



Northeast Site Solutions
Denise Sabo
199 Brickyard Rd Farmington, CT 06032
860-209-4690
denise@northeastsitesolutions.com

October 4, 2016

Members of the Siting Council
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051

RE: Notice of Exempt Modification
274 Derby Avenue, New Haven CT 06520
Latitude: 41.31377
Longitude: -72.95955
T-Mobile Site#: CT11333D_L700

Dear Ms. Bachman:

T-Mobile currently maintains three (3) antennas at the 85-foot level of the existing 90-foot flagpole at 274 Derby Avenue, New Haven CT 06520. On April 22, 2014 T-Mobile received approval to replace this facility. The construction and upgrades for this site never transpired.

T-Mobile now intends to replace the existing facility with a new flagpole of the same height with a larger diameter. The existing flagpole is 10 inches in diameter. The replacement pole is 30 inches in diameter. T-Mobile also intends to replace the existing 7.5 foot square mat foundation with a new 12 foot square mat. The flagpole is owned by T-Mobile. The property is owned by Yale University. T-Mobile intends to replace three (3) of its existing antennas with three (3) new 1900/2100 MHz antenna at the 85-foot level of the flagpole and add three (3) new 700 MHz antenna and (24) coax cables. The new antennas would be installed at the 75-foot level of the flagpole.



NSS **NORTHEAST**
SITE SOLUTIONS

Turnkey Wireless Development

Total Planned Site Modifications:

Remove:

- (1) 3106 Cabinet
- (1) S8000 Cabinet
- Cabinet Concrete Pad

Remove and Replace:

- 10"x48' Flagpole (REMOVE) – 30"x48' flagpole (**REPLACE**)
- 7.5'x7.5 Mat (REMOVE) – 12'x12' Mat Foundation (**REPLACE**)
- (12) Coax Lines (REMOVE) – (24) 7/8" Coax lines (**REPLACE**)
- (3) Antenna/ Canister 10" (REMOVE) – (3) APX16 DWV SE A20 (**REPLACE**) **85' RAD**
- Replace existing Ice Bridge with New Ice Bridge

Install New:

- (3) DBXNH6565B A2M Antenna (75' RAD)
- (3) RRUS11 B12 (Ground Mounted)
- (3) RRUS32 B4 (Ground Mounted)
- (1) H-Frame on exiting concrete pad

Existing to Remain:

- 6102 Radio Cabinet
- 2416 Cabinet
- GPS Antenna (Relocated to Ice Bridge)

This facility was retained by the CT Siting Council, an approved exempt modification was received on April 22, 2014 - No. EM-T-Mobile-093-140307. Approval was received to replace the facility. Please see attached. T-Mobile did not proceed with construction and proposed upgrades were not completed. T-Mobile is now seeking approval to replace and upgrade this facility. The approval for the facility included a 91-foot AGL flagpole.



Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Mayor Toni Harp, Elected Official for the City of New Haven, as well as the property owner and the tower owner.

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

1. The proposed modifications will not result in an increase in the height of the existing structure.
2. The proposed modifications will not require the extension of the site boundary.
3. The proposed modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.
4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communications Commission safety standard.
5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The existing structure and its foundation can support the proposed loading.

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

Sincerely,

Denise Sabo

Mobile: 860-209-4690

Fax: 413-521-0558

Office: 199 Brickyard Rd, Farmington, CT 06032

Email: denise@northeastsitesolutions.com

Attachments

cc: - Toni Harp- Mayor - as elected official

T-Mobile - as tower owner

Yale University - as property owner

Exhibit A

JULIE D. KOHLER

PLEASE REPLY TO: Bridgeport
WRITER'S DIRECT DIAL: (203) 337-4157
E-Mail Address: jkohler@cohenandwolf.com

March 6, 2014

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

**Re: Notice of Exempt Modification
Site ID CT11333D
274 Derby Avenue, New Haven**

Dear Attorney Bachman:

This office represents T-Mobile Northeast LLC ("T-Mobile") and has been retained to file exempt modification filings with the Connecticut Siting Council on its behalf.

In this case, T-Mobile owns the existing flagpole telecommunications facility at 274 Derby Avenue, New Haven Connecticut (Latitude: 41.31377, Longitude: -72.959559). T-Mobile intends to replace the existing flagpole (which houses T-Mobile's canister antenna) with a flagpole of the exact same height at this existing telecommunications facility in New Haven ("New Haven Facility"). Please accept this letter as notification, pursuant to R.C.S.A. § 16-50j-73, of construction which constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2) and/or (3). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Mayor Toni Harp, and the property owner, Yale University.

The existing New Haven Facility consists of a flagpole telecommunications facility at a height of 91 feet AGL, with T-Mobile's canister antenna internally mounted at a height of 85 feet AGL ("Existing Facility").¹ T-Mobile proposes to:

- Replace the Existing Facility with a flagpole of the same height with a slightly larger diameter ("Replacement Facility"). The existing flagpole facility is 10 inches in diameter. The Replacement Facility will be 18 inches in diameter to accommodate T-Mobile's 18 inch diameter canister antenna; and
- Replace the 7.5 foot square mat foundation with a 10 foot square mat

¹ The online Connecticut Siting Council database does not include a docket or petition number for the approval of this structure, and therefore does not include limitations on the configuration of the facility.

March 6, 2014
Site ID CT11333D
Page 2

foundation. (See the plans revised to October 31, 2013 attached hereto as Exhibit A).

The planned modifications to the New Haven Facility fall squarely within those activities explicitly provided for in R.C.S.A. § 16-50j-72(b)(2) and/or (3).

1. The proposed replacement will not increase the height of the tower. T-Mobile's Replacement Facility will be 91 feet AGL, merely replacing the Existing Facility at a height of 91 feet AGL. (The antenna centerline will remain at 85 feet AGL.) The enclosed tower drawing confirms that the proposed modification will not increase the height of the tower.


2. The proposed modifications will not require an extension of the site boundaries. The Replacement Facility will be located in the exact same location as the Existing Facility and no expansion of the existing site boundaries or lease area is required.

3. The proposed replacement of the New Haven Facility will not increase the noise levels at the Existing Facility by six decibels or more.

4. The operation of the replacement antenna will not increase the total radio frequency (RF) power density, measured at the base of the Replacement Facility, to a level at or above the applicable standard. According to a Radio Frequency Emissions Analysis Report prepared by EBI dated October 16, 2013, T-Mobile's operations would add 1.737% of the FCC Standard. Therefore, the calculated "worst case" power density for the planned combined operation at the site including all of the proposed antennas would be 1.737% of the FCC Standard as calculated for a mixed frequency site as evidenced by the engineering exhibit attached hereto as Exhibit B.

For the foregoing reasons, T-Mobile respectfully submits that the proposed Replacement Facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2) and/or (3). Upon acknowledgement by the Council of this proposed exempt modification, T-Mobile shall commence construction approximately sixty days from the date of the Council's notice of acknowledgement.

Sincerely,


Julie D. Kohler, Esq.

cc: City of New Haven, Mayor Toni Harp
Yale University
Sheldon Freinle, Northeast Site Solutions



STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051

Phone: (860) 827-2935 Fax: (860) 827-2950

E-Mail: siting.council@ct.gov

www.ct.gov/csc

April 22, 2014

Julie D. Kohler, Esq.
Cohen and Wolf, P.C.
1115 Broad Street
P.O. Box 1821
Bridgeport, CT 06601-1821

RE: **EM-T-MOBILE-093-140307** – T-Mobile Northeast LLC notice of intent to modify an existing telecommunications facility located at 274 Derby Avenue, New Haven, Connecticut.

Dear Attorney Kohler:

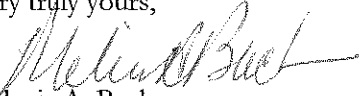
The Connecticut Siting Council (Council) hereby acknowledges your notice to modify this existing telecommunications facility, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies with the following conditions:

- Any deviation from the proposed modification as specified in this notice and supporting materials with the Council shall render this acknowledgement invalid;
- Any material changes to this modification as proposed shall require the filing of a new notice with the Council;
- Within 45 days after completion of construction, the Council shall be notified in writing that construction has been completed;
- The validity of this action shall expire one year from the date of this letter; and
- The applicant may file a request for an extension of time beyond the one year deadline provided that such request is submitted to the Council not less than 60 days prior to the expiration.

The proposed modifications including the placement of all necessary equipment and shelters within the tower compound are to be implemented as specified here and in your notice dated March 6, 2014, and additional correspondence dated March 28, 2014. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site by any dimension, increase noise levels at the tower site boundary by six decibels or more, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standards adopted by the Federal Communications Commission pursuant to Section 704 of the Telecommunications Act of 1996 and by the state Department of Energy and Environmental Protection pursuant to Connecticut General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below state and federal standards applicable to the frequencies now used on this tower.

This decision is under the exclusive jurisdiction of the Council. Please be advised that the validity of this action shall expire one year from the date of this letter. Any additional change to this facility will require explicit notice to this agency pursuant to Regulations of Connecticut State Agencies Section 16-50j-73. Such notice shall include all relevant information regarding the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin 65. Thank you for your attention and cooperation.

Very truly yours,


Melanie A. Bachman
Acting Executive Director

MAB/RDM/laf

- c: The Honorable Toni N. Harp, Mayor, City of New Haven
- Tomas Reyes, Jr., Chief of Staff, City of New Haven
- Thomas Talbot, Zoning Admr., City of New Haven
- Yale University

Exhibit B



Property Information

Owner	YALE UNIVERSITY
Co-Owner	FINANCIAL REPORTING & ANALYSIS
Address	250 DERBY AVE
Mailing Address	155 WHITNEY AVE NEW HAVEN, CT 06510
Land Use	3890 YALE TAXAB MDL-94
Land Class	C

Vision ID	17343
Census Tract	1541
Neighborhood	C700
Zoning Code	RB
Acreage	21.95
Utilities	Public Water,Public Sewer,Gas

Photo



Sketch

Primary Construction Details

Actual Year Built	1930
Effective Year Built	1963
Stories	1
Building Style	Auditorium
Building Use	Comm/Ind
Building Condition	Average
Total Rooms	

Bedrooms	
Full Bathrooms	0
Half Bathrooms	
Bath Style	
Kitchen Style	
Roof Style	Shed
Roof Cover	Asph/F Gls/Cmp

Exterior Walls	Brick/Masonry
Interior Walls	Drywall/Sheet
Heating Type	Forced Air-Duc
Heating Fuel	Gas
AC Type	Central
Gross Bldg Area	5803
Total Living Area	5541



Valuation Summary (Assessed value = 70% of Appraised Value)

Item	Appraised	Assessed
Buildings	1975900	1383130
Outbuildings	549800	384860
Improvements	2535000	1774500
Extras	9300	6510
Land	4115600	2880920
Total	6650600	4655420

Outbuilding and Extra Items

Description	Units
W/FOUR LIGHTS	6 UNITS
CELL SHED	200 S.F.
AIR COND	1500 S.F.
CELL SHED	200 S.F.
W/LIGHTS ETC	600 S.F.

Sub Areas

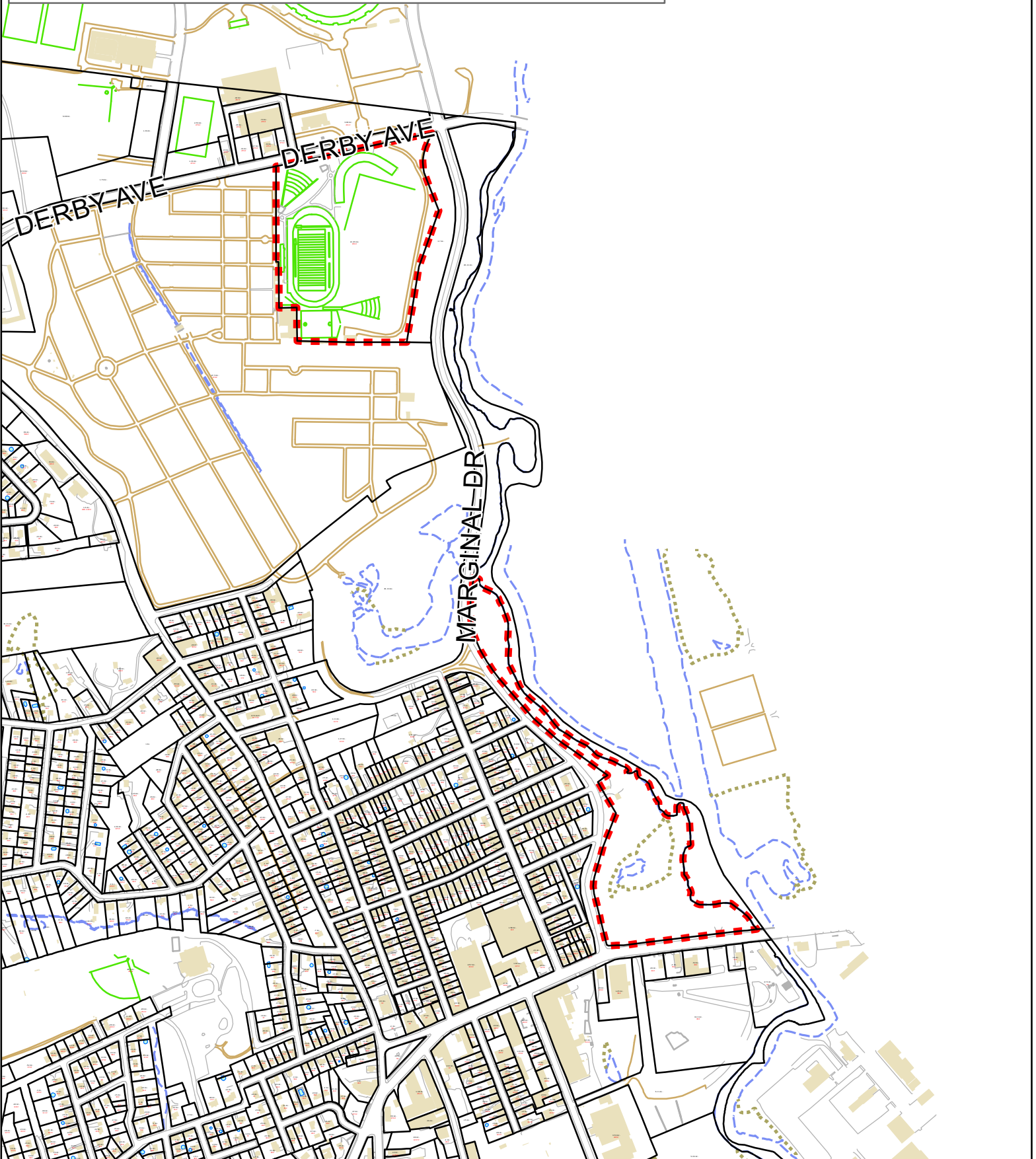
Subarea Type	Gross Area (sq ft)	Living Area (sq ft)
First Floor	29120	29120
Porch, Open, Finished	262	0
First Floor	5541	5541
Basement, Finished	20800	20800
Total Area	5803	

Sales History

Owner of Record	Book/ Page	Sale Date	Sale Price
YALE UNIVERSITY			0
YALE UNIVERSITY			0

City of West Haven, Connecticut - Assessment Parcel Map

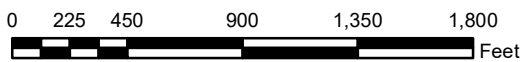
Parcel: 073-0015-0-0000 Address: 250 DERBY AVE



N



Approximate Scale: 1 inch = 750 feet



Map Produced: January 2015

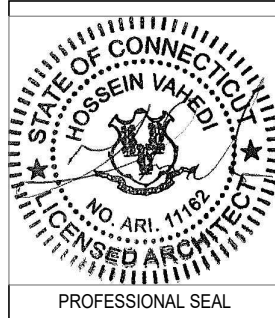
Disclaimer: This map is for informational purposes only. All information is subject to verification by any user. The City of West Haven and its mapping contractors assume no legal responsibility for the information contained herein.

Exhibit C

SUBMITTALS		
DATE	DESCRIPTION	REVISION
09/13/16	ISSUED FOR REVIEW	A
09/23/16	FINAL CD	0

DEPT.	DATE	APP'D	REVISIONS
RFE			
RF MAN.			
ZONING			
OPS			
CONSTR.			
SITE AC.			

PROJECT NO:	CT11333D
DRAWN BY:	FG
CHECKED BY:	KM

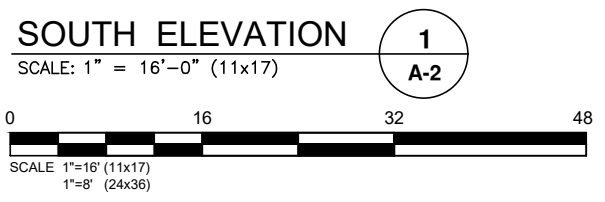
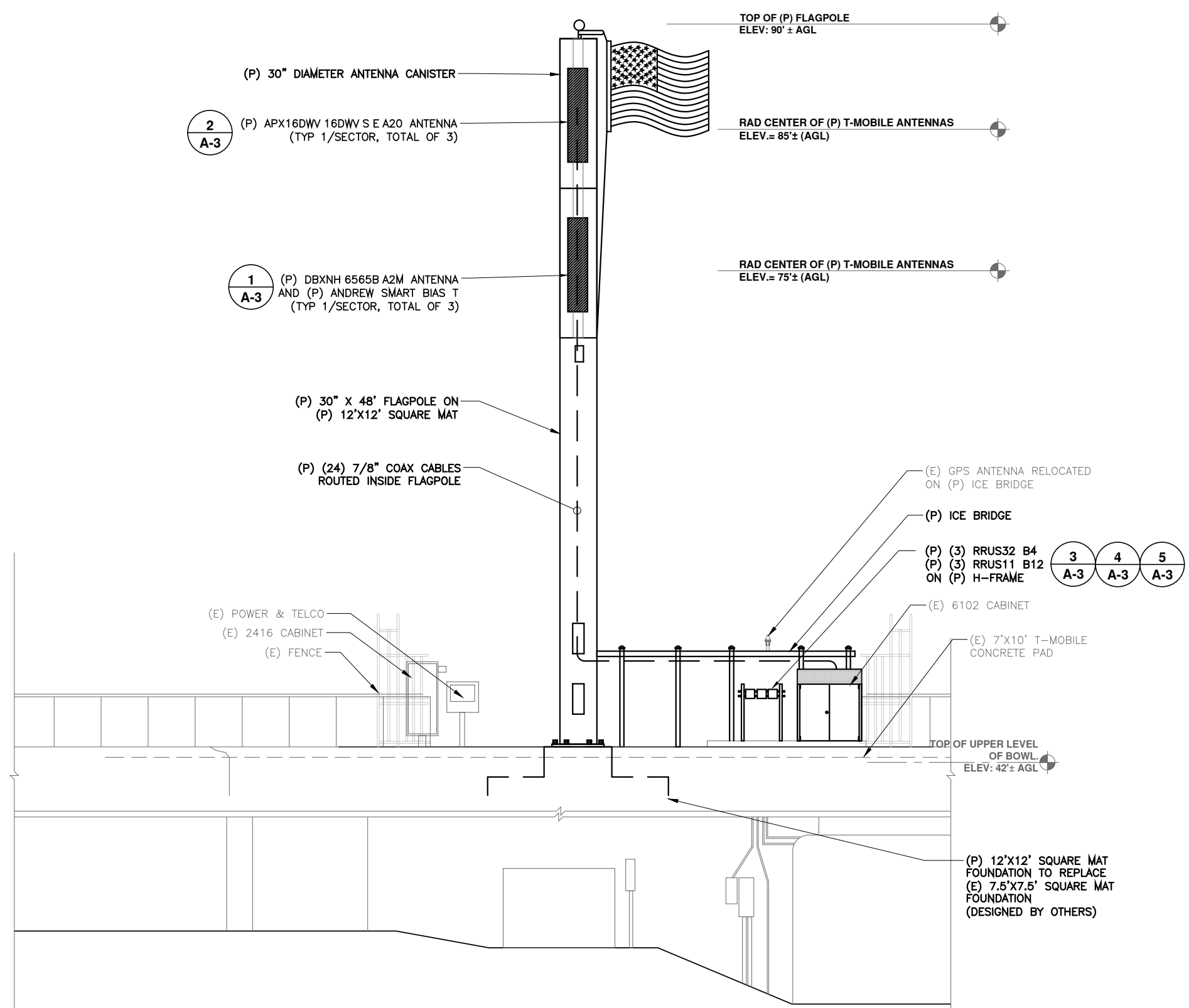


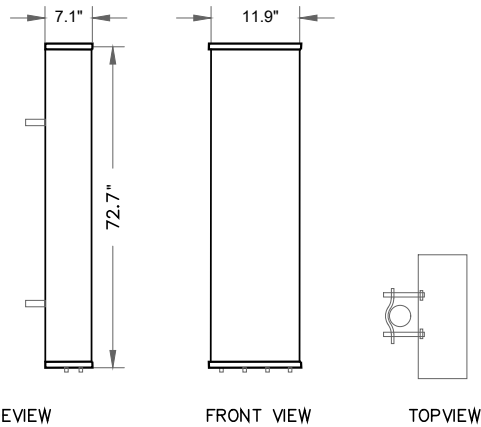
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SITE NUMBER:
 CT11333D
 SITE NAME:
 NEW HAVEN/RT10/RT24
 SITE ADDRESS:
 274 DERBY AVENUE
 NEW HAVEN, CT 06520

SHEET TITLE
 ELEVATION
 AND
 ANTENNA PLAN

SHEET NUMBER
A-2



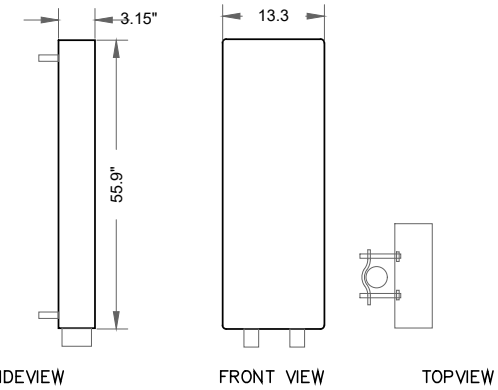


COMMSCOPE
 MANUFACTURE: COMMSCOPE
 MODEL NO. DBXNH-6565B-VTM / DBXNH-6565B-A2M
 DIMENSIONS - HxWxD, (IN) 72.7x11.9x7.1
 WEIGHT - 33.5 LB

**COMMSCOPE DBXNH-6565B-A2M
 ANTENNA DETAILS**

1
A-3

SCALE: N.T.S

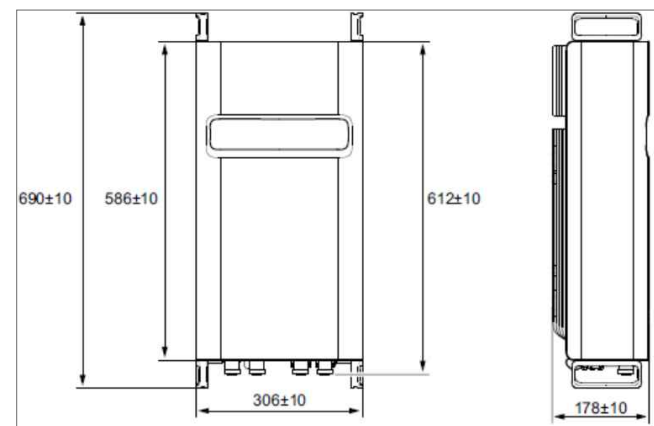


RFS
 MANUFACTURE: RFS
 MODEL NO. APX16DWV-16DWVS-A20
 DIMENSIONS - HxWxD, (IN) 55.9x13.3x3.15
 WEIGHT - 40.7 LB

**RFS APX16DWV-16DWVS-A20
 ANTENNA DETAILS**

2
A-3

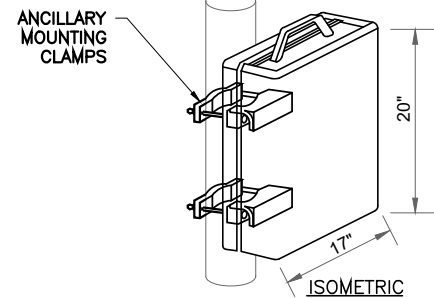
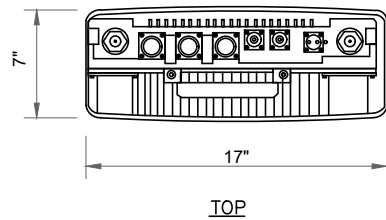
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RRUS32 DETAILS

3
A-3

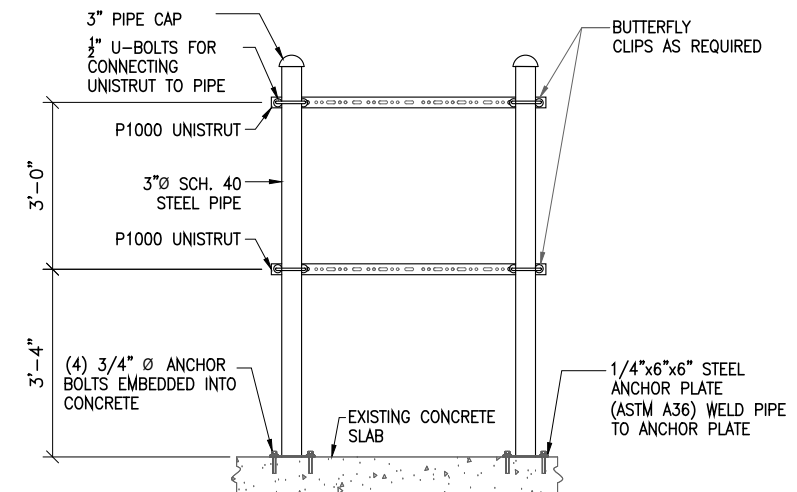
SCALE: N.T.S



RRUS 11 B12 DETAILS

4
A-3

SCALE: N.T.S



H-FRAME DETAILS

5
A-3

SCALE: N.T.S



T-MOBILE NORTHEAST, LLC
 35 GRIFFIN ROAD SOUTH
 BLOOMFIELD, CT 06002
 OFFICE: (860) 692-7100
 FAX: (860) 692-7159



**ATLANTIS DESIGN
 GROUP, INC.**
 3210 MAIN CAMPUS DRIVE
 LEXINGTON, MA 02421
 Phone number: 617-852-3811
 Fax Number: 781-742-2247

SUBMITTALS		
DATE	DESCRIPTION	REVISION
09/13/16	ISSUED FOR REVIEW	A
09/23/16	FINAL CD	0

DEPT.	DATE	APP'D	REVISIONS
RFE			
RF MAN.			
ZONING			
OPS			
CONSTR.			
SITE AC.			

PROJECT NO:	CT11333D
DRAWN BY:	FG
CHECKED BY:	KM



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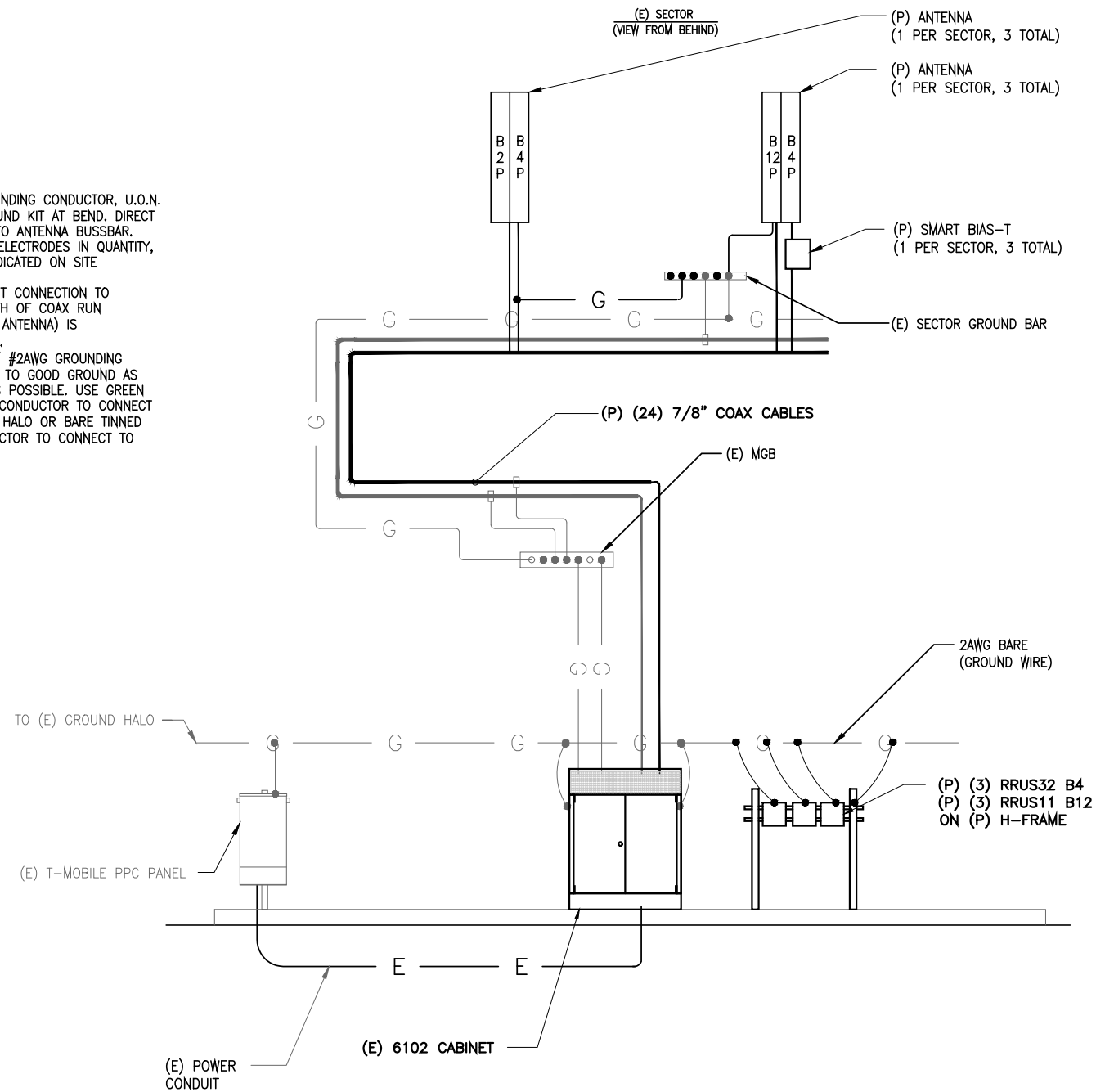
SITE NUMBER:	CT11333D
SITE NAME:	NEW HAVEN/RT10/RT24
SITE ADDRESS:	274 DERBY AVENUE NEW HAVEN, CT 06520

SHEET TITLE
DETAILS

SHEET NUMBER
A-3

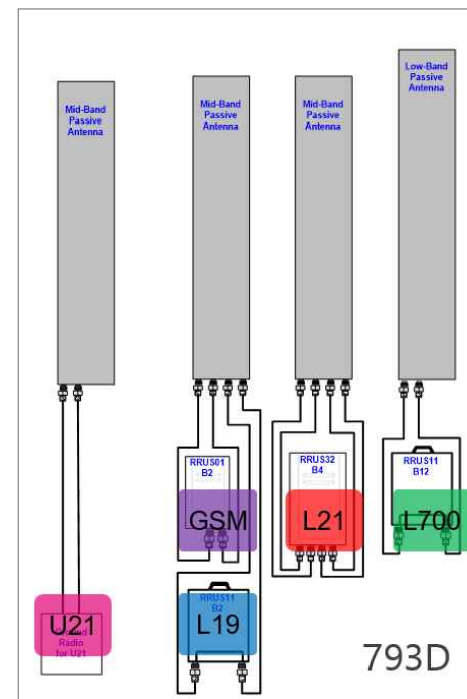
NOTES:

- A. PROVIDE #2AWG GROUNDING CONDUCTOR, U.O.N.
- B. DO NOT INSTALL GROUND KIT AT BEND. DIRECT GROUND WIRE DOWN TO ANTENNA BUSSBAR.
- C. PROVIDE GROUNDING ELECTRODES IN QUANTITY, TYPE AND SIZE AS INDICATED ON SITE GROUNDING PLAN.
- D. ADD COAX GROUND KIT CONNECTION TO BUSSBAR WHEN LENGTH OF COAX RUN (FROM EQUIPMENT TO ANTENNA) IS GREATER THAN 20'-0".
- E. GROUND HCS BOX W/ #2AWG GROUNDING CONDUCTOR ATTACHED TO GOOD GROUND AS DIRECT AND SHORT AS POSSIBLE. USE GREEN STRANDED INSULATED CONDUCTOR TO CONNECT TO BUSSBAR/GROUND HALO OR BARE TINNED SOLID COPPER CONDUCTOR TO CONNECT TO GROUND RING.



GROUNDING DIAGRAM
SCALE: N.T.S

1
E-1



TRUNK FIBER NOTES:

1. IN GENERAL THIS CABLE WILL HANDLE SIMILARLY TO 3/8" COAXIAL CABLE, AND SIMILAR INSTALLATION TECHNIQUES APPLY. ALL CABLES ARE INDIVIDUALLY SERIALIZED, BE SURE TO WRITE DOWN THE CABLE SERIAL NUMBER FOR FUTURE REFERENCE.
2. THE TERMINATED FIBER ENDS (THE BROKEN OUT FIBERS PLUS CONNECTORS) HOWEVER ARE FRAGILE, AND THESE MUST BE PROTECTED DURING THE INSTALLATION PROCESS.
3. LEAVE THE PROTECTIVE TUBE AND SOCK AROUND THE FIBER TAILS AND CONNECTORS IN PLACE DURING HOISTING AND SECURING THE CABLE. REMOVE THIS ONLY JUST PRIOR TO MAKING THE FINAL CONNECTIONS TO THE OVP BOX.
4. DO NOT BEND THE FIBER ENDS (IN THE ORANGE FURCATION TUBES) TIGHTER THAN 3/4" (19MM) BEND RADIUS, ELSE THERE IS A RISK OF BREAKING THE GLASS FIBERS.
5. BE SURE THAT THE LACE UP ENDS AND FIBER CONNECTORS ARE NOT DAMAGED BY ATTACHMENT OF A HOISTING GRIP OR DURING THE HOISTING PROCESS. ATTACH A HOISTING GRIP ON THE JACKETED CABLE NO LESS THAN 6 INCHES BELOW THE FIBER BREAKOUT POINT. IF A HOISTING GRIP IS NOT EASILY ATTACHED, USE A SIMPLE LINE ATTACHED BELOW THE FIBER BREAK-OUT POINT (I.E. AT THE CABLE OUTER JACKET). PREVENT THE FIBER TAILS (IN PROTECTIVE TUBE) AT THE CABLE END FROM UNDUE MOVEMENT DURING HOISTING BY SECURING THE PROTECTIVE TUBE (WITH OUTER SOCK) TO THE HOISTING LINE.
6. DURING HOISTING ENSURE THAT THERE IS A FREE PATH AND THAT THE CABLE, AND ESPECIALLY THE FIBER ENDS, WILL NOT BE SNAGGED ON TOWER MEMBERS OR OTHER OBSTACLES.
7. INSTALLATION TEMPERATURE RANGE IS -22F TO 158F (-30C TO +70C).
8. MINIMUM CABLE BEND RADII ARE 22.2" (565MM) LOADED (WITH TENSION ON THE CABLE) AND 11.1" (280MM) UNLOADED.
9. MAXIMUM CABLE TENSILE LOAD IS 3560 N (800 LB) SHORT TERM (DURING INSTALLATION) AND 1070 N (240 LB) LONG TERM.
10. COMMSCOPE NON LACE UP GRIP RECOMMENDED FOR MONOPOLE INSTALLATIONS.
11. MAXIMUM HANGER SPACING 3FT (0.9 M).

HYBRID FIBER/POWER JUMPER NOTES:

1. IN GENERAL THIS CABLE WILL HANDLE SIMILARLY TO A 3/8" COAXIAL CABLE.
2. THE TERMINATED FIBER ENDS HOWEVER ARE FRAGILE AND MUST BE PROTECTED DURING INSTALLATION. LEAVE THE PACKAGING AROUND THE FIBER ENDS IN PLACE UNTIL READY TO CONNECT THE JUMPER BETWEEN OVP AND RRU OR BBU.
3. DO NOT BEND THE FIBER BREAKOUT CABLE (BETWEEN THE MAIN CABLE AND THE FIBER CONNECTOR) TIGHTER THAN 3/4" (19MM) RADIUS, ELSE THERE IS A RISK OF BREAKING THE GLASS.
4. ATTACH THE MAIN CABLE SECURELY TO THE STRUCTURE OR EQUIPMENT USING HANGERS AND/OR CABLE TIES TO PREVENT STRAIN ON CONNECTIONS FROM MOVEMENT IN WIND OR SNOW/ICE CONDITIONS.
5. ENSURE THE LC FIBER CONNECTORS ARE SEATED FIRMLY IN PANEL IN OVP OR IN EQUIPMENT.
6. INSTALLATION TEMPERATURE RANGE IS -22F TO 158F (-30C TO 70C).
7. MINIMUM CABLE BEND RADII ARE 10.3 INCH (265MM) LOADED (WITH TENSION ON THE CABLE) AND 5.2 INCH (130MM) UNLOADED.
8. MAXIMUM CABLE TENSILE LOAD IS 350 LB (1560N) SHORT TERM (DURING INSTALLATION) AND 105 LB (470N) LONG TERM.
9. STANDARD LENGTHS AVAILABLE ARE 6 FEET, 15 FEET AND 20 FEET

793D CONFIGURATION
COAX/FIBER PLUMBING DIAGRAM

SCALE: N.T.S

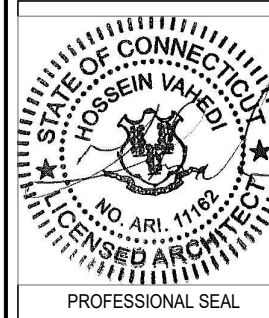
2
E-1

SUBMITTALS

DATE	DESCRIPTION	REVISION
09/13/16	ISSUED FOR REVIEW	A
09/23/16	FINAL CD	0

DEPT.	DATE	APP'D	REVISIONS
RFE			
RF MAN.			
ZONING			
OPS			
CONSTR.			
SITE AC.			

PROJECT NO: CT11333D
DRAWN BY: FG
CHECKED BY: KM

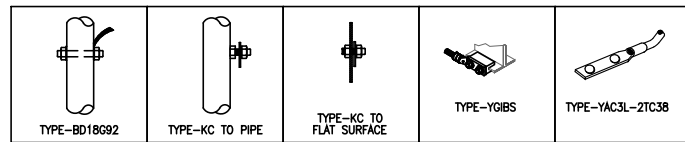


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CT11333D
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NEW HAVEN/RT10/RT24
SITE ADDRESS:
274 DERBY AVENUE
NEW HAVEN, CT 06520

SHEET TITLE
COAX/FIBER PLUMBING DIAGRAM

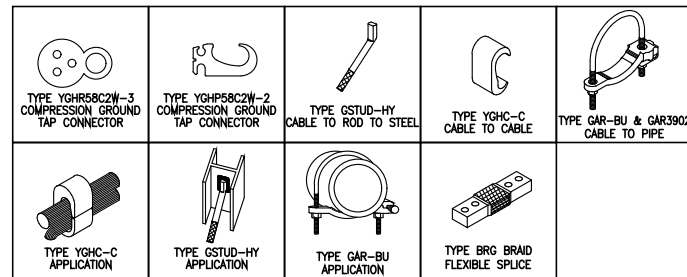
SHEET NUMBER
E-1



BURNDY GROUNDING DETAILS

SCALE: N.T.S

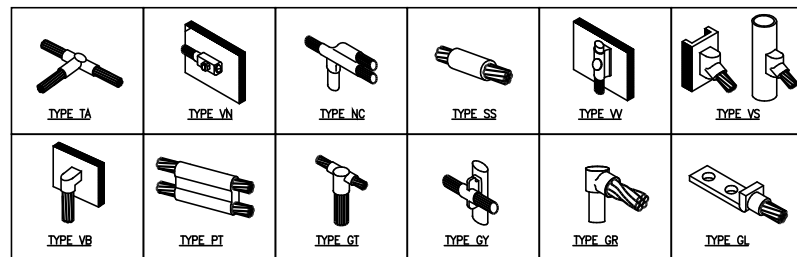
1
E-2



BURNDY GROUNDING PRODUCTS

SCALE: N.T.S

2
E-2



CADWELD GROUNDING CONNECTION PRODUCTS

SCALE: N.T.S

3
E-2

TERMINATION TYPES:

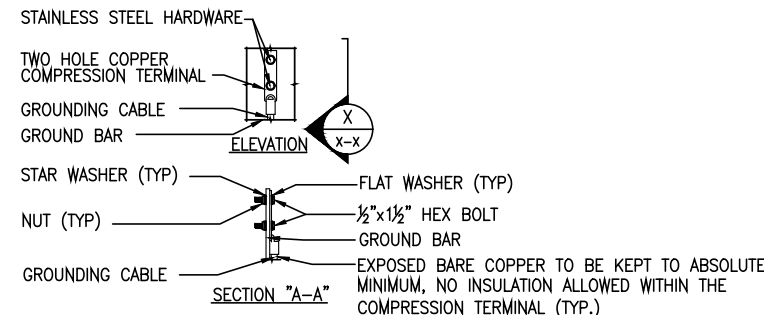
- A. MECHANICAL COMPRESSION LUG
- B. DOUBLE BARRELL COMPRESSION CONNECTOR
- C. EXOTHERMIC TERMINATION
- D. BEAM CLAMP

	SOLID #2 TINNED COPPER	#6 GROUND LEAD	#2/O STRANDED MAIN DOWN CONDUCTOR	MASTER GRND BAR	STRUCTURAL OR TOWER STEEL	BLDG SERVICE ENTR OR GRND RING	GROUND ROD
SOLID #2 TINNED COPPER	B OR C	B OR C		C	A, C, OR D		C
#6 GROUND LEAD	B OR C			A	A, C, OR D		
#2/O STRANDED GRNDG ELECTRODE CONDUCTOR				A	A, C, OR D	A	
MASTER GROUND BAR	C	A	A				
STRUCTURAL OR TOWER STEEL	A, C, OR D	A, C, OR D	A, C, OR D				
GROUND RING	C		C				C

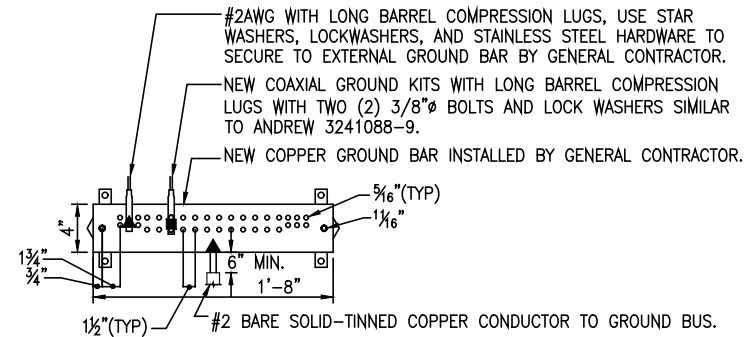
GROUNDING TERMINATION MATRIX

SCALE: N.T.S

7
E-2



- NOTES:
- OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.

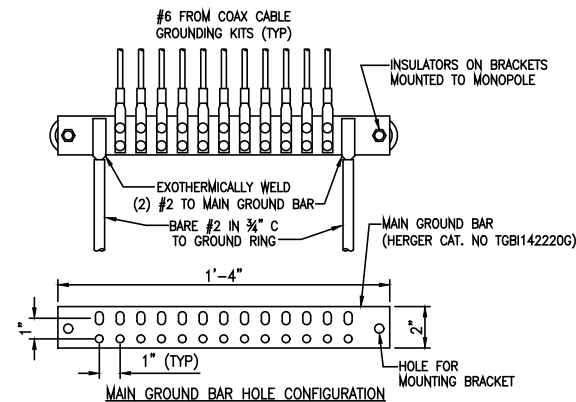


- NOTES:
- ALL HARDWARE STAINLESS STEEL COAT ALL SURFACES WITH KOPR-SHIELD BEFORE MATING.
 - FOR GROUND BOND TO STEEL ONLY: INSERT A TOOTH WASHER BETWEEN LUG AND STEEL, COAT ALL SURFACES WITH KOPR-SHIELD.
 - ALL HOLES ARE COUNTERSUNK 1/16 INCH.

TYPICAL GROUND BAR CONNECTIONS DETAIL

SCALE: N.T.S

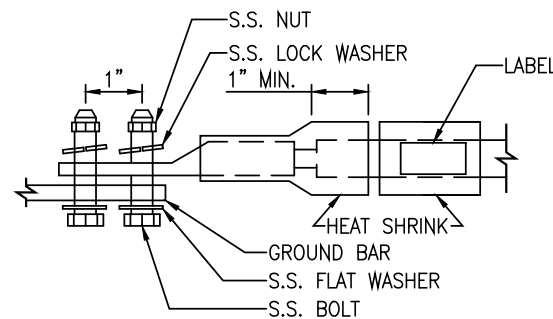
4
E-2



GROUND BAR DETAIL

SCALE: N.T.S

5
E-2



- LUG NOTES:
- ALL HARDWARE IS 18-8 STAINLESS STEEL, INCLUDING LOCK WASHERS.
 - ALL HARDWARE SHALL BE S.S. 3/8 INCH OR LARGER.
 - FOR GROUND BOND TO STEEL ONLY: INSERT A DRAGON TOOTH WASHER BETWEEN LUG AND STEEL. COAT ALL SURFACES WITH ANTI-OXIDIZATION COMPOUND PRIOR TO MATING.

GROUND BAR DETAIL

SCALE: N.T.S

6
E-2



T-MOBILE NORTHEAST, LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
OFFICE: (860) 692-7100
FAX: (860) 692-7159

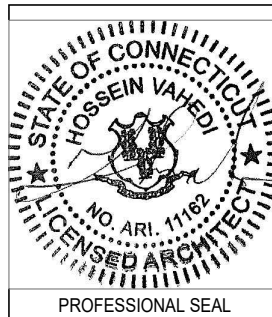


3210 MAIN CAMPUS DRIVE
LEXINGTON, MA 02421
Phone number: 617-852-3611
Fax Number: 781-742-2247

DATE	DESCRIPTION	REVISION
09/13/16	ISSUED FOR REVIEW	A
09/23/16	FINAL CD	0

DEPT.	DATE	APP'D	REVISIONS
RFE			
RF MAN.			
ZONING			
OPS			
CONSTR.			
SITE AC.			

PROJECT NO: CT11333D
DRAWN BY: FG
CHECKED BY: KM

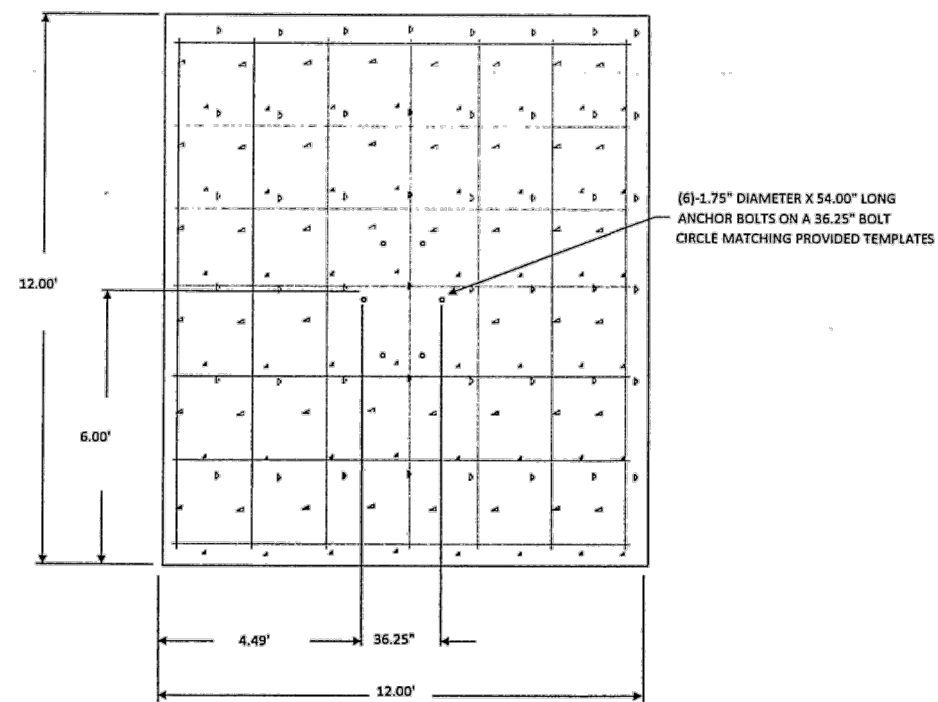


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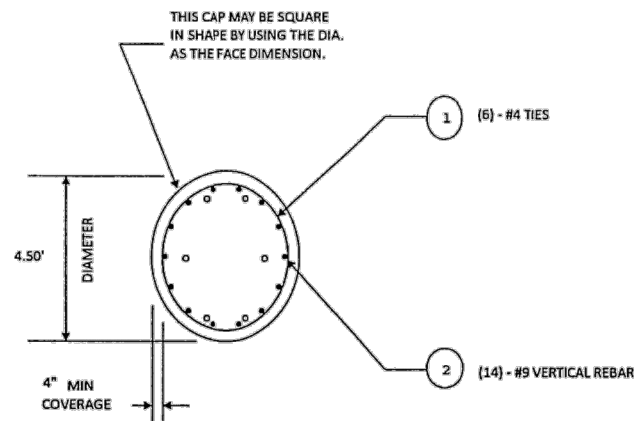
SITE NUMBER:
CT11333D
SITE NAME:
NEW HAVEN/RT10/RT24
SITE ADDRESS:
274 DERBY AVENUE
NEW HAVEN, CT 06520

SHEET TITLE
GROUNDING DETAILS

SHEET NUMBER
E-2



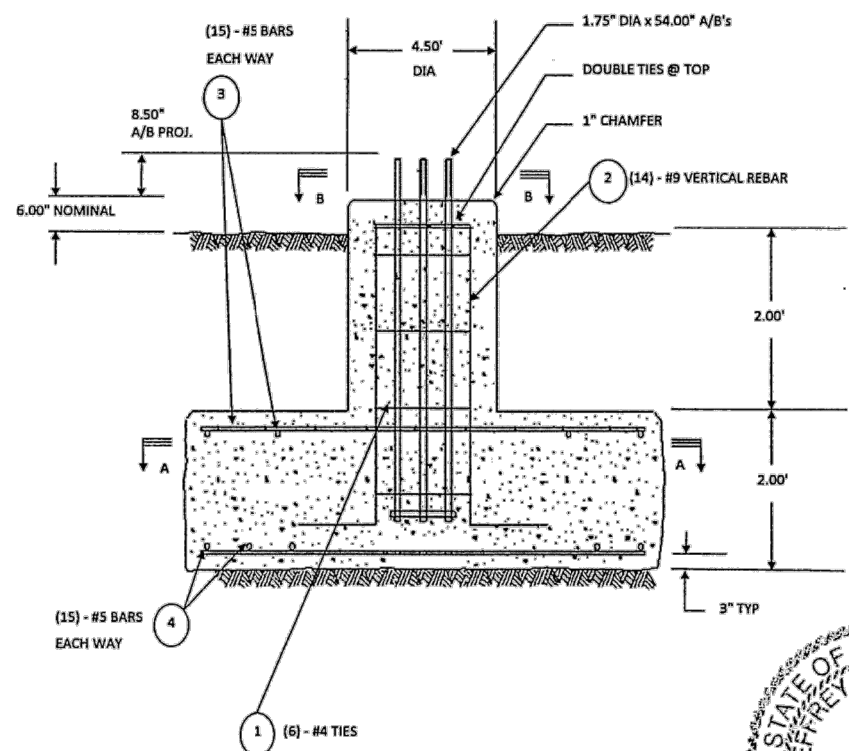
SECTION A-A
No Scale



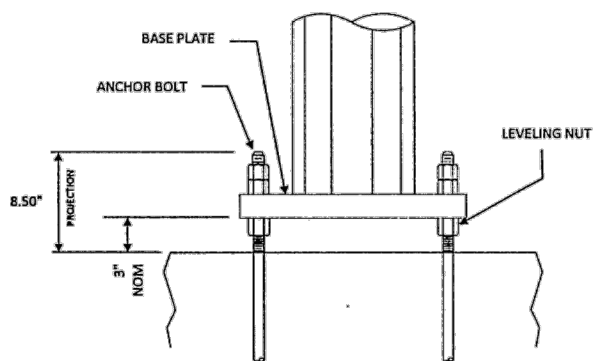
SECTION B-B
No Scale

GENERAL NOTES: SLAB FOUNDATION

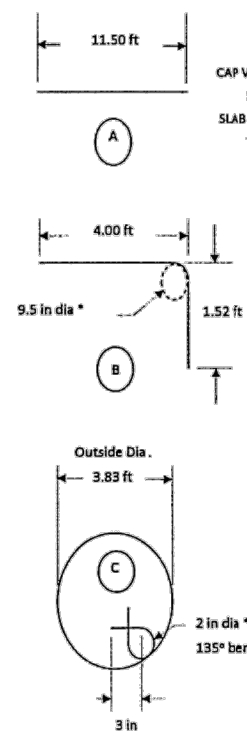
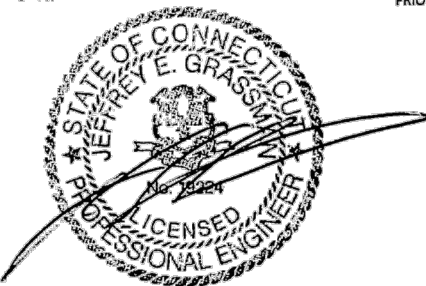
- Prior to excavation, check the area for underground facilities.
 - All reinforcing shall be deformed bars conforming to ASTM A615 Grade 60 (60,000 psi min. yield) and shall be provided by the foundation contractor.
 - All concrete shall have a minimum compressive strength of 4000 psi @ 28 days. The requirement for the concrete shall be as given in the ACI "Building Code Requirements for Reinforced Concrete", ACI 318, the latest edition.
 - Trowel top of foundation smooth.
 - Concrete shall be placed against undisturbed soil to the depth indicated on the foundation drawing. The portion above grade shall be formed. If an area is excavated beyond the limits shown, this volume shall be filled with concrete or formed. After the forms are removed, the excess excavation shall be replaced and compacted.
 - Ground water was not encountered below grade during boring.
 - Foundation design based on vert. bearing pressure of 3000 psf.
 - Concrete is assumed to weigh 150 pcf.
 - Estimated concrete volume = 12.54 cubic yards total.
 - Design Based on the following loads from installation drawing for order No: 329278.
- Factored Moment = 198 FT-KIPS Overturning Safety Factor = 1.92
 Factored Download = 6.0 KIPS Max. Toe Bearing Pressure = 1.14 ksf
 Factored Shear = 7.3 KIPS
- Backfill should be compacted to a density of 100 pct.
 - Anchor bolts to be ASTM A615, Gr. 75 ksi.
 - Reference: DR WELTI REPORT AT YALE BOWL DATED 10/09/2000



ELEVATION
No Scale



SEP 12 2016



REINFORCEMENT STEEL SCHEDULE						
Sym	Type	Rebar Size	Rebar Spacing	Weight (lbs)	Qty	
1	C	#4	EQUAL	48	6	
2	B	#9	---	263	14	
3	A	#5	9.86 in	360	30	
4	A	#5	9.86 in	360	30	
TOTAL STEEL WEIGHT FOR COMPLETE FOUNDATION INSTALLATION =				1031		

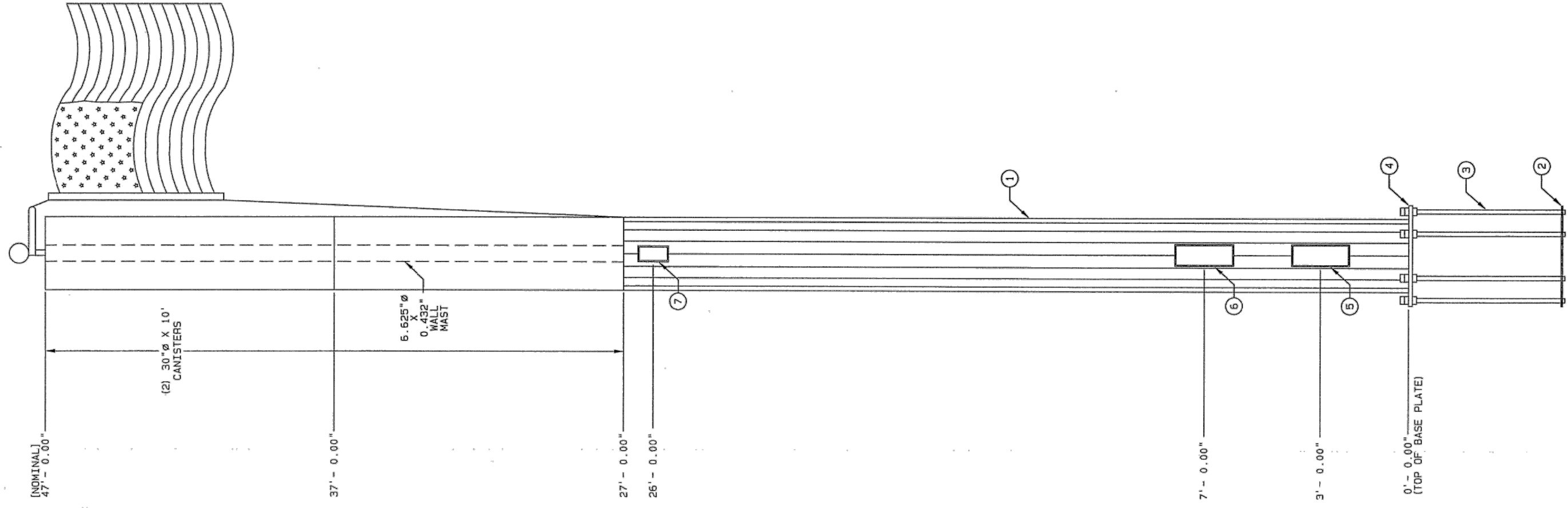
Grade 60 Rebar						
Size	Ask #	Wt/ft	6db (in)	d* (in)	d** (in)	
#3	11-97203	0.38	2.25	2.25	1.50	
#4	11-97204	0.67	3.00	3.00	2.00	
#5	11-97205	1.04	3.75	3.75	2.50	
#6	11-97200	1.50	4.50	4.50	4.50	
#7	11-97207	2.04	5.25	5.25	4.25	
#8	11-97208	2.67	6.00	6.00	6.00	
#9	11-97209	3.40	6.77	9.50	-	
#10	11-97210	4.30	7.62	10.75	-	
#11	11-97211	5.31	8.46	12.00	-	

* Refers to ACI standard hook detail chart
 ** Refers to ACI stirrup hook detail chart

Rebar Lap Splice						
Rebar Size	Rebar Grade	Specified Concrete Strength	Overlap (inches)			
			Vert & Ties	Bottom Horiz	Top Horiz	
#3	60	4000 psi	13	15	21	
#4	60	4000 psi	18	20	29	
#5	60	4000 psi	22	26	36	
#6	60	4000 psi	26	33	46	
#7	60	4000 psi	38	45	62	
#8	60	4000 psi	43	59	82	
#9	60	4000 psi	49	74	104	
#10	60	4000 psi	58	95	132	
#11	60	4000 psi	71	116	163	

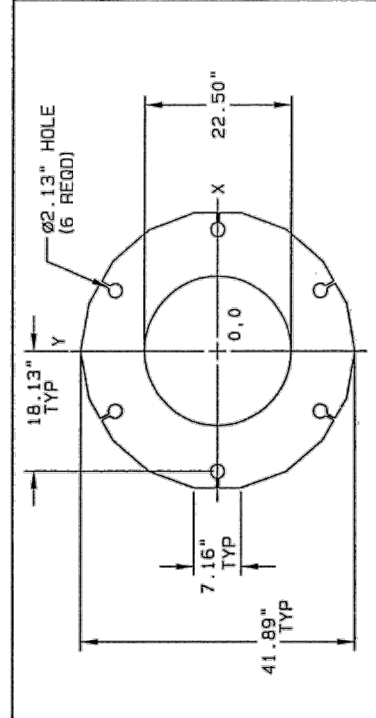
Splicing is an alternative to specified material listed in rebar schedule. Lap Splice may be used on ties when Seismic Hook not required.

Rev	Description	Date	By/Ck	UNLESS OTHERWISE NOTED DIMENSIONS ARE IN INCHES TOLERANCES ARE:	valmont MICROFLECT
				2" - 1/8" = 1/8" 1/8" - 1/16" = 1/16" 1/16" - 1/32" = 1/32" 1/32" - 1/64" = 1/64"	3575 25TH STREET SE SALEM, OR 97302 MAIN (503) 363-9267 FAX (503) 316-2040
					By: NAR Check: NAR Date: 09/08/16
					SLAB FOUNDATION LAYOUT Customer NW SITE SOLUTIONS Site NEW HAVEN
				S.O. 329278	SIZE - B Dwg No. B-144561 Sheet 1 of 1



ITEM NO. / ID	REQD.	FEATURES	UNIT WEIGHT (LBS)	WEIGHT (LBS)
1		SECTION A VALMONT S-22 0.250" THK (A572 GR65)	2.169	2,169
2		BOTTOM CAGE PLATE	75	75
3		1.75" ANCHOR BOLT LENGTH=4.50' A615 GR75	64	381
4		BASE PLATE VALMONT S-56 1.500" THK (A572 GR50)	348	348
		1 TOP CAGE PLATE (REMOVE BEFORE SETTING POLE)	98	98
		3 GROUNDING LUG	2	6
		GALVANIZING	63	63
5		1 HAND HOLE STD (9" x 24")	48	48
6		2 HAND HOLE STD (9" x 24")	48	96
7		3 HAND HOLE STD (6" x 12")	22	66
		1 POLE CAP	44	44

HOLE COORDS (INCHES)	
X-COORD	Y-COORD
18.13	0.00
9.06	15.70



- NOTES:
- BASE PLATE THICKNESS = 1.500"
 - BASE PLATE ALLOWABLE STRESS (KSI) = 50
 - ANGLES ARE MEASURED CLOCKWISE FROM 0 DEGREES
 - MAXIMUM BOLT CIRCLE DIAMETER = 36.25"
 - MAXIMUM CAGE TEMPLATE DIAMETER = 42.25"

BASE PLATE / ANCHORAGE CHARACTERISTICS

NOTES:

- FACTORED REACTIONS FOR FOUNDATION DESIGN.
 MOMENT = 2,380 IN-KIPS
 SHEAR = 7,257 #
 VERTICAL = 7,955 #
 GALVANIZED PER ASTM A-123.
- DESIGN CRITERIA: ANSII/TIA 222-G APPENDUM 2
- THIS STRUCTURE HAS BEEN DESIGNED FOR THE FOLLOWING LOADING:
 EXPOSURE CATEGORY = C
 STRUCTURE CLASSIFICATION = 2
 TOPOGRAPHY CATEGORY = 1
 WIND LOAD CASES ARE BASED ON 3 SECOND GUST AND 50 YEAR WIND RETURN PERIOD
 A. CASE 1: WIND = 115 MPH WIND SPEED
 B. CASE 2: WIND = 50 MPH ICE AND WIND SPEED
 DESIGN ICE THICKNESS = 0.75 INCH
 C. CASE 3: WIND = 60 MPH WIND SPEED
 D. EQUIPMENT
- FEEDLINES ARE PLACED INTERIOR TO POLE SHAFT (UNLESS NOTED OTHERWISE).
 6. TOTAL POLE HEIGHT IS 28 FT
 7. (2) 10 FT CANISTERS TO 48 FT
 8. BASE OF POLE AT 43 FT AGL
 9. ELEVATIONS ARE MEASURED FROM TOP OF BASE PLATE (APPROX 1 FT)
 10. POLE TO BE PAINTED FLAGPOLE WHITE

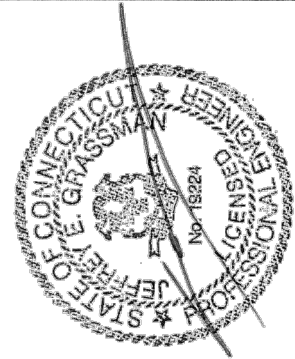
DESCRIPTION	MTG HT. (FT)	CENTROID HT. (FT)	WITHOUT ICE EPA WT (FT**2) (LBS)	WITH ICE EPA WT (FT**2) (LBS)
1-60LB BALL	27.00	49.00	5.00	50
1-30" OD X 20' CELL SILO	27.00	37.00	30.00	4000
1-4FT LIGHTNING ROD	27.00	49.00	0.25	10
1-15' X 25' FLAG (UP TO 100')	27.00	39.50	10.70	100

SECTION INFORMATION			
ITEM ID	LENGTH	BASE OD	TOP OD
1	27' - 0.00"	30.00"	30.00"
		THK	MATL
		0.250"	A572 65 KSI

ORDER 329278 PROJECT 329278

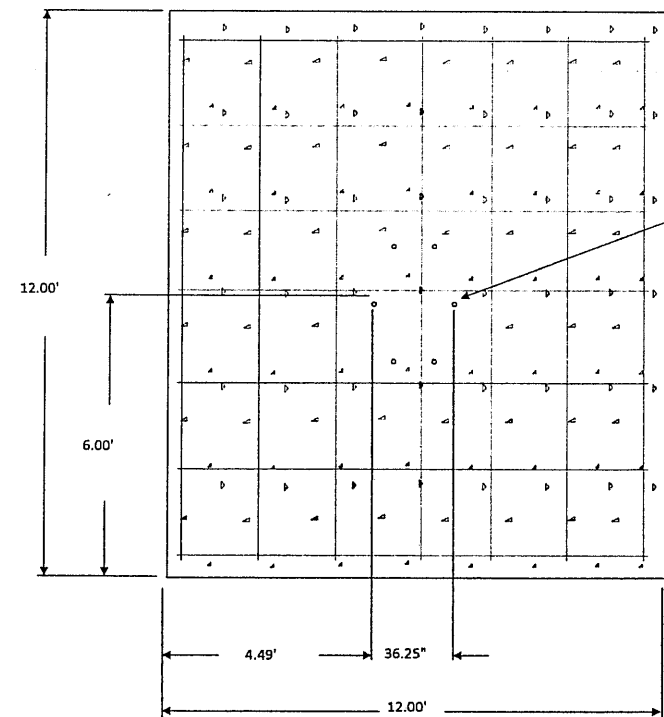
FILE ID 329278 DESCRIPTION NE SITE SOLUTIONS 48' POLE, SITE: NEW HAVEN, CT 329278

SCALE NONE DATE 09/08/16 ENGR NARI



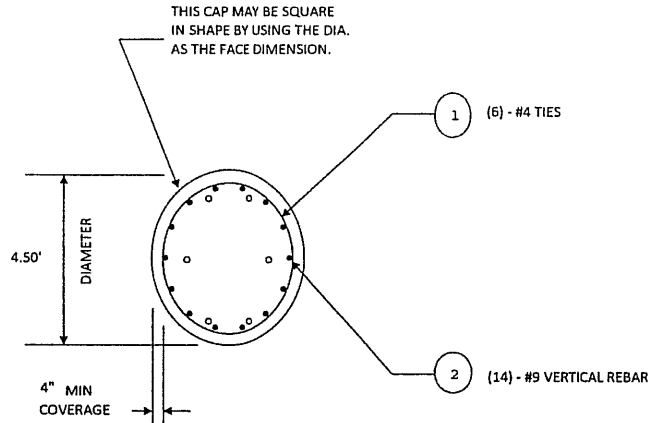
SEP 12 2016

Exhibit D



SECTION A-A
No Scale

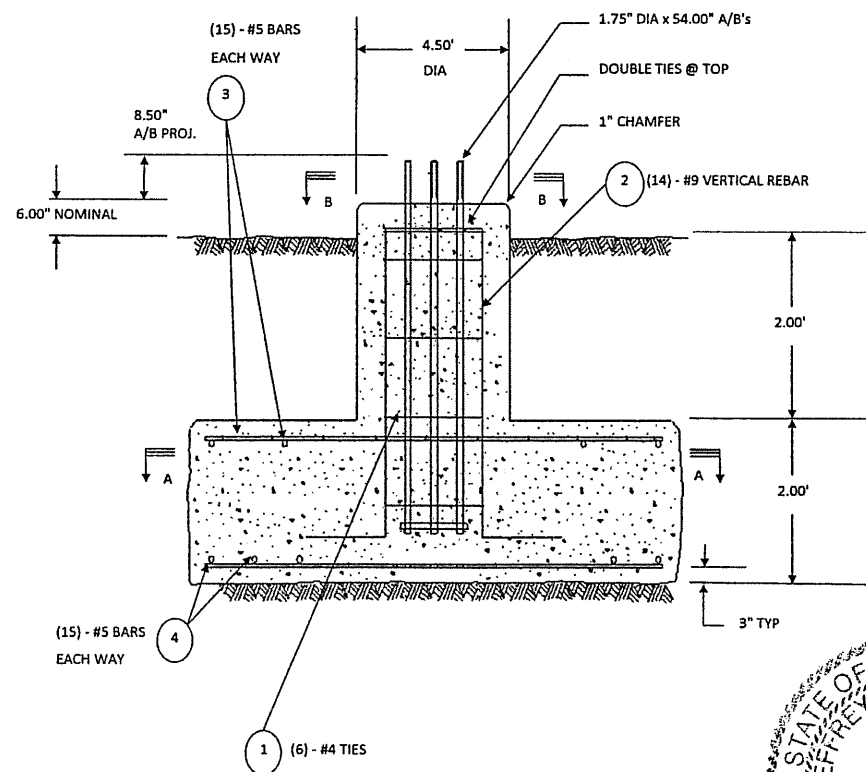
(6)-1.75" DIAMETER X 54.00" LONG ANCHOR BOLTS ON A 36.25" BOLT CIRCLE MATCHING PROVIDED TEMPLATES



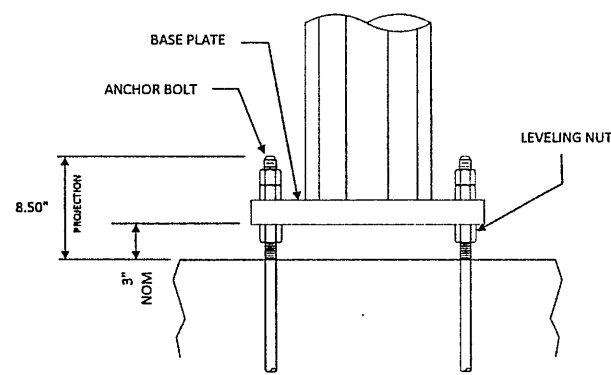
SECTION B-B
No Scale

GENERAL NOTES: SLAB FOUNDATION

- Prior to excavation, check the area for underground facilities.
 - All reinforcing shall be deformed bars conforming to ASTM A615 Grade 60 (60,000 psi min. yield) and shall be provided by the foundation contractor.
 - All concrete shall have a minimum compressive strength of 4000 psi @ 28 days. The requirement for the concrete shall be as given in the ACI "Building Code Requirements for Reinforced Concrete", ACI 318, the latest edition.
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 - Anchor bolts to be ASTM A615, Gr. 75 ksi.
 - Reference: DR WELTI REPORT AT YALE BOWL DATED 10/09/2000

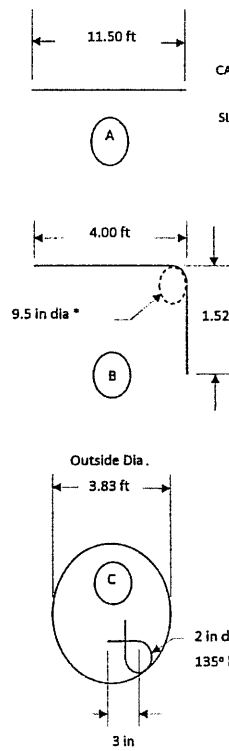
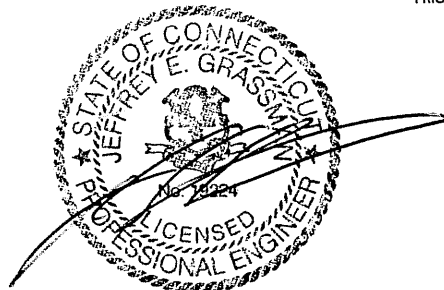


ELEVATION
No Scale



ANCHOR BOLT INSTALLATION
N.T.S.
EXTREME CARE SHOULD BE TAKEN TO ASSURE THAT ALL LEVELING NUTS ARE LEVEL WITH RESPECT TO EACH OTHER PRIOR TO ERECTION OF THE STRUCTURE

SEP 1 2 2016



REINFORCEMENT STEEL SCHEDULE					
Sym	Type	Rebar Size	Rebar Spacing	Weight (lbs)	Qty
1	C	#4	EQUAL	48	6
2	B	#9	---	263	14
3	A	#5	9.86 in	360	30
4	A	#5	9.86 in	360	30
TOTAL STEEL WEIGHT FOR COMPLETE FOUNDATION INSTALLATION =				1031	

Grade 60 Rebar						
Size	Ask #	Wt/ft	Edb (in)	d* (in)	d** (in)	
#3	11-97203	0.38	2.25	2.25	1.50	
#4	11-97204	0.67	3.00	3.00	2.00	
#5	11-97205	1.04	3.75	3.75	2.50	
#6	11-97200	1.50	4.50	4.50	4.50	
#7	11-97207	2.04	5.25	5.25	4.25	
#8	11-97208	2.67	6.00	6.00	6.00	
#9	11-97209	3.40	6.77	9.50	-	
#10	11-97210	4.30	7.62	10.75	-	
#11	11-97211	5.31	8.46	12.00	-	

* Refers to ACI standard hook detail chart
 ** Refers to ACI stirrup hook detail chart


Rebar Lap Splice						
Rebar Size	Rebar Grade	Specified Concrete Strength	Vert & Ties	Overlap (inches)		
				Bottom Horiz	Top Horiz	
#3	60	4000 psi	13	15	21	
#4	60	4000 psi	18	20	29	
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#6	60	4000 psi	26	33	46	
#7	60	4000 psi	38	45	62	
#8	60	4000 psi	43	59	82	
#9	60	4000 psi	49	74	104	
#10	60	4000 psi	58	95	132	
#11	60	4000 psi	71	116	163	

Splicing is an alternative to specified material listed in rebar schedule. Lap Splice may be used on ties when Seismic Hook not required.

Rev	Description	Date	By/Ck	UNLESS OTHERWISE NOTED DIMENSIONS ARE IN INCHES TOLERANCES ARE:	valmont MICROFLECT		
				$\pm 1/8"$ $\pm 1/16"$ $\pm 1/8"$ $\pm 1/16"$	3575 25TH STREET SE SALEM, OR 97302 MAIN (503) 963-9267 FAX (503) 316-2040	By: NAR Check: NAR Date: 09/08/16 SLAB FOUNDATION LAYOUT Customer NW SITE SOLUTIONS Site NEW HAVEN	
S.O. 329278					SIZE - B	Dwg No. B-144561	Sheet 1 of 1

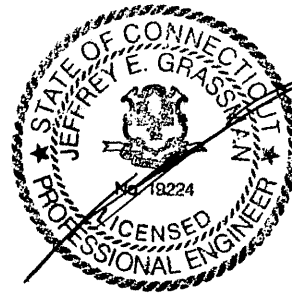
valmont

MICROFLECT

VALMONT/MICROFLECT
3575 25TH ST. SE – P.O. BOX 12985
SALEM, OR 97302-1190
PHONE: 1-800-547-2151
ENGINEER: NAR 
Reviewed by: NAR

SLAB FOUNDATION DESIGN CALCULATIONS

SEP 12 2016



Valmont Order No.: 329278
Customer: NW SITE SOLUTIONS
Site: NEW HAVEN
Pole Ht: 27 FT (48 FT AGL)

valmont  Pole Foundation Mat Design
MICROFLECT

SLAB DESIGN	Date:	09/08/16	Time:	18:06
Project: 329278	Run by:	NAR		
Input (Blue):	Checked by:	NAR		
legs 1		1 = Pole \ 3 or 4 = Tower		
otm_t 198 k-ft		total pole overturning moment		
sh_t 7.26 k		total pole shear		
sh_l 7.26 k				
wt 5.97 k		total pole weight * 0.9		
f_w 3.02 ft		anchor bolt circle dia		
b 12.00 ft		slab width (rigid square slab only)		
t 24.00 in		slab thickness		
net_p_a 3.00 ksf		ultimate soil bearing pressure		
s_f 1.00		allowable stress increase factor (rebar)		
c_h 30.00 in		cap height above slab		
c_s 54.00 in		cap dia		
d_f 4.00 ft.		depth from final grade to bottom of footing		
d_fl 24.00 in		depth of fill over slab		
dens_c 0.150 kcf		density of concrete		
dens_s 0.100 kcf		density of soil		
dens_fl 0.100 kcf		density of fill over slab		
f_c 4,000 psi		concrete compres. strength		
c_type		concrete type		
f_y 60,000 psi		rebar yield strength		
u 1.00		soil factor of safety: qult/qall		
Output Summary (see complete calculations below):				
s_r 1.92		OK (overturning F.S. OK)		
net_p 1.14 ksf		OK (net soil bearing pressure is OK)		
vol_c 12.54 cu.yd.		Total volume of concrete.		
slab two-way shear:		(punching shear ok)		
slab beam shear:		(beam shear ok)		

Slab Reinforcement (ASTM A615 Gr.60):

		Size	Quan. (E/W)	Len. (ft)	Spc. (in)	Total (lbs)	
	Top Bar	#4	14	11.50	10.62	215	<---OK
Y	Options	#5	15	11.50	9.86	360	<---OK
		#6	7	11.50	23.00	242	
	As>=2.79	#7	5	11.50	34.50	235	
		#8	4	11.50	46.00	246	
		#9	3	11.50	69.00	235	
	Bot.Bar	#4	18	11.50	8.12	277	<---OK
y	Options	#5	15	11.50	9.86	360	<---OK
		#6	8	11.50	19.71	276	
	As>=3.43	#7	6	11.50	27.60	282	
		#8	5	11.50	34.50	307	
		#9	4	11.50	46.00	313	

(special design req'd for cap shear reinforcement)

(special design req'd for cap flexural/tensile reinforcement.)

Pole Foundation Mat Design Special Cap Reinforcement

Project: 329278
Date: 09/09/16

Special Cap Reinforcement:

Vertical Reinforcement Size = # **9**
Quantity of vertical rebar = **14**
Total area of vert. rebar = **14.00 in²** >= 0.005*Acap = 11.45in², OK
vertical rebar horiz. Spacing = **8.72 in** >= 1.5db and >= 1.5in, OK (ACI)

Factored max moment in cap = M + (V*hap) = **218.3 ft-k** (conservatively neglect passive pressure of soil)
Section Modulus of rebar = **164.4 in³**
fb = M/S = **15.9 ksi** <= 54ksi, OK

Req'd vert. bar dev. length = $(3d_b/40) * (f_y/f_c^{0.5}) * (1/2.5)$ = **32.02 in**
concrete cover = **4.00 in**
length of vert rebar = **4.00 ft**
a = **48.00 in**
d* = **9.50 in**
b = **1.52 ft**
total wt of vert rebar = **263 lbs**
radius of vert rebar = **21.94 in**
> 33 in of vert. rebar dev. length OK

Shear tie rebar size = # **4**
vertical spacing = **12.00 in**

Factored max shear in cap = **7.3 k**
Concrete shear capacity = $0.85 * 2 * \sqrt{f'_c} * b * w * d$ = **290.3 k**, OK

Anchor Bolt Embedment Check
Bolt length > Bolt Required Length
54 in > 50.6 in ==> OK

tie diameter (a) = **3.83 ft**
circumference = **12.04 ft**
of ties = **6.00**
total wt of ties = **48 lbs**
d** = **2.00 in**
6db = **5.00 in**

Anchor Bolt Diameter = **1.75 in**
Length Of Anchor Bolts = **54.00 in**
Anchor Bolt Projection = **8.50 in**
Depth of Pocket to Accomodate Anchor Bolts = **-5.50 in**
Total Depth from Final Grade = **4.00 ft**
Pocket Vol = **0.00 ft³**

REINFORCEMENT STEEL SCHEDULE

Sym	Type	Rebar Size	Rebar Spacing	Dimensions				Weight (lbs)	Qty	
				a	b	c	d			(6db)
CAP TIES	C	#4	EQUAL	3.83 ft			2 in	3 in	48	6
CAP VERTICAL REBAR	B	#9	-----	4.00 ft	1.52 ft		9.5 in		263	14
SLAB TOP STEEL	A	#5	9.86 in	11.50 ft					360	30
SLAB BOTTOM STEEL	A	#4	8.12 in	11.50 ft					277	36
TOTAL STEEL WEIGHT FOR COMPLETE FOUNDATION INSTALLATION =									948	

[NOMINAL]
47' - 0.00"

(2) 30"Ø X 10'
CANISTERS

37' - 0.00"

6.625"Ø
X
0.432"
WALL
MAST

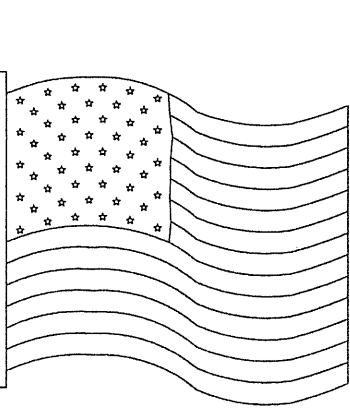
27' - 0.00"

26' - 0.00"

7' - 0.00"

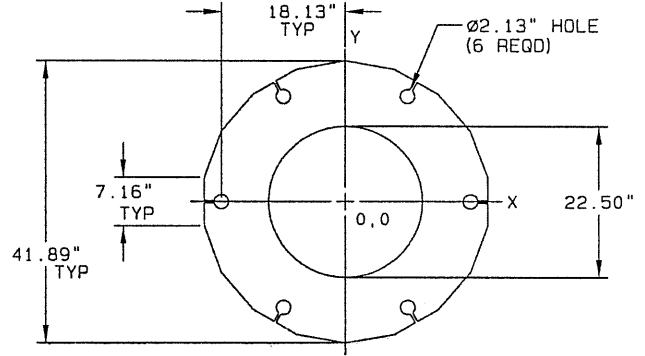
3' - 0.00"

0' - 0.00"
(TOP OF BASE PLATE)



ITEM ID	NO. REQD	FEATURES	UNIT WEIGHT (LBS)	WEIGHT (LBS)
1	1	SECTION A VALMONT S-22 0.250" THK (A572 GR65)	2.169	2.169
2	1	BOTTOM CAGE PLATE	75	75
3	6	1.75" ANCHOR BOLT, LENGTH=4.50' A615 GR75	64	381
4	1	BASE PLATE VALMONT S-56 1.500" THK (A572 GR50)	348	348
	1	TOP CAGE PLATE (REMOVE BEFORE SETTING POLE)	98	98
	3	GROUNDING LUG	2	6
		GALVANIZING	63	63
5	1	HAND HOLE STD (9" x 24")	48	48
6	2	HAND HOLE STD (9" x 24")	48	96
7	3	HAND HOLE STD (6" x 12")	22	66
	1	POLE CAP	44	44

HOLE COORDS (INCHES)	
X-COORD	Y-COORD
18.13	0.00
9.06	15.70



NOTES:

1. BASE PLATE THICKNESS = 1.500"
2. BASE PLATE ALLOWABLE STRESS (KSI) = 50
3. ANGLES ARE MEASURED CLOCKWISE FROM 0 DEGREES
4. MAXIMUM BOLT CIRCLE DIAMETER = 36.25"
5. MAXIMUM CAGE TEMPLATE DIAMETER = 42.25"

BASE PLATE / ANCHORAGE CHARACTERISTICS

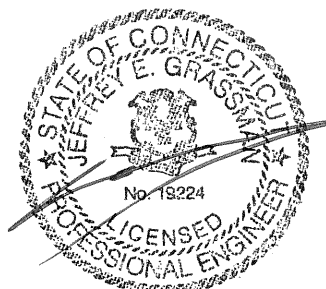
NOTES:

1. FACTORED REACTIONS FOR FOUNDATION DESIGN.
MOMENT = 2.380 IN-KIPS
SHEAR = 7.257 #
VERTICAL = 7.955 #
2. GALVANIZED PER ASTM A-123.
3. DESIGN CRITERIA: ANSI/TIA 222-G ADDENDUM 2
4. THIS STRUCTURE HAS BEEN DESIGNED FOR THE FOLLOWING LOADING:
EXPOSURE CATEGORY = C
STRUCTURE CLASSIFICATION = 2
TOPOGRAPHY CATEGORY = 1
WIND LOAD CASES ARE BASED ON 3 SECOND GUST AND 50 YEAR WIND RETURN PERIOD
A. CASE 1: WIND = 115 MPH WIND SPEED
B. CASE 2: WIND = 50 MPH ICE AND WIND SPEED
DESIGN ICE THICKNESS = 0.75 INCH
C. CASE 3: WIND = 60 MPH WIND SPEED
D. EQUIPMENT

DESCRIPTION	MTG HT (FT)	CENTROID HT (FT)	WITHOUT ICE EPA WT (FT**2) (LBS)	WITH ICE EPA WT (FT**2) (LBS)
1-GOLD BALL	27.00	49.00	5.00	50
1-30" OD X 20' CELL SILO	27.00	37.00	30.00	4000
1-4FT LIGHTNING ROD	27.00	49.00	0.25	10
1-15' X 25' FLAG (UP TO 100')	27.00	39.50	10.70	100

5. FEEDLINES ARE PLACED INTERIOR TO POLE SHAFT (UNLESS NOTED OTHERWISE).
6. TOTAL POLE HEIGHT IS 28 FT
7. (2) 10 FT CANISTERS TO 48 FT
8. BASE OF POLE AT 43 FT AGL
9. ELEVATIONS ARE MEASURED FROM TOP OF BASE PLATE (APPROX 1 FT)
10. POLE TO BE PAINTED FLAGPOLE WHITE

SEP 12 2016




SECTION INFORMATION						ORDER	PROJECT	FILE ID	SCALE	DATE	ENGR
ITEM ID	LENGTH	BASE OD	TOP OD	THK	MATL	329278	329278	329278	NONE	09/08/16	NAR1
1	27' - 0.00"	30.00"	30.00"	0.250"	A572 65 KSI	DESCRIPTION NE SITE SOLUTIONS 48' POLE, SITE: NEW HAVEN, CT 329278					





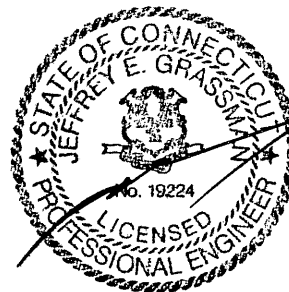
STRUCTURES

VALMONT MICROFLECT
3575 25th St. SE
Salem, OR 97302
PHONE: 1-800-547-2151
ENGINEER: Nathan Ross
Reviewed by: 

COMMUNICATION POLE DESIGN CALCULATIONS

SEP 12 2016

NE SITE SOLUTIONS
VALMONT ORDER# 329278
SITE NAME: NEW HAVEN, CT
POLE HEIGHT: 27FT (48 FT)





STRUCTURES

9/8/16

ENGINEERING DATA

for

NE SITE SOLUTIONS

NEW HAVEN, CT

VALMONT QUOTATION 329278

- 1) STRUCTURE DESIGN CONFORMS TO EIA/TIA-222-G INCLUDING:
 115.0 MPH WIND (3 SECOND GUST, 50 YR. RETURN PERIOD)
 50.0 MPH ICE WIND (50 YR. RETURN PERIOD)
 DESIGN ICE THICKNESS = 0.75 INCHES
 EXPOSURE CATEGORY C
 STRUCTURE CLASSIFICATION II
 TOPOGRAPHIC CATEGORY 1
 60.0 MPH BASIC WIND SPEED WITH NO ICE FOR TWIST AND SWAY
- 2) FEEDLINES ARE ASSUMED TO BE PLACED INTERIOR TO THE POLE.
- 3) ALL MICROWAVE ASSUMED TO BE 6 GHz UNLESS OTHERWISE NOTED.
- 4) TOTAL POLE HEIGHT IS 28 FT
- 5) (2) 10 FT CANISTERS TO 48 FT
- 6) BASE OF POLE AT 43 FT AGL
- 7) ELEVATIONS ARE MEASURED FROM TOP OF BASE PLATE (APPROX 1 FT)
- 8) POLE TO BE PAINTED FLAGPOLE WHITE
- 9) LOADING AS FOLLOWS:
 27.0' POLE
 1 - GOLD BALL @ 27.0
 1 - 30" OD X 20' CELL SILO @ 27.0
 1 - 4ft lightning rod @ 27.0
 1 - 15'x25' flag (up to 100') @ 27.0

STRUCTURE ANCHORAGE INFORMATION

POLE HEIGHT(FT):	27	NUMBER OF A.B.'s:	6
BOLT CIRCLE(IN):	36.25	DIA. OF A.B.'s(IN):	1.75
BASE VERTICAL(K):	7.95	LENGTH OF A.B.'s(IN):	54.00
BASE SHEAR(K):	7.26	PROJECTION LENGTH(IN):	8.50
BASE MOMENT(FT-K):	198	TEMPLATE OD(IN):	39.75

STRUCTURES

BY _____ DATE _____
 CHKD. BY _____ DATE _____

SHEET NO. _____

9/8/16

ENGINEERING DATA

for

**NE SITE SOLUTIONS
 NEW HAVEN, CT
 VALMONT QUOTATION 329278
 EIA/TIA-222-G**

BASIC WIND: 115.0 MPH
 WIND & ICE: 50.0 MPH
 TWIST & SWAY: 60.0 MPH
 S_s: N/A
 S₁: N/A

DESIGN ICE THICKNESS: 0.75 IN.
 EXPOSURE CATEGORY: C
 STRUCTURE CLASS.: II
 TOPOGRAPHIC CATEGORY: 1

QTY DESCRIPTION	HEIGHT	DATA W.O. ICE		DATA W/ ICE	
		EPA	WT	EPA	WT
1 GOLD BALL	@ 27.0'	5.00	50	10.00	100
1 30" OD X 20' CELL SILO	@ 27.0'	30.00	4000	40.00	8000
1 4ft lightning rod	@ 27.0'	0.25	10	1.58	43
1 15'x25' flag (up to 100')	@ 27.0'	10.70	100	10.70	100



BY VALMONT INDUSTRIES FOR: NE SITE SOLUTIONS 48' POLE, SITE: NEW HAVEN, CT 329278

DATE 09/08/2016
Fuse 1.13.0.0

Design Code: TIA-222-G Addendum 2

*** SUMMARY ***

----- DESIGN SUMMARY -----

Height Above Base Plate (ft) 27.00 Ground Line Diameter (in) 30.000 Pole Shaft Weight (lbs) 2169
 Top Diameter (in) 30.000
 Pole Taper (in/ft) 0.00000 Shape: 18 Sides

Section Characteristics /First/

Base Diameter (in) 30.000
 Top Diameter (in) 30.000
 Thickness (in) 0.25000
 Length (ft) 27.000
 Weight (lbs) 2169
 Yield Strength (ksi) 65.00

----- ANALYSIS SUMMARY -----

	Pt. of Fixity	Governing Level Sec.1	Pole Top
Governing Load Case	WIND	WIND	WIND
Height (ft)	0.00	0.00	27.00
Resultant Moment (in-kips)	2380	2380	561
Shear Force (lbs)	7259	7259	3902
Axial Force (lbs)	7604	7604	4970
Effective Yield Strength (ksi)	78.59	78.59	78.59
Combined Interaction Value	0.20	0.20	0.05
Total Deflection (in)	0.00	0.00	1.15

Note: Diameters are outside, measured across the flats
 Forces and moments are reported in the local element coordinate system

*** POLE SHAFT POINT OF FIXITY REACTIONS ***

Loading Case Identifier	Moments About X-Axis (in-kips)		Moments About Y-Axis (in-kips)		Moments Resultant (X & Y) (in-kips)		Vertical Force (lbs)	Shear In X-Direction (lbs)		Shear In Y-Direction (lbs)		Notes
	X-Axis (in-kips)	Y-Axis (in-kips)	X-Axis (in-kips)	Y-Axis (in-kips)	X-Direction (lbs)	Y-Direction (lbs)		X-Direction (lbs)	Y-Direction (lbs)	Resultant (X & Y) (lbs)		
WIND	1823	-1530	2380	0	7607	4665	5559	7257				
ICE + WIND	332	-279	434	0	13822	921	1098	1433				
T+S	277	-233	362	0	6329	710	846	1105				

Note: Positive vertical force is downward.
Reactions are considered in the global coordinate system.

BY VALMONT INDUSTRIES FOR: NE SITE SOLUTIONS 48' POLE, SITE: NEW HAVEN, CT 329278

DATE 09/08/2016
Fuse 1.13.0.0

*** INPUT LOADS ***

Design Code TIA-222-G Addendum 2
Loading Case WIND

Basic Wind Velocity is 115.00 mph Ice Thickness 0.00
Wind Orientation is 50.0 Degrees Clockwise From +X Axis
Structure Weight Overload Factor is 1.200
Exposure C, Gust Factor 1.35
Structure Category 2, Topographic Category 1, Crest Height 0.00 ft
Orientations are Measured Clockwise From +X Axis
Positive Y Axis is 90 Degrees Clockwise From +X Axis
Foundation Rotation of 0.00 Degrees
Elevation of structure base above surrounding terrain = 43.00 ft

Orientation of System
+***** +X-Axis
* * * * *
(Transverse)
* * * * *
* * * * *
(Longitudinal) * * * (Vertical)
+Y-Axis * * * +Z-Axis

Load Number	Mounting Height (ft)	Load Height (ft)	Load Eccentricity (ft)	Load Orientation in XY Plane (Degrees)	Force-X (lbs)	Force-Y (lbs)	Force-Z (lbs)	EPA (ft^2)
1	27.00	49.00	0.00	50.00	278	331	60	5.00
2	27.00	37.00	0.00	50.00	1618	1928	4800	30.00
3	27.00	49.00	0.00	50.00	14	17	12	0.25
4	27.00	39.50	0.00	50.00	581	692	120	10.70

1-GOLD BALL
1-30" OD X 20
1-4ft lightni
1-15'x25' fla

Design Code TIA-222-G Addendum 2
 Loading Case ICE + WIND

Basic Wind Velocity is 50.00 mph Ice Thickness 0.75
 Wind Orientation is 50.0 Degrees Clockwise From +X Axis
 Structure Weight Overload Factor is 1.200
 Exposure C, Gust Factor 1.35

Orientation of System
 +***** +X-Axis
 * * * * *
 * * * * * (Transverse)
 * * * * *

Structure Category 1, Topographic Category 1, Crest Height 0.00 ft
 Orientations are Measured Clockwise From +X Axis
 Positive Y Axis is 90 Degrees Clockwise From +X Axis
 Foundation Rotation of 0.00 Degrees
 Elevation of structure base above surrounding terrain = 43.00 ft

Load Number	Mounting Height (ft)	Load Height (ft)	Load Eccentricity (ft)	Load Orientation in XY Plane (Degrees)	Force-X (lbs)	Force-Y (lbs)	Force-Z (lbs)	EPA (ft^2)	Notes
1	27.00	49.00	0.00	50.00	66	78	120	10.00	1-GOLD BALL
2	27.00	37.00	0.00	50.00	255	304	9600	40.00	1-30" OD X 20
3	27.00	49.00	0.00	50.00	10	12	52	1.58	1-4ft lightni
4	27.00	39.50	0.00	50.00	69	82	120	10.70	1-15'x25' fla

*** INPUT LOADS ***

Design Code TIA-222-G Addendum 2
 Loading Case T+S

Basic Wind Velocity is 60.00 mph Ice Thickness 0.00
 Wind Orientation is 50.0 Degrees Clockwise From +X Axis
 Structure Weight Overload Factor is 1.000
 Exposure C, Gust Factor 1.35
 Structure Category 2, Topographic Category 1, Crest Height 0.00 ft
 Orientations are Measured Clockwise From +X Axis
 Positive Y Axis is 90 Degrees Clockwise From +X Axis
 Foundation Rotation of 0.00 Degrees
 Elevation of structure base above surrounding terrain = 43.00 ft

*** INPUT LOADS ***

Orientation of System
 +***** +X-Axis
 * * (Transverse)
 * *
 * *
 * *
 * *
 * * (Vertical)
 +Y-Axis * * +Z-Axis

Load Number	Mounting Height (ft)	Load Height (ft)	Load Eccentricity (ft)	Orientation in XY Plane (Degrees)	Force-X (lbs)	Force-Y (lbs)	Force-Z (lbs)	EPA (ft ²)
1	27.00	49.00	0.00	50.00	42	50	50	5.00
2	27.00	37.00	0.00	50.00	246	293	4000	30.00
3	27.00	49.00	0.00	50.00	2	3	10	0.25
4	27.00	39.50	0.00	50.00	88	105	100	10.70

1-GOLD BALL
 1-30" OD X 20
 1-4ft lightni
 1-15'x25' fla

*** Properties ***

Connection Locations	Distance From Base (ft)	Diameter Across Flats (in)	Wall Thickness (in)	D/t Across Flats	w/t Across Flats	Moments of Inertia (in ⁴)	Area (in ²)
Top of Sect 1	27.00	30.000	0.2500	120.00	19.40	2639	23.61
	24.50	30.000	0.2500	120.00	19.40	2639	23.61
	22.00	30.000	0.2500	120.00	19.40	2639	23.61
	19.50	30.000	0.2500	120.00	19.40	2639	23.61
	17.00	30.000	0.2500	120.00	19.40	2639	23.61
	14.50	30.000	0.2500	120.00	19.40	2639	23.61
	12.00	30.000	0.2500	120.00	19.40	2639	23.61
	9.50	30.000	0.2500	120.00	19.40	2639	23.61
	7.00	30.000	0.2500	120.00	19.40	2639	23.61
	4.50	30.000	0.2500	120.00	19.40	2639	23.61
	2.00	30.000	0.2500	120.00	19.40	2639	23.61
Pt of Fixity	0.00	30.000	0.2500	120.00	19.40	2639	23.61

Forces and Moments for Pole in the Local Element Coordinate System

Loading Case WIND									
Dist. From Base (ft)	Mx (in-kips)	MV (in-kips)	Resultant Mx & My (in-kips)	Torsion (in-kips)	Shear X-Dir. (lbs)	Shear Y-Dir. (lbs)	Resultant Shear (lbs)	Axial (lbs)	
27.00	430	-361	561	0	2508	2989	3902	4970	
24.50	523	-439	683	0	2718	3240	4229	5212	
22.00	624	-524	815	0	2927	3488	4553	5454	
19.50	732	-615	956	0	3133	3734	4874	5697	
17.00	848	-712	1107	0	3337	3977	5192	5940	
14.50	971	-815	1268	0	3539	4218	5506	6184	
12.00	1101	-924	1437	0	3739	4456	5817	6428	
9.50	1238	-1039	1617	0	3936	4691	6124	6673	
7.00	1383	-1160	1805	0	4131	4923	6427	6919	
4.50	1534	-1287	2002	0	4323	5152	6726	7165	
2.00	1692	-1420	2209	0	4513	5379	7021	7411	
0.00	1823	-1530	2380	0	4666	5561	7259	7604	

Loading Case WIND

*** Deflections and Stresses ***

Distance From Base (ft)	Defl. X-Dir (in)	Defl. Y-Dir (in)	Defl. Resultant X & Y (in)	Defl. Z-Dir (in)	Rotation (deg.)	Axial Interaction Term	Flexural Interaction Term	Shear Interaction Term	Torsion Interaction Term	Combined Stress Interaction	Effective Yield Strength (ksi)
27.00	0.7	0.9	1.2	0.0	0.33	0.00	0.05	0.01	0.00	0.05	78.59
24.50	0.6	0.8	1.0	0.0	0.32	0.00	0.06	0.01	0.00	0.06	78.59
22.00	0.5	0.6	0.8	0.0	0.30	0.00	0.07	0.01	0.00	0.07	78.59
19.50	0.4	0.5	0.7	0.0	0.28	0.00	0.08	0.01	0.00	0.08	78.59
17.00	0.3	0.4	0.5	0.0	0.26	0.00	0.09	0.02	0.00	0.09	78.59
14.50	0.3	0.3	0.4	0.0	0.23	0.00	0.10	0.02	0.00	0.11	78.59
12.00	0.2	0.2	0.3	0.0	0.20	0.00	0.12	0.02	0.00	0.12	78.59
9.50	0.1	0.1	0.2	0.0	0.17	0.00	0.13	0.02	0.00	0.14	78.59
7.00	0.1	0.1	0.1	0.0	0.13	0.00	0.15	0.02	0.00	0.15	78.59
4.50	0.0	0.0	0.0	0.0	0.09	0.00	0.16	0.02	0.00	0.17	78.59
2.00	0.0	0.0	0.0	0.0	0.04	0.00	0.18	0.02	0.00	0.19	78.59
0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.19	0.02	0.00	0.20	78.59

DATE 09/08/2016
Fuse 1.13.0.0

BY VALMONT INDUSTRIES FOR: NE SITE SOLUTIONS 48' POLE, SITE: NEW HAVEN, CT 329278

Forces and Moments for Pole in the Local Element Coordinate System

Loading Case ICE + WIND

Dist. From Base (ft)	Mx (in-kips)	My (in-kips)	Resultant Mx & My (in-kips)	Torsion (in-kips)	Shear X-Dir. (lbs)	Shear Y-Dir. (lbs)	Resultant Shear (lbs)	Axial (lbs)
27.00	74	-62	96	0	406	484	631	9891
24.50	89	-75	116	0	457	544	710	10266
22.00	106	-89	139	0	507	604	788	10640
19.50	125	-105	163	0	556	663	866	11013
17.00	146	-123	191	0	606	722	942	11384
14.50	169	-141	220	0	654	779	1017	11753
12.00	193	-162	252	0	702	836	1092	12119
9.50	219	-184	286	0	749	893	1165	12484
7.00	246	-207	322	0	795	948	1237	12845
4.50	276	-231	360	0	841	1002	1308	13201
2.00	307	-257	400	0	886	1055	1378	13552
0.00	332	-279	434	0	922	1098	1434	13822

*** Deflections and Stresses ***

Loading Case ICE + WIND

Distance From Base (ft)	Defl. X-Dir (in)	Defl. Y-Dir (in)	Defl. Resultant X & Y (in)	Defl. Z-Dir (in)	Rotation (deg.)	Axial Interaction Term	Flexural Interaction Term	Shear Interaction Term	Torsion Interaction Term	Combined Stress Interaction	Effective Yield Strength (ksi)
27.00	0.1	0.2	0.2	0.0	0.06	0.01	0.01	0.00	0.00	0.01	78.59
24.50	0.1	0.1	0.2	0.0	0.06	0.01	0.01	0.00	0.00	0.02	78.59
22.00	0.1	0.1	0.1	0.0	0.05	0.01	0.01	0.00	0.00	0.02	78.59
19.50	0.1	0.1	0.1	0.0	0.05	0.01	0.01	0.00	0.00	0.02	78.59
17.00	0.1	0.1	0.1	0.0	0.05	0.01	0.02	0.00	0.00	0.02	78.59
14.50	0.0	0.1	0.1	0.0	0.04	0.01	0.02	0.00	0.00	0.03	78.59
12.00	0.0	0.0	0.1	0.0	0.04	0.01	0.02	0.00	0.00	0.03	78.59
9.50	0.0	0.0	0.0	0.0	0.03	0.01	0.02	0.00	0.00	0.03	78.59
7.00	0.0	0.0	0.0	0.0	0.02	0.01	0.03	0.00	0.00	0.03	78.59
4.50	0.0	0.0	0.0	0.0	0.02	0.01	0.03	0.00	0.00	0.04	78.59
2.00	0.0	0.0	0.0	0.0	0.01	0.01	0.03	0.00	0.00	0.04	78.59
0.00	0.0	0.0	0.0	0.0	0.00	0.01	0.04	0.00	0.00	0.04	78.59

Forces and Moments for Pole in the Local Element Coordinate System

Dist. From Base (ft)	Mx (in-kips)	My (in-kips)	Resultant Mx & My (in-kips)	Torsion (in-kips)	Shear X-Dir. (lbs)	Shear Y-Dir. (lbs)	Resultant Shear (lbs)	Axial (lbs)
27.00	65	-55	85	0	381	454	593	4159
24.50	80	-67	104	0	413	493	643	4360
22.00	95	-80	124	0	445	530	692	4561
19.50	111	-93	145	0	476	568	741	4762
17.00	129	-108	168	0	508	605	790	4963
14.50	148	-124	193	0	538	642	838	5164
12.00	167	-141	219	0	569	678	885	5365
9.50	188	-158	246	0	599	714	932	5566
7.00	210	-176	275	0	629	749	978	5766
4.50	233	-196	305	0	658	784	1024	5967
2.00	257	-216	336	0	687	819	1069	6168
0.00	277	-233	362	0	710	846	1105	6329

Deflections and Stresses for Pole

Loading Case T+S

*** Deflections and Stresses ***

Distance From Base (ft)	Defl. X-Dir (in)	Defl. Y-Dir (in)	Defl. Resultant X & Y (in)	Defl. Z-Dir (in)	Rotation (deg.)	Axial Interaction Term	Flexural Interaction Term	Shear Interaction Term	Torsion Interaction Term	Combined Stress Interaction	Effective Yield Strength (ksi)
27.00	0.1	0.1	0.2	0.0	0.05	0.00	0.01	0.00	0.00	0.01	78.59
24.50	0.1	0.1	0.1	0.0	0.05	0.00	0.01	0.00	0.00	0.01	78.59
22.00	0.1	0.1	0.1	0.0	0.05	0.00	0.01	0.00	0.00	0.01	78.59
19.50	0.1	0.1	0.1	0.0	0.04	0.00	0.01	0.00	0.00	0.01	78.59
17.00	0.1	0.1	0.1	0.0	0.04	0.00	0.01	0.00	0.00	0.02	78.59
14.50	0.0	0.0	0.1	0.0	0.04	0.00	0.02	0.00	0.00	0.02	78.59
12.00	0.0	0.0	0.0	0.0	0.03	0.00	0.02	0.00	0.00	0.02	78.59
9.50	0.0	0.0	0.0	0.0	0.03	0.00	0.02	0.00	0.00	0.02	78.59
7.00	0.0	0.0	0.0	0.0	0.02	0.00	0.02	0.00	0.00	0.03	78.59
4.50	0.0	0.0	0.0	0.0	0.01	0.00	0.02	0.00	0.00	0.03	78.59
2.00	0.0	0.0	0.0	0.0	0.01	0.00	0.03	0.00	0.00	0.03	78.59
0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.03	0.00	0.00	0.03	78.59

MINIMUM DEFLECTION RATIO // DEFLECTION LIMIT / DEFLECTION // IS

BY VALMONT INDUSTRIES FOR:

NE SITE SOLUTIONS 48' POLE, SITE: NEW HAVEN, CT 329278

DATE 09/08/2016
Fuse 1.13.0.0

NUMBER OF BOLTS	DIAMETER (IN.)	LENGTH (IN.)	WEIGHT (KIPS)	SHIPPED AS	PROJECTION LENGTH (IN.)	GALVANIZED LENGTH (IN.)	THREAD SIZE
6	1.750	54.00	0.25	BOLTS, TEMPLATES	8.50	54.00	5-UNC-2A
STEEL SPEC. VALMONT		MAXIMUM BOLT FORCE (KIPS)	MAXIMUM BOLT SHEAR FORCE (KIPS)	FACTORED NOMINAL TENS. STRENGTH (KIPS)	STRESS AREA (SQ. IN.)	INTERACTION VALUE	CONFIGURATION OF BOTTOM END
S23	A615	39.14	1.21	152.00	1.90	0.27	THREADED WITH HEAVY HEX HEAD NUT

NOTE: BOLT INTERACTION VALUE WAS CALCULATED BY DIVIDING SHEAR FORCE BY FACTOR RELATED TO DETAIL TYPE d] IN EIA-G SPECS.

*** BOLT COORDINATES (IN.) ***

BOLT NO.	X-COORD	Y-COORD	* BOLT NO.	X-COORD	Y-COORD
1	18.125	0.000	2	9.063	15.697

MAX. BOLT CIRCLE = 36.25 IN.

TEMPLATE DIAMETER = 39.75 IN.

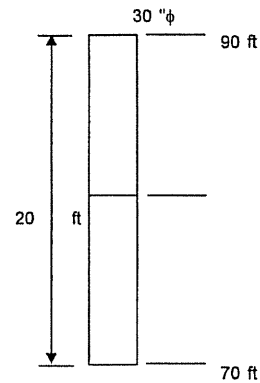
*** BASE PLATE CHARACTERISTICS GOVERNED BY LOADING CASE WIND ***

BASE PLATE DIAMETER (IN.)	BASE PLATE THICKNESS (IN.)	ACTUAL WEIGHT (KIPS)	RAW MATERIAL WEIGHT (KIPS)	POLE DIAM. (IN.)
41.25	1.50	0.35	0.71	30.00
EFFECTIVE PLATE WIDTH (IN.)	PLASTIC SECTION MOD. (CU. IN.)	MOMENT IN BASE PLATE (IN. -K)	PLASTIC MOMENT (IN. -K)	FACTORED RESISTING MOM. (IN. -K)
15.71	8.84	122.31	441.79	397.61
STEEL SPECIF. VALMONT	STEEL SPECIF. OTHER	EFFECTIVE YIELD STRESS (KSI)	STRESS RATIO	
S56	A572	50	0.31	

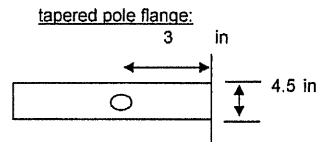
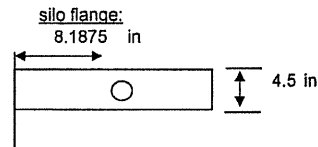
** LOADS AT POLE BASE IN THE GLOBAL COORDINATE SYSTEM ***** LOADING CASES *****

LOADING CASE IDENTIFICATION	WIND ICE + WIND	T+S	MAX CRITERION- LOAD CASE
MOMENT ABT. X-AXIS (IN-KIP)	1823	277	MOMENT ABT. X WIND
MOMENT ABT. Y-AXIS (IN-KIP)	-1529	-232	MOMENT ABT. Y WIND
SHEAR FORCE (LB.)	7256	1104	RES. MOMENT WIND
VERTICAL FORCE (LB.)	7606	6329	SHEAR FORCE WIND
			BOLT FORCE WIND
			BOLT TENSION WIND

Quote/Order No.:	329278	ENGR NAR	
Total flagpole height =	90 ft	Date:	9/8/2016
Height of pole =	70 ft		
Silo pipe change height =	90 ft		
Diameter of cellsilo =	30 in		
Height of cellsilo =	20 ft		
Flag dimensions =	15 ft x 25 ft		
3-sec gust windspeed= V=	115 mph		
# of Top Whip Antennas	0	default 0	
# of Antennas =	6	default # of Carriers*3	
# of Carriers =	2		
Paint Type	White	default Gray	
Weight =	4.00 k		
Topo =	1	default 1	
Topo H =	0		
Exposure =	C OK	default c	
Structure Class =	2 OK	default 2	
Windarea of silo = C _A A _A =	30.0 ft ²		
Windarea of flag = C _A A _A =	10.7 ft ²		
Windpressure per EIA-G=	43.8 psf		
Force from top part of silo =	0.00 k		
Force from entire silo =	2.10 k		
Force from flag =	0.75 k		
Δ _{silo} = PL ³ /3EI =	8.2 in		
Moment at pipe change =	32.9 in-k	= 2.7 ft-k	
Moment at base of silo =	561.0 in-k	= 46.8 ft-k	



Bolts for base flange:			
bolt diameter =	0.75 in		
area of bolt =	0.331 in ²		
number of bolts =	6		
Flange bolt circle =	24 in		
Max bolt force =	15.6 k		
Max bolt stress =	47.0 ksi	<= 90ksi = 0.75*120ksi, OK	
Silo base flange:			
Moment in silo flange =	127.5885417 in-k		
F _b =	50 ksi		
t _{required} =	1.59 in		
t =	2 in	>= 1.59 in req'd, OK	
Silo lower support pipe:			
Pipe Size	6.0" x 0.432"		
Silo support pipe =	6.625 "OD x 0.432 "Wall Thickness		
Support pipe weight per foot =	28.6 lbs/ft		
Z =	16.60 in ³		
I =	54.97 in ⁴		
f _b = M/Z =	34	<= 45Ksi=0.9*50ksi, OK	
Pipe to flange weld size =	0.75 in		
Z _{weld} =	27.20 in		
Weld stress =	20.6	<= 31.5ksi=0.75*0.6*70ksi, OK	



Tapered pole flange:			
Moment in pole flange =	46.75 in-k		
F _b =	50 ksi		
t _{required} =	0.96 in		
t =	1.50 in	>= 0.96 in req'd, OK	
Flange to pole weld size =	0.1875 in		
Total weld =	69 in		
Z _{weld} =	88.12 in ³		
Weld stress =	6.4	<= 31.5ksi=0.75*0.6*70ksi, OK	

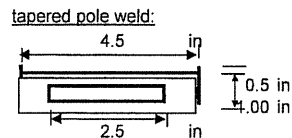


Exhibit E

RADIO FREQUENCY EMISSIONS ANALYSIS REPORT
EVALUATION OF HUMAN EXPOSURE POTENTIAL
TO NON-IONIZING EMISSIONS

T-Mobile Existing Facility

Site ID: CT11333D

New Haven/Rt10/Rt24
274 Derby Avenue
New Haven, CT 06520

September 19, 2016

EBI Project Number: 6216004154

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	8.17 %

September 19, 2016

T-Mobile USA
Attn: Jason Overbey, RF Manager
35 Griffin Road South
Bloomfield, CT 06002

Emissions Analysis for Site: **CT11333D – New Haven/Rt10/Rt24**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **274 Derby Avenue, New Haven, CT**, for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01 and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter ($\mu\text{W}/\text{cm}^2$). The number of $\mu\text{W}/\text{cm}^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

All results were compared to the FCC (Federal Communications Commission) radio frequency exposure rules, 47 CFR 1.1307(b)(1) – (b)(3), to determine compliance with the Maximum Permissible Exposure (MPE) limits for General Population/Uncontrolled environments as defined below.

General population/uncontrolled exposure limits apply to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general public would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu\text{W}/\text{cm}^2$). The general population exposure limit for the 700 MHz Band is approximately 467 $\mu\text{W}/\text{cm}^2$, and the general population exposure limit for the 1900 MHz (PCS) and 2100 MHz (AWS) bands is 1000 $\mu\text{W}/\text{cm}^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

Occupational/controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure and can exercise control over their exposure. Occupational/controlled exposure limits also apply where exposure is of a transient nature as a result of incidental passage through a location where exposure levels may be above general population/uncontrolled limits (see below), as long as the exposed person has been made fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed T-Mobile Wireless antenna facility located at **274 Derby Avenue, New Haven, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

For all calculations, all equipment was calculated using the following assumptions:

- 1) 2 GSM channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
- 2) 2 UMTS channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
- 3) 2 UMTS channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
- 4) 2 LTE channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.
- 5) 2 LTE channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.
- 6) 1 LTE channel (700 MHz Band) was considered for each sector of the proposed installation. This channel has a transmit power of 30 Watts.

- 7) Since all radios are ground mounted there are additional cabling losses accounted for. For each ground mounted RF path the following losses were calculated. 1.14 dB of additional cable loss for all ground mounted 700 MHz Channels, 2.02 dB of additional cable loss for all ground mounted 1900 MHz channels and 2.08 dB of additional cable loss for all ground mounted 2100 MHz channels. This is based on manufacturers Specifications for 120 feet of 7/8" coax cable on each path.
- 8) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.
- 9) For the following calculations the sample point was the top of a 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications minus 10 dB was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 10) The antennas used in this modeling are the **Commscope DBXNH-6565B-A2M & RFS APX16DWV-16DWVS-E-A20** for 700 MHz, 1900 MHz (PCS) and 2100 MHz (AWS) channels. This is based on feedback from the carrier with regards to anticipated antenna selection. The **Commscope DBXNH-6565B-A2M** has a maximum gain of **17 dBd** at its main lobe at 1900 MHz and a maximum gain of **13.1 dBd** at its main lobe at 700 MHz. The **RFS APX16DWV-16DWVS-E-A20** has a maximum gain of **16.3 dBd** at its main lobe at 1900 MHz and 2100 MHz. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 11) The antenna mounting height centerlines of the proposed antennas are **75 feet & 85 feet** above ground level (AGL).
- 12) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.
- 13) All calculations were done with respect to uncontrolled / general public threshold limits.

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	Commscope DBXNH-6565B-A2M	Make / Model:	Commscope DBXNH-6565B-A2M	Make / Model:	Commscope DBXNH-6565B-A2M
Gain:	17 dBd / 13.1 dBd	Gain:	17 dBd / 13.1 dBd	Gain:	17 dBd / 13.1 dBd
Height (AGL):	75	Height (AGL):	75	Height (AGL):	75
Frequency Bands	1900 MHz (PCS) / 700 MHz	Frequency Bands	1900 MHz (PCS) / 700 MHz	Frequency Bands	1900 MHz (PCS) / 700 MHz
Channel Count	3	Channel Count	3	Channel Count	3
Total TX Power(W):	150	Total TX Power(W):	150	Total TX Power(W):	150
ERP (W):	4,196.58	ERP (W):	4,196.58	ERP (W):	4,196.58
Antenna A1 MPE%	3.57	Antenna B1 MPE%	3.57	Antenna C1 MPE%	3.57
Antenna #:	2	Antenna #:	2	Antenna #:	2
Make / Model:	RFS APX16DWV-16DWVS-E-A20	Make / Model:	RFS APX16DWV-16DWVS-E-A20	Make / Model:	RFS APX16DWV-16DWVS-E-A20
Gain:	16.3 dBd	Gain:	16.3 dBd	Gain:	16.3 dBd
Height (AGL):	85	Height (AGL):	85	Height (AGL):	85
Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)
Channel Count	6	Channel Count	6	Channel Count	6
Total TX Power(W):	180	Total TX Power(W):	180	Total TX Power(W):	180
ERP (W):	4,800.45	ERP (W):	4,800.45	ERP (W):	4,800.45
Antenna A2 MPE%	4.59	Antenna B2 MPE%	4.59	Antenna C2 MPE%	4.59

Site Composite MPE%	
Carrier	MPE%
T-Mobile (Per Sector Max)	8.17 %
No Additional Carriers on Site	NA
Site Total MPE %:	8.17 %

T-Mobile Sector A Total:	8.17 %
T-Mobile Sector B Total:	8.17 %
T-Mobile Sector C Total:	8.17 %
Site Total:	8.17 %

T-Mobile_per sector	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu\text{W}/\text{cm}^2$)	Frequency (MHz)	Allowable MPE ($\mu\text{W}/\text{cm}^2$)	Calculated % MPE
T-Mobile AWS - 2100 MHz LTE	2	1,862.74	75	28.13	AWS - 2100 MHz	1000	2.81%
T-Mobile 700 MHz LTE	1	471.11	75	3.56	700 MHz	1000	0.76%
T-Mobile AWS - 2100 MHz UMTS	2	792.72	85	9.13	AWS - 2100 MHz	1000	0.91%
T-Mobile PCS - 1950 MHz UMTS	2	803.75	85	9.26	PCS - 1950 MHz	1000	0.93%
T-Mobile PCS - 1950 MHz GSM	2	803.75	85	9.26	PCS - 1950 MHz	1000	0.93%
T-Mobile AWS - 2100 MHz LTE	2	1,585.45	85	18.27	AWS - 2100 MHz	467	1.83%
						Total:	8.17%

Summary

All calculations performed for this analysis yielded results that were **within** the allowable limits for general public exposure to RF Emissions.

The anticipated maximum composite contributions from the T-Mobile facility as well as the site composite emissions value with regards to compliance with FCC's allowable limits for general public exposure to RF Emissions are shown here:

T-Mobile Sector	Power Density Value (%)
Sector A:	8.17 %
Sector B:	8.17 %
Sector C:	8.17 %
T-Mobile Per Sector Maximum:	8.17 %
Site Total:	8.17 %
Site Compliance Status:	COMPLIANT

The anticipated composite MPE value for this site assuming all carriers present is **8.17%** of the allowable FCC established general public limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

FCC guidelines state that if a site is found to be out of compliance (over allowable thresholds), that carriers over a 5% contribution to the composite value will require measures to bring the site into compliance. For this facility, the composite values calculated were well within the allowable 100% threshold standard per the federal government.

Exhibit F