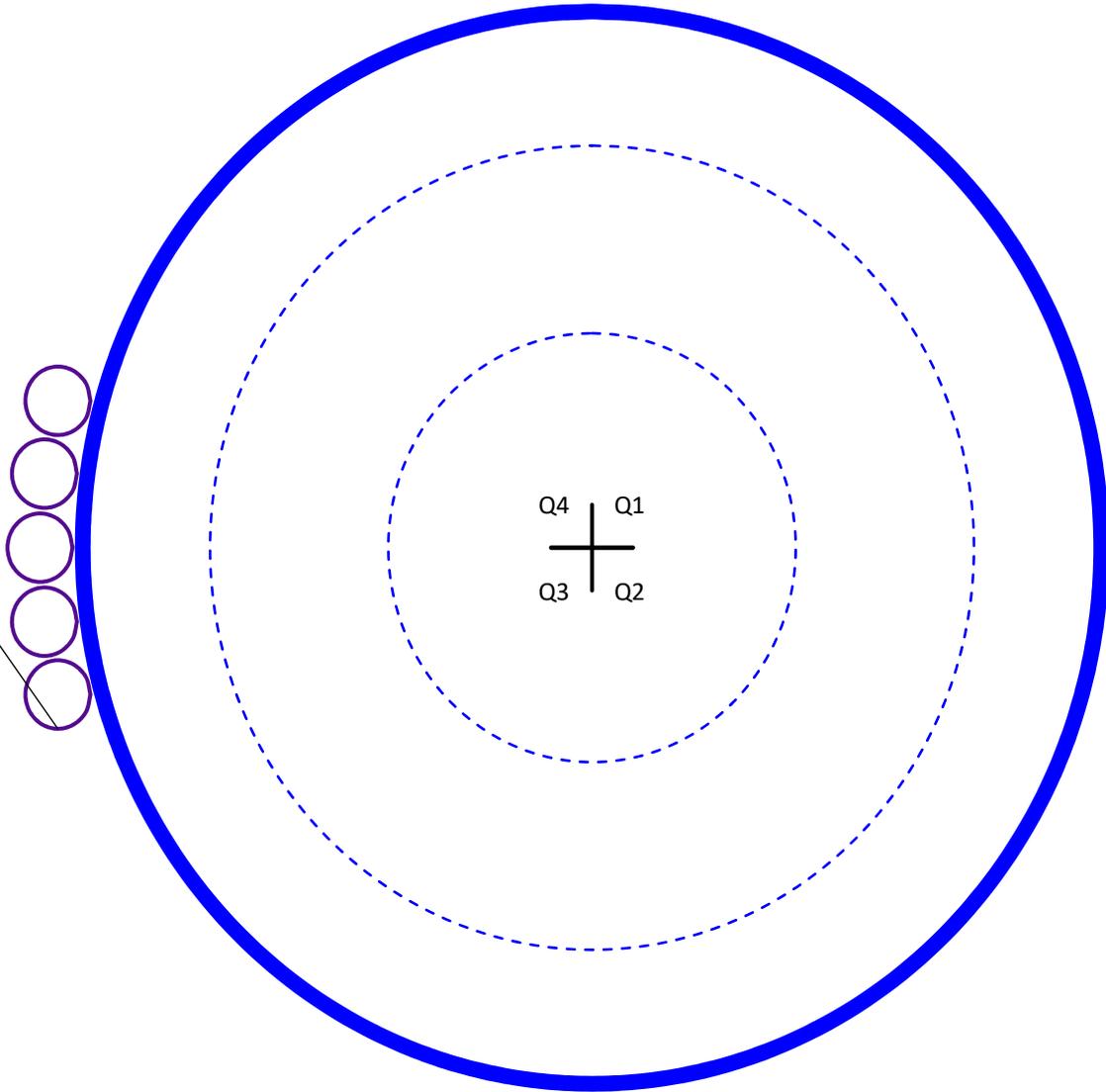
Elevation (ft)	Diameter	Axial (k)	Shear (k)	Moment (k-ft)	f_b (psi)	f_c (psi)	F'_b (psi)	F'_c (psi)	% Capacity
60	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0%
55	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0%
53	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0%
50	8.59	0.000	0.023	0.000	0.00	0.00	2000.00	31.56	0.0%
47	9.18	0.488	0.766	0.068	10.68	7.37	2000.00	35.70	5.2%
42	10.17	0.514	0.817	3.900	453.31	6.32	2000.00	44.66	31.5%
41	10.37	0.529	0.871	4.717	517.58	6.27	2000.00	46.86	34.6%
36	11.35	0.732	1.689	9.071	757.55	7.23	2000.00	60.69	46.3%
31	12.34	0.772	1.785	17.516	1139.22	6.45	2000.00	81.68	63.0%
26	13.33	0.815	1.885	26.441	1365.23	5.84	2000.00	115.69	71.9%
21	14.31	0.862	1.987	35.866	1494.59	5.35	1961.19	176.10	78.2%
16	15.30	0.912	2.091	45.803	1562.66	4.96	1946.71	298.48	81.2%
11	16.29	0.965	2.189	56.258	1591.16	4.63	1933.24	597.45	82.7%
7	17.08	1.014	2.292	65.012	1595.33	4.43	1923.10	1136.16	83.1%
2	18.07	1.056	2.375	76.471	1585.44	4.12	1911.13	1521.01	83.0%
0	18.46	1.074	2.400	81.222	1578.19	4.01	1906.54	1538.98	82.8%

APPENDIX B
BASE LEVEL DRAWING



BASE LEVEL DRAWING

(2) 7/8 TO 36 FT LEVEL
(3) 7/8 TO 47 FT LEVEL



APPENDIX C
ADDITIONAL CALCULATIONS

NDS Version	2015-ASD
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Base Reactions

Moment (k-ft):	81.22
Axial (k):	1.07
Shear (k):	2.40

Pole Properties

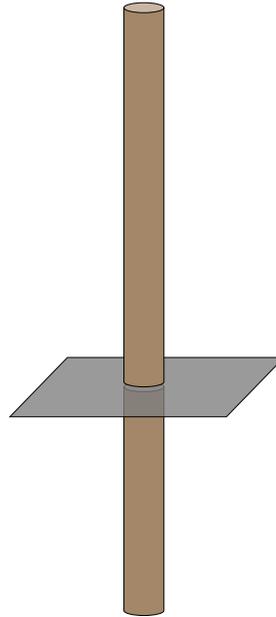
Encased:	No	Select
Depth to check pole (ft):	4.75	

Foundation Dimensions

Pole Diameter (ft):	1.65
Depth Below Existing Grade (ft):	15

Soil Properties

Ultimate Gross Bearing (ksf):	8.00	
Neglect Top Layer:	Yes	Select
Groundwater:	Yes	Select
Groundwater Depth Below Grade (ft):	5	



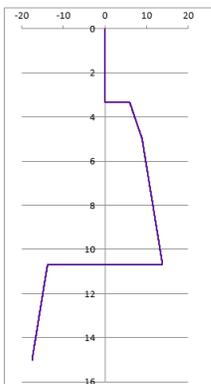
Layer Top Depth (ft)	Layer Bottom Depth (ft)	Layer Thickness (ft)	Effective Unit Weight of Soil (pcf)	Cohesion (ksf)	Internal Friction Angle (deg)	SPT Blow Count	Allowable Skin Friction (ksf)
0	3.33	3.33	120	0	28	0	0.000
3.33	5	1.67	120	0	30	0	0.000
5	15	10	58	0	30	0	0.000

Soil Checks

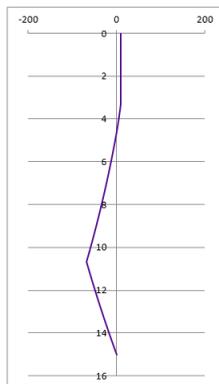
	Available Capacity	Demand	Check	% Capacity
Pier-Soil Interaction (FOS):	3.80	2.00	Pass	52.7%
Bearing (kips):	8.55	4.55	Pass	53.2%

Structural Checks

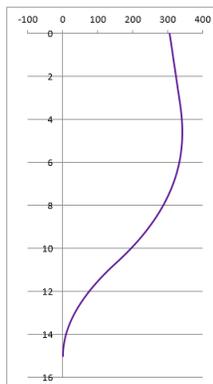
	F'_b (psi)	F'_c (psi)	Bending (psi)	Axial (psi)	Check	% Capacity
Embedded Wood Capacity:	1906.54	1538.98	1745.20	4.15	Pass	91.5%



Passive Pressure



Shear



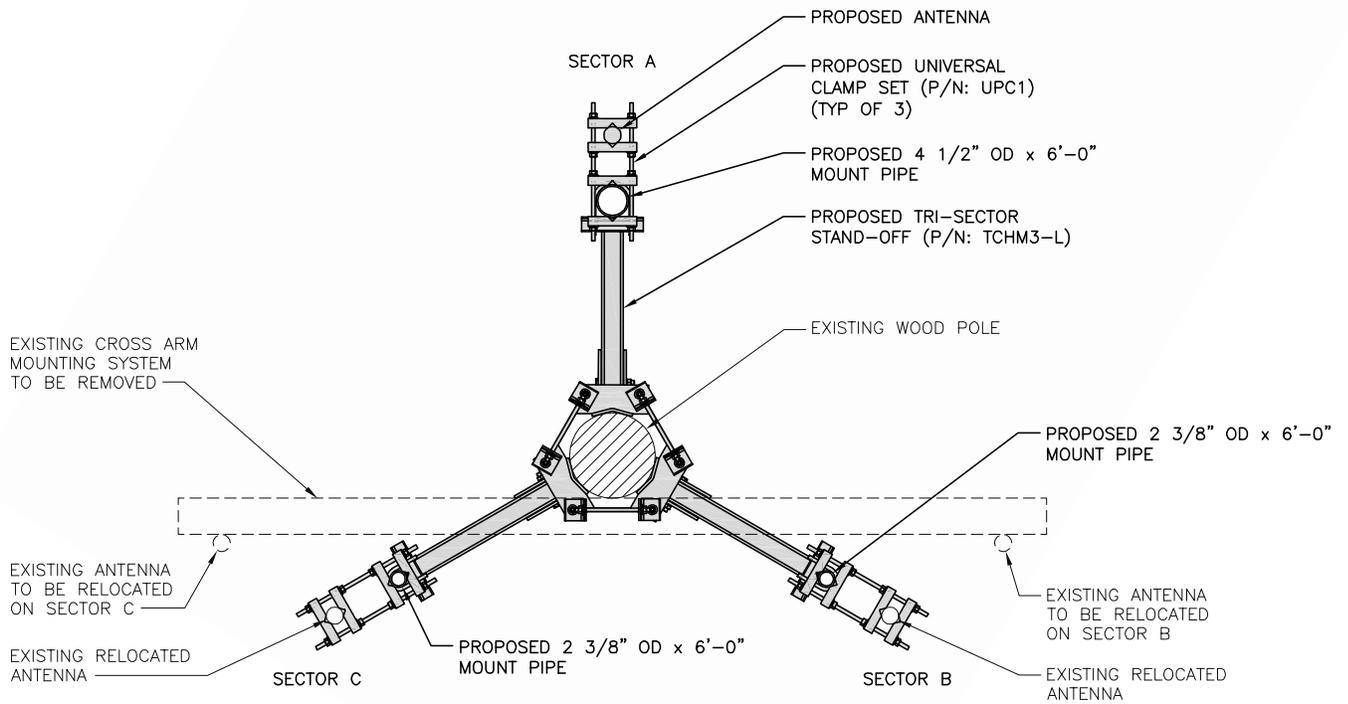
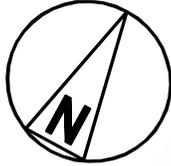
Moment

SUMMARY		
Center of Rotation =	10.68	ft from top of caisson
Factor of Safety =	3.80	
Max Unfactored Moment =	89.84	ft-kips
Bearing Capacity =	8.55	kips



Photos dated 10/02/2019

APPENDIX D
PROPOSED MOUNT REPLACEMENT



47.0 FT LEVEL
NO SCALE

Attachment 4 – Wetlands and Coastal Resources Inspection
Report



WETLAND & COASTAL RESOURCES INSPECTION

April 1, 2020

APT Project No. CT578100

Prepared For: Eversource Energy
107 Selden Street
Berlin, Connecticut 06037

Site Name: Branford 11J Substation Communications Facility

Site Address: 272-276 East Main Street, Branford, Connecticut

Date(s) of Investigation: 2/12/2020

Field Conditions: **Weather:** partly cloudy, mid 40's
Soil Moisture: moist

Wetland/Watercourse Delineation Methodology¹²:

- Connecticut Inland Wetlands and Watercourses
- Connecticut Tidal Wetlands

Municipal Upland Review Areas: Wetlands: 150 feet **Watercourses:** 150 feet

The wetlands inspection was performed by:

Matthew Gustafson, Registered Soil Scientist

Enclosures: Wetland Delineation Field Form, Tidal Wetland Delineation Field Form, Wetland Inspection Map, Coastal Boundary Map & Coastal Resources Map

This report is provided as a brief summary of findings from APT's wetland investigation of the referenced Study Area that consists of proposed development activities and areas generally within 200 feet.³ If applicable, APT is available to provide a more comprehensive wetland impact analysis upon receipt of site plans depicting the proposed development activities and surveyed location of identified wetland and watercourse resources.

¹ Wetlands and watercourses were delineated in accordance with applicable local, state and federal statutes, regulations and guidance.

² All established wetlands boundary lines are subject to change until officially adopted by local, state, or federal regulatory agencies.

³ APT has relied upon the accuracy of information provided by Eversource Energy and its contractors regarding the proposed Study Area for the purposes of identifying wetlands and watercourses.

Attachments

- Wetland Delineation Field Form
- Tidal Wetland Delineation Field Form
- Wetland Inspection Map
- Coastal Boundary Map
- Coastal Resources Map

Wetland Delineation Field Form

Wetland I.D.:	Wetland 1	
Flag #'s:	WF 1-01 to 1-08	
Flag Location Method:	Site Sketch <input checked="" type="checkbox"/>	GPS (sub-meter) located <input checked="" type="checkbox"/>

WETLAND HYDROLOGY:

NONTIDAL

Intermittently Flooded <input checked="" type="checkbox"/>	Artificially Flooded <input type="checkbox"/>	Permanently Flooded <input type="checkbox"/>
Semipermanently Flooded <input type="checkbox"/>	Seasonally Flooded <input type="checkbox"/>	Temporarily Flooded <input type="checkbox"/>
Permanently Saturated <input type="checkbox"/>	Seasonally Saturated/seepage <input type="checkbox"/>	Seasonally Saturated/perched <input type="checkbox"/>
Comments: Wetland 1 is a riverine system associated with the Branford River that experiences intermittent flooding along the banks. It is a well incised, confined bank and channel with no bordering wetlands and no tidal influence.		

TIDAL

Subtidal <input type="checkbox"/>	Regularly Flooded <input type="checkbox"/>	Irregularly Flooded <input type="checkbox"/>
Irregularly Flooded <input type="checkbox"/>		
Comments: None		

WETLAND TYPE:

SYSTEM:

Estuarine <input type="checkbox"/>	Riverine <input checked="" type="checkbox"/>	Palustrine <input type="checkbox"/>
Lacustrine <input type="checkbox"/>	Marine <input type="checkbox"/>	
Comments: As the southern banks to the resource are generally stone armored with no bordering wetlands, this resource is entirely classified as riverine.		

CLASS:

Emergent <input type="checkbox"/>	Scrub-shrub <input type="checkbox"/>	Forested <input checked="" type="checkbox"/>
Open Water <input checked="" type="checkbox"/>	Disturbed <input checked="" type="checkbox"/>	Wet Meadow <input type="checkbox"/>
Comments: Far western extents of this resource consist of mature forest bordering the riverine system, which transitions to exposed stone armoring to the east as a result of historic alteration of the watercourse.		

WATERCOURSE TYPE:

Perennial <input checked="" type="checkbox"/>	Intermittent <input type="checkbox"/>	Tidal <input type="checkbox"/>
Watercourse Name: Branford River		
Comments: The delineated boundary to the Branford River consists of very well incised banks with an approximately 10 to 15-foot wide channel which drains east within a stone/sandy bottom. This portion of the Branford River does not appear to experience significant tidal influence due to a downstream crossing under Route 1.		

Wetland Delineation Field Form (Cont.)

SPECIAL AQUATIC HABITAT:

Vernal Pool Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Potential <input type="checkbox"/>	Other <input type="checkbox"/>
Vernal Pool Habitat Type: None	
Comments: None	

SOILS:

Are field identified soils consistent with NRCS mapped soils?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
---	---	-----------------------------

DOMINANT PLANTS:

Sugar Maple (<i>Acer saccharum</i>)	American Elm (<i>Ulmus americana</i>)
Japanese Knotweed* (<i>Polygonum cuspidatum</i>)	Winged Euonymus* (<i>Euonymus alata</i>)

* denotes Connecticut Invasive Species Council invasive plant species

GENERAL COMMENTS:

All-Points Technology Corp., P.C. ("APT") understands that Eversource proposes to install a new communications antenna on an existing wooden pole located at the Branford 11J Substation facility. The location of the proposed communication facility consists of gravel surfaces within the substation's security fence. Existing gravel surfaces provide access off Route 1 to the proposed facility. In support of the communication facility, a propane fueled emergency backup power generator and 1,000-gallon propane tank would be installed along the southwestern side of the substation security fence. A small expansion of the security fence to accommodate the generator is within an existing developed and disturbed area.

One wetland area is located on the Subject Property near the proposed work activities. The nearest wetland area, Wetland 1, is located off the northern edge of the substation security fence associated with the Branford River riparian corridor. This south flowing perennial watercourse is characterized by stone-armored fill slopes associated with the substation. Portions of the riverbanks to this resource are dominated by invasive species including Asiatic bittersweet, common reed, and burning bush indicative of the historic disturbances within and proximate to this wetland boundary.

The proposed communication facility development activities are located ±78 feet south of the nearest location to Wetland 1's boundary. Limited ground disturbance would be associated with the work activities since the substation contains an existing gravel surface. Therefore, the project would not result in a likely adversely impact to Wetland 1 due to the separating distance and the intervening substation facility, provided appropriate erosion controls are installed and maintained in accordance with the *2002 Connecticut Guidelines For Soil Erosion and Sediment Control*.

Coastal Resources Inspection Field Form

Coastal Resources Identified on Subject Property:	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Nearest Coastal Resource:	Tidal wetlands ±155 feet to the south associated with Branford River; Subject Property located in Coastal Boundary	
Identification Method:	Remote sensing <input checked="" type="checkbox"/> Type: CTDEEP Tidal Wetland & Coastal Resource Mapping	Field identified <input checked="" type="checkbox"/>

SITE CONDITIONS:

DEVELOPED

Paved <input type="checkbox"/>	Gravel <input checked="" type="checkbox"/>	Maintained lawn <input type="checkbox"/>
Agriculture:	Cultivated <input type="checkbox"/>	Hayfield/Pasture <input type="checkbox"/>
Comments: Property is developed with the Branford 11J Substation		

UNDEVELOPED UPLAND HABITAT

Forest <input type="checkbox"/>	Scrub/Shrub <input type="checkbox"/>	Field <input type="checkbox"/>
Other: N/A		
Comments: None		

SOILS:

Are field identified soils consistent with NRCS mapped soils?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
If no, describe field identified soils		

NEAREST COASTAL RESOURCES:

Coastal Resources	Adjacent to Property	Off Site but Potentially Affected by Project	Not Applicable
General Resources*	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Beaches & Dunes	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Bluffs & Escarpments	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Coastal Hazard Area	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coastal Waters & Estuarine Embayments	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Developed Shorefront	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Freshwater Wetlands and Watercourses	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Intertidal Flats	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Islands	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Rocky Shorefront	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Shellfish Concentration Areas	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Shorelands	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Tidal Wetlands	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Coastal Resources Inspection Field Form (Cont.)

TIDAL WETLAND TYPE:

Coastal Salt Marsh <input checked="" type="checkbox"/>	Common Reed Marsh <input checked="" type="checkbox"/>	Scrub/Shrub/Emergent <input type="checkbox"/>
Brackish Marsh <input type="checkbox"/>	Other: None	
Distance from Subject Property:	Click here to enter text. feet to the Choose an item.	
Comments: tidal wetlands located south across Route 1 in rear of commercial property		

TIDAL WATERCOURSE/ESTUARINE EMBAYMENT TYPE:

Perennial <input checked="" type="checkbox"/>	Intermittent <input type="checkbox"/>	Tidal <input checked="" type="checkbox"/>
Watercourse/Embayment Name: Branford River		
Distance from Subject Property:	Tidally influenced stretch of river is located on south side of the Route 1 bridge adjacent to the Site	
Comments: Branford River is located along the north and east sides of the Site		

GENERAL COMMENTS:

No coastal resources (e.g., tidal wetlands or tidally influenced river) are located on the Subject Property. Coastal resources are located just to the south associated with the tidally influenced section of the Branford River (located south of the Route 1 bridge) and bordering tidal wetlands.

The proposed communications facility would be located either within the existing Branford 11J Substation or associated developed areas. As a result, no direct impact to coastal resources would result from the proposed project and downstream coastal resources would not be adversely impacted. Therefore, the proposed facility meets the requirements of the Connecticut Coastal Management Act¹ and is adequately protective of the interests of these regulations and the State's coastal resources and policies.

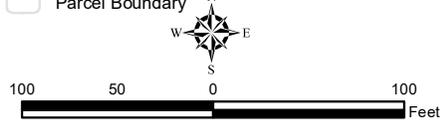
¹ CGS Section 22a-90 through 22a-112



Legend

- Existing Eversource Communications Wood Pole
- Proposed Eversource Ice Bridge and Coax Cables
- Proposed Eversource 24kW Generator
- Proposed Eversource 1,000 Gallon LPG Tank
- Proposed Eversource Fenced Equipment Compound
- Existing Eversource Structure
- Overhead Eversource Line
- Existing Eversource Right-of-Way (ROW)
- Subject Property
- Wetland Flag
- Delineated Wetland Boundary Outline
- Perennial Watercourse
- Field Delineated Wetland
- Open Water (not delineated; CTDEEP)
- Parcel Boundary

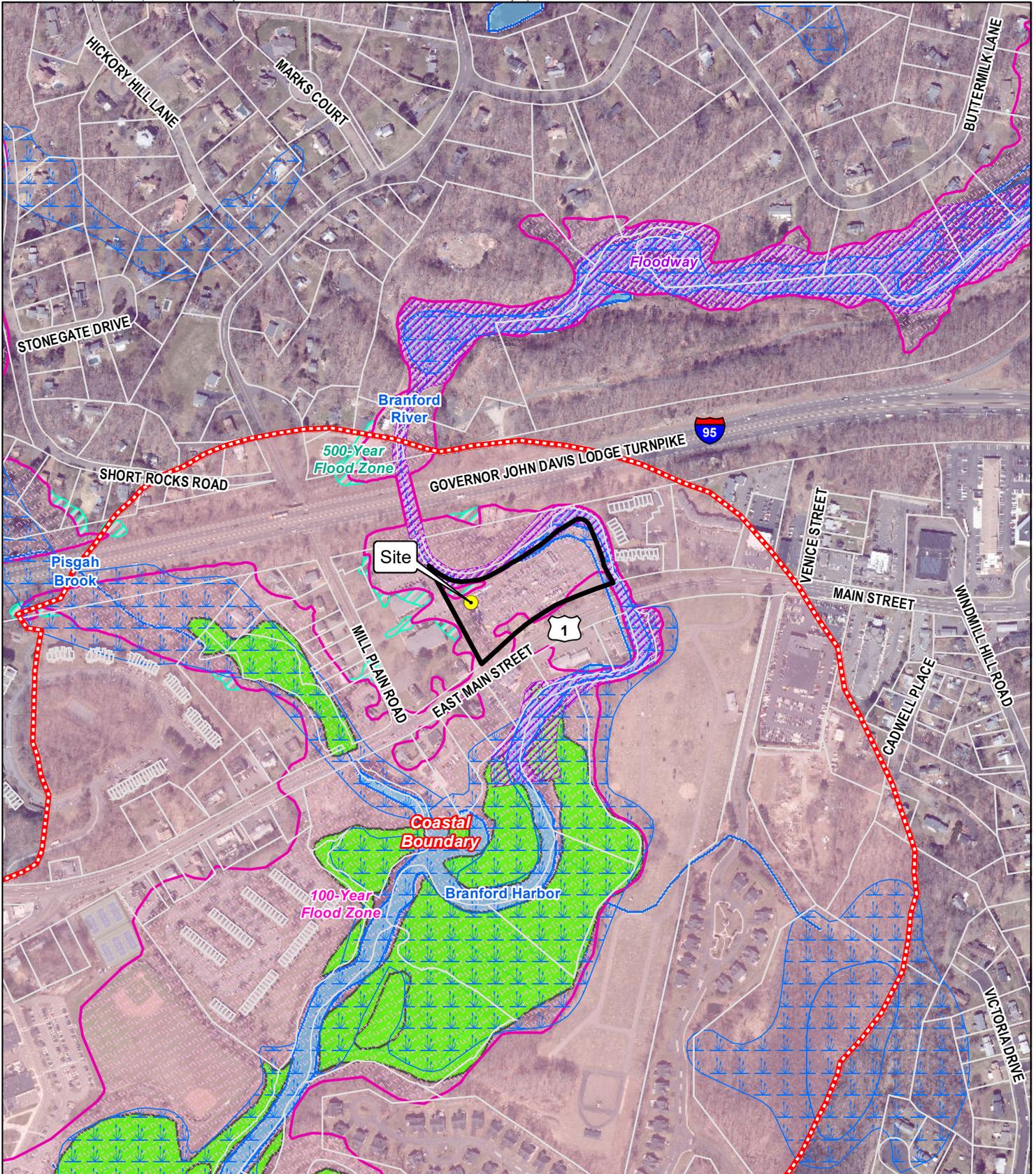
Map Notes:
 Base Map Source: 2019 Aerial Photograph (CTECO)
 Map Scale: 1 inch = 100 feet
 Map Date: February 2020



Wetland Inspection Map

Proposed Communications Facility
 Branford 11J
 272 East Main Street
 Branford, Connecticut





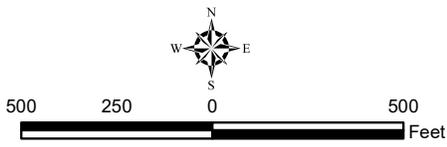
Legend

- Site
- Subject Property
- Open Water (not delineated; CTDEEP)
- CTDEEP Wetlands
- CTDEEP Tidal Wetland (1990)
- CTDEEP Coastal Boundary
- 100-Year Flood Zone
- 500-Year Flood Zone
- Floodway
- Parcel Boundary

Coastal Boundary Map

Proposed Communications Facility
 Branford 11J
 272 East Main Street
 Branford, Connecticut

Map Notes:
 Base Map Source: 2019 Aerial Photograph (CTECO)
 Map Scale: 1 inch = 500 feet
 Map Date: February 2020





Coastal Resources Legend

LEGEND

COASTAL LAND RESOURCES

- E** **COASTAL BLUFFS AND ESCARPMENTS:** Steep, seaward sloping marine cliffs or escarpments composed of unconsolidated bouldery to stony or sandy to gravelly soils. The slopes are active and the shores retreating (eroding). The slopes may be mantled with a sparse shrub or herb cover of salt spray tolerant plants. (Sources: 1,2)
- ME** **MODIFIED BLUFFS AND ESCARPMENTS:** Bluffs and escarpments which have been temporarily stabilized by erosion control structures (revetment, bulkhead or seawall) positioned seaward of the marine cliff or escarpment. (Source: 1)
- B** **BEACHES AND DUNES:** Moderately sloping shores composed of water worked sand, gravel or cobble deposits (beach) and when present, wind deposited sands (dunes or sand flats). The beach (proper) is positioned between mean low water and coastal bluffs/escarpments or dunes or vegetation. The map designations include all areas of sandy beach fill. Dunes and sand flats positioned landward and elevated above the beach, support coastal grasslands dominated by beach grass (*Ammophila breviligulata*). (Sources: 1,2,3,4)
- MB** **MODIFIED BEACHES AND DUNES:** Beach systems temporarily stabilized by an erosion control structure (revetment, seawall or bulkhead) positioned between the dune ridge and the beach. (Source: 1)
- R** **ROCKY SHOREFRONTS:** Shorefront composed of bedrock or armored with a dense aggregate of boulder and stone. Includes rugged nearly vertical rock cliffs or gently seaward sloping rock and bouldery lands. (Source: 1)
- CF** **COASTAL "FLOOD" HAZARD AREA:** 100 year coastal flood hazard area as identified by the Federal Emergency Management Agency (FEMA). On those coastal islands currently unmapped by FEMA, the flood hazard area is conservatively approximated by the 10' contour interval. (Sources: 2,5)
- F** **FRESHWATER WETLANDS AND UNDESIGNATED TIDAL WETLANDS:** Areas defined in Section 22a-33 of the Connecticut General Statutes as "land, including submerged land, not regulated pursuant to sections 22a-28 to 22a-35 ('Tidal' Wetlands and Watercourses Act), inclusive, which consists of any of the soil types designated as poorly drained, very poorly drained, alluvial and floodplain... (Inland Wetlands and Watercourses Act)." Includes all freshwater wetland soils and any poorly to very poorly drained soils of the Pawcatuck and Westbrook series (tidal wetland soils) that are unmapped and unregulated by the state tidal wetland program. (Sources: 1,5)
- I** **ISLANDS:** A land mass of bedrock or till encircled by coastal waters. (Note: All critical coastal resource components of the island such as bluffs and escarpments, beaches and dunes, rocky shorefront and wetlands should be managed accordingly whether or not these are displayed on this map). (Sources: 1,2)
- SH** **SHORELANDS:** Upland areas at elevations in excess of the 100 year stillt water flood level and located within the coastal boundary. (Sources: 2,5)
- D** **DEVELOPED SHOREFRONT:** Port and harbor areas which have been highly engineered and developed resulting in the functional impairment or substantial alteration of their natural physiographic features or systems. (Sources: 1,3,4,7)
- W** **WATER:** Open water bodies such as but not limited to lakes and ponds subject to regulation under Sections 22a-36 to 22a-45 of the Connecticut General Statutes. (Source: 2)

INTERTIDAL RESOURCES

- T** **REGULATED TIDAL WETLANDS:** Official state designated and regulated tidal wetlands located within the coastal boundary. The areas depicted on this map shall in no way supersede the official state regulated tidal wetland maps at the scale of 1:2400. (Source: 6)
- IF** **INTERTIDAL FLATS:** Level to gently sloping areas subjected to alternating periods of tidal inundation and exposure. Sediment is variable ranging from mud to sand. (Source: 2)

COASTAL WATERS

- EM** **ESTUARINE EMBAYMENTS:** Protected coastal water bodies with an open connection to the Sound including tidal rivers, bays, coves and lagoons. (Source: 2)
- NW** **NEARSHORE WATERS:** Those waters and submerged lands between mean low water and a depth approximated by the 10 meter bathymetric contour. (Source: 2)
- OW** **OFFSHORE WATERS:** Those waters and submerged lands seaward of a depth approximated by the 10 meter bathymetric contour. (Source: 2)
- CB** **COASTAL BOUNDARY:** As defined in Section 22a-94 of the Connecticut General Statutes as amended by Public Act 79-535. (Lands and waters seaward of the inside edge of this line are subject to the provisions of the Connecticut Coastal Management Act)

SOURCES:

1. False Color Infrared Aerial Photographs (1:12000), 1974
2. U.S.G.S. 7 1/2 Minute Quadrangle
3. Surficial Geology Maps (U.S.G.S. or Connecticut Geological and Natural History Survey)
4. Soil Conservation Service, Coastal Soil Maps (1:24000), 1979
5. Flood Insurance Maps Prepared by the Federal Emergency Management Agency (hazard boundary maps, preliminary Flood Insurance rate maps or final Flood Insurance rate maps, whichever ones were most current at this printing)
6. State Regulated Tidal Wetland Maps (1:2400)
7. Coastal Area Management, Land Use Overlays (1:24000)

This map is intended as a guide to identify the approximate locations of coastal resources. Map designations conform to the resource definitions in Section 22a-93 of the Connecticut General Statutes as amended by Public Act 79-535. Boundary lines are as precise as this map and source information permit. This map shall not supersede any existing and more precise official tidal wetland map, state or municipal inland wetlands map or FEMA Flood Insurance rate maps. Specific question or comments, relating to the map units or the application of this map, should be directed to the Connecticut Coastal Area Management Program.

EVERSOURCE
ENERGY

ALL-POINTS
TECHNOLOGY CORPORATION

Legend
 Subject Property

Coastal Resources Map

Proposed Communications Facility
 Branford 11J
 272 East Main Street
 Branford, Connecticut



Map Notes:
 Base Map Source: Coastal Resources Map, 1979.
 Prepared by Coastal Area Management Program, CTDEEP.
 Map Scale: 1 inch = 1,000 feet
 Map Date: February 2020