Robinson+Cole

KENNETH C. BALDWIN

280 Trumbull Street
Hartford, CT 06103-3597
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Also admitted in Massachusetts

October 31, 2019

Melanie A. Bachman, Esq.
Executive Director/Staff Attorney
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: **Docket No. 481 – Application of Cellco Partnership d/b/a Verizon Wireless for a Certificate of Environmental Compatibility and Public Need for the Construction, Maintenance and Operation of a Wireless Telecommunications Facility Located at 663R Main Street, Cromwell, Connecticut**

Development and Management Plan Submission

Dear Ms. Bachman:

Enclosed please find fifteen (15) copies of the following:

1. Final Development and Management ("D&M") Plans prepared by All-Points Technology Corporation for the approved telecommunications facility at 663R Main Street in Cromwell, Connecticut, incorporating the Council's conditions of approval. Also enclosed are three (3) full size (24" x 36") sets of D&M plans.

2. Tower and Foundation design drawings and calculations prepared by Valmont Structures dated October 23, 2019.

3. Geotechnical Engineering Report prepared by Down To Earth Consulting, LLC dated June 12, 2019.

Together, this information constitutes the final D&M Plan submission for the approved telecommunications facility at 663R Main Street in Cromwell, Connecticut.

We respectfully request that this information be reviewed and this matter be placed on the next available Siting Council agenda for approval. Please feel free to contact me if you have any questions or require additional information. Thank you.

Sincerely,

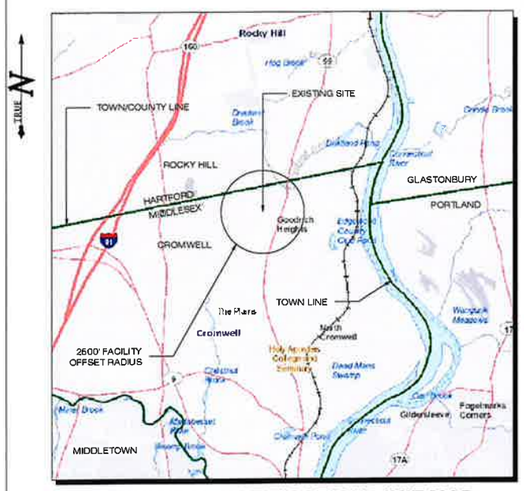
Kenneth C. Baldwin

KCB/kmd
Enclosures
Copy to:
Enzo Faienza, Mayor, Town of Cromwell
Andy Candiello
Anne Mcguinnes
Tim Burks

verizon

WIRELESS SERVICES FACILITY

CROMWELL NORTH 2 CT
667 MAIN STREET
CROMWELL, CT 06416



MUNICIPAL NOTIFICATION LIMIT MAP
SCALE : 1" = 4000'-0"

VICINITY MAP
SCALE : 1" = 1000'-0"

SITE INFORMATION

SITE TYPE:	NEW 120' AGL MONOPOLE
SCOPE OF WORK:	PROPOSED RF EQUIPMENT ON NEW 120'± AGL MONOPOLE W/ CORRESPONDING GROUND EQUIPMENT WITHIN A PROPOSED 50x50' FENCED COMPOUND
SITE NAME:	CROMWELL NORTH 2 CT
SITE ADDRESS:	667, 665 & 663R MAIN STREET CROMWELL, CT 06416
ZONING JURISDICTION:	CONNECTICUT SITING COUNCIL
COUNTY:	MIDDLESEX
ASSESSORS TAX ID#:	MAP: 48, BLOCK 15, LOTS: 28C, 28 & 40
ZONING DISTRICT:	BUSINESS PARK (BP) & RESIDENTIAL (R-15)
LATITUDE:	41°37'56.625" N
LONGITUDE:	72°39'10.727"W
GROUND ELEVATION:	147.0± AMSL
PROPERTY OWNER:	CROMWELL CONCRETE PRODUCTS, INC. 667 MAIN STREET CROMWELL, CT 06416
APPLICANT:	CELLCO PARTNERSHIP d/b/a VERIZON WIRELESS 20 ALEXANDER DRIVE WALLINGFORD, CT 06492
LEGAL:	ROBINSON & COLE, LLP KENNETH C. BALDWIN 280 TRUMBULL STREET HARTFORD, CT 06103
SITE ENGINEER:	ALL-POINTS TECHNOLOGY CORP., P.C. 3 SADDLEBROOK DRIVE KILLINGWORTH, CT 06419 (860) 663-1697

LIST OF DRAWINGS

Cellco Partnership d/b/a
verizon
20 ALEXANDER DRIVE
WALLINGFORD, CT 06492

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

DEVELOPMENT & MANAGEMENT PLANS

NO	DATE	REVISION
0	10/28/19	FOR REVIEW: RCB
1		
2		
3		
4		
5		
6		

DESIGN PROFESSIONALS OF RECORD

PROF: ROBERT C. BURNS, P.E.
COMP: ALL-POINTS TECHNOLOGY CORPORATION, P.C.
ADD: 3 SADDLEBROOK DRIVE KILLINGWORTH, CT 06419

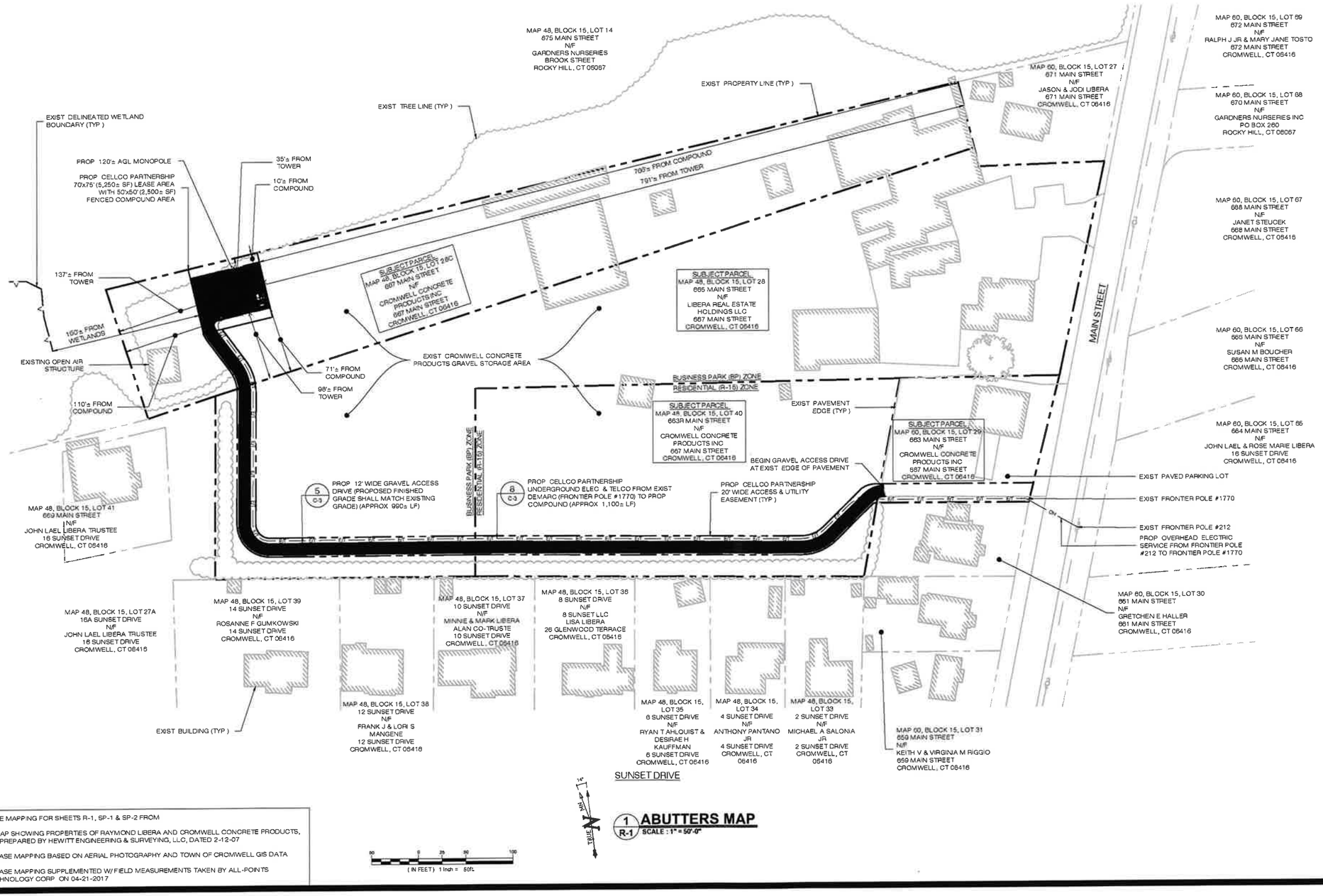
VERIZON AT CROMWELL NORTH 2 CT

SITE ADDRESS: 667 MAIN STREET CROMWELL, CT 06416
APT FILING NUMBER: NY141NB6710
DRAWN BY: CSH
DATE: 10/28/19
CHECKED BY: RCB

SHEET TITLE:
TITLE SHEET & INDEX

SHEET NUMBER:
T-1

STATE OF CONNECTICUT ROBERT C. BURNS 20071 LICENSED PROFESSIONAL ENGINEER



1 R-1 **ABUTTERS MAP**
SCALE : 1" = 50'-0"

BASE MAPPING FOR SHEETS R-1, SP-1 & SP-2 FROM

1 MAP SHOWING PROPERTIES OF RAYMOND LIBERA AND CROMWELL CONCRETE PRODUCTS, INC PREPARED BY HEWITT ENGINEERING & SURVEYING, LLC, DATED 2-12-07

2 BASE MAPPING BASED ON AERIAL PHOTOGRAPHY AND TOWN OF CROMWELL GIS DATA

3 BASE MAPPING SUPPLEMENTED W/ FIELD MEASUREMENTS TAKEN BY ALL-POINTS TECHNOLOGY CORP ON 04-21-2017

Cellco Partnership d/b/a

verizon

20 ALEXANDER DRIVE
WALLINGFORD, CT 06492

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DESIGN PROFESSIONALS OF RECORD

PROF: ROBERT C. BURNS, P.E.
COMP: ALL-POINTS TECHNOLOGY CORPORATION, P.C.
ADD: 3 SADDLEBROOK DRIVE KILLINGWORTH, CT 06419

VERIZON AT CROMWELL NORTH 2 CT

SITE ADDRESS: 667 MAIN STREET CROMWELL, CT 06416

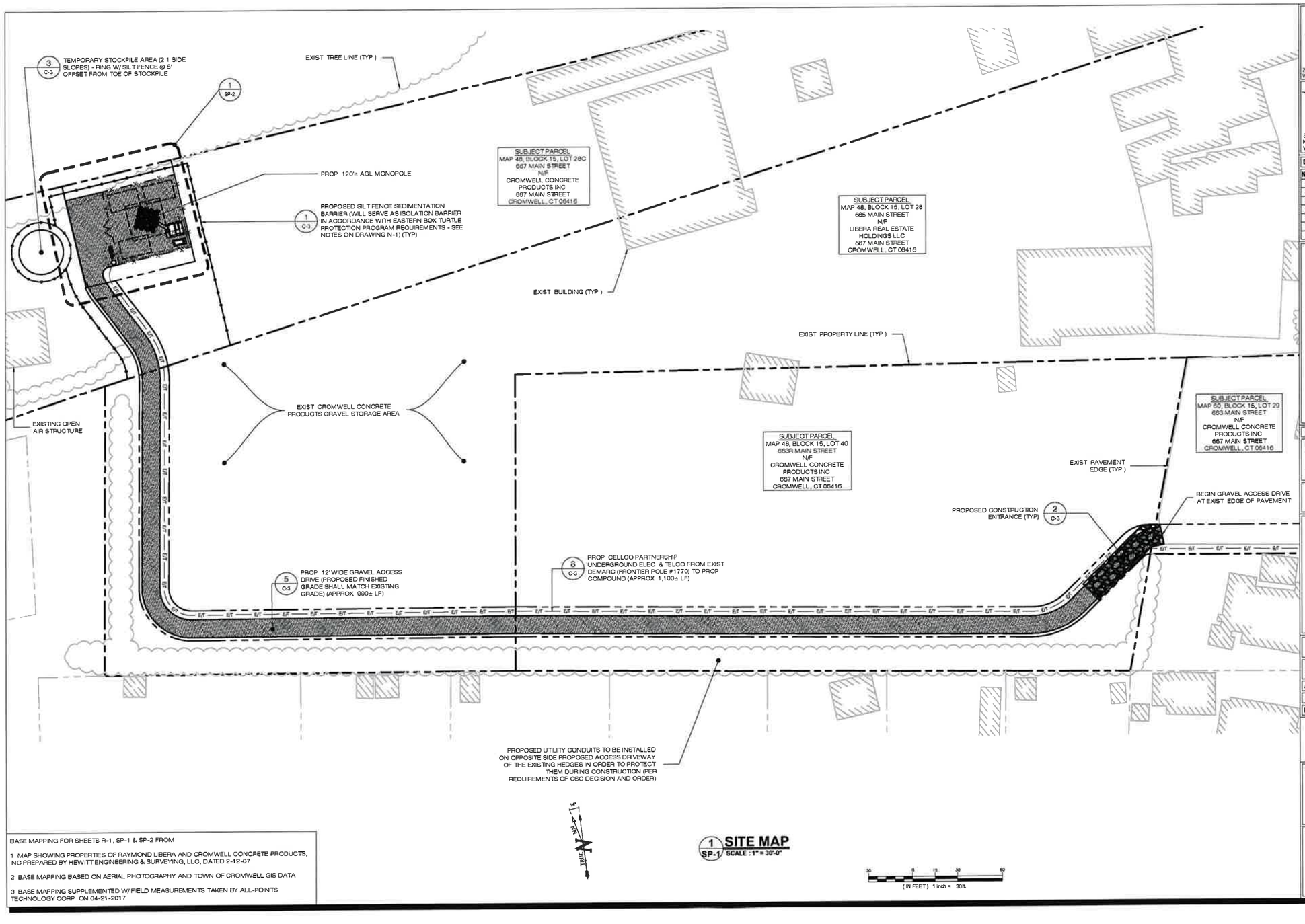
APT FILING NUMBER: NY141NB8710

DRAWN BY: CSH
DATE: 10/28/19 CHECKED BY: RCB

SHEET TITLE:
ABUTTERS MAP

SHEET NUMBER:
R-1

STATE OF CONNECTICUT ROBERT C. BURNS 21601 REGISTERED PROFESSIONAL ENGINEER



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COMP: ALL-POINTS TECHNOLOGY CORPORATION, P.C.
ADD: 3 SADDLEBROOK DRIVE KILLINGWORTH, CT 06419

VERIZON AT CROMWELL NORTH 2 CT

SITE ADDRESS: 667 MAIN STREET CROMWELL, CT 06416

APT FILING NUMBER: NY141NB6710

DRAWN BY: CSH

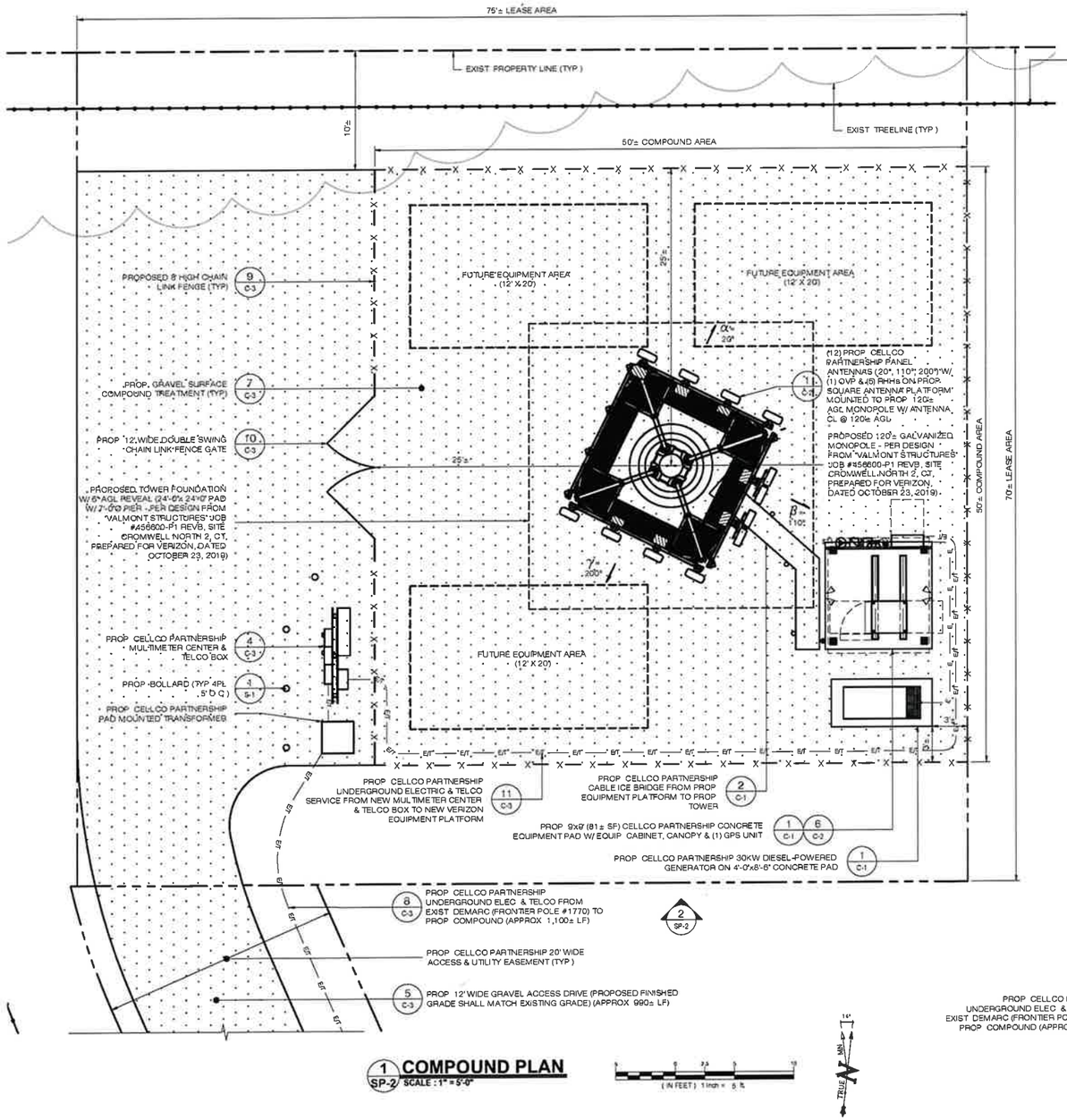
DATE: 10/28/19 CHECKED BY: RCB

SHEET TITLE:

SITE PLAN

SHEET NUMBER:

SP-1



1 COMPOUND PLAN
SP-2 SCALE : 1" = 5'-0"

(IN FEET) 1 inch = 5 ft.

2 SOUTH ELEVATION
SP-2 SCALE : 1" = 10'-0"

(IN FEET) 1 inch = 10ft.

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COMP: ALL-POINTS TECHNOLOGY CORPORATION, P.C.
ADD: 3 SADDLEBROOK DRIVE KILLINGWORTH, CT 06419

VERIZON AT CROMWELL NORTH 2 CT

SITE ADDRESS: 667 MAIN STREET CROMWELL, CT 06416

APT FILING NUMBER: NY141NB6710

DRAWN BY: CBH

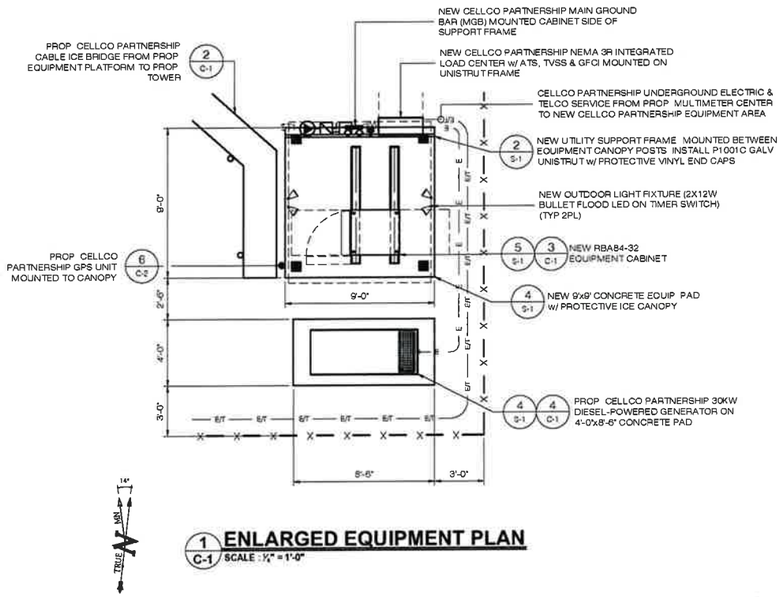
DATE: 10/28/19 CHECKED BY: RCB

SHEET TITLE:

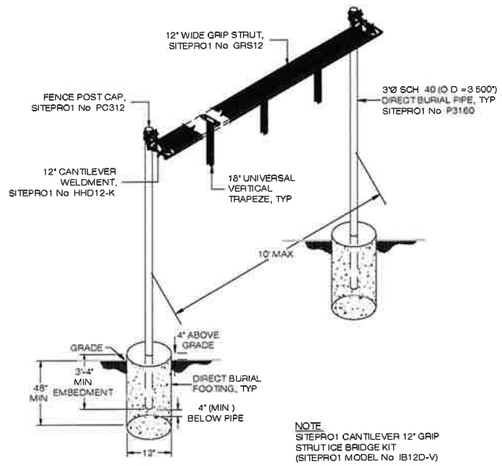
COMPOUND PLAN & TOWER ELEVATION

SHEET NUMBER:

SP-2

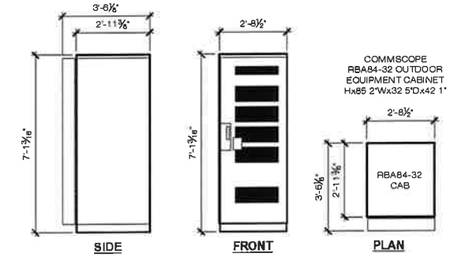


1 C-1 ENLARGED EQUIPMENT PLAN
SCALE : 1/4" = 1'-0"



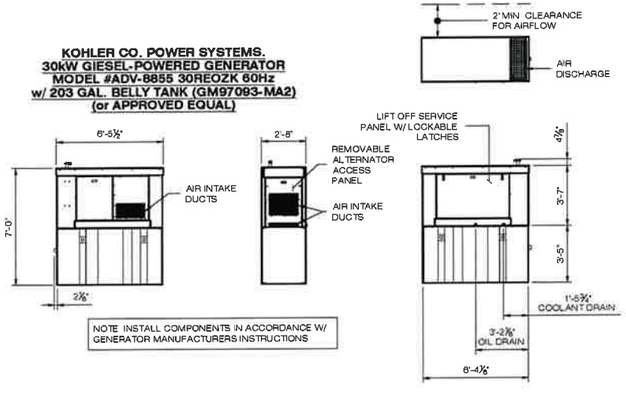
NOTE
SITEPRO1 CANTILEVER 12" GRIP STRUT ICE BRIDGE KIT (SITEPRO1 MODEL No IB12D-V)

2 C-1 CABLE BRIDGE & COAX HANGER DETAIL
SCALE : N.T.S.



3 C-1 OUTDOOR RBA84-32 EQUIPMENT CABINET
SCALE : 3/4" = 1'-0"

KOHLER CO. POWER SYSTEMS.
30kW GIESEL-POWERED GENERATOR
MODEL #ADV-8855 30REOZK 60Hz
w/ 203 GAL. BELLY TANK (GM97093-MA2)
(or APPROVED EQUAL)



NOTE INSTALL COMPONENTS IN ACCORDANCE W/ GENERATOR MANUFACTURERS INSTRUCTIONS

4 C-1 GENERATOR SCHEMATICS
SCALE : 1/4" = 1'-0"

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ADD: 3 SADDLEBROOK DRIVE KILLINGWORTH, CT 06419

VERIZON AT CROMWELL NORTH 2 CT

SITE ADDRESS: 667 MAIN STREET CROMWELL, CT 06416

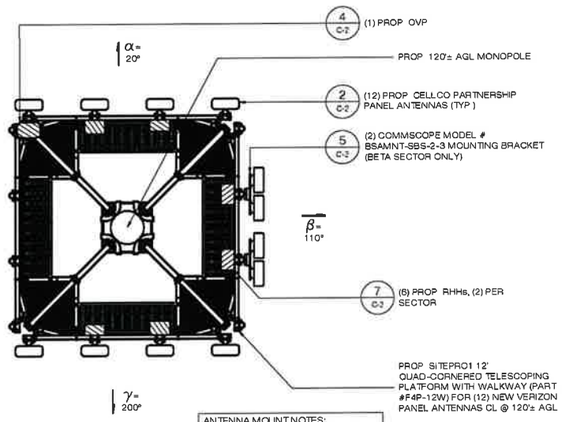
APT FILING NUMBER: NY141NB6710

DRAWN BY: CSH
DATE: 10/28/19 CHECKED BY: RCB

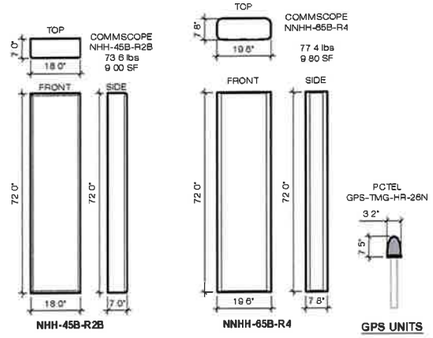
SHEET TITLE:
VERIZON EQUIPMENT PLAN & DETAILS

SHEET NUMBER:
C-1

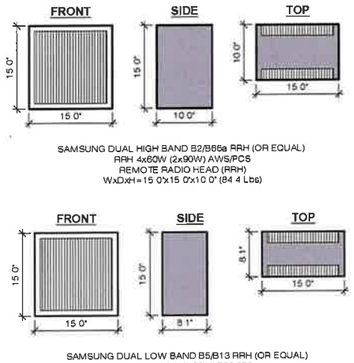
STATE OF CONNECTICUT ROBERT C. BURNS 29071 REGISTERED PROFESSIONAL ENGINEER



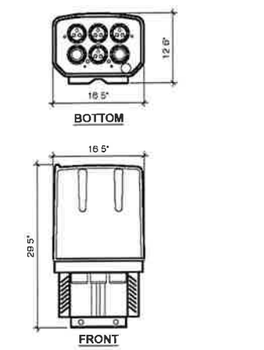
1 C-2 ANTENNA PLAN
SCALE : 1/4" = 1'-0"



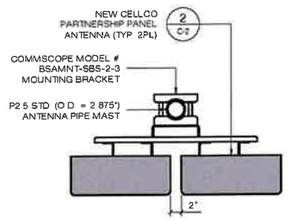
2 C-2 ANTENNA DETAIL
SCALE : ½" = 1'-0



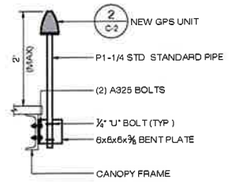
3 C-2 RRH EQUIPMENT
SCALE : 1" = 1'-0"



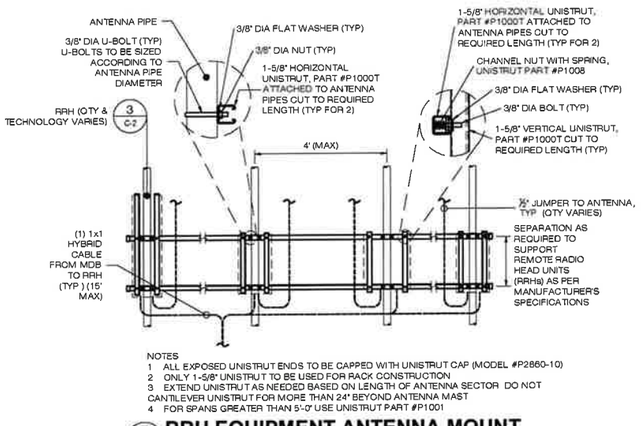
4 C-2 OVER VOLTAGE PROTECTION BOX (OVP)
SCALE : 1" = 1'-0"



5 C-2 ANTENNA MOUNTING BRACKET DETAIL
SCALE : N.T.S.



6 C-2 GPS MOUNT
SCALE : N.T.S.



NOTES
1 ALL EXPOSED UNISTRUT ENDS TO BE CAPPED WITH UNISTRUT CAP (MODEL #P2860-10)
2 ONLY 1-5/8" UNISTRUT TO BE USED FOR RACK CONSTRUCTION
3 EXTEND UNISTRUT AS NEEDED BASED ON LENGTH OF ANTENNA SECTOR DO NOT CANTILEVER UNISTRUT FOR MORE THAN 24" BEYOND ANTENNA MAST
4 FOR SPANS GREATER THAN 5'-0" USE UNISTRUT PART #P1001

7 C-2 RRH EQUIPMENT ANTENNA MOUNT
SCALE : ½" = 1'-0"

Cellco Partnership d/b/a
verizon
20 ALEXANDER DRIVE
WALLINGFORD, CT 06492

ALL-POINTS TECHNOLOGY CORPORATION
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PHONE: (860) 663-1697
FAX: (860) 663-0935
WWW.ALLPOINTSTECH.COM

DEVELOPMENT & MANAGEMENT PLANS

NO	DATE	REVISION
0	10/28/19	FOR REVIEW: RCB
1		
2		
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DESIGN PROFESSIONALS OF RECORD

PROF: ROBERT C. BURNS, P.E.
COMP: ALL-POINTS TECHNOLOGY CORPORATION, P.C.
ADD: 3 SADDLEBROOK DRIVE KILLINGWORTH, CT 06419

VERIZON AT CROMWELL NORTH 2 CT

SITE ADDRESS: 867 MAIN STREET CROMWELL, CT 06416

APT FILING NUMBER: NY141NB6710

DRAWN BY: CSH
DATE: 10/28/19
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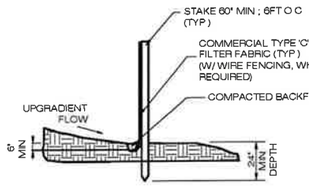
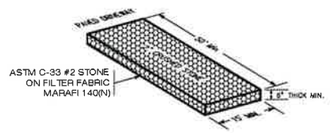
SHEET TITLE:
VERIZON ANTENNA PLAN & DETAILS

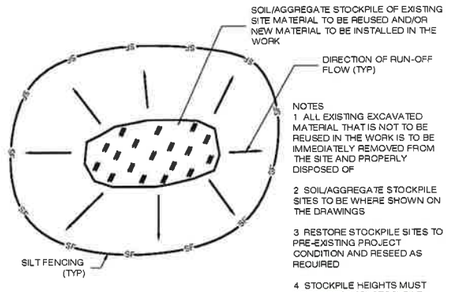
SHEET NUMBER:
C-2



1 C-3 GEOTEXTILE SILT FENCE DETAIL
SCALE : NTS



2 C-3 (CE) CONSTRUCTION ENTRANCE DETAIL
SCALE : NTS



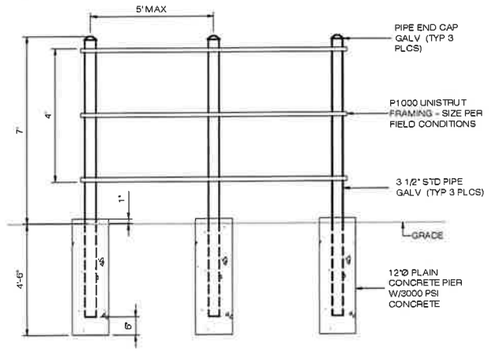
NOTES
1 ALL EXISTING EXCAVATED MATERIAL THAT IS NOT TO BE REUSED IN THE WORK IS TO BE IMMEDIATELY REMOVED FROM THE SITE AND PROPERLY DISPOSED OF

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

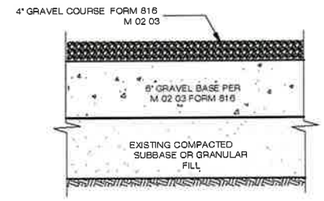
3 RESTORE STOCKPILE SITES TO PRE-EXISTING PROJECT CONDITION AND RESEED AS REQUIRED

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

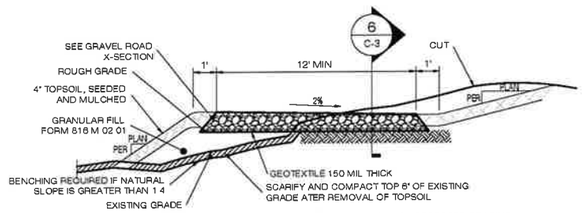
3 C-3 TEMPORARY STOCKPILE DETAIL
SCALE : N.T.S.



4 C-3 UTILITY BACKBOARD DETAIL
SCALE : NTS



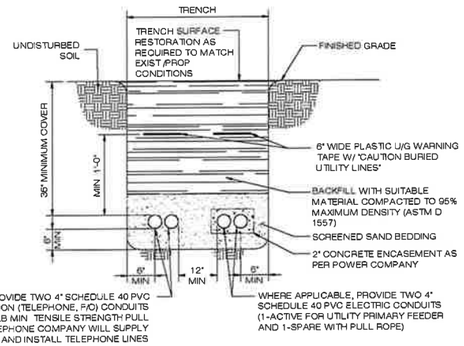
6 C-3 GRAVEL ROAD SECTION
SCALE : NTS



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

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

5 C-3 TYPICAL ROAD CROSS SECTION
SCALE : NTS



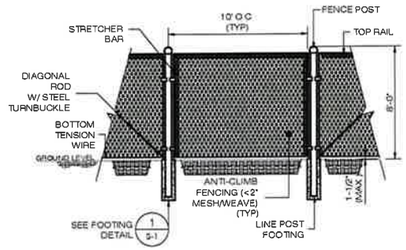
NOTES

1 THE CLEAN FILL SHALL PASS THROUGH A 3/8" MESH SCREEN AND SHALL NOT CONTAIN SHARP STONES OTHER BACKFILL SHALL NOT CONTAIN ASHES, CINDERS, SHELLS, FROZEN MATERIAL, LOOSE DEBRIES OR STONES LARGER THAN 2" IN MAXIMUM DIMENSION WHERE EXISTING UTILITIES ARE LIKELY TO BE ENCOUNTERED

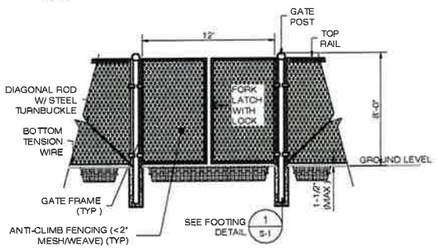
2 CONTRACTOR SHALL HAND DIG AND PROTECT EXISTING UTILITIES

3 EXISTING PAVEMENT SHALL BE SAW-CUT PRIOR TO TRENCH EXCAVATION

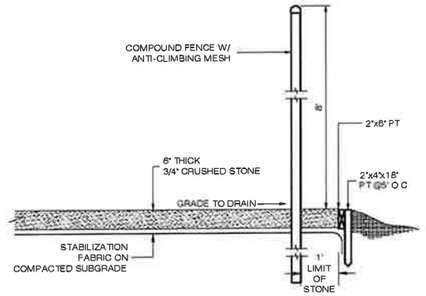
8 C-3 PRIMARY UTILITY TRENCH



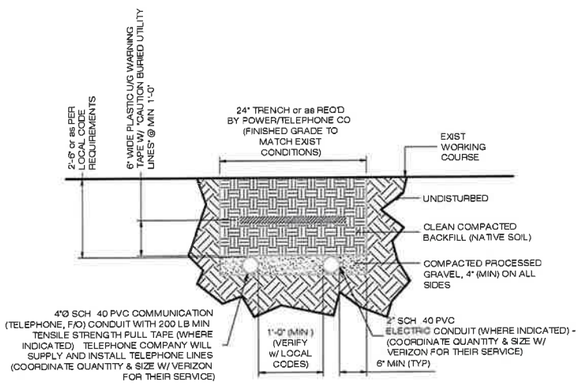
9 C-3 CHAIN-LINK FENCING DETAIL
SCALE : NTS



10 C-3 FENCE & GATE DETAIL
SCALE : N.T.S.



7 C-3 COMPOUND DETAIL
SCALE : NTS



11 C-3 SECONDARY TRENCH DETAIL
SCALE : N.T.S.

Cellco Partnership d/b/a
verizon

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PHONE: (860)-663-1697
FAX: (860)-663-0935
WWW.ALLPOINTSTECH.COM

DEVELOPMENT & MANAGEMENT PLANS

NO	DATE	REVISION
0	10/28/19	FOR REVIEW: RCB
1		
2		
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DESIGN PROFESSIONALS OF RECORD

PROF: ROBERT C. BURNS, P.E.
COMP: ALL-POINTS TECHNOLOGY CORPORATION, P.C.
ADD: 3 SADDLEBROOK DRIVE KILLINGWORTH, CT 06419

VERIZON AT CROMWELL NORTH 2 CT

SITE ADDRESS: 667 MAIN STREET CROMWELL, CT 06416

APT FILING NUMBER: NY141NB6710

DRAWN BY: CSH

DATE: 10/28/19 CHECKED BY: RCB

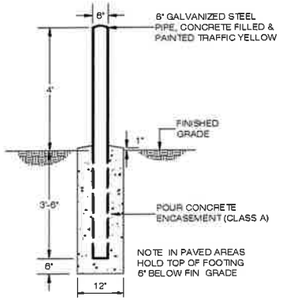
SHEET TITLE:

SITE DETAILS

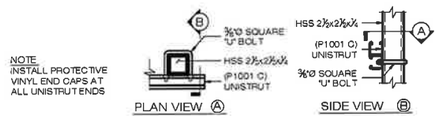
SHEET NUMBER:

C-3

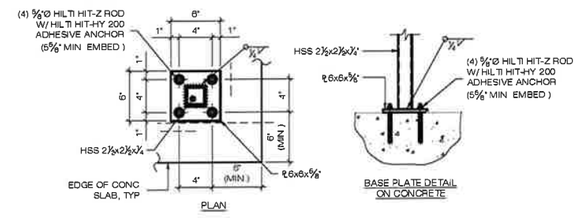
STATE OF CONNECTICUT ROBERT C. BURNS 24871 REGISTERED PROFESSIONAL ENGINEER



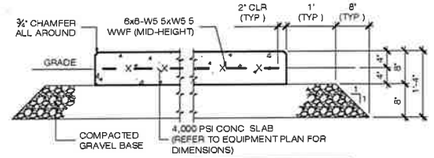
1 S-1 BOLLARD DETAIL
SCALE : N.T.S.



2 S-1 SUPPORT FRAME CONN. DETAIL
SCALE : 1½" = 1'-0"

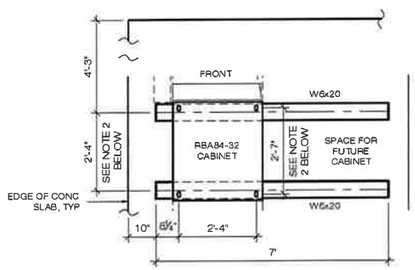


3 S-1 CANOPY POST BASE PLATE
SCALE : 1½" = 1'-0"



NOTES:
1 CONTRACTOR SHALL COORDINATE ALL SLAB DIMENSIONS & HOLD DOWN REQUIREMENTS W/ EQUIPMENT MANUFACTURER
2 CONCRETE SLAB DESIGN IS BASED ON A MINIMUM ALLOWABLE SOIL BEARING PRESSURE (q a) OF 3,000 PSF

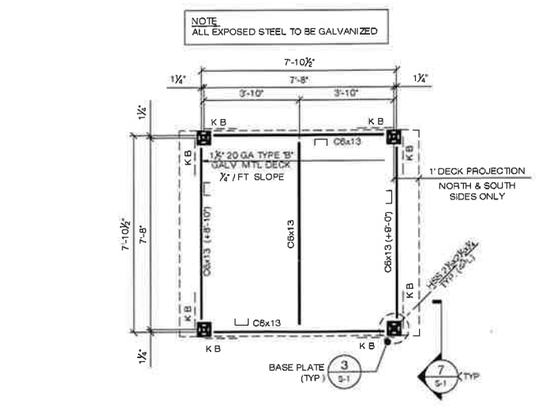
4 S-1 CONCRETE PAD DETAIL
SCALE : N.T.S.



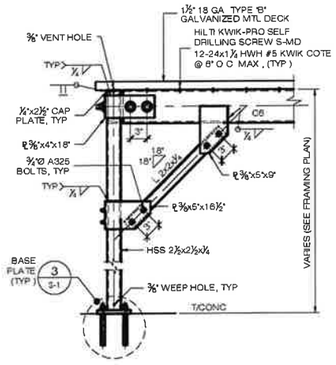
NOTES:
1 FASTEN W BEAMS TO CONCRETE PAD w/ ½"Ø HDG HILTI KWIK BOLT 3 w/ 2" EMBEDMENT @ 24" O C MAX, STAGGERED) MIN 2" FROM W BEAM ENDS
2 COORDINATE W BEAM FLANGE SPACING W/ EQUIPMENT CABINET BOLTING PATTERN MOUNT EQUIPMENT CABINETS TO DUNNAGE FRAME PER MANUFACTURER'S RECOMMENDATIONS

5 S-1 EQUIPMENT BOLTING PATTERN
SCALE : ½" = 1'-0"

NOTE
ALL EXPOSED STEEL TO BE GALVANIZED



6 S-1 CANOPY FRAMING PLAN
SCALE : ⅜" = 1'-0"



7 S-1 CANOPY SUPPORT
SCALE : 1" = 1'-0"

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verizon
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WALLINGFORD, CT 06492

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STRUCTURAL PLAN & DETAILS

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S-1

STATE OF CONNECTICUT ROBERT C. BURNS 20071 REGISTERED PROFESSIONAL ENGINEER

ENVIRONMENTAL NOTES

EASTERN BOX TURTLE PROTECTION PROGRAM

EASTERN BOX TURTLE (TERRAPENNE C CAROLINA), A STATE SPECIAL CONCERN SPECIES AFFORDED PROTECTION UNDER THE CONNECTICUT ENDANGERED SPECIES ACT, IS KNOWN TO OCCUR WITHIN THE VICINITY OF THE PROPOSED CELLCO COMMUNICATIONS TOWER FACILITY AT 667 MAIN STREET IN CROMWELL, CONNECTICUT THE FOLLOWING TURTLE PROTECTION MEASURES SATISFY REQUIREMENTS FROM THE CONNECTICUT DEPARTMENT OF ENERGY & ENVIRONMENTAL PROTECTION (DEEP) WILDLIFE DIVISION IN ACCORDANCE WITH THEIR NATURAL DIVERSITY DATA BASE (NDDB) DETERMINATION LETTER (NO 201801108) DATED FEBRUARY 25, 2018, THIS DETERMINATION IS VALID UNTIL FEBRUARY 25, 2020 PROVIDED THE SCOPE OF THE PROJECT HAS NOT CHANGED AND WORK HAS BEGUN ON THE PROJECT PRIOR TO THE EXPIRATION DATE

IT IS OF THE UTMOST IMPORTANCE THAT THE CONTRACTOR COMPLIES WITH THE REQUIREMENT FOR IMPLEMENTATION OF THESE PROTECTIVE MEASURES AND THE EDUCATION OF ITS EMPLOYEES AND SUBCONTRACTORS PERFORMING WORK ON THE PROJECT SITE THIS PROTECTION PLAN SHALL BE IMPLEMENTED IF WORK WILL OCCUR DURING THE TURTLE'S ACTIVE PERIOD (APRIL 1ST TO OCTOBER 30TH) THE PROPOSED COMMUNICATIONS TOWER FACILITY WOULD BE SITED IN A CONCRETE PRODUCTS STORAGE YARD THAT IS CLEARED AND CONSISTS OF A GRAVEL SURFACE WHICH DOES NOT PROVIDE SUITABLE HIBERNATING HABITAT FOR EASTERN BOX TURTLE. HIBERNATION HABITAT TYPICALLY INCLUDES WOODLANDS, WOODLAND EDGES AND FORESTED WETLANDS THEREFORE, PROTECTION MEASURES DURING THE TURTLE'S INACTIVE PERIOD (OCTOBER 1ST THROUGH MARCH 30TH) ARE NOT REQUIRED FOR THIS PROJECT

ALL-POINTS TECHNOLOGY CORPORATION, P C (APT) WILL SERVE AS THE ENVIRONMENTAL MONITOR FOR THIS PROJECT TO ENSURE THAT THESE PROTECTION MEASURES ARE IMPLEMENTED PROPERLY AND WILL PROVIDE AN EDUCATION SESSION ON RARE SPECIES THAT MAY BE ENCOUNTERED AND THE PROJECTS PROXIMITY TO SENSITIVE HABITAT PRIOR TO THE START OF CONSTRUCTION ACTIVITIES THE CONTRACTOR SHALL CONTACT DEAN GUSTAFSON, SENIOR ENVIRONMENTAL SCIENTIST AT APT, AT LEAST 5 BUSINESS DAYS PRIOR TO THE START OF ANY CONSTRUCTION ACTIVITIES MR GUSTAFSON CAN BE REACHED BY PHONE AT (860) 663-1697 EXT 201 OR VIA EMAIL AT DGUSTAFSON@ALLPOINTSTECH COM

THE PROPOSED PROTECTION PROGRAM CONSISTS OF SEVERAL COMPONENTS EDUCATION OF ALL CONTRACTORS AND SUB-CONTRACTORS PRIOR TO INITIATION OF WORK ON THE SITE PROTECTIVE MEASURES, PERIODIC INSPECTION OF THE CONSTRUCTION PROJECT, AND, REPORTING

1 ISOLATION MEASURES & SEDIMENTATION AND EROSION CONTROLS

A PLASTIC NETTING USED IN A VARIETY OF EROSION CONTROL PRODUCTS (I E , EROSION CONTROL BLANKETS, FIBER ROLLS (WATTLES), REINFORCED SILT FENCE) HAS BEEN FOUND TO ENTANGLE WILDLIFE, INCLUDING REPTILES, AMPHIBIANS, BIRDS AND SMALL MAMMALS, BUT PARTICULARLY SNAKES NO PERMANENT EROSION CONTROL PRODUCTS OR REINFORCED SILT FENCE WILL BE USED ON THE PROJECT TEMPORARY EROSION CONTROL PRODUCTS WILL USE EITHER EROSION CONTROL BLANKETS AND FIBER ROLLS COMPOSED OF PROCESSED FIBERS MECHANICALLY BOUND TOGETHER TO FORM A CONTINUOUS MATRIX (NETLESS) OR NETTING COMPOSED OF PLANAR WOVEN NATURAL BIODEGRADABLE FIBER TO AVOID/MINIMIZE WILDLIFE ENTANGLEMENT

B INSTALLATION OF SEDIMENTATION AND EROSION CONTROLS, REQUIRED FOR EROSION CONTROL COMPLIANCE AND CREATION OF A BARRIER TO POSSIBLE MIGRATING/DISPERSING TURTLES, SHALL BE PERFORMED BY THE CONTRACTOR FOLLOWING CLEARING ACTIVITIES AND PRIOR TO ANY EARTHWORK THE ENVIRONMENTAL MONITOR WILL INSPECT THE WORK ZONE AREA PRIOR TO AND FOLLOWING EROSION CONTROL BARRIER INSTALLATION TO ENSURE THE AREA IS FREE OF EASTERN BOX TURTLE AND DOCUMENT BARRIERS HAVE BEEN SATISFACTORILY INSTALLED THE INTENT OF THE BARRIER IS TO SEGREGATE THE MAJORITY OF THE WORK ZONE AND ISOLATE IT FROM FORAGING/MIGRATING/DISPERSING TURTLES, SNAKES AND OTHER HERPETOFAUNA OFTENTIMES COMPLETE ISOLATION OF A WORK ZONE IS NOT FEASIBLE DUE TO ACCESSIBILITY NEEDS AND LOCATIONS OF STAGING/MATERIAL STORAGE AREAS, ETC ALTHOUGH THE BARRIERS MAY NOT COMPLETELY ISOLATE THE WORK ZONE, THEY WILL BE POSITIONED TO DEFLECT MIGRATING/DISPERSAL ROUTES AWAY FROM THE WORK ZONE TO MINIMIZE POTENTIAL ENCOUNTERS WITH TURTLES, SNAKES AND OTHER HERPETOFAUNA

C THE CONTRACTOR IS RESPONSIBLE FOR DAILY INSPECTIONS OF THE SEDIMENTATION AND EROSION CONTROLS FOR TEARS OR BREECHES AND ACCUMULATION LEVELS OF SEDIMENT, PARTICULARLY FOLLOWING STORM EVENTS THAT GENERATE A DISCHARGE APT WILL PROVIDE PERIODIC INSPECTIONS OF THE SEDIMENTATION AND EROSION CONTROLS THROUGHOUT THE DURATION OF CONSTRUCTION ACTIVITIES ONLY AS IT PERTAINS TO PROTECTION OF RARE SPECIES THIRD PARTY MONITORING OF SEDIMENTATION AND EROSION CONTROLS WILL BE PERFORMED BY OTHER PARTIES, AS NECESSARY, UNDER APPLICABLE LOCAL, STATE AND/OR FEDERAL REGULATIONS

D THE EXTENT OF THE SEDIMENTATION AND EROSION CONTROLS WILL BE AS SHOWN ON THE SITE PLANS THE CONTRACTOR SHALL HAVE ADDITIONAL SEDIMENTATION AND EROSION CONTROLS STOCKPILED ON SITE SHOULD FIELD OR CONSTRUCTION CONDITIONS WARRANT EXTENDING THE CONTROLS AS DIRECTED BY APT

E NO EQUIPMENT, VEHICLES OR CONSTRUCTION MATERIALS SHALL BE STORED OUTSIDE OF THE SEDIMENTATION AND EROSION CONTROLS WITHIN 100 FEET OF WETLANDS OR WATERCOURSES

F ALL SEDIMENTATION AND EROSION CONTROLS SHALL BE REMOVED WITHIN 30 DAYS OF COMPLETION OF WORK AND PERMANENT STABILIZATION OF SITE SOILS SO THAT REPTILE AND AMPHIBIAN MOVEMENT BETWEEN UPLANDS AND WETLANDS IS NOT RESTRICTED

2 CONTRACTOR EDUCATION

A PRIOR TO WORK ON SITE, THE CONTRACTOR SHALL ATTEND AN EDUCATIONAL SESSION AT THE PRE-CONSTRUCTION MEETING WITH APT THIS ORIENTATION AND EDUCATIONAL SESSION WILL CONSIST OF AN INTRODUCTORY MEETING WITH APT PROVIDING PHOTOS OF EASTERN BOX TURTLE EMPHASIZING THE NON-AGGRESSIVE NATURE OF THESE SPECIES, THE ABSENCE OF NEED TO DESTROY ANIMALS THAT MIGHT BE ENCOUNTERED AND THE NEED TO FOLLOW PROTECTIVE MEASURES AS DESCRIBED IN SECTION 4 BELOW WORKERS WILL ALSO BE PROVIDED INFORMATION REGARDING THE IDENTIFICATION OF OTHER TURTLES, SNAKES AND COMMON HERPETOFAUNA SPECIES THAT COULD BE ENCOUNTERED

B THE EDUCATION SESSION WILL ALSO FOCUS ON MEANS TO DISCRIMINATE BETWEEN THE SPECIES OF CONCERN AND OTHER NATIVE SPECIES TO AVOID UNNECESSARY "FALSE ALARMS" ENCOUNTERS WITH ANY SPECIES OF TURTLES OR SNAKES WILL BE DOCUMENTED

C THE CONTRACTOR WILL BE PROVIDED WITH CELL PHONE AND EMAIL CONTACTS FOR APT PERSONNEL TO IMMEDIATELY REPORT ANY ENCOUNTERS WITH EASTERN BOX TURTLE OR OTHER SPECIES EDUCATIONAL POSTER MATERIALS WILL BE PROVIDED BY APT AND DISPLAYED ON THE JOB SITE TO MAINTAIN WORKER AWARENESS AS THE PROJECT PROGRESSES

3 PETROLEUM MATERIALS STORAGE AND SPILL PREVENTION

A CERTAIN PRECAUTIONS ARE NECESSARY TO STORE PETROLEUM MATERIALS, REFUEL AND CONTAIN AND PROPERLY CLEAN UP ANY INADVERTENT FUEL OR PETROLEUM (I E , OIL, HYDRAULIC FLUID, ETC) SPILL TO AVOID POSSIBLE IMPACT TO NEARBY HABITATS

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

C THE FOLLOWING PETROLEUM AND HAZARDOUS MATERIALS STORAGE AND REFUELING RESTRICTIONS AND SPILL RESPONSE PROCEDURES WILL BE ADHERED TO BY THE CONTRACTOR

I PETROLEUM AND HAZARDOUS MATERIALS STORAGE AND REFUELING

1 REFUELING OF VEHICLES OR MACHINERY SHALL OCCUR A MINIMUM OF 100 FEET FROM WETLANDS OR WATERCOURSES AND SHALL TAKE PLACE ON AN IMPERVIOUS PAD WITH SECONDARY CONTAINMENT DESIGNED TO CONTAIN FUELS

2 ANY FUEL OR HAZARDOUS MATERIALS THAT MUST BE KEPT ON SITE SHALL BE STORED ON AN IMPERVIOUS SURFACE UTILIZING SECONDARY CONTAINMENT A MINIMUM OF 100 FEET FROM WETLANDS OR WATERCOURSES

II INITIAL SPILL RESPONSE PROCEDURES

1 STOP OPERATIONS AND SHUT OFF EQUIPMENT

2 REMOVE ANY SOURCES OF SPARK OR FLAME

3 CONTAIN THE SOURCE OF THE SPILL

4 DETERMINE THE APPROXIMATE VOLUME OF THE SPILL

5 IDENTIFY THE LOCATION OF NATURAL FLOW PATHS TO PREVENT THE RELEASE OF THE SPILL TO SENSITIVE NEARBY WATERWAYS OR WETLANDS

6 ENSURE THAT FELLOW WORKERS ARE NOTIFIED OF THE SPILL

III SPILL CLEAN UP & CONTAINMENT

1 OBTAIN SPILL RESPONSE MATERIALS FROM THE ON-SITE SPILL RESPONSE KIT PLACE ABSORBENT MATERIALS DIRECTLY ON THE RELEASE AREA

2 LIMIT THE SPREAD OF THE SPILL BY PLACING ABSORBENT MATERIALS AROUND THE PERIMETER OF THE SPILL

3 ISOLATE AND ELIMINATE THE SPILL SOURCE

4 CONTACT THE APPROPRIATE LOCAL, STATE AND/OR FEDERAL AGENCIES, AS NECESSARY

5 CONTACT A DISPOSAL COMPANY TO PROPERLY DISPOSE OF CONTAMINATED MATERIALS IN ACCORDANCE WITH ALL LOCAL, STATE AND FEDERAL REGULATIONS

IV REPORTING

1 COMPLETE AN INCIDENT REPORT

2 SUBMIT A COMPLETED INCIDENT REPORT TO THE APPROPRIATE TOWN OF CROMWELL, CONNECTICUT SITING COUNCIL AND OTHER APPLICABLE LOCAL, STATE AND FEDERAL OFFICIALS

4 TURTLE PROTECTIVE MEASURES

A PRIOR TO THE START OF CONSTRUCTION EACH DAY, THE CONTRACTOR SHALL SEARCH THE ENTIRE WORK AREA FOR TURTLES

B IF A TURTLE IS FOUND, IT SHALL BE IMMEDIATELY MOVED, UNHARMED, BY CAREFULLY GRASPED IN BOTH HANDS, ONE ON EACH SIDE OF THE SHELL, BETWEEN THE TURTLES FORELIMBS AND THE HIND LIMBS, AND PLACED JUST OUTSIDE OF THE ISOLATION BARRIER IN THE SAME APPROXIMATE DIRECTION IT WAS WALKING

C SPECIAL CARE SHALL BE TAKEN BY THE CONTRACTOR DURING EARLY MORNING AND EVENING HOURS SO THAT POSSIBLE BASKING OR FORAGING TURTLES ARE NOT HARMED BY CONSTRUCTION ACTIVITIES

5 HERBICIDE AND PESTICIDE RESTRICTIONS

A THE USE OF HERBICIDES AND PESTICIDES AT THE PROPOSED COMMUNICATIONS TOWER FACILITY SHALL BE AVOIDED WHEN POSSIBLE IN THE EVENT HERBICIDES AND/OR PESTICIDES ARE REQUIRED AT THE PROPOSED FACILITY, THEIR USE WILL BE USED IN ACCORDANCE WITH INTEGRATED PEST MANAGEMENT (IPM) PRINCIPLES WITH PARTICULAR ATTENTION TO MINIMIZE APPLICATIONS WITHIN 100 FEET OF WETLAND OR WATERCOURSE RESOURCES NO APPLICATIONS OF HERBICIDES OR PESTICIDES ARE ALLOWED WITHIN ACTUAL WETLAND OR WATERCOURSE RESOURCES

6 REPORTING

A DAILY COMPLIANCE MONITORING REPORTS (BRIEF NARRATIVE AND APPLICABLE PHOTOS) DOCUMENTING EACH APT INSPECTION WILL BE SUBMITTED BY APT TO CELLCO FOR COMPLIANCE VERIFICATION ANY OBSERVATIONS OF TURTLES WILL BE INCLUDED IN THE REPORTS

B FOLLOWING COMPLETION OF THE CONSTRUCTION PROJECT, APT WILL PROVIDE A COMPLIANCE MONITORING SUMMARY REPORT TO CELLCO DOCUMENTING IMPLEMENTATION OF THE RARE SPECIES AND WETLAND PROTECTION PROGRAM, MONITORING AND ANY SPECIES OBSERVATIONS CELLCO WILL PROVIDE A COPY OF THE COMPLIANCE MONITORING SUMMARY REPORT TO THE CONNECTICUT SITING COUNCIL FOR COMPLIANCE VERIFICATION

C ANY OBSERVATIONS OF EASTERN BOX TURTLE WILL BE REPORTED TO CTDEEP BY APT, WITH PHOTO-DOCUMENTATION (IF POSSIBLE) AND WITH SPECIFIC INFORMATION ON THE LOCATION AND DISPOSITION OF THE ANIMAL

CONSTRUCTION SEQUENCING

CONTRACTOR TO FOLLOW THE FOLLOWING CONSTRUCTION PHASING AS CLOSELY AS POSSIBLE

1 MOBILIZATION BRING MATERIAL AND EQUIPMENT TO SITE ALL CONSTRUCTION TRAFFIC AND ACTIVITIES MUST RESIDE INSIDE ACCESS PATH DELINEATED, WITHIN STAGING AND STOCKPILE AREA, OR WITHIN AREA WHERE PROPOSED WORK IS BEING COMPLETED THE CONTRACTOR IS TO PROTECT WETLANDS FROM DISTURBANCE AT ALL TIMES AND NO CONSTRUCTION ACTIVITIES OR DUMPING SHALL OCCUR IN THE WETLANDS HOURS OF CONSTRUCTION ARE 8 AM - 5 PM, MONDAY - SATURDAY

2 THE CONTRACTOR SHALL HOST AND ATTEND AN ENVIRONMENTAL EDUCATION SESSION AT THE PRE-CONSTRUCTION MEETING (SEE NOTES ON DRAWING N-1)

3 INSTALL TEMPORARY EROSION AND SEDIMENTATION CONTROL AND ISOLATION BARRIERS

4 INSTALL CONSTRUCTION ENTRANCE

5 CLEAR AND ROUGH GRADE ACCESS ROAD TO THE NEW EQUIPMENT COMPOUND

6 CONSTRUCT NEW UTILITY TRENCH & SET CONDUITS & BACKFILL PROTECT EXISTING HEDGE ROOT SYSTEMS DURING CONSTRUCTION

7 ROUGH GRADE COMPOUND AREA

8 EXCAVATE FOR TOWER FOUNDATION

9 FINALIZE ACCESS ROAD GRADES AND INSTALL WEARING COURSE

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

11 INSTALL BURIED GROUND RINGS, GROUND RODS, GROUND LEADS, UTILITY CONDUITS, AND UTILITY EQUIPMENT

12 BACKFILL TOWER FOUNDATION

13 ERECT MONOPOLE

14 INSTALL TELECOMMUNICATIONS EQUIPMENT ON TOWER AND IN COMPOUND

15 INSTALL COMPOUND GRAVEL SURFACES

16 INSTALL FENCING

17 CONNECT GROUNDING LEADS AND LIGHTENING PROTECTION

18 FINAL GRADE AROUND COMPOUND

19 LOAM AND SEED DISTURBED AREAS OUTSIDE COMPOUND, AS REQUIRED

20 REMOVE TEMPORARY EROSION & SEDIMENTATION CONTROL BARRIER AFTER SEEDED AREAS HAVE ESTABLISHED VEGETATION

21 FINAL CLEANUP AND EQUIPMENT TESTING

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

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SHEET NUMBER:

N-1

STATE OF CONNECTICUT ROBERT C. BURNS 19371 REGISTERED PROFESSIONAL ENGINEER

DESIGN BASIS

GOVERNING CODES/DESIGN STANDARDS

- 2015 IBC/2018 CONNECTICUT STATE BUILDING CODE/ASCE 7-10
- TIA-222-G

DESIGN CRITERIA

RISK CATEGORY/ STRUCT OCCUPANCY	II	(2015 IBC TABLE 1604 5)
SNOW LOAD		
GROUND, P_g	30 PSF	(2018 CSBC APPENDIX N)
MINIMUM FLAT ROOF, P_{min}	30 PSF	(2018 CSBC SECT 1608.1 1)
WIND LOADS		
ULTIMATE BASIC WIND SPEED, V_{ULT} (3-SECOND GUST)	125 MPH	(2018 CSBC APPENDIX N)
NOMINAL BASIC WIND SPEED, V_{ASD} (3-SECOND GUST)	100-120 MPH	(TIA-222G, ANNEX B)
EXPOSURE CATEGORY	C	(2015 IBC SECT 1609 4)
WIND IMPORTANCE FACTOR, I_w	1 0	(TIA-222G, TABLE 2-3)
ICE LOADS		
ICE THICKNESS, t_i	0 75	(TIA-222G, ANNEX B)
ICE THICKNESS IMPORTANCE FACTOR, I_i	1 0	(TIA-222G, TABLE 2-3)
NOMINAL BASIC WIND SPEED W/ ICE, V_i (3-SECOND GUST)	50 MPH	(TIA-222G, ANNEX B)

SEISMIC LOAD

REFER TO SECTION 1613 OF THE 2015 IBC/2018 CONNECTICUT STATE BUILDING CODE FOR SEISMIC CLASSIFICATION AND LOADING DETERMINATION

01 GENERAL

ABBREVIATIONS USED IN THESE SPECIFICATIONS INCLUDE THE FOLLOWING

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

04 CONCRETE

THESE SPECIFICATIONS SHALL INCLUDE THE GENERAL SPECIFICATIONS HEREIN

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

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

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

*ALL CONCRETE EXPOSED TO FREEZING WEATHER SHALL CONTAIN ENTRAINED AIR PER ACI 211 TABLE 4 2 1 OF ACI 318-05

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

THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCING STEEL

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

A 3/4 IN CHAMFER SHALL BE PROVIDED AT ALL EXPOSED EDGES OF CONCRETE, IN ACCORDANCE WITH ACI 301 SECTION 4 2 4

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

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

05 ANCHORS

THESE SPECIFICATIONS SHALL INCLUDE THE GENERAL SPECIFICATIONS HEREIN

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

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

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

INJECTION ADHESIVE ANCHORING IN SOLID MASONRY AND GROUT FILLED BLOCK SHALL BE HILTI HIT HY 200 OR EQUAL WITH THREADED ROD. MAINTAIN 12 INCHES BETWEEN ANCHORS AND ALL FREE EDGES. MINIMUM SPACING BETWEEN ANCHORS IS 6 INCHES.

ANCHORS SHALL BE INSTALLED PER MANUFACTURERS RECOMMENDATIONS AND SHALL NOT BE INSTALLED IN MORTAR JOINTS

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

05 POST-INSTALLED ANCHORS

THESE SPECIFICATIONS SHALL INCLUDE THE GENERAL SPECIFICATIONS HEREIN

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

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

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

ADHESIVE ANCHORS INSTALLED IN A HORIZONTALLY OR UPWARDLY INCLINED ORIENTATION INTO CONCRETE AND SUPPORTING A SUSTAINED TENSION LOAD SHALL BE INSTALLED BY A CERTIFIED ADHESIVE ANCHOR INSTALLER, PER SECTION 9 2 2 OF ACI-318-14. INSTALLER SHALL BE CERTIFIED THROUGH THE ACI/CRSI ADHESIVE ANCHOR INSTALLER CERTIFICATION PROGRAM

ANCHORS SHALL BE INSTALLED PER MANUFACTURERS RECOMMENDATIONS AND SHALL NOT TO BE INSTALLED IN MORTAR JOINTS

AS PER OSHA 29 CFR 1926 1153 SILICA DUST CONTROL REGULATIONS, DRILLED HOLES FOR POST INSTALLED ANCHORS IN CONCRETE AND MASONRY SHALL BE INSTALLED USING HILTI SAFE SET INSTALLATION SYSTEM WHICH COMPRISES OF A CODE APPROVED HILTI HOLLOW DRILL BIT AND VACUUM. ALTERNATE INSTALLATION METHODS ARE ALSO ALLOWED WITH AN APPROVED DUSTLESS SYSTEM THAT MAINTAINS SILICA DUST EMISSION BELOW THE PERMISSIBLE LEVELS

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

CONTINUOUS OR PERIODIC SPECIAL INSPECTION FOR POST INSTALLED ANCHORS SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 4 3/4 4 OF THE ICC-ES REPORT FOR THE INDIVIDUAL ANCHOR. SPECIAL INSPECTOR SHALL BE NOTIFIED PRIOR TO COMMENCEMENT OF WORK TO COORDINATE INSPECTION EFFORTS

05 STEEL

THESE SPECIFICATIONS SHALL INCLUDE THE GENERAL SPECIFICATIONS HEREIN

MATERIALS

[illegible]

07 THERMAL & MOISTURE PROTECTION

[illegible]

26 ELECTRICAL

[illegible]

26 GROUNDING

[illegible]

26 LIGHTNING PROTECTION

[illegible]

27 ANTENNAS & CABLES

[illegible]

27 CABLE TRAY

[illegible]

31 EXCAVATION & FILL

THESE SPECIFICATIONS SHALL INCLUDE THE GENERAL SPECIFICATIONS HEREIN

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

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

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

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

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

TRENCH EXCAVATIONS SHALL BE BACKFILLED AT THE END OF EACH DAY

TOWER FOUNDATION EXCAVATION, BACKFILL AND COMPACTION SHALL BE IN ACCORDANCE WITH TOWER MANUFACTURERS DESIGNS AND SPECIFICATIONS

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

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

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

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

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

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

100%	WITH PASS 5"
100%	WITH PASS 3-1/2"
100%	WITH PASS 2 1/4"
65-100%	WITH PASS 2"
55-100%	WITH PASS 1-1/2"
25-60%	WITH PASS 1/4"
15-45%	WITH PASS #10
5-25%	WITH PASS #40
0-10%	WITH PASS #100
0-5%	WITH PASS #200

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

90-100%	WITH PASS 3-1/2"
55-85%	WITH PASS 1 1/2"
50-75%	WITH PASS 3/4"
25-45%	WITH PASS 1/4"
5-20%	WITH PASS #40
2-12%	WITH PASS #100

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

31 SEDIMENTATION & EROSION CONTROL

THESE SPECIFICATIONS SHALL INCLUDE THE GENERAL SPECIFICATIONS HEREIN

[illegible]

Cellco Partnership d/b/a
verizon
20 ALEXANDER DRIVE
WALLINGFORD, CT 06492

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

DEVELOPMENT & MANAGEMENT PLANS

NO	DATE	REVISION
0	10/28/19	FOR REVIEW: RCB
1		
2		
3		
4		
5		
6		

DESIGN PROFESSIONALS OF RECORD

PROF: ROBERT C. BURNS, P.E.
COMP: ALL-POINTS TECHNOLOGY CORPORATION, P.C.
ADD: 3 SADDLEBROOK DRIVE KILLINGWORTH, CT 06419

VERIZON AT CROMWELL NORTH 2 CT

SITE ADDRESS: 667 MAIN STREET CROMWELL, CT 06416

APT FILING NUMBER: NY141NB6710

DRAWN BY: CSH

DATE: 10/28/19 | CHECKED BY: RCB

SHEET TITLE: **NOTES & SPECIFICATIONS**

SHEET NUMBER: **N-2**

valmont
STRUCTURES

Valmont Microflect
3575 25th St. SE
Salem, Oregon 97302 USA
1-800-547-2151

Communication Structure Calculations
for
Verizon
CROMWELL NORTH 2 CT
456600-P1

Wednesday, 23 October 2019

Prepared By:
James Ahlgren

Reviewed By:
Timothy Drumm

valmont STRUCTURES

Valmont Microflect
3575 25th St. SE
Salem, Oregon 97302 USA
1-800-547-2151

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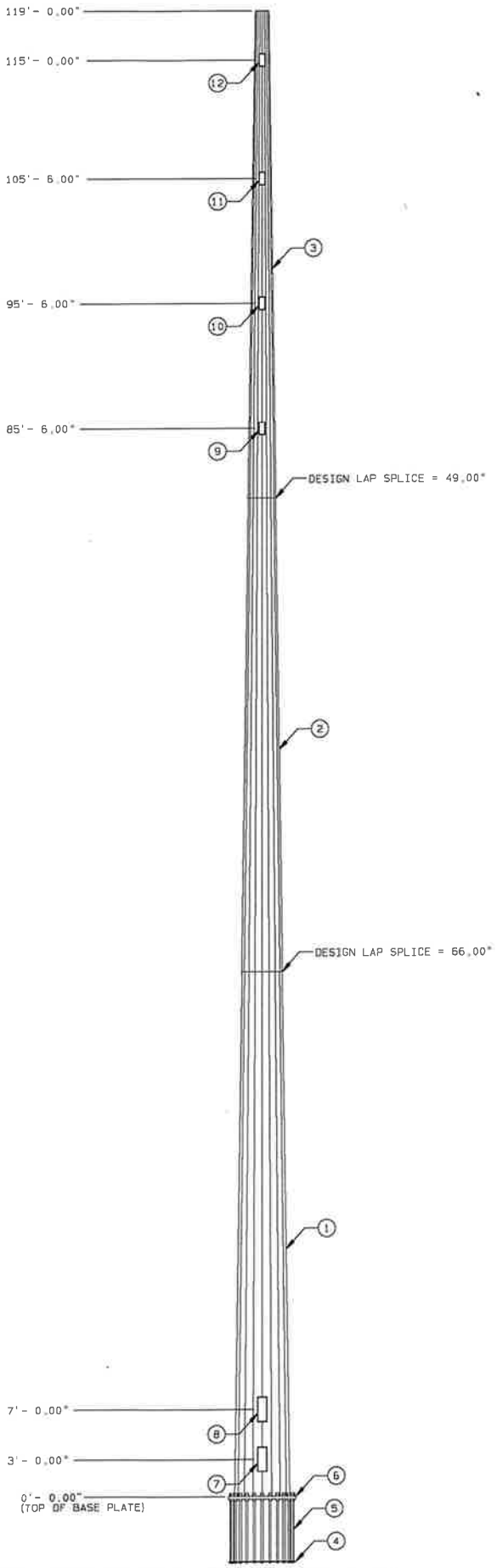
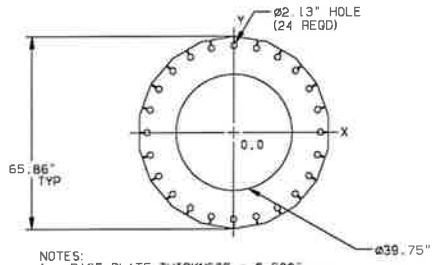


ITEM ID	NO. REQD	FEATURES	UNIT WEIGHT (LBS)	WEIGHT (LBS)
1	1	SECTION A VALMONT S-22 0.438" THK (A572 GR65)	9,938	9,938
2	1	SECTION B VALMONT S-22 0.438" THK (A572 GR65)	6,245	6,245
3	1	SECTION C VALMONT S-22 0.313" THK (A572 GR65)	2,573	2,573
4	1	BOTTOM CAGE PLATE	119	119
5	24	1.75" ANCHOR BOLT, LENGTH=5.50' A615 GR75	62	1,474
6	1	BASE PLATE VALMONT S-56 2.500" THK (A572 GR50)	1,724	1,724
	1	TOP CAGE PLATE (REMOVE BEFORE SETTING POLE)	156	156
	1	SAFETY CLIMBING CABLE (LENGTH = 109.00')	88	88
	3	GROUNDING LUG	2	6
		GALVANIZING	324	324
	86	STEP AND CLIP (VALMONT STANDARD)	1	43
7	2	HAND HOLE HVY (9" x 24")	66	132
8	2	HAND HOLE HVY (9" x 24")	66	132
9	3	HAND HOLE HVY (6" x 12")	26	78
10	3	HAND HOLE HVY (6" x 12")	26	78
11	3	HAND HOLE HVY (6" x 12")	26	78
12	2	HAND HOLE HVY (6" x 12")	26	52
	1	POLE CAP	11	11

HOLE COORDS (INCHES)	
X-COORD	Y-COORD
29.75	0.00
28.74	7.70
25.76	14.88
21.04	21.04
14.88	25.76
7.70	28.74
0.00	29.75



NOTES:
1. BASE PLATE THICKNESS = 2.500"
2. BASE PLATE ALLOWABLE STRESS (KSI) = 50.000
3. ANGLES ARE MEASURED CLOCKWISE FROM 0 DEGREES
4. BOLT CIRCLE DIAMETER = 59.50"
5. CAGE TEMPLATE DIAMETER = 63.00"

BASE PLATE / ANCHORAGE CHARACTERISTICS

NOTES:

1. FACTORED REACTIONS FOR FOUNDATION DESIGN
   MOMENT = 56,235 IN-KIPS
   SHEAR = 47,696 #
   VERTICAL = 48,311 #
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 = 97 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	ABP MTG HT. (FT)	ABP CENTROID HT. (FT)	WITHOUT ICE EPA (FT**2)	WITHOUT ICE WT (LBS)	WITH ICE EPA (FT**2)	WITH ICE WT (LBS)
1-12'-6" SQUARE PLATFORM	117.00	119.00	40.33	3143	59.42	4753
1-12'-6" SQUARE PLATFORM	107.50	109.00	30.74	2260	43.82	3215
1-12'-6" SQUARE PLATFORM	97.50	99.00	30.74	2260	43.82	3215
1-12'-6" SQUARE PLATFORM	87.50	89.00	30.74	2260	43.82	3215
4-6'X19.6''X7.8'' PANEL ANTEN	117.00	119.00	40.52	516	49.84	928
8-6'X18''X7'' PANEL ANTENNA	117.00	119.00	71.68	1032	90.24	1792
3-RRU 15''X15''X10''	117.00	119.00	4.23	165	5.19	228
3-RRU 15''X15''X8.1''	117.00	119.00	3.90	152	4.86	222
12-8'X1.5'X8'' PANEL ANTENNAS	107.50	109.00	134.76	1248	167.04	2808
12-8'X1.5'X8'' PANEL ANTENNAS	97.50	99.00	134.76	1248	166.92	2808
12-8'X1.5'X8'' PANEL ANTENNAS	87.50	89.00	134.76	1248	166.80	2808
1-1/2" X 4' LIGHTNING ROD	119.00	121.00	0.20	14	1.20	34
1-RFS DB-C1-12C-24AB-0Z (29.5	117.00	119.00	4.06	32	4.88	168
12-RRU (24" X 13" X 9")	107.50	109.00	21.12	660	27.24	1680
3-COVP (20.22" X 18.86" X 7")	107.50	109.00	6.57	90	8.34	348
12-RRU (24" X 13" X 9")	97.50	99.00	21.12	660	27.12	1668
3-COVP (20.22" X 18.86" X 7")	97.50	99.00	6.57	90	8.31	345
12-RRU (24" X 13" X 9")	87.50	89.00	21.12	660	27.12	1656
3-COVP (20.22" X 18.86" X 7")	87.50	89.00	6.57	90	8.31	342
6-RRU (24" X 13" X 9")	117.00	119.00	10.56	330	13.62	846

5. FEEDLINES ARE PLACED INTERIOR TO POLE SHAFT (UNLESS NOTED OTHERWISE).
6. TOTAL POLE HEIGHT IS 120 FT AGL.
7. ELEVATIONS ARE MEASURED FROM TOP OF BASE PLATE (APPROX. 1 FT AGL).
8. 18 SIDED SHAFT
9. MONOPOLE DESIGNED W/ A THEORETICAL FALL ZONE RADIUS OF 35 FT.

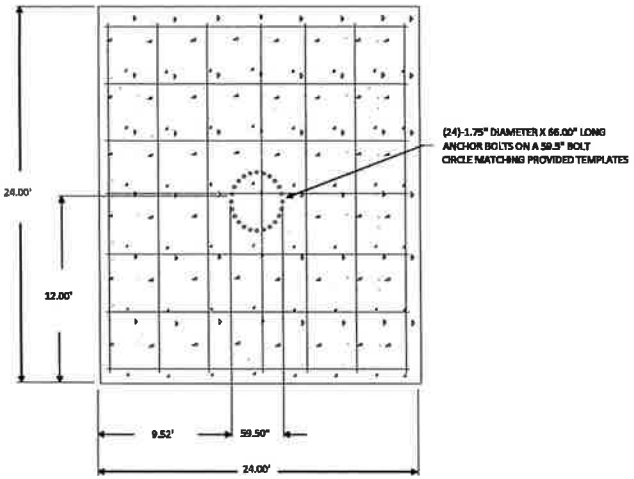
SECTION INFORMATION					
ITEM ID	LENGTH	BASE OD	TOP OD	THK	MATL
1	47'- 6.00"	53.00"	36.43"	0.438"	A572 65 KSI
2	42'- 0.00"	39.23"	24.58"	0.438"	A572 65 KSI
3	39'- 1.00"	26.63"	13.00"	0.313"	A572 65 KSI

REV ID	DATE	REV BY	DESCRIPTION
D	10/23/19	JA70	ADDITIONAL ALL-POINT REVISIONS.
C	10/08/19	JA70	REVISED PER ALL-POINT INDEPENDENT REVIEW.
B	08/16/19	YZ	CUSTOMER REVISIONS PER MARKUP.
A	08/09/19	TED	CUSTOMER REVISIONS PER MARKUP.

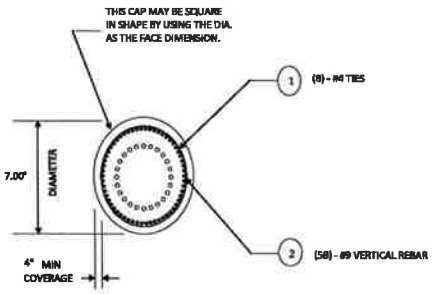
ORDER	PROJECT	FILE ID	SCALE	DATE	ENGR
456600		456600R6	NONE	10/23/19	JA70

DESCRIPTION: VERIZON 120' POLE, SITE: CROMWELL NORTH 2 CT

valmont



SECTION A-A
No Scale



SECTION B-B
No Scale

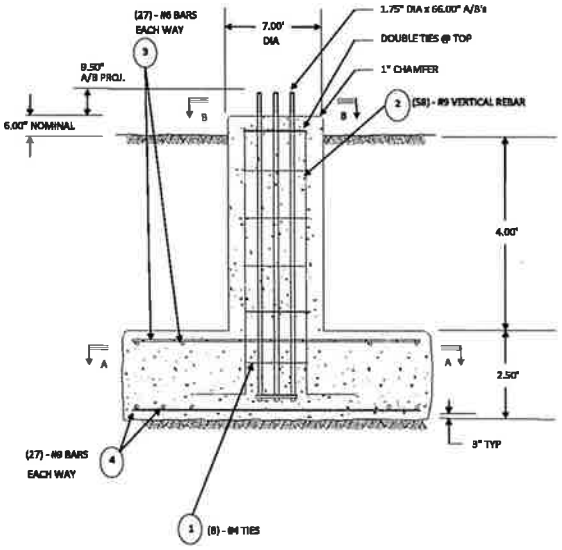
GENERAL NOTES: SLAB FOUNDATION

1. Prior to excavation, check the area for underground facilities.
2. 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.
3. 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.
4. Trowel top of foundation smooth.
5. 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.
6. The ground water was encountered at 15' below grade during boring.
7. Foundation design based on ultimate vert. bearing pressure of 10000 psf.
8. Concrete is assumed to weigh 150 pcf.
9. Estimated concrete volume = 59.75 cubic yards total.
10. Design Based on the following loads from installation drawing for order No: 456600-P1.

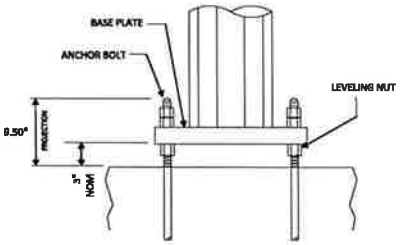
Factored Moment = 4686 FT-KIPS **Overturning Safety Factor = 1.87**
Factored Download = 36.2 KIPS **Max. Toe Bearing Pressure = 3.96 ksf**
Factored Shear = 47.7 KIPS

11. Backfill should be compacted to a density of 100 pcf.
12. Anchor bolts to be ASTM A615, Gr. 75 ksi.
13. Reference: Down To Earth Consulting, LLC File No. 0092-016.00

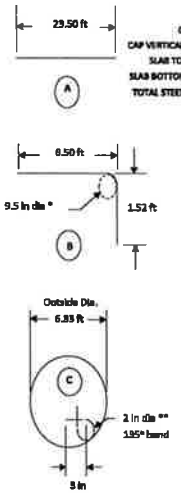
14. Factored download (after load combination) = (48.31/1.2)*0.9 = 36.23 kips.



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



REINFORCEMENT STEEL SCHEDULE						
Item	Type	Rebar Size	Rebar Spacing	Weight (lbs)	Qty
CAP TIES	1	C	#4	EQUAL	388	8
CAP VERTICAL REBAR	2	B	#9	----	1982	58
SLAB TOP STEEL	3	A	#6	10.85 in	1306	54
SLAB BOTTOM STEEL	4	A	#9	10.85 in	4315	54
TOTAL STEEL WEIGHT FOR COMPLETE FOUNDATION INSTALLATION =					7909	

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	11-97206	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	5.00
#9	11-97209	3.40	8.77	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 in Ties	Bottom Horiz	Top Horiz
#3	60	4000 psi	15	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	85	122
#11	60	4000 psi	71	118	168

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

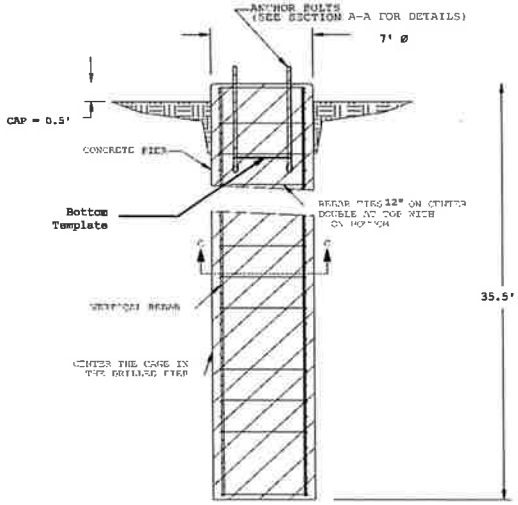
UNLESS OTHERWISE NOTED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:

valmont MICROFLECT
8975 25TH STREET SE SALEM, OH 44460
PHONE (330) 533-6097
FAX (330) 533-3040

By:	JA
Check:	TD
Date:	10/23/19

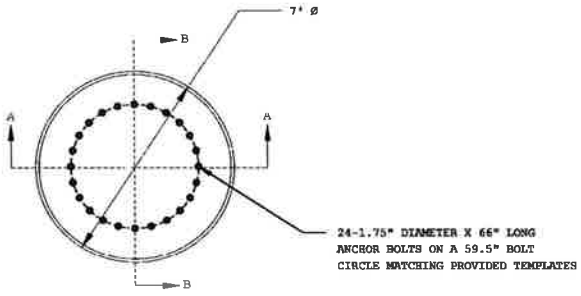
SLAB FOUNDATION LAYOUT
Customer Verizon
Site CROMWELL NORTH 2 CT

S.O. 456600-P1 | SIZE - B | Dwg No. CT 456600-P1 | Sheet 1 of 1



SECTION B-B

PIER ELEVATION
(NO SCALE)



FOUNDATION & ANCHOR BOLT LAYOUT PLAN
(NO SCALE)

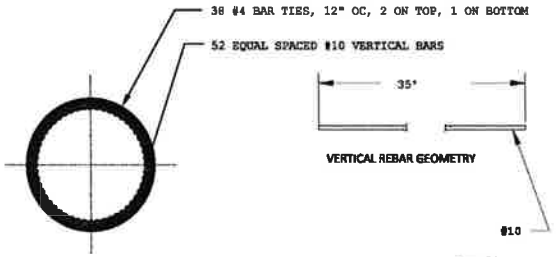
GENERAL NOTES: DRILLED PIER

1. Prior to excavation, check the area for underground facilities.
2. 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.
3. 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.
4. Trowel top of pedestal smooth.
5. Steel reinforcement and concrete should be placed immediately upon completion of the pier excavations. Contractor shall not allow a cold joint to form in the pier. Portion above grade should be formed. Temporary casing may be required to prevent caving prior to concrete placement.
6. The ground water was encountered at 15' below grade during boring.
7. Concrete is assumed to weigh 150 pcf.
8. Estimated concrete volume = **50.7 cubic yards total.**
9. Design Based on the following loads from installation drawing for order No: 456600-P1.

Factored Moment =	**56295 in-kips**
Factored Shear =	**47.7 kips**
Factored Download =	**48.31 kips**

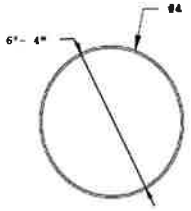
10. Reference: Down To Earth Consulting, LLC File No. 0032-016.00

11. Concrete shall be placed using a tremie to the depth indicated on the foundation drawing.
12. Anchor bolts to be ASTM A615, Gr. 75 ksi.
13. Ref Soils Report for installation recommendations.



SECTION C-C
PIER REBAR LAYOUT
(NO SCALE)

VERTICAL REBAR GEOMETRY



REBAR TIE GEOMETRY

Reinforcement Steel Schedule					Total	Total
-	Type	Rebar size	Rebar Spacing	Bar Weight lb/ft	Weight (lb)	BAR Qty
1	Vertical	#10	EQUAL	4.3	7826	52
2	Ties	#4	12"	0.67	539	38

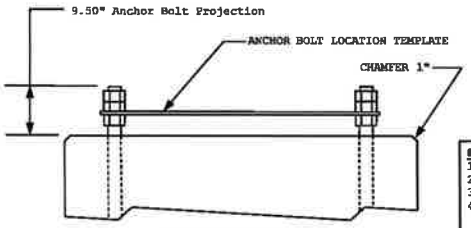
TOTAL STEEL WEIGHT FOR COMPLETE FOUNDATION INSTALLATION = **83648**

REBAR LAP SPLICE TABLE			Ref. ACI 318
Rebar Size	Rebar Grade	CONCRETE STRENGTH PSI	REBAR OVERLAP INCHES
#10	60	4000	67
#4	60	4000	15

NOTES: Where vertical bars are to be spliced, splices should be staggered.

GRADE 60 REBAR TIES		HOOK GEOMETRY***	
Rebar Size	ASK #	6db* ** Min Length	4db* Nominal Diameter
	Seismic Hook Not Reqd	N/A	N/A

* db = Bar Diameter
** Refers to ACI Stirrup hook detail 6db 3in min.



SECTION A-A TYP
ANCHOR BOLT ELEVATION
(NO SCALE)

Note: EXTREME CARE SHOULD BE TAKEN TO ENSURE THAT ALL BOLTS ARE LEVEL WITH RESPECT TO EACH OTHER TO ENSURE ADEQUATE NUT ENGAGEMENT

Special Inspection
1. Inspection of reinforcing steel and placement (periodic).
2. Inspection of anchor bolts cast in concrete (periodic).
3. Verifying use of required mix design (periodic).
4. At the time fresh concrete is sampled to fabricate specimens for strength tests; perform slump and air content tests and determine temperature of concrete (continuous).
5. Inspection of concrete placement for proper application techniques (continuous).
6. Verify excavations are extended to proper depth and have reached proper material (periodic).
7. Observe drilling operations and maintain complete and accurate records for each element (continuous).
8. Verify placement locations and plumbness, confirm element diameters, lengths, and adequate end-bearing strata capacity; record concrete volume (continuous).
9. Inspect formwork for shape, location, and dimensions of the concrete member being formed (periodic).

Rev	Description	Date	By/Ck

UNLESS OTHERWISE NOTED DIMENSIONS ARE IN INCHES TOLERANCES ARE:
X' = ± 1/8"
X.X" = ± 1/16"
X.XX" = ± 1/32"
X" = ± 1/16"

valmont STRUCTURES
3975 25TH STREET SE
SALEM, OR 97302
MAIN (503) 363-9267
(800) 547-2151

By:	JA	DRILLED PIER FOUNDATION LAYOUT
Check:	TD	Customer: Verizon
Date:	10/23/19	Site: CROMWELL NORTH 2 CT

ANALYSIS Version: 2.1 | S.O.#456600-P1 | SIZE - B | Drawing No.CT 456600-P1 | Sheet 1 of 1

Valmont Industries, Inc.
Project Summary
Verizon
456600

			Anchor Bolts			Shaft Diameters			Weight (lb)								Global Base Reactions For Pole Shaft Governing Load Case				
Structure Identifier	Pole Height (ft)	Emb. Length (ft)	Max Bolt Circle (in)	Anchor Bolt Length (in)	Qty	Base (in)	Ground Line (in)	Top (in)	Sect A	Sect B	Sect C	Sect D	Sect E	Sect F	Base Plate	Anchor Bolts	Load Case Identifier	Moment (in-kip)	Shear (kips)	Axial (kips)	Max Defl (in)
456600R6	119.00	----	59.50	66	24	53.00	53.00	13.00	9938	6245	2573	----	----	----	1724	1474	WIND	56235	47.7	46.6	113

Valmont Industries, Inc.
Project Summary
Verizon
456600

Structure Identifier	Shaft Yield Stress (ksi)	Shaft Taper (in/ft)	Shaft Shape	Anchor Bolt Diameter (in)	Base Plate Width/ Length (in)	Base Plate Thickness (in)	Camber (in)	Length (ft)						Thickness (in)					
								Sect A	Sect B	Sect C	Sect D	Sect E	Sect F	Sect A	Sect B	Sect C	Sect D	Sect E	Sect F
456600R6	65	0.349	18	1.75	64.86	2.50	0.0	47.50	42.00	39.08	----	----	----	0.438	0.438	0.313	----	----	----

Valmont Industries, Inc.
Project Summary
Verizon
456600

	Section Data																
Structure Identifier	"A" Base Diameter (in)	"A" Top Diameter (in)	"B" Base Diameter (in)	"B" Top Diameter (in)	"C" Base Diameter (in)	"C" Top Diameter (in)	"D" Base Diameter (in)	"D" Top Diameter (in)	"E" Base Diameter (in)	"E" Top Diameter (in)	"F" Base Diameter (in)	"F" Top Diameter (in)	"A"-"B" Joint Type	"B"-"C" Joint Type	"C"-"D" Joint Type	"D"-"E" Joint Type	"E"-"F" Joint Type
456600R6	53.00	36.43	39.23	24.58	26.63	13.00	----	----	----	----	----	----	Slip Joint	Slip Joint		----	----

*** OVERVIEW ***

1. Structure design conforms to TIA-222-G Addendum 2 including:
   97 mph Wind Speed (3 second gust, 50 year return period)
   50 mph Ice Wind (50 year return period)
   0.75 in ice thickness
   60.0 mph Basic Wind Speed with no ice for twist and sway
   Exposure Category C
   Structure Classification II
   Topographic Category 1
2. Feedlines are assumed to be placed interior to the pole
3. All microwave assumed to be 2 GHz unless otherwise noted
4. Total pole height is 120.0 ft agl
5. Elevations are measured from top of base plate (approximately 1.0 ft agl)
6. MONOPOLE DESIGNED W/ A THEORETICAL FALL ZONE RADIUS OF 35 FT.

*** Structure Anchorage Information ***

Pole Height (ft):	119.0	Number of Anchor Bolts:	24
Bolt Circle (in):	59.50	Diameter of Anchor Bolts (in):	1.75
Base Shear (lbs):	47696	Length of Anchor Bolts (in):	66.00
Base Vertical (lbs):	48311	Projection Length (in):	9.50
Base Moment (in-kips):	56235	Template OD (in):	63.00

*** Loading Data***

			Without Ice		With Ice	
Qty	Description	ABP Height (ft)	EPA (ft^2)	Weight (lbs)	EPA (ft^2)	Weight (lbs)
1	12'-6" SQUARE PLATFORM	117.00	40.33	3143	59.42	4753
1	12'-6" SQUARE PLATFORM	107.50	30.74	2260	43.82	3215
1	12'-6" SQUARE PLATFORM	97.50	30.74	2260	43.82	3215
1	12'-6" SQUARE PLATFORM	87.50	30.74	2260	43.82	3215
4	6'X19.6''X7.8'' PANEL ANTENNA (W/PM)	117.00	40.48	633	49.84	1317
8	6'X18''X7'' PANEL ANTENNA (W/PM)	117.00	71.68	1266	90.24	2571
3	RRU 15''X15''X10''	117.00	4.23	165	5.19	228
3	RRU 15''X15''X8.1''	117.00	3.90	162	4.86	222
12	8'X1.5'X8'' PANEL ANTENNAS (W/PM)	107.50	134.76	1599	167.04	3966
12	8'X1.5'X8'' PANEL ANTENNAS (W/PM)	97.50	134.76	1599	166.92	3955
12	8'X1.5'X8'' PANEL ANTENNAS (W/PM)	87.50	134.76	1599	166.80	3943
1	1/2" X 4' LIGHTNING ROD	119.00	0.20	14	1.20	34
1	RFS DB-C1-12C-24AB-0Z (29.5"X16.5"X12.6")	117.00	4.06	32	4.88	168
12	RRU (24" X 13" X 9")	107.50	21.12	660	27.24	1681
3	COVP (20.22" X 18.86" X 7")	107.50	6.57	90	8.34	349
12	RRU (24" X 13" X 9")	97.50	21.12	660	27.12	1670
3	COVP (20.22" X 18.86" X 7")	97.50	6.57	90	8.31	346
12	RRU (24" X 13" X 9")	87.50	21.12	660	27.12	1657
3	COVP (20.22" X 18.86" X 7")	87.50	6.57	90	8.31	343
6	RRU (24" X 13" X 9")	117.00	10.56	330	13.62	846

BY VALMONT INDUSTRIES FOR: VERIZON 120' POLE, SITE: CROMWELL NORTH 2 CT DATE 10/23/2019
Design Id: 456600R6 IMPAX 22.4.16.0

*** SUMMARY ***

Design Code: TIA-222-G Addendum 2

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

Height Above Base Plate (ft) 119.00	Ground Line Diameter (in)	53.000	Pole Shaft Weight (lbs)	18755	
	Top Diameter (in)	13.000			
	Pole Taper (in/ft)	0.34874	Shape:	18 Sides	

Connections Between Sections	/First/	/Second/
Height Above Ground (ft)	47.50	84.00
Type	Slip Joint	Slip Joint
Overlap Length (in)	66	49
Maximum Axial Force (lbs)	58840	48885

Section Characteristics	/First/	/Second/	/Third/
Base Diameter (in)	53.000	39.228	26.630
Top Diameter (in)	36.435	24.581	13.000
Thickness (in)	0.43750	0.43750	0.31250
Length (ft)	47.500	42.000	39.083
Weight (lbs)	9938	6245	2573
Yield Strength (ksi)	65.00	65.00	65.00
Section Shape	18 Sides	18 Sides	18 Sides

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

	Pt. of Fixity	Governing Level Sec.1	Governing Level Sec.2	Governing Level Sec.3	Pole Top
Governing Load Case	WIND	WIND	WIND	WIND	WIND
Height (ft)	0.00	47.50	54.00	84.00	119.00
Resultant Moment (in-kips)	56235	29758	26251	10396	0
Shear Force (lbs)	47783	45064	44677	43396	13
Axial Force (lbs)	46498	31011	29320	21387	15
Effective Yield Strength (ksi)	78.35	82.55	82.55	82.55	82.55
Combined Interaction Value	0.85	0.92	0.88	0.95	0.00
Total Deflection (in)	0.00	14.64	19.37	51.65	113.08

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

BY VALMONT INDUSTRIES FOR: VERIZON 120' POLE, SITE: CROMWELL NORTH 2 CT DATE 10/23/2019
Design Id: 456600R6 IMPAX 22.4.16.0

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

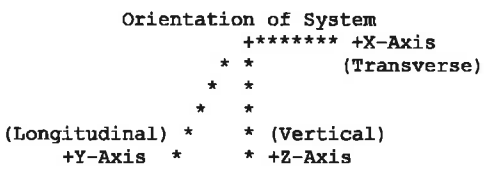
Loading Case Identifier	Moments About X-Axis (in-kips)	Moments About Y-Axis (in-kips)	Moments Resultant (X & Y) (in-kips)	Moments Torsional (in-kips)	Vertical Force (lbs)	Shear In X-Direction (lbs)	Shear In Y-Direction (lbs)	Shear Resultant (X & Y) (lbs)	Notes
WIND	43079	-36147	56235	0	46587	30658	36537	47696	
ICE + WIND	16380	-13744	21382	0	77180	11637	13868	18103	
T+S	9180	-7703	11984	0	38354	6568	7827	10218	

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

*** INPUT LOADS ***

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

Basic Wind Velocity is 97.00 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 1.10
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 = 1.00 ft



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	117.00	119.00	0.00	50.00	1373	1636	3772	40.33	1-12'-6" Squa
2	107.50	109.00	0.00	50.00	1028	1225	2712	30.74	1-12'-6" Squa
3	97.50	99.00	0.00	50.00	1007	1200	2712	30.74	1-12'-6" Squa
4	87.50	89.00	0.00	50.00	985	1174	2712	30.74	1-12'-6" Squa
5	117.00	119.00	0.00	50.00	1378	1642	760	40.48	4-6'x19.6''x7
6	117.00	119.00	0.00	50.00	2440	2908	1519	71.68	8-6'x18''x7''
7	117.00	119.00	0.00	50.00	144	172	198	4.23	3-RRU 15''x15
8	117.00	119.00	0.00	50.00	133	158	194	3.90	3-RRU 15''x15
9	107.50	109.00	0.00	50.00	4505	5368	1919	134.76	12-8'x1.5'x8''
10	97.50	99.00	0.00	50.00	4415	5262	1919	134.76	12-8'x1.5'x8''
11	87.50	89.00	0.00	50.00	4318	5146	1919	134.76	12-8'x1.5'x8''
12	119.00	121.00	0.00	50.00	7	8	17	0.20	1-1/2" x 4' 1
13	117.00	119.00	0.00	50.00	138	165	38	4.06	1-RFS DB-C1-1
14	107.50	109.00	0.00	50.00	706	841	792	21.12	12-RRU (24" x
15	107.50	109.00	0.00	50.00	220	262	108	6.57	3-COVP (20.22
16	97.50	99.00	0.00	50.00	692	825	792	21.12	12-RRU (24" x
17	97.50	99.00	0.00	50.00	215	257	108	6.57	3-COVP (20.22

*** INPUT LOADS ***

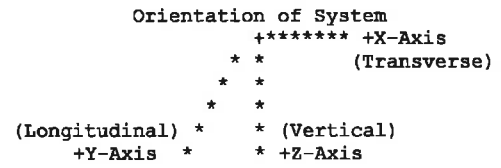
Loading Case WIND - Continued

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)	Orientation of System EPA (ft^2)	Orientation of System 3-COVP (20.22 3-COVP (20.22 3-COVP (20.22
18	87.50	89.00	0.00	50.00	677	807	792	21.12	12-RRU (24" x
19	87.50	89.00	0.00	50.00	211	251	108	6.57	3-COVP (20.22
20	117.00	119.00	0.00	50.00	360	428	396	10.56	6-RRU (24" x

*** INPUT LOADS ***

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 1.10
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 = 1.00 ft



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	117.00	119.00	0.00	50.00	538	641	5704	59.42	1-12'-6" Squa
2	107.50	109.00	0.00	50.00	389	464	3858	43.82	1-12'-6" Squa
3	97.50	99.00	0.00	50.00	381	455	3858	43.82	1-12'-6" Squa
4	87.50	89.00	0.00	50.00	373	445	3858	43.82	1-12'-6" Squa
5	117.00	119.00	0.00	50.00	451	537	1581	49.84	4-6'x19.6''x7
6	117.00	119.00	0.00	50.00	816	973	3085	90.24	8-6'x18''x7''
7	117.00	119.00	0.00	50.00	47	56	274	5.19	3-RRU 15''x15
8	117.00	119.00	0.00	50.00	44	52	266	4.86	3-RRU 15''x15
9	107.50	109.00	0.00	50.00	1484	1768	4759	167.04	12-8'x1.5'x8''
10	97.50	99.00	0.00	50.00	1453	1732	4746	166.92	12-8'x1.5'x8''
11	87.50	89.00	0.00	50.00	1420	1693	4732	166.80	12-8'x1.5'x8''
12	119.00	121.00	0.00	50.00	11	13	41	1.20	1-1/2" x 4' l
13	117.00	119.00	0.00	50.00	44	53	202	4.88	1-RFS DB-C1-1
14	107.50	109.00	0.00	50.00	242	288	2018	27.24	12-RRU (24" x
15	107.50	109.00	0.00	50.00	74	88	418	8.34	3-COVP (20.22
16	97.50	99.00	0.00	50.00	236	281	2004	27.12	12-RRU (24" x
17	97.50	99.00	0.00	50.00	72	86	415	8.31	3-COVP (20.22

*** INPUT LOADS ***

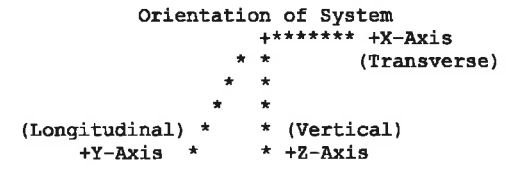
Loading Case ICE + WIND - Continued

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)	Orientation of System EPA (ft^2)	Orientation of System 3-COVP (20.22 3-COVP (20.22 3-COVP (20.22
18	87.50	89.00	0.00	50.00	231	275	1989	27.12	12-RRU (24" x
19	87.50	89.00	0.00	50.00	71	84	411	8.31	3-COVP (20.22
20	117.00	119.00	0.00	50.00	123	147	1015	13.62	6-RRU (24" x

*** 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 1.10
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 = 1.00 ft



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	117.00	119.00	0.00	50.00	294	350	3143	40.33	1-12'-6" Squa
2	107.50	109.00	0.00	50.00	220	262	2260	30.74	1-12'-6" Squa
3	97.50	99.00	0.00	50.00	215	257	2260	30.74	1-12'-6" Squa
4	87.50	89.00	0.00	50.00	211	251	2260	30.74	1-12'-6" Squa
5	117.00	119.00	0.00	50.00	295	351	633	40.48	4-6'x19.6''x7
6	117.00	119.00	0.00	50.00	522	622	1266	71.68	8-6'x18''x7''
7	117.00	119.00	0.00	50.00	31	37	165	4.23	3-RRU 15''x15
8	117.00	119.00	0.00	50.00	28	34	162	3.90	3-RRU 15''x15
9	107.50	109.00	0.00	50.00	964	1149	1599	134.76	12-8'x1.5'x8''
10	97.50	99.00	0.00	50.00	945	1126	1599	134.76	12-8'x1.5'x8''
11	87.50	89.00	0.00	50.00	924	1101	1599	134.76	12-8'x1.5'x8''
12	119.00	121.00	0.00	50.00	1	2	14	0.20	1-1/2" x 4' l
13	117.00	119.00	0.00	50.00	30	35	32	4.06	1-RFS DB-C1-1
14	107.50	109.00	0.00	50.00	151	180	660	21.12	12-RRU (24" x
15	107.50	109.00	0.00	50.00	47	56	90	6.57	3-COVP (20.22
16	97.50	99.00	0.00	50.00	148	176	660	21.12	12-RRU (24" x
17	97.50	99.00	0.00	50.00	46	55	90	6.57	3-COVP (20.22

*** INPUT LOADS ***

Loading Case T+S - Continued

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)	Orientation of System EPA (ft^2)	3-COVP (20.22 3-COVP (20.22 3-COVP (20.22
18	87.50	89.00	0.00	50.00	145	173	660	21.12	12-RRU (24" x
19	87.50	89.00	0.00	50.00	45	54	90	6.57	3-COVP (20.22
20	117.00	119.00	0.00	50.00	77	92	330	10.56	6-RRU (24" x

*** 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 3	119.00	13.000	0.3125	41.60	5.57	256	12.58
	117.00	13.697	0.3125	43.83	5.97	300	13.28
	114.00	14.744	0.3125	47.18	6.56	377	14.31
	109.00	16.487	0.3125	52.76	7.54	530	16.04
	107.50	17.011	0.3125	54.43	7.83	583	16.56
	104.00	18.231	0.3125	58.34	8.52	721	17.77
	99.00	19.975	0.3125	63.92	9.51	952	19.50
	97.50	20.498	0.3125	65.59	9.80	1030	20.02
	94.00	21.718	0.3125	69.50	10.49	1229	21.23
	89.00	23.462	0.3125	75.08	11.48	1554	22.96
	87.50	23.985	0.3125	76.75	11.77	1662	23.48
	84.00	25.206	0.3125	80.66	12.46	1932	24.69
Top of Sect 2	84.00	24.581	0.4375	56.18	8.14	2468	33.52
Base of Sect 3	79.92	26.005	0.4375	59.44	8.72	2931	35.50
	79.00	26.325	0.4375	60.17	8.85	3043	35.95
	74.00	28.068	0.4375	64.16	9.55	3700	38.37
	69.00	29.812	0.4375	68.14	10.25	4445	40.79
	64.00	31.556	0.4375	72.13	10.95	5285	43.21
	59.00	33.299	0.4375	76.11	11.66	6224	45.63
	54.00	35.043	0.4375	80.10	12.36	7268	48.05
	49.00	36.787	0.4375	84.08	13.06	8423	50.47
	47.50	37.310	0.4375	85.28	13.27	8792	51.20
Top of Sect 1	47.50	36.435	0.4375	83.28	12.92	8181	49.99
	44.00	37.655	0.4375	86.07	13.41	9041	51.68
Base of Sect 2	42.00	38.353	0.4375	87.66	13.69	9559	52.65
	39.00	39.399	0.4375	90.06	14.12	10373	54.10
	34.00	41.143	0.4375	94.04	14.82	11828	56.52
	29.00	42.887	0.4375	98.03	15.52	13415	58.94
	24.00	44.630	0.4375	102.01	16.22	15136	61.36
	19.00	46.374	0.4375	106.00	16.93	17000	63.79
	14.00	48.118	0.4375	109.98	17.63	19010	66.21
	9.00	49.861	0.4375	113.97	18.33	21173	68.63
	4.00	51.605	0.4375	117.95	19.04	23494	71.05
Pt of Fixity	0.00	53.000	0.4375	121.14	19.60	25468	72.99

BY VALMONT INDUSTRIES FOR: VERIZON 120' POLE, SITE: CROMWELL NORTH 2 CT DATE 10/23/2019
Design Id: 456600R6 IMPAX 22.4.16.0
Forces and Moments for Pole in the Local Element Coordinate System

Loading Case 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)
119.00	0	0	0	0	9	10	13	15
117.00	1	-1	2	0	64	77	100	119
117.00	190	-160	249	0	6675	7954	10384	5381
114.00	479	-402	625	0	6753	8048	10506	5578
109.00	967	-812	1263	0	6905	8229	10742	5915
107.50	1116	-937	1457	0	6957	8291	10823	6014
107.50	1265	-1061	1651	0	13876	16537	21588	9952
104.00	1963	-1647	2562	0	13963	16640	21722	10332
99.00	2968	-2491	3875	0	14124	16832	21973	10824
97.50	3272	-2745	4271	0	14186	16906	22069	10943
97.50	3417	-2867	4461	0	20916	24927	32540	15150
94.00	4468	-3749	5832	0	20983	25007	32644	15716
89.00	5976	-5015	7801	0	21141	25195	32890	16381
87.50	6431	-5396	8394	0	21212	25280	33000	16523
87.50	6572	-5514	8579	0	27724	33041	43132	21045
84.00	7964	-6682	10396	0	27894	33243	43396	21387
84.00	7964	-6682	10396	0	27792	33121	43236	21708
79.92	9594	-8050	12524	0	27975	33339	43521	22892
79.00	9961	-8358	13003	0	27946	33305	43476	23252
74.00	11969	-10043	15624	0	28084	33469	43691	24387
69.00	13987	-11737	18259	0	28230	33643	43918	25564
64.00	16016	-13439	20908	0	28384	33827	44158	26780
59.00	18057	-15151	23571	0	28547	34021	44411	28032
54.00	20109	-16874	26251	0	28718	34224	44677	29320
49.00	22174	-18606	28946	0	28943	34493	45027	30536
47.50	22796	-19128	29758	0	29039	34607	45177	30847
47.50	22796	-19128	29758	0	28967	34521	45064	31011
44.00	24252	-20350	31659	0	29133	34720	45324	32662
42.00	25087	-21051	32749	0	29201	34800	45428	33683
39.00	26344	-22105	34390	0	29272	34885	45539	34583
34.00	28449	-23871	37137	0	29442	35087	45803	36010
29.00	30565	-25647	39900	0	29614	35293	46071	37472
24.00	32694	-27434	42679	0	29786	35498	46339	38970
19.00	34835	-29230	45474	0	29956	35700	46603	40506
14.00	36988	-31037	48285	0	30118	35894	46856	42079
9.00	39153	-32853	51110	0	30280	36087	47108	43692
4.00	41329	-34679	53951	0	30463	36305	47393	45321
0.00	43079	-36147	56235	0	30714	36604	47783	46498

BY VALMONT INDUSTRIES FOR: VERIZON 120' POLE, SITE: CROMWELL NORTH 2 CT DATE 10/23/2019
Design Id: 456600R6 IMPAX 22.4.16.0
Deflections and Stresses for Pole

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)
119.00	72.7	86.6	113.1	6.5	9.49	0.00	0.00	0.00	0.00	0.01	82.55
117.00	70.1	83.6	109.1	6.2	9.49	0.00	0.00	0.00	0.00	0.01	82.55
117.00	70.1	83.6	109.1	6.2	9.49	0.01	0.08	0.05	0.00	0.09	82.55
114.00	66.3	79.1	103.2	5.7	9.40	0.01	0.17	0.05	0.00	0.18	82.55
109.00	60.1	71.7	93.5	4.9	9.15	0.01	0.27	0.05	0.00	0.28	82.55
107.50	58.3	69.5	90.7	4.7	9.06	0.01	0.29	0.04	0.00	0.30	82.55
107.50	58.3	69.5	90.7	4.7	9.06	0.01	0.33	0.09	0.00	0.35	82.55
104.00	54.1	64.5	84.2	4.1	8.79	0.01	0.44	0.08	0.00	0.46	82.55
99.00	48.3	57.6	75.2	3.5	8.34	0.01	0.56	0.08	0.00	0.57	82.55
97.50	46.7	55.6	72.6	3.3	8.19	0.01	0.58	0.08	0.00	0.59	82.55
97.50	46.7	55.6	72.6	3.3	8.19	0.01	0.61	0.11	0.00	0.63	82.55
94.00	42.9	51.1	66.8	2.9	7.81	0.01	0.70	0.11	0.00	0.73	82.55
89.00	37.9	45.1	58.9	2.4	7.23	0.01	0.80	0.10	0.00	0.82	82.55
87.50	36.4	43.4	56.7	2.2	7.05	0.01	0.83	0.10	0.00	0.85	82.55
87.50	36.4	43.4	56.7	2.2	7.05	0.01	0.85	0.13	0.00	0.87	82.55
84.00	33.2	39.6	51.7	1.9	6.62	0.01	0.93	0.12	0.00	0.95	82.55
84.00	33.2	39.6	51.7	1.9	6.62	0.01	0.71	0.09	0.00	0.72	82.55
79.92	29.7	35.4	46.2	1.6	6.21	0.01	0.76	0.08	0.00	0.78	82.55
79.00	28.9	34.5	45.0	1.5	6.11	0.01	0.77	0.08	0.00	0.78	82.55
74.00	25.0	29.8	38.9	1.2	5.61	0.01	0.81	0.08	0.00	0.83	82.55
69.00	21.4	25.5	33.2	1.0	5.12	0.01	0.84	0.07	0.00	0.85	82.55
64.00	18.1	21.6	28.1	0.7	4.64	0.01	0.85	0.07	0.00	0.87	82.55
59.00	15.1	18.0	23.5	0.6	4.18	0.01	0.86	0.07	0.00	0.88	82.55
54.00	12.4	14.8	19.4	0.4	3.74	0.01	0.86	0.06	0.00	0.88	82.55
49.00	10.1	12.0	15.7	0.3	3.33	0.01	0.86	0.06	0.00	0.88	82.55
47.50	9.4	11.2	14.6	0.3	3.21	0.01	0.86	0.06	0.00	0.88	82.55
47.50	9.4	11.2	14.6	0.3	3.21	0.01	0.91	0.06	0.00	0.92	82.55
44.00	8.0	9.5	12.4	0.2	2.91	0.01	0.90	0.06	0.00	0.91	82.55
42.00	7.2	8.6	11.2	0.2	2.75	0.01	0.90	0.06	0.00	0.91	82.55
39.00	6.1	7.3	9.6	0.1	2.51	0.01	0.89	0.06	0.00	0.91	82.55
34.00	4.6	5.5	7.1	0.1	2.12	0.01	0.88	0.06	0.00	0.89	82.55
29.00	3.3	3.9	5.1	0.1	1.76	0.01	0.87	0.05	0.00	0.88	82.55
24.00	2.2	2.6	3.4	0.0	1.42	0.01	0.86	0.05	0.00	0.87	82.32
19.00	1.4	1.6	2.1	0.0	1.09	0.01	0.86	0.05	0.00	0.87	81.49
14.00	0.7	0.9	1.1	0.0	0.79	0.01	0.85	0.05	0.00	0.87	80.66
9.00	0.3	0.4	0.5	0.0	0.49	0.01	0.85	0.05	0.00	0.86	79.84
4.00	0.1	0.1	0.1	0.0	0.21	0.01	0.85	0.05	0.00	0.86	79.01
0.00	0.0	0.0	0.0	0.0	0.00	0.01	0.84	0.04	0.00	0.85	78.35

BY VALMONT INDUSTRIES FOR: VERIZON 120' POLE, SITE: CROMWELL NORTH 2 CT DATE 10/23/2019
Design Id: 456600R6 IMPAX 22.4.16.0
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)
119.00	0	0	0	0	13	15	20	40
117.00	1	-1	2	0	50	59	77	211
117.00	74	-62	97	0	2602	3100	4047	12110
114.00	187	-157	244	0	2651	3159	4124	12388
109.00	380	-319	497	0	2746	3273	4272	12894
107.50	440	-369	574	0	2779	3312	4324	13055
107.50	496	-416	647	0	5378	6410	8367	23890
104.00	767	-644	1001	0	5420	6459	8432	24307
99.00	1159	-972	1513	0	5508	6564	8568	24938
97.50	1277	-1072	1668	0	5545	6609	8627	25133
97.50	1332	-1117	1738	0	8035	9576	12501	35977
94.00	1736	-1457	2266	0	8125	9683	12641	36451
89.00	2317	-1944	3024	0	8183	9753	12731	37216
87.50	2491	-2090	3252	0	8163	9729	12700	37477
87.50	2543	-2134	3320	0	10528	12547	16378	48333
84.00	3073	-2578	4011	0	10626	12664	16532	48885
84.00	3073	-2578	4011	0	10537	12557	16392	48932
79.92	3692	-3098	4820	0	10621	12657	16523	50386
79.00	3831	-3215	5002	0	10583	12612	16464	50610
74.00	4594	-3854	5997	0	10625	12662	16529	51746
69.00	5359	-4497	6996	0	10672	12718	16602	52950
64.00	6128	-5142	7999	0	10724	12780	16684	54219
59.00	6900	-5790	9008	0	10782	12850	16774	55554
54.00	7677	-6442	10022	0	10845	12925	16872	56954
49.00	8459	-7098	11042	0	10948	13047	17032	58402
47.50	8694	-7295	11350	0	10999	13108	17112	58840
47.50	8694	-7295	11350	0	10947	13046	17030	58864
44.00	9246	-7758	12069	0	11020	13133	17144	60955
42.00	9562	-8023	12482	0	11042	13160	17179	62187
39.00	10038	-8423	13104	0	11060	13181	17206	63138
34.00	10835	-9091	14144	0	11126	13259	17309	64757
29.00	11636	-9764	15190	0	11194	13341	17415	66436
24.00	12443	-10441	16243	0	11263	13423	17523	68174
19.00	13254	-11121	17302	0	11332	13505	17629	69968
14.00	14070	-11806	18367	0	11398	13584	17732	71816
9.00	14891	-12495	19438	0	11464	13663	17835	73712
4.00	15716	-13187	20516	0	11543	13757	17958	75642
0.00	16380	-13744	21382	0	11672	13910	18158	77167

BY VALMONT INDUSTRIES FOR: VERIZON 120' POLE, SITE: CROMWELL NORTH 2 CT DATE 10/23/2019
Design Id: 456600R6 IMPAX 22.4.16.0
Deflections and Stresses for Pole

Loading Case ICE + 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)
119.00	27.8	33.2	43.3	1.0	3.64	0.00	0.00	0.00	0.00	0.01	82.55
117.00	26.9	32.0	41.8	1.0	3.64	0.00	0.00	0.00	0.00	0.01	82.55
117.00	26.9	32.0	41.8	1.0	3.64	0.01	0.03	0.02	0.00	0.04	82.55
114.00	25.4	30.3	39.5	0.9	3.61	0.01	0.07	0.02	0.00	0.08	82.55
109.00	23.0	27.4	35.8	0.8	3.51	0.01	0.11	0.02	0.00	0.12	82.55
107.50	22.3	26.6	34.7	0.7	3.48	0.01	0.11	0.02	0.00	0.13	82.55
107.50	22.3	26.6	34.7	0.7	3.48	0.02	0.13	0.03	0.00	0.15	82.55
104.00	20.7	24.6	32.2	0.7	3.37	0.02	0.17	0.03	0.00	0.19	82.55
99.00	18.5	22.0	28.7	0.6	3.20	0.02	0.22	0.03	0.00	0.24	82.55
97.50	17.8	21.2	27.7	0.5	3.14	0.02	0.23	0.03	0.00	0.25	82.55
97.50	17.8	21.2	27.7	0.5	3.14	0.03	0.24	0.04	0.00	0.26	82.55
94.00	16.4	19.5	25.5	0.5	2.99	0.02	0.27	0.04	0.00	0.30	82.55
89.00	14.4	17.2	22.5	0.4	2.77	0.02	0.31	0.04	0.00	0.34	82.55
87.50	13.9	16.6	21.6	0.4	2.70	0.02	0.32	0.04	0.00	0.34	82.55
87.50	13.9	16.6	21.6	0.4	2.70	0.03	0.33	0.05	0.00	0.36	82.55
84.00	12.7	15.1	19.7	0.3	2.53	0.03	0.36	0.05	0.00	0.39	82.55
84.00	12.7	15.1	19.7	0.3	2.53	0.02	0.27	0.03	0.00	0.29	82.55
79.92	11.3	13.5	17.6	0.3	2.37	0.02	0.29	0.03	0.00	0.31	82.55
79.00	11.0	13.1	17.2	0.3	2.33	0.02	0.30	0.03	0.00	0.32	82.55
74.00	9.5	11.3	14.8	0.2	2.14	0.02	0.31	0.03	0.00	0.33	82.55
69.00	8.1	9.7	12.7	0.2	1.95	0.02	0.32	0.03	0.00	0.34	82.55
64.00	6.9	8.2	10.7	0.1	1.77	0.02	0.33	0.03	0.00	0.34	82.55
59.00	5.8	6.9	9.0	0.1	1.59	0.02	0.33	0.03	0.00	0.35	82.55
54.00	4.7	5.6	7.4	0.1	1.43	0.02	0.33	0.02	0.00	0.35	82.55
49.00	3.8	4.6	6.0	0.1	1.27	0.02	0.33	0.02	0.00	0.35	82.55
47.50	3.6	4.3	5.6	0.1	1.22	0.02	0.33	0.02	0.00	0.35	82.55
47.50	3.6	4.3	5.6	0.1	1.22	0.02	0.35	0.02	0.00	0.36	82.55
44.00	3.0	3.6	4.7	0.0	1.11	0.02	0.34	0.02	0.00	0.36	82.55
42.00	2.7	3.3	4.3	0.0	1.04	0.02	0.34	0.02	0.00	0.36	82.55
39.00	2.3	2.8	3.6	0.0	0.95	0.02	0.34	0.02	0.00	0.36	82.55
34.00	1.7	2.1	2.7	0.0	0.81	0.02	0.34	0.02	0.00	0.35	82.55
29.00	1.2	1.5	1.9	0.0	0.67	0.02	0.33	0.02	0.00	0.35	82.55
24.00	0.8	1.0	1.3	0.0	0.54	0.02	0.33	0.02	0.00	0.34	82.32
19.00	0.5	0.6	0.8	0.0	0.42	0.02	0.33	0.02	0.00	0.34	81.49
14.00	0.3	0.3	0.4	0.0	0.30	0.02	0.33	0.02	0.00	0.34	80.66
9.00	0.1	0.1	0.2	0.0	0.19	0.02	0.32	0.02	0.00	0.34	79.84
4.00	0.0	0.0	0.0	0.0	0.08	0.02	0.32	0.02	0.00	0.34	79.01
0.00	0.0	0.0	0.0	0.0	0.00	0.02	0.32	0.02	0.00	0.34	78.35

BY VALMONT INDUSTRIES FOR: VERIZON 120' POLE, SITE: CROMWELL NORTH 2 CT DATE 10/23/2019
Design Id: 456600R6 IMPAX 22.4.16.0
Forces and Moments for Pole in the Local Element Coordinate System

Loading Case T+S

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)
119.00	0	0	0	0	2	2	3	14
117.00	0	0	0	0	13	16	21	102
117.00	40	-34	53	0	1418	1690	2207	5760
114.00	102	-85	133	0	1435	1710	2232	5902
109.00	206	-172	268	0	1466	1747	2281	6161
107.50	237	-199	309	0	1477	1760	2298	6245
107.50	269	-226	351	0	2954	3520	4595	10781
104.00	417	-350	545	0	2971	3541	4622	10992
99.00	631	-530	824	0	3004	3580	4674	11314
97.50	696	-584	908	0	3017	3596	4694	11415
97.50	727	-610	949	0	4452	5305	6926	15964
94.00	950	-798	1241	0	4465	5321	6946	16222
89.00	1271	-1067	1660	0	4497	5360	6996	16607
87.50	1368	-1148	1786	0	4512	5377	7020	16726
87.50	1398	-1173	1825	0	5899	7030	9177	21289
84.00	1694	-1422	2212	0	5935	7073	9233	21576
84.00	1694	-1422	2212	0	5913	7047	9199	21590
79.92	2041	-1713	2664	0	5950	7091	9256	22431
79.00	2119	-1778	2766	0	5944	7084	9247	22553
74.00	2546	-2136	3324	0	5973	7119	9293	23202
69.00	2975	-2497	3884	0	6005	7156	9342	23892
64.00	3407	-2859	4447	0	6039	7197	9395	24623
59.00	3841	-3223	5014	0	6075	7240	9451	25394
54.00	4278	-3589	5584	0	6113	7285	9511	26206
49.00	4717	-3958	6158	0	6162	7344	9587	27054
47.50	4850	-4069	6331	0	6183	7368	9618	27314
47.50	4850	-4069	6331	0	6169	7352	9597	27321
44.00	5160	-4330	6736	0	6205	7395	9654	28554
42.00	5338	-4479	6968	0	6221	7414	9678	29280
39.00	5605	-4703	7317	0	6239	7435	9706	29836
34.00	6054	-5080	7903	0	6279	7483	9768	30791
29.00	6505	-5459	8492	0	6320	7532	9832	31786
24.00	6960	-5840	9085	0	6361	7580	9896	32821
19.00	7417	-6223	9682	0	6401	7629	9959	33898
14.00	7877	-6609	10282	0	6441	7676	10020	35015
9.00	8340	-6998	10887	0	6480	7723	10082	36173
4.00	8805	-7389	11495	0	6524	7775	10150	37370
0.00	9180	-7703	11984	0	6578	7839	10233	38350

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)
119.00	15.5	18.5	24.1	0.3	2.02	0.00	0.00	0.00	0.00	0.01	82.55
117.00	15.0	17.8	23.3	0.3	2.02	0.00	0.00	0.00	0.00	0.01	82.55
117.00	15.0	17.8	23.3	0.3	2.02	0.01	0.02	0.01	0.00	0.02	82.55
114.00	14.2	16.9	22.0	0.3	2.00	0.01	0.04	0.01	0.00	0.04	82.55
109.00	12.8	15.3	19.9	0.2	1.95	0.01	0.06	0.01	0.00	0.06	82.55
107.50	12.4	14.8	19.3	0.2	1.93	0.01	0.06	0.01	0.00	0.07	82.55
107.50	12.4	14.8	19.3	0.2	1.93	0.01	0.07	0.02	0.00	0.08	82.55
104.00	11.5	13.7	17.9	0.2	1.87	0.01	0.09	0.02	0.00	0.10	82.55
99.00	10.3	12.3	16.0	0.2	1.77	0.01	0.12	0.02	0.00	0.13	82.55
97.50	9.9	11.9	15.5	0.2	1.74	0.01	0.12	0.02	0.00	0.13	82.55
97.50	9.9	11.9	15.5	0.2	1.74	0.01	0.13	0.02	0.00	0.14	82.55
94.00	9.1	10.9	14.2	0.2	1.66	0.01	0.15	0.02	0.00	0.16	82.55
89.00	8.1	9.6	12.6	0.1	1.54	0.01	0.17	0.02	0.00	0.18	82.55
87.50	7.8	9.2	12.1	0.1	1.50	0.01	0.18	0.02	0.00	0.19	82.55
87.50	7.8	9.2	12.1	0.1	1.50	0.01	0.18	0.03	0.00	0.19	82.55
84.00	7.1	8.4	11.0	0.1	1.41	0.01	0.20	0.03	0.00	0.21	82.55
84.00	7.1	8.4	11.0	0.1	1.41	0.01	0.15	0.02	0.00	0.16	82.55
79.92	6.3	7.5	9.8	0.1	1.32	0.01	0.16	0.02	0.00	0.17	82.55
79.00	6.2	7.3	9.6	0.1	1.30	0.01	0.16	0.02	0.00	0.17	82.55
74.00	5.3	6.3	8.3	0.1	1.19	0.01	0.17	0.02	0.00	0.18	82.55
69.00	4.6	5.4	7.1	0.1	1.09	0.01	0.18	0.02	0.00	0.19	82.55
64.00	3.9	4.6	6.0	0.0	0.99	0.01	0.18	0.01	0.00	0.19	82.55
59.00	3.2	3.8	5.0	0.0	0.89	0.01	0.18	0.01	0.00	0.19	82.55
54.00	2.7	3.2	4.1	0.0	0.80	0.01	0.18	0.01	0.00	0.19	82.55
49.00	2.1	2.6	3.3	0.0	0.71	0.01	0.18	0.01	0.00	0.19	82.55
47.50	2.0	2.4	3.1	0.0	0.68	0.01	0.18	0.01	0.00	0.19	82.55
47.50	2.0	2.4	3.1	0.0	0.68	0.01	0.19	0.01	0.00	0.20	82.55
44.00	1.7	2.0	2.6	0.0	0.62	0.01	0.19	0.01	0.00	0.20	82.55
42.00	1.5	1.8	2.4	0.0	0.58	0.01	0.19	0.01	0.00	0.20	82.55
39.00	1.3	1.6	2.0	0.0	0.53	0.01	0.19	0.01	0.00	0.20	82.55
34.00	1.0	1.2	1.5	0.0	0.45	0.01	0.19	0.01	0.00	0.20	82.55
29.00	0.7	0.8	1.1	0.0	0.38	0.01	0.19	0.01	0.00	0.19	82.55
24.00	0.5	0.6	0.7	0.0	0.30	0.01	0.18	0.01	0.00	0.19	82.32
19.00	0.3	0.3	0.5	0.0	0.23	0.01	0.18	0.01	0.00	0.19	81.49
14.00	0.2	0.2	0.2	0.0	0.17	0.01	0.18	0.01	0.00	0.19	80.66
9.00	0.1	0.1	0.1	0.0	0.10	0.01	0.18	0.01	0.00	0.19	79.84
4.00	0.0	0.0	0.0	0.0	0.05	0.01	0.18	0.01	0.00	0.19	79.01
0.00	0.0	0.0	0.0	0.0	0.00	0.01	0.18	0.01	0.00	0.19	78.35

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

NUMBER OF BOLTS	DIAMETER (IN.)	LENGTH (IN.)	WEIGHT (KIPS)	SHIPPED AS	PROJECTION LENGTH (IN.)	GALVANIZED LENGTH (IN.)	THREAD SIZE
24	1.750	66.00	1.47	BOLTS, TEMPLATES	9.50	66.00	5-UNC-2A

STEEL SPEC. VALMONT	STEEL SPECIF.	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	125.73	1.99	152.00	1.90	0.85	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	29.750	0.000	*	2	28.736	7.700
3	25.764	14.875	*	4	21.036	21.036
5	14.875	25.764	*	6	7.700	28.736
7	0.000	29.750	*			

MAX. BOLT CIRCLE = 59.50 IN. TEMPLATE DIAMETER = 63.00 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. (MAJOR DIAM.) (IN.)
64.86	2.50	1.72	2.94	53.00

EFFECTIVE PLATE WIDTH (IN.)	PLASTIC SECTION MOD. (CU. IN.)	MOMENT IN BASE PLATE (IN. -K)	PLASTIC MOMENT (IN. -K)	FACTORED RESISTING MOM. (IN. -K)
6.94	10.84	408.61	542.01	487.81

STEEL SPECIF. VALMONT	STEEL SPECIF. OTHER	EFFECTIVE YIELD STRESS (KSI)	STRESS RATIO
S56	A572	50	0.84

** 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)	43078	16379	9180	]MOMENT ABT. X	WIND
MOMENT ABT. Y-AXIS (IN-KIP)	-36147	-13744	-7703	]MOMENT ABT. Y	WIND
SHEAR FORCE (LB.)	47696	18103	10217	]RES. MOMENT	WIND
VERTICAL FORCE (LB.)	46586	77179	38354	]SHEAR FORCE	WIND
				]BOLT FORCE	WIND
				]BOLT TENSION	WIND

valmont MICROFLECT **Pole Foundation Mat Design**

SLAB DESIGN Date: 10/23/19 Time: 09:46
Project: 456600-P1 Run by: JA
Input (Blue): Checked by: TD

legs	1		1 = Pole \ 3 or 4 = Tower
otm_t	4686	k-ft	total pole overturning moment
sh_t	47.70	k	total pole shear
sh_l	47.70	k	
wt	36.23	k	total pole weight * 0.9
f_w	4.96	ft	anchor bolt circle dia
b	24.00	ft	slab width (rigid square slab only)
t	30.00	in	slab thickness
net_p_a	10.00	ksf	ultimate soil bearing pressure
s_f	1.00		allowable stress increase factor (rebar)
c_h	54.00	in	cap height above slab
c_s	84.00	in	cap dia
d_f	6.50	ft.	depth from final grade to bottom of footing
d_fl	48.00	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	1.07		OK (overturning F.S. OK)
net_p	3.96	ksf	OK (net soil bearing pressure is OK)
vol_c	59.75	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	59	23.50	4.86	1852	<---OK
	Options	#5	38	23.50	7.62	1863	<---OK
y		#6	27	23.50	10.85	1906	<---OK
	As>=11.65	#7	20	23.50	14.84	1921	<---OK
		#8	15	23.50	20.14	1882	
		#9	12	23.50	25.64	1918	
	Bot.Bar	#4	135	23.50	2.10	4238	
	Options	#5	87	23.50	3.28	4265	
		#6	61	23.50	4.70	4306	<---OK
	As>=26.81	#7	45	23.50	6.41	4323	<---OK
		#8	34	23.50	8.55	4267	<---OK
y		#9	27	23.50	10.85	4315	<---OK

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

VALMONT MICROFLECT
3575 25TH STREET SE
SALEM, OR 97302
PHONE: 1-800-547-2151

valmont MICROFLECT

Pole Foundation Mat Design Special Cap Reinforcement

Special Cap Reinforcement:

Projec 456600-P1
Date: 10/23/19

Vertical Reinforcement Size = #	9		
Quantity of vertical rebar =	58		
Total area of vert. rebar =	58.00	in2	>= 0.005*Acap = 27.711n2, OK
vertical rebar horiz. Spacing =	2.87	in	>= 1.5db and >= 1.5in, OK (ACI)
Factored max moment in cap = M + (V*h_{cap}) =	4912.8	ft-k	(conservatively neglect passive pressure of soil)
Section Modulus of rebar =	1115.7	in^3	
fb = M/S =	52.8	ksi	<=54ksi, OK
Req'd vert. bar dev. length = $(3d_b/40)*(f_y/f'_c{}^{0.5})*(1/2.5)$ =	32.02	in	provide min 33 in vert. rebar dev. length
concrete cover =	4.00	in	
length of vert rebar =	6.50	ft	
a =	78.00	in	> 33 in of vert. rebar dev. length OK
d* =	9.50	in	
b =	1.52	ft	
total wt of vert rebar=	1582	lbs	
radius of vert rebar =	36.94	in	
Shear tie rebar size = #	4		
vertical spacing =	12.00	in	
Factored max shear in cap =	47.7	k	
Concrete shear capacity = 0.85*2*sqrt(f'c)*bw*d =	722.5	k, OK	
tie diameter (a) =	6.33	ft	
circumference =	19.90	ft	
# of ties =	8.00		
total wt of ties =	106	lbs	
d** =	2.00	in	
6db =	5.00	in	
Anchor Bolt Diameter =	1.75	in	
Length Of Anchor Bolts =	66.00	in	
Anchor Bolt Projection =	9.50	in	
Depth of Pocket to Accommodate Anchor Bolts =	-24.50	in	
Total Depth from Final Grade =	6.50	ft	
Pocket Vol =	0.00	ft^3	

Anchor Bolt Embedment Check

Bolt Length	>	Bolt Required Length
66 in	>	51.1 in ====> OK

REINFORCEMENT STEEL SCHEDULE

	Sym	Type	Rebar Size	Rebar Spacing	Dimensions a	b	c	d	(6db)	Weight (lbs)	Qty
CAP TIES	1	C	#4	EQUAL	6.33 ft			2 in	3 in	106	8
CAP VERTICAL REBAR	2	B	#9	-----	6.50 ft	1.52 f		9.5 in		1582	58
SLAB TOP STEEL	3	A	#6	10.85 in	23.50 ft					1906	54
SLAB BOTTOM STEEL	4	A	#9	10.85 in	23.50 ft					4315	54
TOTAL STEEL WEIGHT FOR COMPLETE FOUNDATION INSTALLATION =										7909	

TOTAL VOLUME OF CONCRETE FOR FOUNDATION INSTALLATION = 59.75 yd^3

VALMONT MICROFLECT
3575 25TH STREET SE
SALEM, OR 97302
PHONE: 1-800-547-2151

valmont STRUCTURES

Monopole Pier Design Lateral Pressure

CUSTOMER:	Verizon	
SITE:	CROMWELL NORTH 2 CT	
S.O.#	456600-P1	
DWG NO.	CT 456600-P1	
FS	1.0	EIA-F = 2 (Default), TIA-G = 1
Ø FACTOR	0.75	EIA-F = 1, TIA-G = 0.75
GW DEPTH (FT)	15	BGS

**CHECK UNIT WEIGHT BELOW THE WATER TABLE.*

ultimate lateral pressure $= \gamma z \tan^2(45+(\phi/2))+2c\tan(45+(\phi/2))$ ***(ref. Bowles, eq. 2-41)***

allow. Lat. Pressure = (ult. Lat. Pressure)/FS

Group	Soil Type	Depth start (ft)	Depth end (ft)	c (psf)	ϕ (degrees)	γ (pcf)	lateral pressure start (psf)	lateral pressure end (psf)	slope (psf/ft)
SW	Sand (Well Graded)	3.5	15.0	0.0	34.0	125.0	0.00	3813.47	331.61
SW	Sand (Well Graded)	15.0	62.0	0.0	34.0	67.6	3813.47	12242.10	179.33

valmont STRUCTURES

Monopole Pier Design

Customer: Verizon
Site: CROMWELL NORTH 2 CT
S.C.# 456600-P1
Drawing No. CT 456600-P1
Geotechnical Report Down To Earth Consulting, LLC File No. 0032-016.00
Geotechnical Report Water Depth 15 ft
Original Run Date: 10/23/19
Version: 2.10
Engineer: JA Checker: ED

Pole Geometry

Pole Height =	119	ft
Bolt Circle =	59.50	in
Number of Bolts =	24	
Bolt Diameter =	1.75	in
Bolt Projection =	9.50	in
Bolt Length =	66.0	in
Bottom Template Diameter =	63.0	in

Pole Loads

Factored Moment =	4686.3	ft-kips
Factored Shear =	47.70	kips
Factored Weight =	48.31	kips
Shear Height =	98.3	ft
e (col offset) =	1164.0	in

Anchor Bolt Load

Factored Moment =	56235	in-kips
Factored Shear =	47.70	kips
Factored Weight =	48.31	kips

Anchor Bolt Allowable

F_u =	100.0	ksi
F_y =	75.0	ksi
Area tensile =	1.90	in^2

Soil Properties

ZERO = GROUND LINE

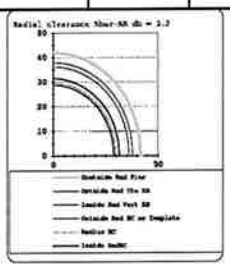
Level #	ϕ Ultimate Pas Pressure psf Start	ϕ Ultimate Pas Press Slope psf/ft	Depth Start (ft)	Depth End (ft)	End Pres
1	0	331.61	3.5	15	3813
2	3813	179.33	15	62	12242
3					
4					
5					
6					
7					
8					
9					
10					

Max Moment Depth (ft): 9.92

Max Pier Moment

(in-kips)	(ft-kips)
62199	5183

$$\int_{Ground\_Line}^{Depth\_Mmax} \frac{Passive\ Pressure}{ft}\,dft = Applied\ Shear$$



Footing Concrete Geometry

Cap Height (Above Ground Line) =	0.5	ft
Diameter Pier =	7	ft
Length (Below ground) =	38	ft
Concrete Volume =	50.6	yd^3

Summation of shear and passive pressure forces to find LLD: $\Sigma F_x = 0$

Load Inflection Point Depth (LLD)= 25.26 ft

Summation of moments about LLD: $\Sigma M_{LLD} = M_{applied} - OTM \geq 0$

			Resisting		
OTM =	5914.9	ft-kips	M_{resist} =	6058	Soil FS above allowable: 1.02 = M_{resist}/OTM
$Shear_{applied}$ =	47.7	kips	$Shear_{resisting}$ =	48.47	1.02 = resisting V/applied V
Weight =	48.3	kips			

Foundation Load Properties

Level #	Passive Pressure psf Start	Pas Press Slope psf/ft	Zero = Ground Line Depth Start (ft)	Depth End (ft)	About Load Inflection Point Forces Constant kips	Forces Slope kips	Moments Constant ft-kips	Moments Slope ft-kips
1	0	332	3.5	15.0	0.0	153.5	0	2163
2	3813	179	15.0	25.3	273.9	66.1	1405	226
3	5653	179	25.3	62.0	-305.4	-59.5	1877	387

V_{max} kips: 444.99

Footing Reinforcement Requirements

Tie Bar #	4	Trans OK	Seismic Ties? No	
Tie Vertical Spacing	1	ft =	12"	
Number of Ties	38			
Area_Ties	0.4	in^2		AREA OF TIE CUT BY VERTICAL SECTION (2*Area of the tie)
MP_Tc	4	in		THICKNESS OF CONCRETE COVER
MP_Rin	36.9	in		RADIUS OF VERT. REBAR
MP_Asteel	65.9	in^2		TOTAL AREA OF VERT. BARS
MP_Esteel	29000	ksi		YOUNG'S MODULUS
MP_Isteel	44780	in^4		REBAR MOMENT OF INERTIA
EI	1298619420	in^2*lbf		E*I
S	1214.7	in^3		REBAR SECTION MODULUS
M	62199	in-kips		APPLIED MAXIMUM MOMENT @ AT DEPTH ZERO SHEAR ON PIER
Bars Per Bundle	1			
			17	= Min ϕ based on 200*bw*d/fy per ACI 318
Vertical Bar #	10			
Bar Count	52	>=	22	= Min ϕ based on area
ϕ_{Shear}	0.85			Strength Reduction Factor for Capacity Of Steel Shear
$\phi_{Flexure}$	0.9			Strength Reduction Factor for Capacity Of Steel Flexure
MP_Fty_REV	60	ksi		Rebar Fty Grade 60
MP_Fty_REV_ALL	54	ksi		Rebar Fty Allowable Pier Design includes PHI_Steel
FTYDESIGN	51.9	ksi		calculated
ϕV_s	149.5	kips		Rebar Shear Allowable Pier Design ACI 318
	3.19	in		Vertical Rebar Horiz Spacing
	6.33	ft		Diameter of hoops
	73.75	in		Diameter of vertical rebar circle

Footing Concrete Requirements

f_c'	4000	psi	Concrete compression properties
$\phi_{Concrete}$	0.85		Strength Reduction Factor for Capacity Of Concrete
ϕV_c	596	kips	Shear Capacity of Concrete ACI 318
d	5.50	ft	Distance from extreme com fiber to cent of tension reaction group

Pole Geometry

Bolt Circle =	**59.50**	Inches
Number of Bolts =	**24**	
Bolt Diameter =	**1.75**	Inches
Bolt Projection =	**9.5**	Inches
Bolt Length =	**66.0**	Inches
Bottom Template Diameter =	**63.00**	Inches

Pole Loads

Factored Moment =	**4686.3**	ft-kips
Factored Shear =	**47.7**	kips
Factored Weight =	**48.3**	kips
Shear Height =	**98.3**	ft

Anchor Bolt Allowables

Fu =	**100.0**	Ksi
Fy =	**75.0**	Ksi
At =	**1.90**	in^2

Anchor Bolt Loads

Moment =	**56235**	in-Kips
Shear =	**47.70**	Kips
Weight =	**48.31**	Kips

Calculate the Bolt Maximum Applied Force

$$\text{Bolt Applied Force} = \frac{176668 \text{ in-kips}}{59.5 \text{ in} * 24} + \frac{47.7 \,/\, 0.50 \text{ Kips}}{24} + \frac{48.31 \text{ Kips}}{24} = \mathbf{129.7 \text{ Kips}}$$

Bolt Allowable = .8 * Fu * At = **152.0 Kips** (per EIA-G Sec. 4.9.9)

Bolt Allowable > Bolt Applied Force

152 Kips > 129.7 Kips ====> OK

Calculate the Anchor Bolt Development Length

ACI 318

$$ld = db*Fy*\alpha\beta\gamma\lambda*\frac{3}{(40*(fc')^{.5}) * ((c+Ktr)/db))}$$

Given all minimums are met for the Bar Installation Per ACI

Bf = 1 Bundle factor per ACI 318-11 12.4.1

α = 1

β = 1

λ = 1

$((c+Ktr)/db)_{anchor\ bolts}$ = 1.5

$$ld = 1.75*75000*1*\frac{3}{(40*(4000)^{.5})*1.5} = \mathbf{104 \text{ in}}$$

Calculate the Ultimate Bond Stress

Fy*Ag/(π*db*ld) = Bond_Allowable Ksi

= 0.250 Ksi

Calculate the Allowable Bond Stress

.6*Bond_Allow*1.33 = 0.199 Ksi

Calculate the Required Bolt Length

$$Lreq = \frac{\text{Bolt Applied Force}}{3.14*db*0.199} + \text{Bolt Projection} = \mathbf{127.9 \text{ in}}$$

>66 in provided, bottom template needs to be double nutted

Check AB pullout via Rebar Development length with bottom template double nutted:

((c+Ktr)/db)rebar= 2.5

Ldb = (3*db*fy/(40*f'c^0.5*((c+Ktr)/db)))*(As_req/As_prov'd) = **34.2 in**

L_reqd = Ldb + abproj + 7.125" + 3" = **53.8 in**

Bolt Length > Bolt Required Length

66 in > 53.8 in ====> OK

Down To Earth Consulting, LLC File No. 0032-016.00

Ref: ACI 318 BUILDING CODE REQUIREMENTS

valmont STRUCTURES		By:	JA	DRILLED PIER ANALYSIS
	Site: CROMWELL NORTH 2 CT	Check:	TD	POLE STRUCTURE
	Dwg: CT 456600-P1	Date:	10/23/19	Customer: Verizon

Calculate the Concrete Shear Strength

ACI 318

$V_c = 2*(fc')^{0.5}*bw*d$

Given:

bw	=	84 in
d	=	66.0 in
f_c'	=	4000 in
ϕ_c	=	0.85
$\phi_c V_c$	=	**596** Kips

Calculate the Reinforcment Shear Strength

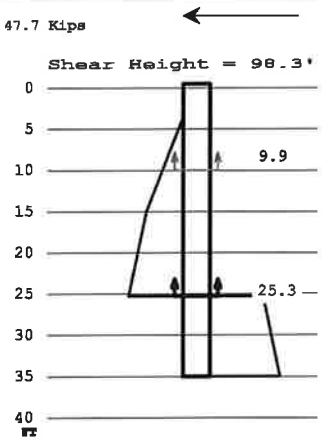
ACI 318

#4 horizontal ties at 12" spacing.

$V_s = \frac{(4/3)*A_v*f_y*d}{s}$

Given:

A_v	=	0.4 in^2
f_y	=	60 ksi
d	=	5.497 Ft
s	=	1 Ft
ϕ_s		0.85
$\phi_s V_s$	=	**150** Kips



Pressure Profile for Analysis

SECTION AT 9.9 FT THE MAX MOMENT IN THE PIER MAX PRESSURE 0 PSF

SECTION AT 25.3 FT THE MAX SHEAR IN THE PIER MAX NEGATIVE PRESSURE 0 PSF

The Maximum Shear in the Pier occurs at Reaction Inflection Point 25.3'

Load Factors for the design

ACI 318

TIA222-G wind loads are factored by 1.6 already

U_{ACI}	=	1.0
U_{EIA}	=	1.0
U_{TOTAL}	=	$U_{EIA}*U_{ACI}$
U_{TOTAL}	=	1.0
$V_{design}=U_{TOTAL}*V_{max}$	=	**445.0 Kips**

ϕV_c	**+**	**ϕV_s**		**> Vdesign**	
595.7 Kips	**+**	**149.5 Kips**	**= 745.3 Kips**	**> 445 Kips**	**⟹ OK**

The maximum bending stress in the pier occurs at 9.9' below the ground level. Where the (passive pressure reaction) = (the applied shear)

M_{MAX} = 62199.1 At The Location

$$\int_{Ground\_Line}^{(Depth\_Mmax)} \frac{Passive\ Pressure}{ft}\,dft = Applied\ Shear$$

Use only the steel to carry the bending loads - Calculate the Reinforcment Bending Strength

Use (52) #10 vertical rebar.

Vertical Rebar Section Properties

$I = \frac{A_{STEEL}*R_{VBAR}^2}{2}$ in^4

A_{rebar}	=	65.9 in2
R_{VBAR}	=	36.9 in
I	=	44780 in4
S	=	1214.7 in3

Base the bending strength on factored Vertical bar Fy per TIA-222-G of 54 Ksi

F_{TY}	=	60 KSI
ϕ	=	0.9
$F_{TYALLOWABLE}$	=	$F_{TY}*\phi$
$F_{TYALLOWABLE}$	=	54 KSI

Max Design Moment

M_{MAX}	=	62199 in-kips
M_{DESIGN}	=	$M_{MAX-UTOTAL}$
M_{DESIGN}	=	62199 in-kips

$F_{TYDESIGN} = \frac{M_{DESIGN}}{S} + \frac{Weight}{A_{rebar}}$

$F_{TYDESIGN}$ = 51.9 KSI

$F_{TYALLOWABLE}$	**>**	**$F_{TYDESIGN}$**		
54 KSI	**>**	**51.9 KSI**	**⟹**	**OK**

Down To Earth Consulting, LLC File No. 0032-016.00

Ref: ACI 318 BUILDING CODE REQUIREMENTS

valmont STRUCTURES	Site: CROMWELL NORTH 2 CT	By: JA	DRILLED PIER ANALYSIS
	Dwg: CT 456600-P1	Check: TD	POLE STRUCTURE
		Date: 10/23/19	Customer:Verizon

valmont
STRUCTURES

October 23rd, 2019

Ref: Design and failure modes for a 120-ft AGL Tapered Monopole
Quality of Steel and Fabrication of a Monopole Structure
Valmont Project No. 456600
Pole Designed with a Theoretical Fall Radius of 35-ft.

In order to assure you of the high quality of all Valmont products, we would like to offer the following comments:

Tapered Monopole Design Standards and Failure Modes:

- Communications monopole structures designed by Valmont are sized in accordance with the latest governing revision of the ANSI/TIA 222 standard unless otherwise requested by our customer. This standard has been approved by ANSI/ASCE, which has dealt with the design of antenna support structures for over 40 years. The TIA standard, based on provisions of this nationally known specification, has a long history of reliability. At its core philosophy is it's first and foremost priority to safeguard and maintain the health and welfare of the public.
- The TIA standard designates a minimum wind loading for each county in the United States. Valmont uses the wind loading listed in the TIA standard unless a greater value is specified by our customer. Structures are also designed for radial ice at a code specified reduced design wind loading. Code designated coefficients are used to ensure that the structure will survive the designed wind speed. The structure can usually survive even a greater wind load than the basic design wind speed because of these conservative coefficients.
- Design and loading assumptions that are used for the analyses of these structures are very conservative in nature when compared to other codes, which makes structural failure highly improbable.
- Failure of a steel monopole occurs when a point is reached where the induced stresses exceed the yield strength of the material. At this point, the deflections induced in the material are no longer temporary. Hence, a permanent deflection in the monopole would exist.
- The term failure above refers to local buckling at a designated point on the pole. Local buckling does not cause a free falling pole; rather it relieves the stresses from the pole at this location. Monopoles are flexible, forgiving structures, which are not generally susceptible to damage by impact loads such as wind gust or earthquake shocks.
- **When local buckling occurs, a relatively small portion of the shaft distorts and "kinks" the steel. When** the pole begins to bend the exposure area is reduced and therefore, the force due to wind is decreased as well. Even though buckling exists, the cross section of the pole is capable of carrying the entire vertical load. Therefore, wind induced loads could not conceivably bring this type of structure to the ground due to the excellent ductile properties, design criteria, and failure mode.
- **Valmont's communication poles have proven to be very reliable products. Valmont has provided** structures that have performed well during earthquakes in California, hurricanes in the South (including Hugo, Andrew, Opal and Katrina), and a number of tornadoes. In over 25 years of engineering and fabricating thousands of monopoles, to our knowledge Valmont has never experienced an in service failure of a communication pole due to weather induced overloading, even though, as in the cases of Hurricanes Hugo, Andrew and Katrina, the wind speeds exceeded the design wind speed. We use the latest standards, wind speed information, and sophisticated analytical tools to ensure that we maintain our unblemished record for quality.

Valmont Microflect, Valmont Industries, Inc.
3575 25th Street Salem, OR 97302-1123 USA
Toll Free: 800-547-2151 Fax: 503-316-2040 www.valmont.com

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STRUCTURES

Valmont Quality of Steel and Manufacturing:

- Monopoles are fabricated from ASTM A572 Grade 65 material with a controlled silicon content of 0.06% maximum to ensure a uniform galvanized coating. The base material is fabricated from Grade 50 material. All plate material meets a V-Notch toughness requirement of 15 ft-lbs. @ -20 degrees Fahrenheit. By meeting the strict toughness requirement, monopoles are best suited to resist the cyclic/fatigue type loading (i.e. wind induced loading) these structures exhibit.
- **Valmont's anchor bolts are fabricated** from A615 Grade 75 material. The bolts are typically 2 ¼ in diameter, made from #18J bar stock. Anchor bolts come complete with five (5) A194 Grade 2H hex nuts.
- For the past 40 years, our company has always guaranteed the quality of the steel used in building our structures. Material Certifications are available on all material at the time of fabrication. Fabrication of the monopole is performed in accordance with the provisions of the AISC Manual of Steel Construction **and ASCE's Design of Steel Transmis**sion Pole Structures. All welding and inspection is in accordance **with the American Welding Society's Specification D1.1**-latest revision. Testing and inspection reports are available upon request at the time of fabrication.

In addition, our monopoles can be designed to theoretically fail at approximately 85-ft AGL by purposely over designing the pole sections below this point. In the unlikely event the pole were to fail at this point, the significant loading reduction caused by the removal of the tower wind area and weight above would greatly reduce any chance that the remaining tower would have any structural damage, thereby providing a desired theoretical failure radius of approximately 35-ft for the 120-ft AGL monopole.

I hope these comments address any issues that you might encounter relative to the anticipated performance of monopole structures and quality of steel fabrication. If you have additional questions or comments, I may be reached at (402) 359-6026.

Sincerely,

James Ahlgren

James Ahlgren
Associate Engineer

Valmont Microflect, Valmont Industries, Inc.
3575 25th Street Salem, OR 97302-1123 USA
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DOWN TO EARTH
CONSULTING, LLC
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERING

GEOTECHNICAL ENGINEERING REPORT
PROPOSED TELECOMMUNICATIONS TOWER
CROMWELL NORTH 2 CT
667 MAIN STREET, CROMWELL, CONNECTICUT

Prepared for:

All-Points Technologies Corporation, P.C.
3 Saddlebrook Drive
Killingworth, Connecticut 06419

APT Filing No. NY141NB 6710

Prepared by:

Down To Earth Consulting, LLC
122 Church Street
Naugatuck, Connecticut 06770

File No. 0032-016.00
June 12, 2019

DOWN TO EARTH CONSULTING, LLC
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERING

June 12, 2019
File No. 0032-016.00

Mr. Robert C. Burns
All-Points Technology Corporation
3 Saddlebrook Drive
Killingworth, Connecticut 06419

Via email: rburns@allpointstech.com

Re: Geotechnical Engineering Report
Proposed Telecommunications Tower
667 Main Street, Cromwell, Connecticut

Down To Earth Consulting, LLC (DTE) is pleased to submit this geotechnical engineering report for the proposed telecommunications tower on 667 Main Street in Cromwell, Connecticut (Site) for All-Points Technologies Corporation, P.C. (Client). Our services were completed in general accordance with our Master Services Agreement, dated January 22, 2018. We appreciate this opportunity to work with you. Please call if you have any questions.

Sincerely,

Down To Earth Consulting, LLC

Raymond P. Janeiro, P.E.
Principal

Daniel LaMesa, P.E.
Reviewer/Principal

TABLE OF CONTENTS

APPENDICES

1.0 INTRODUCTION

Down To Earth Consulting, LLC, completed a subsurface exploration program and geotechnical engineering evaluation for the proposed telecommunications tower at the referenced Site. Our geotechnical engineering services included: reviewing project plans, observing test borings, obtaining soil resistivity measurements, characterizing subsurface conditions within the structure limits, performing geotechnical engineering analyses, and providing geotechnical design and construction recommendations for the project. Refer to Figure 1 and 2 (in Appendix 1) for an area plan and site plan, respectively.

Our services were performed in accordance with our April 25, 2019, email proposal, which was based in part on the provided drawings (*Verizon at Cromwell North 2 CT,* sheet numbers R-1, A-1, and C-1, prepared by the Client, revision dated 04/12/2018).

Elevations (El.) stated in this report are in feet and reference mean sea level (AMSL), unless otherwise noted. Our recommendations are based on allowable stress design methods and the 2018 Connecticut State Building Code which references the 2015 International Building Code.

2.0 BACKGROUND

The Site is located at the rear of the Cromwell Concrete Products materials yard and is generally bordered by undeveloped land to the north and west, residential parcels to the south, and the Cromwell Concrete Products facility to the east. Existing Site grades are relatively level at about El. 147+/-. Existing Site conditions in the area of proposed improvements generally consist of dirt accessways and precast concrete product storage.

The project consists of constructing a 120-foot monopole telecommunications tower and associated equipment cabinets within a 50-foot by 50-foot fenced compound with a gravel wearing surface. Tower and equipment platform loads were not provided to DTE at the time of writing this report. It's anticipated that nominal cuts and fills on the order of 1-foot or less will be needed to achieve design grades and that no significant slopes will be required. Refer to the Site and Exploration Location Plan (Figure 2) for additional proposed development details.

3.0 SUBSURFACE DATA

3.1 GENERAL SITE GEOLOGY

Published surficial and bedrock geological map data (*1:125,000 scale, Surficial Materials Map of Connecticut, Janet Radway Stone, 1992 and Bedrock Geological Map of Connecticut, John Rodgers, 1985*) was reviewed. The Site surficial material is mapped as glacial outwash deposits generally consisting of sand, gravel, and silt that is intermixed with cobbles and possible boulders. The underlying bedrock is classified as red-brown, shale siltstone, sandstone, and conglomerate (Portland Formation).

3.2 EXPLORATIONS

We observed and logged one test boring (B-1) and one test probe (P-1) drilled by our subcontractor New England Boring Contractors, Inc. on June 3, 2019. Exploration locations are depicted on Figure 2 (Appendix 1) and the logs are included in Appendix 2. Exploration locations were located in the field by taping/pacing from existing site features. The approximate ground surface elevation was estimated from the referenced topographic survey. Exploration locations and their elevations should be considered approximate.

The boring was drilled to explore the soil, bedrock (if encountered), and groundwater conditions in the proposed tower area. Rotary drilling methods were used to advance the boring to a depth of approximately 62 feet (approximate El. 85) below existing grades. The test probe was advanced using 3.25-inch inside-diameter hollow-stem augers to a depth of 17 feet below grade. The objective of the probe was to asses soil consistency within the area of the proposed equipment pad.

Representative soil samples were obtained from the boring for soil classification by split barrel sampling procedures in general accordance with ASTM D-1586. The split-spoon sampling procedure utilizes a standard 2-inch O.D. split-barrel sampler that is driven into the bottom of the boring with a 140-pound hammer falling a distance of 30 inches. The number of blows required to advance the sampler the middle 12-inches of a normal 24-inch penetration is recorded as the Standard Penetration Resistance Value (N). The blows (i.e., "N-Value") are indicated on the boring logs at their depth of occurrence and provide an indication of the relative consistency of the material.

Groundwater levels were measured using a weighted tape in open exploration holes during drilling.

4.0 SUBSURFACE CONDITIONS

4.1 SUBSURFACE PROFILE

The generalized subsurface profile in the area of the proposed telecommunications compound, as inferred from the subsurface exploration data, is summarized as follows:

- Fill: Dense, red-brown/gray, well-graded SAND with gravel (SW)
  – about 1 foot thick (to about El. 146); over
- Sand: Dense, red-brown, well-graded SAND with gravel (SW)
  – 14 feet thick (to about El. 132); over
  Dense, red-brown, poorly-graded SAND with silt (SP-SM)
  – over 48 feet thick (to about El. 85).

Visual classifications of soil samples, and conditions encountered at each exploration location can be found in the provided exploration logs, included as Appendix 2.

4.2 GROUNDWATER

Groundwater levels were measured in the explorations at the times and under the conditions stated on the logs. Groundwater was measured at about 15 feet (approximate El. 132) below existing grades. Groundwater levels measured in the explorations may not have had sufficient time to stabilize and should be considered approximate.

Groundwater levels will vary depending on factors such as temperature, season, precipitation, construction activity, and other conditions, which may be different from those at the time of these measurements. Therefore, groundwater levels during construction or at other times in the life of the structure may be higher or lower than the levels indicated on the boring logs. The possibility of groundwater level fluctuations should be considered when developing the design and construction plans for the project.

4.3 SOIL RESISTIVITY TESTING

On June 3, 2019, DTE field personnel conducted in-situ soil resistivity testing in accordance with accepted engineering practices using the Wenner electrode configuration. Electrodes were spaced at 5, 10, 20, 30 and 40 feet. A set of two approximately perpendicular resistivity lines were completed in the general vicinity of the proposed tower location. The approximate locations and orientations of the resistivity lines are shown on the attached Figure 2.

The results of the resistivity tests are as follows:

	Resistivity (ohm-cm)	
Electrode Spacing (ft)	Line 1	Line 2
5	80,142	57,258
10	130,411	18,939*
20	134,050	105,018*
30	133,111	87,841*
40	94,754	93,758*

*A large puddle of water was located between electrodes.

Field resistivity results may be influenced by existing utilities, underground structures, and boulders. Resistivity results will also fluctuate depending on the degree of compaction, moisture content, constituent solubility, and temperature. Field resistivity values may also vary depending upon season, precipitation, and other conditions that may differ from those at the time of testing.

5.0 GEOTECHNICAL DESIGN AND CONSTRUCTION RECOMMENDATIONS

5.1 GEOTECHNICAL EVALUATION

Based on the results of our subsurface investigation, it is our opinion the proposed 120-foot steel monopole telecommunications tower may be supported on a monolithic mat or a pier-and-pad foundation bearing on undisturbed, natural Sand Deposits, or on Structural Fill (hereinafter specified as Compacted Granular Fill (CGF)) or Crushed Stone placed over a prepared native Sand subgrade. Alternatively, the telecommunications tower may be supported on a drilled shaft foundation extending into competent Sand.

Design recommendations and construction considerations for the recommended foundation systems are presented in the following sections.

5.2 SEISMIC DESIGN

Based on the standard penetration test results, visual soil classification, and design peak ground acceleration at this locale, the site soils are not susceptible to liquefaction.

We recommend using the following design parameters as defined by the Building Code:

- Site Class: D (Section 1613.3.2 of the IBC)
- MCE spectral response accelerations: S_s = 0.181g and S_1 = 0.063g (Building Code Appendix N)
- Site Coefficients: F_a = 1.6 and F_v = 2.4 (IBC Table 1613.3.3 (1 and 2))
- Seismic design parameters: S_{MS} = 0.289 and S_{M1} = 0.151 (IBC Equation 16-37 and 16-38); S_{DS} = 0.193 and S_{D1} = 0.101 (IBC Equation 16-39 and 16-40)

5.3 TOWER FOUNDATION DESIGN RECOMMENDATIONS

5.3.1 Shallow Foundation (Mat/Pad) Alternative

The proposed monopole telecommunications tower may be supported on a mat or pad-and-pier foundation bearing on proof-rolled Sand, or CGF or Crushed Stone placed on above a proof-rolled Sand subgrade. Crushed Stone, if used, should be separated from soil subgrades, excavation sidewalls and backfill using a geotextile separation fabric.

DTE recommends a maximum net allowable bearing pressure of 5 kips per square foot (ksf). Foundations should be embedded a minimum of 42 inches below final grades for frost protection. The total settlement is anticipated to be less than 1 inch and differential settlement to be less than 0.5 inches. Foundation settlement will depend on the variations within the subsurface soil profile, the structural loading conditions, the embedment depth of the foundation, the thickness of compacted fill, and the quality of earthwork operations.

We recommend an ultimate passive pressure coefficient (Kp) of 3.0. Calculated passive pressures should be reduced by a minimum factor of safety of 3, to reflect the amount of movement required to mobilize the passive resistance. We also recommend an ultimate coefficient of sliding friction of 0.5. A factor of safety of at least 1.5 should be applied to calculated sliding resistance.

To summarize, we recommend the following static design parameters:

DESCRIPTION	VALUE
Maximum Net Allowable Bearing Pressure	5 kips per square foot (ksf)
Minimum Foundation Width	Isolated Spread Footing/ Mat Foundation: 3 feet
Minimum Embedment Below Finished Grade	42 inches
Estimated Total Settlement	<1 inch
Estimated Differential Settlement	<½ inch
Total Soil Unit Weight	125 pounds per cubic foot
Ultimate Passive Pressure Coefficient, Kp	3.0
Ultimate Coefficient of Sliding Friction	0.5

Uplift resistance for the tower foundation may be computed as the sum of the weight of the foundation element and the weight of the soil overlying the foundation. We recommend using a soil unit weight of 100 pounds per cubic foot for CGF overlying the foundation.

5.3.2 Shallow Foundation (Mat/Pad) Construction Recommendations

The proposed mat/pad foundation and associated equipment areas should be cleared of existing vegetation and grubbed. Cobbles, boulders, and any deleterious materials should be removed. Existing fill (including re-worked parent materials), and other unsuitable materials, must be removed from beneath footing zones of influence to the top of firm, natural Sand prior to construction. Over-excavation below foundations should include the zone of influence, defined as the area beneath 1 horizontal to 1 vertical (1H:1V) lines extending downward and outward from footing edges. Footings shall bear on a prepared subgrade of firm natural Sand, or CGF or Crushed Stone (over firm natural Sand). Refer to Section 6.0 - Materials and Compaction for material placement recommendations.

Earthwork should be performed in dry conditions so that disturbance to foundation subgrades is limited. During earthwork, the Contractor should be responsible for protecting subgrades from the elements and maintaining the soils in a suitable state until completion of the project. Backfill should not be placed over a subgrade with standing water or that is frozen. Standing water, if present, should be removed and any soft and yielding soil should be removed prior to backfill placement. Excavations to subgrade levels should be performed using a smooth-edged bucket to minimize possible disturbance to the in-place subgrade soils.

Soil subgrades should be proof-rolled under the observation of a qualified Geotechnical Engineer with at least four (4) passes of a smooth-drum vibratory roller (minimum 8,000 pounds, minimum centrifugal force of 12,500 pounds) or, where approved by the geotechnical engineer, a vibratory plate compactor with a minimum of 2,500 pounds of centrifugal force. Any soft or loose zones

identified during proof-rolling should be excavated and replaced with CGF, as necessary, and as required by the Geotechnical Engineer.

5.3.3 Deep Foundation (Drilled Shaft) Alternative

DTE recommends the following static design parameters for a drilled shaft foundation alternative:

DESCRIPTION	VALUE
Maximum Net Allowable Bearing Capacity Sand (10 to >20 feet)	7 kips per square foot (ksf)
Ultimate Side Friction Values[2] Sand (3.5 to 15 feet) Sand (>15 feet)	15 pounds per square inch (psi) 10 psi
P-Y Modulus (k_{py})[3] Sand (3.5 to 15 feet) Sand (>15 feet)	150 pounds per cubic inch (pci) 90 pci
Angle of Internal Friction Sand	34
Total Soil Unit Weight Sand (3.5 to 15 feet) Sand (>15 feet)	125 pounds per cubic foot (pcf) 130 pcf
Minimum Drilled Shaft Diameter	3 feet
Allowable Deflection at Top of Shaft	0.5 inch

1. The allowable end bearing capacity also assumes that loose, disturbed material has been removed from the base of the shaft.
2. Grout-to-ground values (i.e., skin friction) are provided (i.e., no permanent casing is assumed). Contribution to shaft capacity from soil above a depth of 3.5 feet should be ignored. The uplift capacity should be based on the dead weight of the shaft and side resistance provided by the subsurface soils. It's assumed that applied loading will not have a significant Poissons-effect on the shaft.
3. To analyze foundation under lateral loading (e.g., Ensoft LPILE).

We anticipate that the design length of the shaft will be primarily dependent on the embedment/lateral capacity required to resist live loading. The drilled shaft will be subject to tension loads and therefore should have reinforcing steel that extend through the entire length of the shaft.

5.3.4 Deep Foundation (Drilled Shaft) Construction Recommendations

Technical specifications should be prepared by the design team that require detailed material and construction submittals and proof of experience in drilled shaft installation by the specialty Contractor. The drilling method or combination of methods selected by the contractor should be submitted for review by the geotechnical engineer, prior to mobilization of drilling equipment.

A section of temporary casing is recommended to reduce the likelihood of caving of the side walls of the shaft hole. Concrete should be placed by directing the concrete down the center of the shaft

to reduce the likelihood of hitting the reinforcing steel and segregating. Groundwater, if encountered in the shaft, should be removed prior to placing concrete; alternatively, concrete may be placed by tremie methods.

5.4 EQUIPMENT PLATFORM FOUNDATIONS

The proposed equipment cabinets and accessory structures may be designed as slabs-on-grade bearing on a base course of at least 12-inches of CGF or Crushed Stone overlying densified native Sands as described in Section 5.3.2. Alternatively, the equipment platforms can be founded on drilled shaft foundations.

5.4.1 Equipment Platform Slab-on-Grade Foundations

We recommend a maximum net allowable bearing pressure of 2 kips per square foot (ksf) for slab design. Frost walls should be embedded a minimum of 42 inches below final grades for frost protection. Alternatively, dense insulation boards could be used under lightly loaded slabs-on-grade to reduce frost penetration.

The total settlement is expected to be less than 1 inch and differential settlement to be less than 0.5 inches. We recommend an ultimate coefficient of sliding friction of 0.5 (except if insulation boards are used to minimize frost penetration). A factor of safety of at least 1.5 should be applied to calculated sliding resistance.

The design subgrade modulus for the recommended subgrade and base course is 250 pounds per cubic inch.

5.4.2 Equipment Platform Drilled Shaft Foundations

We recommend a maximum allowable soil bearing capacity of 4 kips per square foot (ksf) for piers end bearing on Sand. Based on anticipated loads and the recommended soil bearing capacity, the anticipated total and differential settlement is less than one inch and one-half inch, respectively. Bottom of piers must be constructed at a minimum depth of 42-inches below final site grades. We recommend a minimum pier diameter of 12 inches. Construction operations should be planned to mitigate disturbance to the final subgrade. The base of pier excavations should be free of water and loose soils prior to placing concrete.

6.0 MATERIALS RECOMMENDATIONS

6.1 ON-SITE MATERIALS

Based on our visual soil classifications, existing Site soils *may* satisfy the requirements for CGF. Excavated soils could also be reused as Common Fill during Site development. If during construction excavated materials are planned for reuse, gradation analyses and Modified Proctor Test (ASTM D-1577, Method C) should be performed on representative soil samples and the results submitted to the Geotechnical Engineer for review and approval.

6.2 COMPACTED GRANULAR FILL

Compacted Granular Fill (CGF) for use as structural fill shall consist of inorganic soil free of clay, loam, ice and snow, tree stumps, roots, and other organic matter; graded within the following limits:

Sieve Size	Percent finer by weight
3-inches	100%
1/2-inch	50 - 85
No. 4	40 - 75
No. 50	8 - 28
No. 200	0 – 12

6.3 CRUSHED STONE

Crushed Stone for use below foundations and slabs shall consist of sound, tough, durable, rock that is graded within the following:

Sieve Size	Percent finer by weight
5/8-inches	100%
1/2-inch	85 - 100
3/8 inch	15 - 45
No. 4	0 - 15
No. 8	0 - 5

6.4 COMMON FILL

Common Fill may be used for general site grading, and other areas as appropriate, or as directed by the Geotechnical Engineer or his/her representative. The material should not be used beneath sensitive structures. Common Fill should conform to the following gradation requirements:

Sieve Size	Percent finer by weight
6-inches	100%
No. 200	0 - 25

6.5 MATERIAL COMPACTION

CGF should be placed in loose lifts not exceeding 8 inches in depth and compacted to at least 95 percent of its maximum dry density (and within 2% of optimum moisture content) as determined by ASTM D1557, Method C (Modified Proctor).

Common Fill should also be placed in loose lifts not exceeding 8 inches in depth, and compacted to at least 92 percent of its maximum dry density.

Crushed Stone is considered to be "self-compacting" and would negate the need to run laboratory proctor testing and have field density testing of in-place lifts. The crushed stone should be plate

compacted to "chink up" the working surface in lifts. We recommend placing Crushed Stone in maximum 12-inch lifts and compacting the lifts with a minimum of four passes with a vibratory plate compactor weighing a minimum of 1,000 pounds and with a minimum centrifugal force of 10,000 pounds.

6.6 GEOTEXTILE FABRIC

Geotextile fabric used as a separation fabric for crushed stone and soil material should meet the following criteria:

Property	Criteria	Test Method
Grab Strength	min. 80lbs	ASTM D4632
Static (CBR) Puncture	min. 50lbs	ASTM D6241
Trapezoid Tear	min. 25lbs	ASTM D4533
Apparent Opening Size	No. 70-100 U.S. Sieve Size	ASTM D4751

Fabric should be needle-punched non-woven material. Seams should be overlapped a minimum of six inches. During stone placement, the stone drop height should not exceed three feet and equipment traffic should be kept off the fabric until at least 6 to 12 inches of material is placed.

7.0 ADDITIONAL CONSTRUCTION RECOMMENDATIONS

Permanent slopes (though not anticipated) may be needed to develop the proposed compound area and access road. We recommend slopes be constructed no steeper than 3 Horizontal to 1 Vertical (3H:1V). Permanent slope surfaces should be vegetated and protected with erosion mats until the vegetation is established. Grading should be designed to reduce the likelihood of water ponding near the proposed structures.

Based on information obtained from the subsurface exploration program, the proposed foundations and slabs-on-grade may be constructed at or below the groundwater table (i.e., for drilled shaft construction) and construction dewatering should be anticipated. Stormwater runoff should not be permitted to accumulate on/within exposed subgrades and the runoff should be directed away from the exposed subgrade areas.

Where space permits and as needed, temporary slopes no steeper than 1.5H:1V appear to be appropriate. Excavation geometry should conform to OSHA excavation regulations contained in 29 CFR Part 1926. Temporary earth support is not anticipated for the excavations. If needed, temporary earth support systems should be designed by a Professional Engineer registered in the State of Connecticut.

8.0 REVIEW OF FINAL DESIGN, PLANS, AND SPECIFICATIONS

When project plans are finalized, and specifications are available, they should be provided to DTE for review of conformance with our geotechnical recommendations. If any changes are made to the proposed structure locations or elevations, the recommendations provided in this report will need to be verified by DTE for applicability.

9.0 CONSTRUCTION QUALITY CONTROL

We further recommend that DTE be retained during earthwork construction to observe excavation to footing subgrade, subgrade preparation, and fill placement and compaction in accordance with Building Code requirements. The geotechnical engineer in the field should observe the work for compliance with the recommendations in this report, identify changes in subsurface conditions from those observed in the explorations should they become apparent, and assist in the development of design changes should subsurface conditions differ from those anticipated prior to the start of construction.

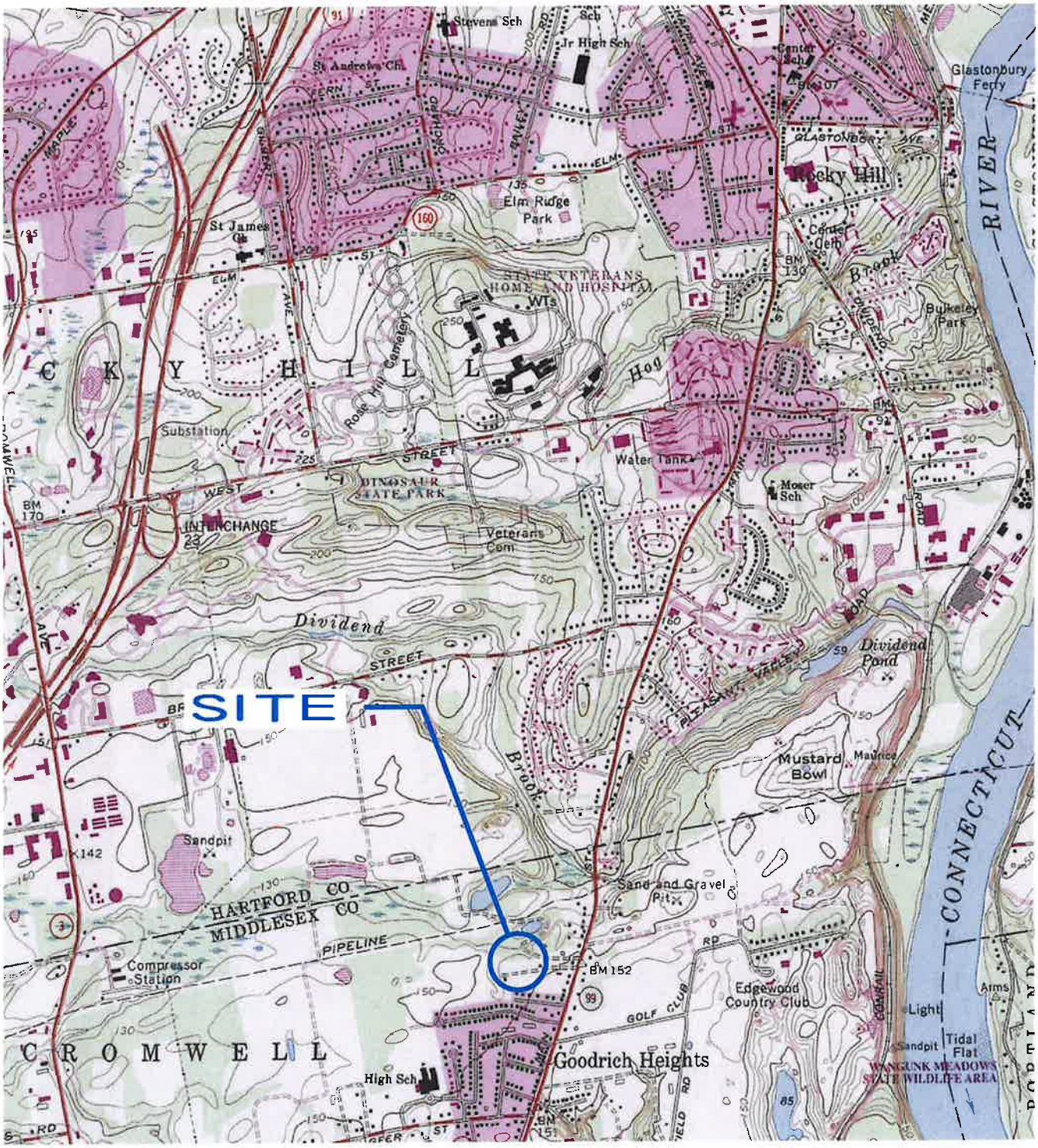
10.0 CLOSURE

We trust the information presented herein is sufficient for your use to progress design of the proposed telecommunications tower and compound equipment. We have enjoyed working with you on this project and look forward to our continued involvement. Please do not hesitate to call us if you have any questions.

This report is subject to the limitations included in Appendix 3.

APPENDIX 1 -

FIGURES



DOWN TO EARTH CONSULTING, LLC
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERING
122 CHURCH STREET
NAUGATUCK, CONNECTICUT 06770

CONNECTICUT

QUADRANGLE LOCATION

AREA PLAN
CROMWELL NORTH 2 CT
667 MAIN STREET
CROMWELL, CONNECTICUT

REFERENCE:
USGS TOPOGRAPHIC QUADRANGLE: HARTFORD SOUTH, CT

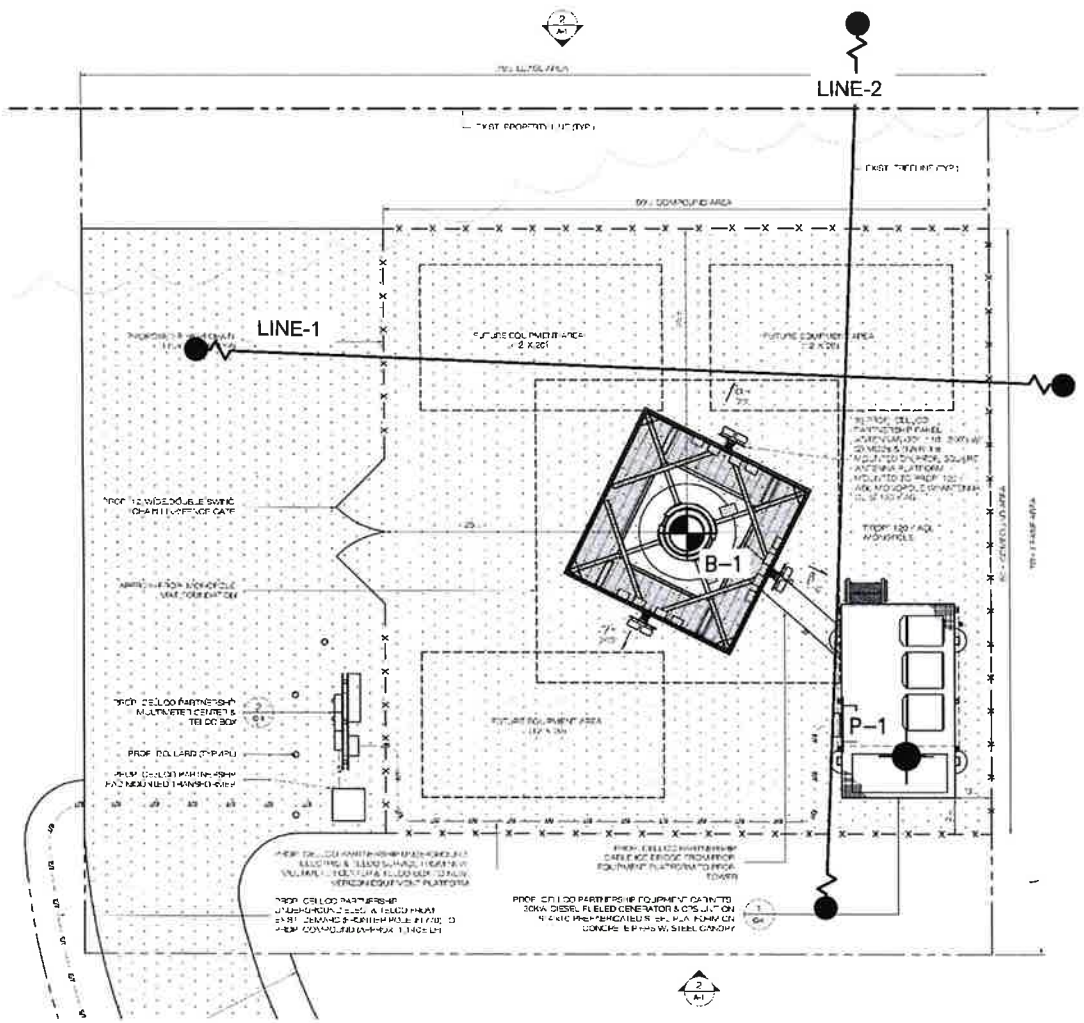
SCALE 1"= 2,000'

2,000' 1,000' 0 2,000'

PROJECT NO.	0032-016.00
DATE:	06/07/19
FIGURE NO.	1

DRAWN BY: RPJ	REVIEWED BY: RPJ

G:\My Drive\DTE Root Drive\Client Folders\0032 - All-Points Technology\016 - Cromwell Concrete Tower, Cromwell, CT\0032-016.00 AREA AND SITE PLAN.dwg



LEGEND

B-1 — TEST BORING NO. AND LOCATION OBSERVED BY DOWN TO EARTH CONSULTING

P-1 — TEST PROBE NO. AND LOCATION OBSERVED BY DOWN TO EARTH CONSULTING

LINE-1 — RESISTIVITY TEST LOCATION (TYP.)

NOTES:

1) BASE MAP DEVELOPED FROM AN ELECTRONIC FILE PREPARED BY ALL-POINTS TECHNOLOGY CORP., ENTITLED "COMPOUND PLAN AND TOWER ELEVATION, CROMWELL NORTH 2 CT, 667 MAIN STREET, CROMWELL, CT 06416", DRAWING A-1, REVISION DATED APRIL 12, 2018. ORIGINAL SCALE 1" = 5'.
2) EXPLORATIONS WERE COMPLETED BY NEW ENGLAND BORING CONTRACTORS, INC. AND OBSERVED BY DOWN TO EARTH CONSULTING, LLC.
3) RESISTIVITY TESTING WAS PERFORMED ON JUNE 3, 2019 BY DOWN TO EARTH CONSULTING, LLC.
4) THE LOCATIONS OF THE EXPLORATIONS AND RESISTIVITY TESTING WERE DETERMINED BY TAPING AND VISUAL ESTIMATES FROM EXISTING SITE FEATURES. THESE LOCATIONS SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.

DESIGNED BY OTHERS					
DRAWN BY RPJ					
CHECKED BY DFL					
APPROVED BY RPJ	NO.	DATE	REVISIONS	DRWN	CHKD	APPVD

SCALE 1"= 10'
20' 10' 0 20'

DOWN TO EARTH CONSULTING, LLC
122 CHURCH STREET
NAUGATUCK, CONNECTICUT 06770

PROJECT: CROMWELL NORTH 2 CT
667 MAIN STREET
CROMWELL, CONNECTICUT

DWG. TITLE: SITE AND EXPLORATION LOCATION PLAN

FILE NO. 0032-016.00
SCALE AS NOTED
DATE 06/07/19
FIGURE NO. 2

APPENDIX 2 -

EXPLORATION LOGS

DOWN TO EARTH CONSULTING, LLC

PROJECT		BORING NO.	B-1
CROMWELL NORTH 2 CT		SHEET	1 of 2
667 MAIN STREET		FILE NO.	0032-016.00
CROMWELL, CONNECTICUT		CHKD. BY	DFL

Boring Co.	New England Boring Contractors, Inc.	Boring Location	See Boring Location Plan		
Driller	Rick Posa	Ground Surface El.	147'+/-	Datum	AMSL
Logged By	Ray Janeiro	Date Start	6/3/2019	Date End	6/3/2019

Sampler Type:	Safety Hammer
Sampler Size:	1-3/8" I.D. Split Spoon
Type Drill Rig:	Mobile B-53 Truck Rig
Drilling Method:	4-inch I.D. FJ Casing

Groundwater Readings (from ground surface)				
Date	Time	Depth	Elev.	Stabilization Time
6/3/2019	-	15	132+/-	Wet Sample

DEPTH	Casing Blows (ft)	SAMPLE INFORMATION Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	PID ppmv	SAMPLE DESCRIPTION	STRATA DESCRIPTION
1		S-1	24/18	0 to 2	25-28-18-15		Dense, Top 14": dark brown to red-brown, fine to coarse SAND and GRAVEL, little Silt, with crushed stone fragments; Bot. 4": red-brown fine to coarse SAND, trace Silt	FILL
2								
3		S-2	24/13	2 to 4	17-18-18-21		Dense, red-brown fine to coarse SAND, trace fine Gravel, trace Silt	
4								
5								
6		S-3	24/16	5 to 7	18-20-15-18		Dense, red-brown fine to coarse SAND, little fine Gravel, trace Silt	
7								
8		S-4	24/14	7 to 9	22-22-26-22		Dense, red-brown fine to coarse SAND, trace Silt	
9								
10								
11		S-5	24/15	10 to 12	16-17-18-20		Dense, red-brown fine to coarse SAND, some fine Gravel, trace Silt	
12								
13								
14								
15								
16		S-6	24/12	15 to 17	9-11-10-12		Medium dense, red-brown fine SAND and SILT, stratified, wet	
17								
18								
19								
20								
21		S-7	24/14	20 to 22	13-20-22-22		Dense, red-brown fine SAND, some Silt, stratified	SAND
22								
23								
24								
25								
26		S-8	24/17	25 to 27	12-18-17-16		Dense, red-brown fine SAND, some (-) Silt, stratified	
27								
28								
29								
30								
31		S-9	24/16	30 to 32	12-19-16-20		Dense, red-brown SILT and fine SAND	
32								
33								
34								
35								
36		S-10	24/15	35 to 37	15-18-21-23		Dense, red-brown fine to medium SAND, trace Silt, with occasional SILT and Clayey SILT seams up to 2" thick	
37								
38								
39								
40								

SPT N-Values	SPT N-Values	Proportions	SYMBOL KEY	
0 to 4 - Very Loose	0 to 2 - Very Soft	Trace = 1 to 10%	1. S denotes split-barrel sampler.	7. PID denotes Photoionization Detector
5 to 10 - Loose	3 to 4 - Soft	Little = 10 to 20%	2. ST denotes 3-inch O.D. undisturbed sample.	8. PPM denotes parts per million.
11 to 30 - Medium Dense	5 to 8 - Medium Stiff	Some = 20 to 35%	3. UO denotes 3-inch Osterberg undisturbed sample.	9. PP denotes Pocket Penetrometer.
31 to 50 - Dense	9 to 15 - Stiff	And = 35 to 50%	4. PEN denotes penetration length of sampler.	10. FVST denotes field vane shear test.
Over 50 - Very Dense	16 to 30 - Very Stiff		5. REC denotes recovered length of sample.	11. RQD denotes Rock Quality Designation.
	Over 30 - Hard		6. SPT denotes Standard Penetration Test.	12. R denotes core run number.

FIELD NOTES: 1) 3" O.D. solid-stem augers advanced to 10 feet below grade (fbg), prior to switching to flush-joint casing.
2) Casing advancing to 15 fbg and bentonite drilling mud was introduced prior to advancing boring open-hole.

DOWN TO EARTH CONSULTING, LLC

PROJECT		BORING NO.	B-1
CROMWELL NORTH 2 CT		SHEET	2 of 2
667 MAIN STREET		FILE NO.	0032-016.00
CROMWELL, CONNECTICUT		CHKD. BY	DFL

Boring Co.	New England Boring Contractors, Inc.	Boring Location	See Boring Location Plan		
Driller	Rick Posa	Ground Surface El.	147'+/-	Datum	AMSL
Logged By	Ray Janeiro	Date Start	6/3/2019	Date End	6/3/2019

Sampler Type:	Safety Hammer
Sampler Size:	1-3/8" I.D. Split Spoon
Type Drill Rig:	Mobile B-53 Truck Rig
Drilling Method:	4-inch I.D. FJ Casing

Groundwater Readings (from ground surface)

Date	Time	Depth	Elev.	Stabilization Time
6/3/2019	-	15	132+/-	Wet Sample

DEPTH	Casing Blows (ft)	SAMPLE INFORMATION Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	PID ppmv	SAMPLE DESCRIPTION	STRATA DESCRIPTION
41		S-11	24/18	40 to 42	17-18-21-22		Dense, red-brown fine to medium SAND, trace Silt, with occasional SILT seams up to 3" thick	
42								
43								
44								
45								
46		S-12	24/16	45 to 47	14-21-19-22		Dense, red-brown fine SAND, some Silt	
47								
48								
49								
50								
51		S-13	24/15	50 to 52	17-24-23-30		Dense, red-brown fine SAND, little Silt	SAND
52								
53								
54								
55								
56		S-14	24/16	55 to 57	16-23-29-24		Very dense, red-brown fine SAND, little Silt	
57								
58								
59								
60								
61		S-15	24/15	60 to 62	21-26-32-27		Very dense, red-brown fine to medium SAND, trace Silt, with occasional Clayey SILT seams up to 2" thick	
62								
63							END OF BORING @ 62 FEET BELOW GRADE	
64								
65								
66								
67								
68								
69								
70								
71								
72								
73								
74								
75								
76								
77								
78								
79								
80								

SPT N-Values	SPT N-Values	Proportions	SYMBOL KEY	
0 to 4 - Very Loose	0 to 2 - Very Soft	Trace = 1 to 10%	1. S denotes split-barrel sampler.	7. PID denotes Photoionization Detector.
5 to 10 - Loose	3 to 4 - Soft	Little = 10 to 20%	2. ST denotes 3-inch O.D. undisturbed sample.	8. PPM denotes parts per million.
11 to 30 - Medium Dense	5 to 8 - Medium Stiff	Some = 20 to 35%	3. UO denotes 3-inch Osterberg undisturbed sample.	9. PP denotes Pocket Penetrometer.
31 to 50 - Dense	9 to 15 - Stiff	And = 35 to 50%	4. PEN denotes penetration length of sampler.	10. FVST denotes field vane shear test.
Over 50 - Very Dense	16 to 30 - Very Stiff		5. REC denotes recovered length of sample.	11. RQD denotes Rock Quality Designation.
	Over 30 - Hard		6. SPT denotes Standard Penetration Test.	12. R denotes core run number.

FIELD NOTES:

DOWN TO EARTH CONSULTING, LLC

PROJECT		BORING NO.	P-1
CROMWELL NORTH 2 CT		SHEET	1 of 1
667 MAIN STREET		FILE NO.	0032-016.00
CROMWELL, CONNECTICUT		CHKD. BY	DFL

Boring Co.	New England Boring Contractors, Inc.	Boring Location	See Boring Location Plan		
Driller	Rick Posa	Ground Surface El.	147'+/-	Datum	AMSL
Logged By	Ray Janeiro	Date Start	6/3/2019	Date End	6/3/2019

Sampler Type	-
Sampler Size	-
Type Drill Rig	Mobile B-53 Truck Rig
Drilling Method	3.25-inch I.D. Hollow-Stem Augers

Groundwater Readings (from ground surface)				
Date	Time	Depth	Elev.	Stabilization Time
6/3/2019	-	15	132+/-	end of drilling

DEPTH	Casing Blows (ft)	SAMPLE INFORMATION: Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	PID ppmv	SAMPLE DESCRIPTION	STRATA DESCRIPTION
1							Dark red-brown, fine to coarse SAND, some fine to coarse Gravel, little Silt, trace Asphalt fragments	FILL
2								
3							Red-brown fine to coarse SAND, trace fine to coarse Gravel, trace Silt	
4								
5							-increasing Gravel content at about 5 feet below grade	
6								
7								
8								
9								SAND
10								
11								
12								
13								
14								
15							-increasing Silt content at about 14 feet below grade	
16								
17								
18							END OF PROBE @ 17 FEET BELOW GRADE	
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
32								
33								
34								
35								
36								
37								
38								
39								
40								

SPT N-Values	SPT N-Values	Proportions	SYMBOL KEY	
0 to 4 - Very Loose	0 to 2 - Very Soft	Trace = 1 to 10%	1. S denotes split-barrel sampler.	7. PID denotes Photoionization Detector
5 to 10 - Loose	3 to 4 - Soft	Little = 10 to 20%	2. ST denotes 3-inch O.D. undisturbed sample.	8. PPM denotes parts per million.
11 to 30 - Medium Dense	5 to 8 - Medium Stiff	Some = 20 to 35%	3. UO denotes 3-inch Osterberg undisturbed sample.	9. PP denotes Pocket Penetrometer.
31 to 50 - Dense	9 to 15 - Stiff	And = 35 to 50%	4. PEN denotes penetration length of sampler.	10. FVST denotes field vane shear test.
Over 50 - Very Dense	16 to 30 - Very Stiff		5. REC denotes recovered length of sample.	11. RQD denotes Rock Quality Designation.
	Over 30 - Hard		6. SPT denotes Standard Penetration Test.	12. R denotes core run number.

FIELD NOTES: 1) Auger chatter observed at about 10 to 11 feet below grade on inferred cobbles/boulder.

APPENDIX 3 -

LIMITATIONS

LIMITATIONS

Explorations

1. The analyses and recommendations submitted in this report are based in part upon the data obtained from subsurface explorations by Down To Earth Consulting, LLC (DTE) and others. The nature and extent of variations between these explorations may not become evident until construction. If variations then appear evident, it will be necessary to reevaluate the recommendations of this report.

2. The generalized soil profile described in the text is intended to convey trends in subsurface conditions. The boundaries between strata are approximate and idealized and have been developed by interpretations of widely spaced explorations and samples; actual soil transitions are probably more erratic. For specific information, refer to the boring logs.

3. Water level readings have been made in the drill holes at times and under conditions stated on the boring logs. These data have been reviewed and interpretations have been made in the text of this report. However, it must be noted that fluctuations in the level of the groundwater may occur due to variations in rainfall, tidal, temperature, and other factors occurring since the time measurements were made.

Review

4. In the event that any changes in the nature, design or location of the proposed structures are planned, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and conclusions of this report modified or verified in writing by DTE. It is recommended that this firm be provided the opportunity for a general review of final design and specifications in order that earthwork and foundation recommendations may be properly interpreted and implemented in the design and specifications.

Construction

5. It is recommended that this firm be retained to provide soil engineering services during construction of the earthworks and foundation phases of the work. This is to observe compliance with the design concepts, specifications, and recommendations and to allow design changes in the event that subsurface conditions differ from those anticipated prior to start of construction.

Use of Report

6. This report has been prepared for the exclusive use of All-Points Technology Corporation, P.C. for specific application to the project noted in this geotechnical report in accordance with generally accepted soil and foundation engineering practices. No other warranty, express or implied, is made.

7. This soil and foundation engineering report has been prepared for this project by DTE. This report is for design purposes only and is not sufficient to prepare an accurate bid. Contractors wishing a copy of the report may secure it with the understanding that its scope is limited to design considerations only.

8. This report may contain comparative cost estimates for the purpose of evaluating alternative foundation schemes. These estimates may also involve approximate quantity evaluations. It should be noted that quantity estimates may not be accurate enough for construction bids. Since DTE has no control over labor and materials cost and design, the estimates of construction costs have been made on the basis of experience. DTE does not guarantee the accuracy of cost estimates as compared to contractor's bids for construction costs.