

FLORIDA DEPARTMENT OF TRANSPORTATION
Procurement Office
605 Suwannee Street, MS 20
Tallahassee, Florida 32399-0450

ADDENDUM NO. 1

DATE: February 13, 2018

RE: ITB-DOT-17/18-9053-GH
FDOT DISTRICT 5 COMMUNICATIONS FACILITIES– REVISED

Notice is hereby given of the following revisions/additions to the above-referenced ITB:

- Replace the original contract plans with the attached revised contract plans (D5 Facilities Plans REV1 Edits 20180212)
- The attached Geotechnical Engineering Report (Soil Boring Report) has been added as a resource to the advertisement.

Proposers must acknowledge receipt of this Addendum by completing and submitting with their proposal (or Addendum may be sent via email to greg.hill@dot.state.fl.us) no later than the time and date of the proposal opening. **Failure to do so may subject the bidder/proposer to disqualification.**

Bidder/Proposer

Submitted by (Signature)

Failure to file a protest within the time prescribed in Section 120.57(3), Florida Statutes, or failure to post the bond or other security required by law within the time allowed for filing a bond shall constitute a waiver of proceedings under Chapter 120, Florida Statutes.

REVISION 1

INDEX OF PLANS

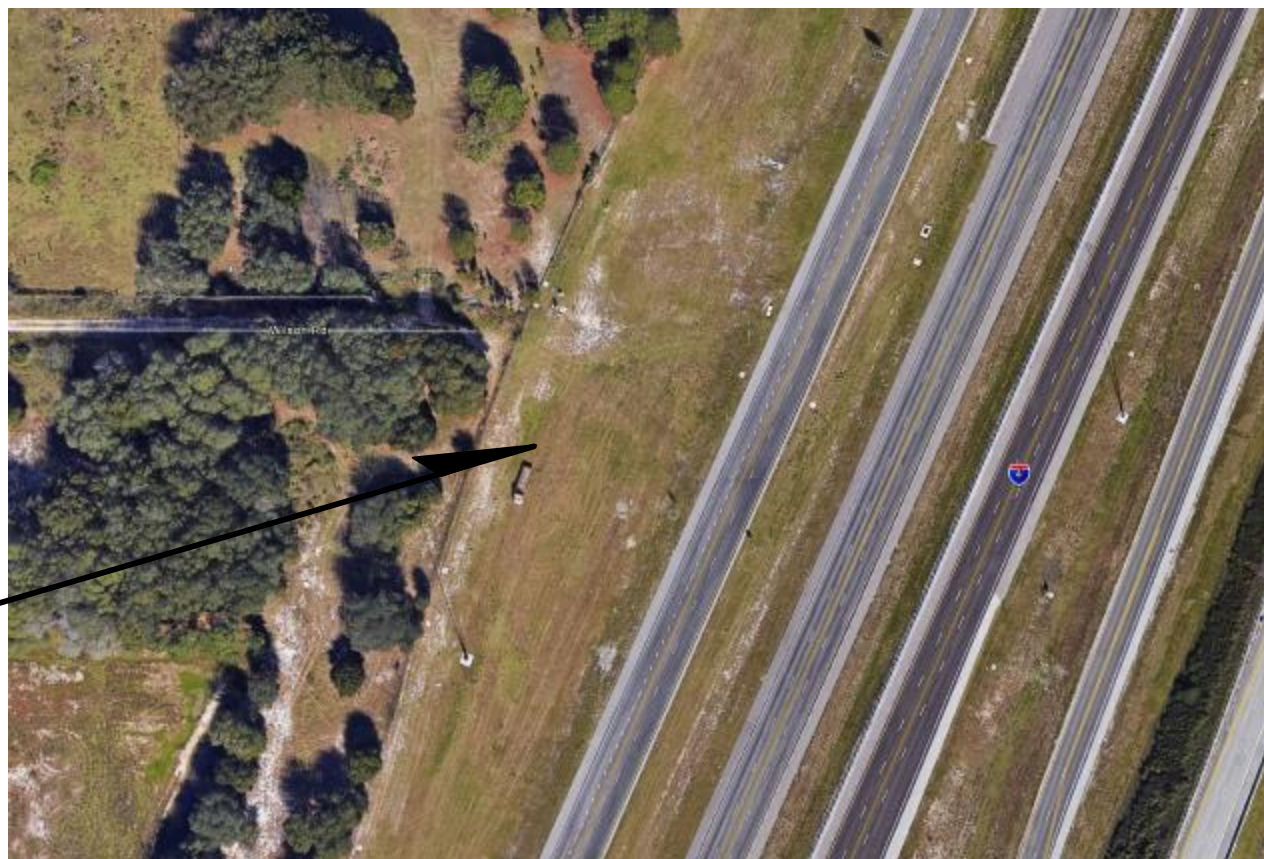
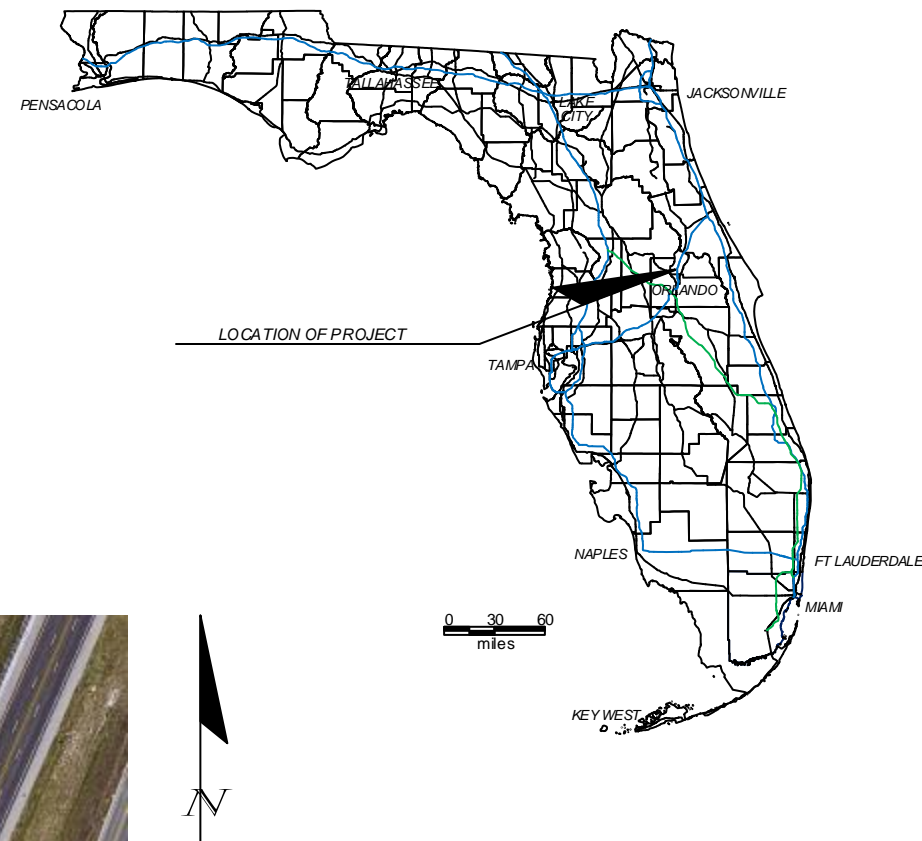
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**STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION**

CONTRACT PLANS

FINANCIAL PROJECT ID 424401-1-1-52-01
FLORIDA DEPARTMENT OF TRANSPORTATION (FDOT) DISTRICT 5 FACILITIES

INTELLIGENT TRANSPORTATION SYSTEMS PLANS



PROPOSED TOWER SITE

NOTE: THE SCALE OF THESE PLANS MAY HAVE CHANGED DUE TO REPRODUCTION.

GOVERNING STANDARDS AND SPECIFICATIONS:
FLORIDA DEPARTMENT OF TRANSPORTATION,
DESIGN STANDARDS DATED 2017,
AND STANDARD SPECIFICATIONS FOR ROAD AND
BRIDGE CONSTRUCTION DATED 2017,
AS AMENDED BY CONTRACT DOCUMENTS.

**FLORIDA DEPARTMENT OF
TRANSPORTATION
DISTRICT 5 COMMUNICATIONS FACILITIES**

FDOT PROJECT MANAGER: RANDY PIERCE

ENGINEER OF RECORD: DANIELLE S. MORALES, P.E.

P.E. NO.: 68460

CONTRACT PLANS RECORD					
DATE	REV.	DESCRIPTION	DATE	REV.	DESCRIPTION
2/12/18	1	TOWER LIGHT SYSTEM AND MODEL CHANGE			



FLORIDA DEPARTMENT OF TRANSPORTATION
605 SUWANNEE ST. MS 90
TALLAHASSEE, FL 32399-0450
PH. (850)-410-5600
FAX. (850)-410-5501

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION		
SITE NAME	COUNTY	FINANCIAL PROJECT ID
D5 RTMC	SEMINOLE	424401-1-52-01

**COMMUNICATIONS
FACILITIES
KEY SHEET**

SHEET NO.
A-1

GENERAL NOTES:

1. ALL CONSTRUCTION WORK SHALL BE COMPLETED BY APRIL 30,2019, THE VENDOR SHALL BE PENALIZED IN ACCORDANCE WITH THE CONTRACT FOR EACH DAY AFTER APRIL 30,2019 THAT THE WORK IS NOT COMPLETED.
3. THE VENDOR SHALL BE RESPONSIBLE FOR VERIFYING ALL CONDITIONS AND MEASUREMENTS RELATING TO THE WORK IN THE FIELD PRIOR TO PROCEEDING WITH INSTALLATION ACTIVITIES. THE VENDOR SHALL COORDINATE ANY MODIFICATIONS REQUIRED WITH FDOT.
4. THE VENDOR IS RESPONSIBLE FOR ALL EQUIPMENT, MATERIALS, AND SERVICES REQUIRED TO COMPLETE THIS PROJECT. THE VENDOR IS RESPONSIBLE FOR VERIFYING THE COMPLETENESS OF MATERIALS REQUIRED AND SUITABILITY OF DEVICES TO MEET THESE PLANS THE VENDOR SHALL PROVIDE AND INSTALL, WITHOUT CLAIM, ANY ADDITIONAL EQUIPMENT AND SERVICES REQUIRED FOR OPERATION PER THESE PLANS.
5. THE VENDOR SHALL BE RESPONSIBLE FOR DETERMINING LOCAL FACILITIES FOR DELIVERING, STORING, AND LEGALLY DISPOSING OF POST-INSTALLATION MATERIALS.
6. THE VENDOR SHALL PROTECT AND PRESERVE ALL EXISTING UTILITIES, INCLUDING THOSE REQUIRING UPGRADES OR RELOCATION IN THESE PLANS, LOCATED WITHIN THE INSTALLATION LIMITS OF THE PROJECT.
7. THE VENDOR SHALL NOT BRING ANY HAZARDOUS MATERIALS ONTO THE PROJECT SITE SHOULD THE VENDOR REQUIRE SUCH FOR PERFORMING THE WORK, THE VENDOR SHALL REQUEST, IN WRITING, PERMISSION FROM FDOT. THE VENDOR SHALL PROVIDE THE CONTAMINATION IMPACT COORDINATOR (CIC) WITH A COPY OF THE MATERIAL SAFETY DATA SHEET (MSDS) FOR EACH HAZARDOUS MATERIAL PROPOSED FOR USE FDOT SHALL COORDINATE WITH THE CIC PRIOR TO ISSUING WRITTEN APPROVAL TO THE VENDOR. BECAUSE STATE LAW DOES NOT TREAT PETROLEUM PRODUCTS THAT ARE PROPERLY CONTAINERIZED AND INTENDED FOR EQUIPMENT USE AS HAZARDOUS MATERIAL, SUCH PRODUCTS DO NOT NEED MSDS SUBMITTAL.
ANY KNOWN OR SUSPECTED HAZARDOUS MATERIAL FOUND ON THE PROJECT SITE BY THE VENDOR SHALL BE IMMEDIATELY REPORTED TO FDOT, WHO SHALL DIRECT THE VENDOR TO PROTECT THE AREA OF KNOWN OR SUSPECTED CONTAMINATION FROM FURTHER ACCESS. FDOT IS TO NOTIFY THE CIC OF THE DISCOVERY. THE CIC WILL ARRANGE FOR INVESTIGATION, IDENTIFICATION, AND REMEDIATION OF THE HAZARDOUS MATERIAL. THE VENDOR SHALL NOT RETURN TO THE AREA OF CONTAMINATION UNTIL APPROVAL IS PROVIDED BY FDOT. THE CIC WILL ADVISE FDOT.
8. THE VENDOR IS RESPONSIBLE FOR OBTAINING ANY PERMITS (DEP, SAINT JOHN'S WATER MANAGEMENT DISTRICT, ETC.) AND MEETING BUILDING OFFICIAL REQUIREMENTS, INCLUDING ASSOCIATED FEES. THE VENDOR IS RESPONSIBLE FOR CONTACTING APPLICABLE BUILDING OFFICIALS FOR PERMIT APPLICATIONS AND SUBMITTING TO THE FDOT FOR SIGNATURE.
9. THE VENDOR IS RESPONSIBLE FOR COORDINATING ALL NECESSARY NOTIFICATIONS OF WORK AND CONSTRUCTION WITH THE FEDERAL AVIATION ADMINISTRATION (FAA) AND FEDERAL COMMUNICATIONS COMMISSION (FCC), WITH THE FDOT PROJECT MANAGER. ALL FAA AND FCC FILINGS WILL BE HANDLED BY THE VENDOR BASED ON THIS COORDINATION.
10. THE VENDOR SHALL SUBMIT ALL DETAILED DESIGN PLANS FOR FDOT REVIEW AND APPROVAL PER THESE PLANS AND SPECIFICATIONS. THE VENDOR SHALL NOT BEGIN INSTALLATION WORK UNTIL ALL DESIGN SUBMITTALS ARE APPROVED IN WRITING BY THE FDOT PROJECT MANAGER.
11. THE VENDOR SHALL SUBMIT AN INSTALLATION SCHEDULE TO FDOT FOR REVIEW AND APPROVAL
12. THE VENDOR MUST COORDINATE ALL SITE WORK WITH FDOT. THE CONTACT PERSON IS RANDY PIERCE, 850-410-5608.
13. ALL TOWER INSTALLATION WORK SHALL BE DONE BY TOWER CLIMBERS CERTIFIED BY COMTRAIN, OR APPROVED EQUIVALENT.
14. THE VENDOR SHALL COORDINATE EACH ELEMENT ON THE SCHEDULE WITH OTHER INSTALLATION ACTIVITIES AND SHOW EACH ACTIVITY IN PROPER SEQUENCE.
15. THE VENDOR SHALL NOTIFY ALL UTILITY OWNERS THROUGH SUNSHINE STATE ONE CALL OF FLORIDA (811) THREE BUSINESS DAYS IN ADVANCE OF BEGINNING INSTALLATION ON THE JOB SITE. NOTE THAT NOT ALL UTILITY COMPANIES ARE MEMBERS OF THE SUNSHINE STATE ONE CALL, AND THEREFORE, THE VENDOR SHALL CONTACT THEM INDIVIDUALLY.
THE VENDOR SHALL COORDINATE WITH THE PROJECT MANAGER FOR LOCATION OF ITS FIBER IN THE AREA IF RELOCATION OF FIBER IS NECESSARY, THE VENDOR SHALL COORDINATE WITH THE PROJECT MANAGER.
16. THE VENDOR SHALL FIELD LOCATE ALL BURIED GROUNDING, CONDUITS, STRUCTURES, AND UTILITIES IN AND AROUND THE WORK AREA PRIOR TO COMMENCING ANY EXCAVATIONS. ALL DIGGING AND EXCAVATING INSIDE AND AROUND THE SITE COMPOUND SHALL BE PERFORMED IN A MANNER CONSISTENT WITH GOOD ENGINEERING PRACTICES. THE USE OF HEAVY EXCAVATING MACHINERY IS NOT PERMITTED INSIDE THE PROPOSED FENCED AREA OTHER THAN FOR DRILLING NEW TOWER SHAFTS.
17. THE FDOT SHALL BE NOTIFIED 72 HOURS IN ADVANCE OF ANY SCHEDULED INTERRUPTIONS FOR SAFETY PRECAUTIONS. IN ADDITION TO THE 72 HOUR ADVANCE NOTIFICATION FOR SCHEDULED INTERRUPTIONS, THE VENDOR SHALL NOTIFY FDOT AT LEAST TWO HOURS IN ADVANCE OF ALL NECESSARY COMMUNICATIONS DISRUPTIONS AND SUCH PLANNED OUTAGES WITH THE ANTICIPATED OUTAGE TIME.

GENERAL NOTES (CONT'D.):

18. THE VENDOR SHALL RESTRICT PERSONNEL, THE USE OF EQUIPMENT, AND THE STORAGE OF MATERIALS TO AREAS WITHIN THE LIMITS OF INSTALLATION. ANY OFF-SITE STORAGE AREA IS THE RESPONSIBILITY OF THE VENDOR.
19. THE VENDOR SHALL PROVIDE SECURITY FOR HIS/HER EQUIPMENT AND SHALL CONDUCT HIS/HER OPERATIONS SO AS TO AVOID INTERFERENCE WITH FDOT'S NORMAL OPERATIONS.
20. ALL EXISTING DRIVEWAYS, EASEMENTS, AND GROUNDS SHALL BE PROTECTED OR RESTORED TO INITIAL CONDITION IF DAMAGED OR DISTURBED AS A RESULT OF INSTALLATION.
21. THE VENDOR SHALL PROVIDE AND MAINTAIN IN A NEAT AND SANITARY CONDITION SUCH ACCOMMODATIONS FOR THE USE OF HIS/HER EMPLOYEES AS MAY BE NECESSARY TO COMPLY WITH REGULATIONS OF THE COUNTY OR THE DEPARTMENT OF HEALTH AND REHABILITATIVE SERVICES. NO NUISANCE WILL BE PERMITTED.
22. THE VENDOR SHALL BE RESPONSIBLE FOR REMOVING AND LEGALLY DISPOSING OF TRASH IN A TIMELY MANNER, DAILY. THIS INCLUDES TRASH GENERATED FROM THE INSTALLATION, INCLUDING LUNCH BAGS AND DRINKS. THE VENDOR SHALL NOT ALLOW TRASH TO BLOW AROUND OR AWAY FROM ANY CONSTRUCTION SITE.
23. ALL EQUIPMENT AND SERVICES FURNISHED BY THE VENDOR AS PART OF THIS PROJECT SHALL BE WARRANTED TO BE FREE FROM DEFECTS IN MATERIAL AND WORKMANSHIP. IN THE EVENT ANY SUCH DEFECTS IN EQUIPMENT OR SERVICES BECOME EVIDENT WITHIN THE WARRANTY PERIOD, THE VENDOR SHALL CORRECT THE DEFECT BY REPAIRING OR REPLACING THE DEFECTIVE COMPONENT OR EQUIPMENT AT NO COST TO FDOT DURING THE WARRANTY PERIOD. THE WARRANTY PERIOD SHALL BE A MINIMUM OF 12 MONTHS FROM DATE OF FINAL ACCEPTANCE. CLAIMS UNDER ANY OF THE WARRANTIES HEREIN ARE VALID IF MADE WITHIN 30 DAYS AFTER TERMINATION OF THE WARRANTY PERIOD.
24. THE VENDOR SHALL COLLECT PRODUCT DATA INTO A SINGLE SUBMITTAL FOR EACH ELEMENT OF INSTALLATION OR SYSTEM. PRODUCT DATA SHALL INCLUDE PRINTED INFORMATION SUCH AS MANUFACTURER'S INSTALLATION INSTRUCTIONS AND PERFORMANCE SPECIFICATIONS.
25. THE VENDOR SHALL SUBMIT ONE (1) SET OF AS-BUILT DRAWINGS DEPICTING THE LOCATION OF THE COMPONENTS OF THE COMMUNICATIONS FACILITIES WITH RESPECT TO LOCAL FEATURES AND BENCHMARKS. AS-BUILT DRAWINGS DEPICTING ANY FIELD CHANGES TO THE FACILITIES SHALL ALSO BE SUBMITTED. AS-BUILT DOCUMENTATION SHALL BE SUBMITTED IN ELECTRONIC FORMAT, AS WELL AS PRINTED. ALL ITS FACILITY MANAGEMENT (ITSM) ATTRIBUTE FORMS SHALL BE COMPLETED IN ACCORDANCE WITH THE TECHNICAL SPECIFICATIONS.
26. THE VENDOR SHALL BE RESPONSIBLE FOR ENSURING THE SITE IS SECURED BY FENCING AT THE END OF EACH DAY.

APPLICABLE PUBLICATIONS AND STANDARDS

1. ACI 336.3R-93: DESIGN AND CONSTRUCTION OF DRILLED PIERS
2. ANSI/TIA-222-G-4, STRUCTURAL STANDARD FOR ANTENNA SUPPORTING STRUCTURES AND ANTENNAS
3. APPLICABLE MANUFACTURER'S INSTRUCTIONS AND STANDARD PRACTICES.
4. APPLICABLE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (O.S.H.A.) PRACTICES.
5. ASTM A123: STANDARD SPECIFICATION FOR: ZINC (HOT GALVANIZED) COATINGS ON PRODUCTS FABRICATED FROM ROLLED, PRESSED, AND FORGED STEEL SHAPES, PLATES, BARS, AND STRIP.
6. ASTM A153: STANDARD SPECIFICATION FOR: ZINC COATING (HOT-DIP) ON IRON AND STEEL HARDWARE.
7. IEEE-81: MEASURING GROUND RESISTANCE AND POTENTIAL GRADIENTS IN THE EARTH.
8. FHWA-NHI-10-016: DRILLED SHAFTS: CONSTRUCTION PROCEDURES AND LRFD DESIGN METHODS
9. FLORIDA BUILDING CODE, 2017 EDITION.
10. FDOT 2017 STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE DESIGN.
11. FDOT FY 2017-18 DESIGN STANDARDS.
12. FEDERAL AVIATION ADMINISTRATION REGULATIONS.
13. FEDERAL COMMUNICATIONS COMMISSION REGULATIONS
14. IEEE 837: STANDARD FOR QUALIFYING PERMANENT CONNECTIONS USED IN SUBSTATION GROUNDING.
15. MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD)
16. NATIONAL ELECTRICAL CODE (NEC) (NFPA 70), 2017 EDITION.
17. NATIONAL FIRE PROTECTION ASSOCIATION (NFPA 780)
18. NEC ARTICLE 250: GROUNDING AND BONDING.
19. NIST: NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY.
20. UL 467: STANDARDS FOR GROUNDING AND BONDING EQUIPMENT.

CONTRACT PLANS RECORD						 FLORIDA DEPARTMENT OF TRANSPORTATION 605 SUWANNEE ST. MS 90 TALLAHASSEE, FL 32399-0450 PH. (850)-410-5600 FAX. (850)-410-5501	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			COMMUNICATIONS FACILITIES GENERAL NOTES	SHEET NO.
DATE	REV.	DESCRIPTION	DATE	REV.	DESCRIPTION		SITE NAME	COUNTY	FINANCIAL PROJECT ID		A-2
						D5 RTMC	SEMINOLE	424401-1-52-01			

REVISION 1

TOWER DESIGN CRITERIA NOTES:

1. THE TOWER MANUFACTURER SHALL BE AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC) CERTIFIED AND SHALL SUBMIT PROOF OF AISC CERTIFICATION FOR THE MANUFACTURING FACILITY TO THE FDOT.
2. ALL TOWER MEMBERS SHALL BE SOLID STEEL (I.E., NO HOLLOW MEMBERS ARE PERMITTED).
3. ALL TOWER STRUCTURAL STEEL SHALL BE HOT-DIP GALVANIZED PER ASTM A123.

ALL TOWER HARDWARE, INCLUDING BUT NOT LIMITED TO, BOLTS, NUTS, FASTENERS, RODS, AND OTHER HARDWARE SHALL BE HOT-DIP GALVANIZED PER ASTM A153. MECHANICALLY GALVANIZED HARDWARE (ASTM B695) IS NOT PERMITTED.

4. ANSI/TIA-222-G-4
 3-SECOND GUST BASIC WIND SPEED: 140 MPH
 RADIAL ICE: 0 inches
 STRUCTURAL CLASSIFICATIONS: III
 IMPORTANCE FACTOR: 1.15
 EXPOSURE CATEGORY: C
 TOPOGRAPHIC FACTOR: 1

FLORIDA BUILDING CODE 2017
 3-SECOND GUST ULTIMATE WIND SPEED: 194 MPH
 RISK CATEGORY: III-IV
 EXPOSURE CATEGORY: C

THE TOWER DESIGN SHALL ALSO MEET THE DEFLECTION CRITERIA OUTLINED IN ANSI/TIA-222-G-4 FOR MICROWAVE DISHES: TOTAL BEAM DEFLECTION (TWIST AND SWAY) FOR PROPOSED 11GHZ AND 6GHZ MICROWAVE DISHES SHALL NOT EXCEED 3DB SIGNAL DEGRADATION AT 60 MPH.

THE TOWER SHALL ALSO MEET THE ADDITIONAL REQUIREMENTS AS DELINEATED ON SHEET A-3 OF THESE SPECIFICATIONS. THE VENDOR SHALL PROVIDE TOWER MANUFACTURER SHOP/FABRICATION DRAWINGS THAT DEPICT THE SIZE AND SPECIFICATIONS OF ALL SUPPORT GUSSETS AND/OR TABS THAT ARE DESIGNED TO SUPPORT CROSS BRACING/MEMBERS OR ANY OTHER SUPPORT POINTS. THESE DRAWINGS SHALL ALSO DEPICT THE SPECIFICATIONS AND PROCESS USED TO WELD THE SUPPORT GUSSETS AND/OR TABS TO THE TOWER LEG STEEL.

5. A GROUND BONDING TAB SHALL BE WELDED TO EACH LEG DURING FACTORY FABRICATION, PRIOR TO HOT DIP GALVANIZATION. THE TAB SHALL BE LOCATED 2-FEET ABOVE THE ANCHOR ROD BASE PLATE. SEE DETAIL A-10A ON SHEET A-10.
6. THE FOLLOWING TABLE IS A LIST OF THE ANTENNAS, THEIR ELEVATIONS, AND THE TRANSMISSION LINES TO BE USED IN THE DESIGN: (NOTE: THE ELEVATIONS ARE CENTERLINE FOR PANEL ANTENNAS AND DISHES. THEY ARE MOUNTING HEIGHTS FOR OMNI AND WHIP ANTENNAS). ALL OTHER ELEVATIONS ARE REFERENCED TO THE TOWER BASE PLATE. **IF AN (EPA)_A (PER ANSI/TIA-222-G) IS SHOWN AFTER THE DESCRIPTION, THIS IS THE MINIMUM VALUE THAT SHALL BE USED FOR THE TOWER DESIGN. IF A MINIMUM (EPA)_A IS GIVEN, IT MAY NOT BE REDUCED USING SHIELDING FACTORS (K_a), OR OTHER FACTORS.**

ELEVATION	LEG	AZIMUTH	DESIGN ANTENNAS	MINIMUM (EPA) _A	LINES
250'	C	-	LIGHTNING ROD	1 FT ²	1/2" Ø COPPER
250'	A	-	TECHNOSTROBE WHITE LED FLASH HEAD	2 FT ²	1" Ø CONDUIT
250'	B	-	TECHNOSTROBE WHITE LED FLASH HEAD	2 FT ²	SAME CONDUIT
245'	A	320°	*DS8A06F36U-N	6 FT ²	7/8" COAX
245'	A	320°	*6' SIDE ARM	6 FT ²	—
245'	C	160°	*DS8A06F36U-N	6 FT ²	7/8" COAX
245'	C	160°	*6' SIDE ARM	6 FT ²	—
245'	B	80°	*DB340-1	6 FT ²	7/8" COAX
245'	B	80°	*6' SIDE ARM	6 FT ²	—
200'	A	9.6°	*DA8-W57ACU (8' DISH)	SEE NOTE 7	EP65J
200'	A	9.6°	*DISH MOUNT	10 FT ²	—
170'	A	9.6°	*DA8-W57ACU (8' DISH)	SEE NOTE 7	EP65J
170'	A	9.6°	*DISH MOUNT	10 FT ²	—
130'	C	198.6°	*DA8-W57ACU (8' DISH)	SEE NOTE 7	EP65J
130'	C	198.6°	*DISH MOUNT	10 FT ²	—
115'	B	19.8°	*DA8-W57ACU (8' DISH)	SEE NOTE 7	EP65J
115'	B	19.8°	*DISH MOUNT	10 FT ²	—
100'	A	80°	*DB224	6 FT ²	7/8" COAX
100'	A	19.8°	*6' SIDE ARM	6 FT ²	—
80'	A	20°	*DB493	6 FT ²	7/8" COAX
80'	A	20°	*6' SIDE ARM	6 FT ²	—
80'	C	175°	*DB493	6 FT ²	7/8" COAX
80'	C	175°	*6' SIDE ARM	6 FT ²	—

* THIS IS A FUTURE LOAD ANTENNA SYSTEM TO BE CONSIDERED FOR TOWER CAPACITY DESIGN, NOT TO BE FURNISHED OR INSTALLED AS A PART OF THIS PROJECT.

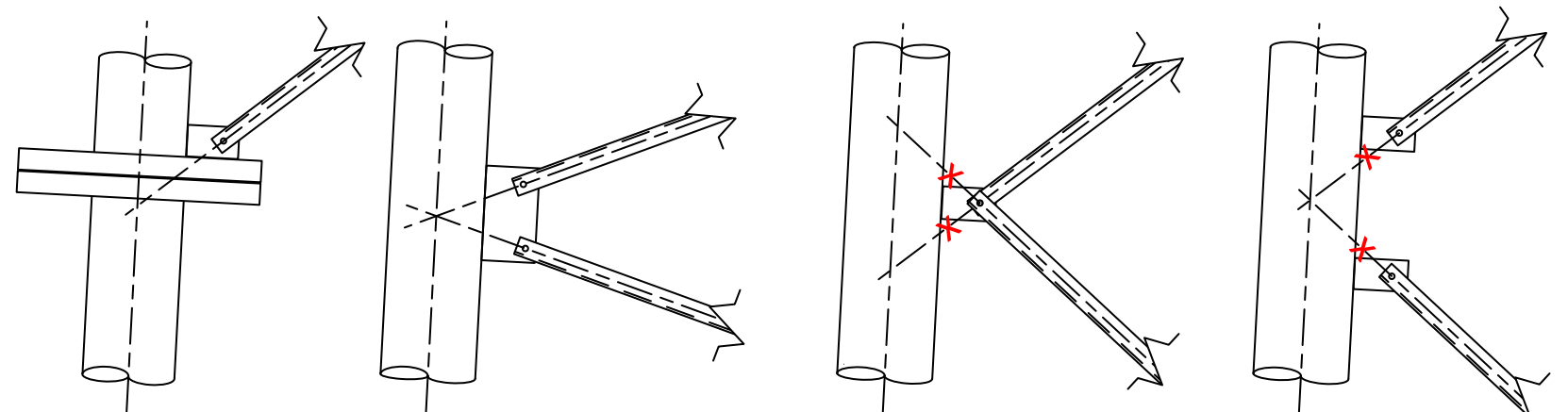
TOWER DESIGN CRITERIA NOTES (CONTD.):

7. THE WIND FORCE ON ANY ANTENNA SHALL BE COMPUTED USING THE MOST CRITICAL WIND DIRECTION AND ANTENNA AREA. IF A SPECIFIC MINIMUM "WIND AREA - (EPA)_A" IS SHOWN, THAT VALUE (OR A HIGHER VALUE) SHALL BE USED FOR THE TOWER DESIGN.
8. THE WIND LOADING FOR THE MICROWAVE DISHES SHALL BE CALCULATED FOR EACH WIND DIRECTION USING THE VALUES FROM ANSI/TIA-222-G-4, ANNEX C (C.2 AND TABLE C3). THE DISH AZIMUTHS RELATIVE TO THE TOWER ORIENTATION SHALL BE IN ACCORDANCE WITH SHEET A-3, AND INCORPORATED IN THE FINAL TOWER DESIGN.
9. ONE (1) WAVEGUIDE LADDER MUST BE INCLUDED IN THE WIND LOADING. NO STACKING OF TRANSMISSION LINES SHALL BE CONSIDERED IN THE ORIGINAL DESIGN. ALL LINEAR APPURTENANCES ON ALL FACES ARE TO BE INCLUDED IN THE DESIGN LOADING. NO SHIELDING OF LINEAR APPURTENANCES MAY BE CONSIDERED EXCEPT THAT K_a, IN ACCORDANCE WITH ANSI/TIA-222-G-4, SECTION 2.6.11.2, MAY BE INCLUDED FOR LINEAR APPURTENANCES ENTIRELY WITHIN THE FACE ZONE.
10. OTHER ANCILLARY ITEMS SUCH AS CLIMBING HARDWARE, SAFETY CLIMB CABLE AND ATTACHMENTS, WAVEGUIDE LADDERS, LIGHTNING PROTECTION, OBSTRUCTION LIGHTING SYSTEM, ETC. SHALL BE INCLUDED IN THE WIND LOADING OF THE TOWER.
11. THE ANCHOR BOLTS SHALL BE PROPERLY DESIGNED IN ACCORDANCE WITH ANSI/TIA-222-G-4. FOR THE PURPOSES OF DESIGN, THE ANCHOR BOLTS SHALL BE DESIGNED FOR REACTIONS 10 PERCENT HIGHER THAN CALCULATED FOR THE TOWER DESIGN. FOR THE PURPOSES OF DESIGN, THE ANCHOR BOLTS SHALL BE DESIGNED ASSUMING THAT NO GROUT IS INSTALLED UNDER THE BASE PLATE.

THE ANCHOR BOLT DESIGN SHALL BE SUBMITTED AS PART OF THE TOWER DESIGN SUBMITTAL.
12. IF USED, **ALL FACE, PLAN AND HIP REDUNDANT BRACING MEMBERS ON THE NEW TOWER MUST BE TRIANGULATED** IN ACCORDANCE WITH THE REQUIREMENTS OF ANSI/TIA-222-G-4, TABLE 4-7. ANY TOWER DESIGN INCLUDING NON-TRIANGULATED BRACING MEMBERS WILL BE CONSIDERED IN NON-COMPLIANCE WITH THESE SPECIFICATIONS.
13. FOR TOWER DESIGNS USING DOUBLE ANGLE MEMBERS, OR OTHER BUILT UP MEMBERS, THESE MEMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ANSI/TIA-222-G-4, SECTION 4.5.3 (I.E. THE SLENDERNESS OF THE MEMBERS MUST BE ADJUSTED IN ACCORDANCE WITH THE APPLICABLE STITCH BOLT MODIFICATION FORMULA).
14. ALL TOWER MEMBERS AND CONNECTIONS SHALL BE DETAILED SO THAT THE WORK LINES OF THE TOWER MEMBERS ARE WITHIN THE "NORMAL FRAMING ECCENTRICITIES" AS DEFINED BY ANSI/TIA-222-G-4, SECTION 4.4.4.
15. ALL GUSSET PLATES, CONNECTION PLATES, BRACING MEMBERS, ETC. SHALL HAVE CONNECTIONS THAT ARE PROPERLY DESIGNED AND DETAILED FOR BOLT HOLE BEARING, BLOCK SHEAR, AND RUPTURE PER THE REQUIREMENTS OF ANSI/TIA-222-G-4 SECTION 4.9.6 AS WELL AS ALL OTHER FORCES APPLIED TO THEM. ALL GUSSET PLATES, CONNECTION PLATES, ETC. SHALL BE DETAILED SO THAT THE WORK LINES HAVE A CONTINUOUS LOAD PATH THROUGH THE GUSSET STEEL OR CONNECTION PLATE STEEL TO THE MEMBERS BEING CONNECTED. DETAILING THAT INDUCES BENDING FORCES INTO THE GUSSETS OR CONNECTION PLATES, OR THAT DO NOT PROVIDE A CONTINUOUS LOAD PATH ALONG THE WORK LINES SHALL BE CONSIDERED IN NONCOMPLIANCE WITH THESE SPECIFICATIONS.
16. THE DRILLED SHAFT PIERS SHALL EXTEND A MINIMUM 12 INCHES ABOVE FINISHED GRADE. CORNERS SHALL HAVE A MINIMUM ONE (1) INCH CHAMFER. THE TOP OF THE PIERS SHALL BE SLOPED TO DRAIN WATER FROM THE CENTER.
17. THE FOUNDATIONS SHALL BE DESIGNED FOR TOWER REACTIONS 10 PERCENT HIGHER THAN CALCULATED FOR TOWER DESIGN. THE FDOT WILL PROVIDE A REPORT OF SUBSURFACE EXPLORATION AND GEOTECHNICAL ENGINEERING EVALUATION AS AN ADDENDUM TO THIS PROCUREMENT SPECIFICATION.


THE FOUNDATION MATERIALS SHALL MEET OR EXCEED THE FOLLOWING CRITERIA: CONCRETE f_c = 3,000 PSI AT 28 DAYS, REINFORCED STEEL ASTM A-160 GRADE 60, CEMENT ASTM C 150 TYPE 1 LOW-ALKALI CONTENT WITH A NaO₂ EQUIVALENT LESS THAN 0.5 PERCENT.

CONCRETE DESIGN MIX SHALL BE SUBMITTED TO THE FDOT PROJECT MANAGER FOR REVIEW AND APPROVAL.



PROPER GUSSET/TAB DESIGN

IMPROPER GUSSET/TAB DESIGN

CONTRACT PLANS RECORD						 FLORIDA DEPARTMENT OF TRANSPORTATION 605 SUWANNEE ST. MS 90 TALLAHASSEE, FL 32399-0450 PH. (850)-410-5600 FAX. (850)-410-5501	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			TOWER DESIGN CRITERIA	SHEET NO. A-3
DATE	REV.	DESCRIPTION	DATE	REV.	DESCRIPTION		SITE NAME	COUNTY	FINANCIAL PROJECT ID		
2/12/2018	1	UPDATED TABLE IN NOTE 6				D5 RTMC	SEMINOLE	424401-1-52-01			

REVISION 1

INSTALLATION NOTES:

1. THE VENDOR SHALL SUBMIT A DETAILED INSTALLATION PLAN FOR APPROVAL BY FDOT. THE PLAN SHALL INCLUDE A SCHEDULE OF EVENTS DETAILING EACH PHASE OF INSTALLATION, INCLUDING A PROJECTED TIMELINE.
2. THE VENDOR SHALL SUBMIT DETAILED DESIGN PLANS FOR ALL MAJOR ASPECTS OF THIS PROJECT, INCLUDING BUT NOT LIMITED TO THE TOWER, TOWER FOUNDATION, SHELTER, SHELTER FOUNDATION, GENERATOR AND LP TANK, AND AC/DC POWER DISTRIBUTION SYSTEMS FOR FDOT REVIEW AND APPROVAL.
3. ALL EQUIPMENT AND COMPONENT PARTS FURNISHED SHALL BE NEW, MEET OR EXCEED THE MINIMUM REQUIREMENTS STATED HEREIN, AND PERFORM TO MANUFACTURER'S SPECIFICATIONS. NO PART OR ATTACHMENT SHALL BE SUBSTITUTED OR APPLIED CONTRARY TO THE MANUFACTURER'S RECOMMENDATIONS AND STANDARD PRACTICES.
4. THE VENDOR IS RESPONSIBLE FOR CLEARING OF BRUSH, TREES, OR ANY OTHER OBSTRUCTIONS, INCLUDING THE REMOVAL OF FENCING, ASPHALT OR CONCRETE. ANY TREE STUMPS RESULTING FROM CLEARING SHALL BE GRUBBED. ALL ENVIRONMENTAL PROTECTION REQUIREMENTS SHALL BE COMPLIED.
5. THE VENDOR SHALL PROVIDE AND INSTALL THE FOLLOWING MAJOR ITEMS:
 NEW 250' SELF SUPPORTING TOWER
 TOWER OBSTRUCTION LIGHTING
 NEW EQUIPMENT COMMUNICATIONS SHELTER
 EMERGENCY STANDBY GENERATOR AND LPG TANK
 -48VDC BATTERY PLANT AND DISTRIBUTION SYSTEM
 THREE (3) EIA 19-INCH X 7-FOOT OPEN ALUMINUM RELAY EQUIPMENT RACKS
 FIBER OPTIC CABLE AND CONDUIT
 COMMERCIAL AC POWER SERVICE AND DISTRIBUTION SYSTEM
 SITE GROUNDING SYSTEM
 NEW FENCING, WEED PREVENTION BARRIER MATERIAL, AND GRAVEL FOR THE SITE COMPOUND
 TESTING OF NEW FACILITIES
6. THE VENDOR SHALL PROVIDE AND INSTALL A NEW 250 FT. SOLID ROD MEMBER SELF-SUPPORTING TOWER AND CONCRETE DRILLED SHAFT FOUNDATIONS PER THESE PLANS.
7. THE VENDOR SHALL PROVIDE AND INSTALL A NEW HORIZONTAL TRANSMISSION LINE BRIDGE AND ALL ASSOCIATED SUPPORT AND INSTALLATION HARDWARE. THE TRANSMISSION LINE BRIDGE SHALL INCLUDE TWO LEVELS OF TRAPEZE KITS, INSTALLED WITH MAXIMUM SEPARATION OF 36 IN. ON CENTER. THE TRANSMISSION LINE BRIDGE SHALL BE INSTALLED IN SUCH A MANNER AS TO NOT COMPROMISE THE MINIMUM BEND RADII OF FUTURE WAVEGUIDE AND TRANSMISSION LINES.

 THE HORIZONTAL TRANSMISSION LINE LADDER SUPPORT POLES SHALL BE 10 FT. ABOVE FINISHED GRADE, AND THE ASSOCIATED TRAPEZE KITS SHALL BE INSTALLED IN SUCH A MANNER TO PROVIDE SMOOTH TRANSITION AND ENTRANCE OF FUTURE WAVEGUIDES AND TRANSMISSION LINES INTO THE BULKHEAD PORTS. THE HORIZONTAL TRANSMISSION LINE BRIDGE SHALL BE SUPPORTED SEPARATE FROM THE TOWER, AND SHALL RUN FROM THE FACE OF THE TOWER TO WITHIN 3 IN. OF THE TRANSMISSION LINE BULKHEAD LOCATED ON THE COMMUNICATIONS BUILDING EXTERIOR WALL.
8. THE VENDOR SHALL PROVIDE AND INSTALL THE TOWER LIGHTNING PROTECTION AND GROUNDING SYSTEM PER THESE PLANS.
9. THE VENDOR SHALL PROVIDE AND INSTALL A NEW TECHNOSTROBE MODEL D1-1-LED-B-WHITE-48VDC-SNMP-C-APT-DS WHITE LED FLASH HEAD TOWER OBSTRUCTION LIGHTING SYSTEM PER THESE PLANS. TWO (2) LED WHITE STROBES SHALL BE PLACED AT THE TOP OF THE TOWER.

 THE OBSTRUCTION LIGHTING SYSTEM SHALL BE MOUNTED TO THE TOWER WITH GALVANIZED OR STAINLESS STEEL HARDWARE. ALL TOWER LIGHTING CABLES SHALL BE INSTALLED IN APPROPRIATELY SIZED GALVANIZED STEEL CONDUIT. THE CONDUIT SYSTEM SHALL BE EQUIPPED WITH CABLE STRAIN RELIEF JUNCTION BOXES EVERY 100 FT. (MAXIMUM). ALL TOWER LIGHTING SYSTEM CONDUIT SHALL BE SECURED TO THE TOWER USING STAINLESS STEEL BOLT-ON HANGERS AND HARDWARE. STAINLESS STEEL TIE WRAPS ARE NOT ACCEPTED.

 THE VENDOR SHALL INSTALL A #12 AWG WHITE INSULATED CONDUCTOR FROM THE NEGATIVE DC POWER TERMINAL OF THE TOWER LIGHTING SYSTEM TO THE -48 VDC POWER DISTRIBUTION RACK BREAKER PANEL. THE VENDOR SHALL INSTALL A #12 AWG BLACK INSULATED CONDUCTOR FROM THE POSITIVE DC POWER TERMINAL OF THE TOWER LIGHTING SYSTEM TO THE -48 VDC POWER SYSTEM (GROUNDED) RETURN BUS BAR. THE VENDOR SHALL INSTALL A 15 AMP BREAKER IN THE -48 VDC POWER DISTRIBUTION RACK BREAKER PANEL.
10. THE VENDOR SHALL PROVIDE AND INSTALL NEW TYPE B (CHAIN LINK) SITE COMPOUND FENCING WITH TOP RAIL PER SECTION 550 OF THE FDOT 2015 STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, AND PER INDEX 802 OF THE CURRENT FDOT DESIGN STANDARDS. IN ADDITION, THE FENCE FABRIC SHALL BE FASTENED TO THE TOP RAIL.

GENERAL SITE REQUIREMENTS:

FENCING

1. METAL FENCING SHALL BE INCLUDED AND INSTALLED BY THE VENDOR TO PROVIDE COMPLETE TOWER AND COMMUNICATIONS EQUIPMENT SHELTER PERIMETER SECURITY AT THE D5 RTMC COMMUNICATIONS SITE. THE FENCE SHALL BE TYPE B (CHAIN-LINK) AS SPECIFIED IN SECTION 550 OF THE FDOT'S STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION. THE FENCING MATERIALS, INCLUDING POSTS, BRACES, AND ALL ACCESSORIES OTHER THAN CONCRETE BASES, SHALL BE METAL AND MEET OR EXCEED THE REQUIREMENTS OF INDEX 802 OF THE FDOT DESIGN STANDARDS. CONSTRUCTION SHALL BE IN ACCORDANCE WITH SECTION 550-4 OF THE FDOT'S STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION.
2. THE FENCE HEIGHT SHALL BE A MINIMUM OF SIX FEET, AND SHALL BE TOPPED WITH BARBED WIRE IN ACCORDANCE WITH INDEX 802 OF THE REFERENCED FDOT'S DESIGN STANDARDS. IN ADDITION, THE FENCE FABRIC SHALL BE FASTENED TO TOP RAIL.
3. THE FENCE SHALL INCLUDE (2) GATES MADE OF THE SAME MATERIAL AS THE FENCE MATERIAL. THE FIRST GATE SHALL HAVE A MINIMUM WIDTH OF 10 - FEET FOR ACCESS TO THE COMMUNICATIONS AREA OF THE COMPOUND. THE SECOND GATE SHALL HAVE A MINIMUM WIDTH OF 6 - FEET FOR ACCESS TO THE FUEL STORAGE AREA OF THE COMPOUND. BOTH GATES SHALL INCLUDE A GATE CLOSING ARRANGEMENT THAT IS ANCHORED IN CONCRETE IN THE GROUND (FEMALE PIPE RECEPTACLE ANCHORED IN CONCRETE). A HARDENED, FOUR-DIGIT COMBINATION GATE LOCK (MEDECO, OR APPROVED EQUIVALENT) SHALL BE PROVIDED BY THE VENDOR, AND THE COMBINATION SET TO THE FDOT SPECIFICATIONS.

WEED PREVENTION MATERIAL AND COMPOUND GRAVEL

4. ALL NEWLY LANDSCAPED OR CLEARED AREAS OF THE COMPOUND SHALL BE TREATED WITH A DEPARTMENT-APPROVED HERBICIDE AND COVERED WITH WEED PREVENTION MATERIAL. THE WEED PREVENTION BARRIER MATERIAL SHALL BE AT MINIMUM 6MM PLASTIC SHEETING. THE WEED PREVENTION MATERIAL SHALL BE INSTALLED WITH A MINIMUM 10 PERCENT OVERLAP OF ADJACENT SECTIONS.
5. THE VENDOR SHALL FURNISH AND INSTALL GRAVEL OR CRUSHED ROCK TO COVER THE NEW FENCED AREA. THE GRAVEL OR CRUSHED ROCK SHALL BE OBTAINED LOCALLY AND SHALL NOT EXCEED TWO INCHES IN DIAMETER SO THAT FOOT TRAFFIC IS NOT DIFFICULT. THE GRAVEL OR CRUSHED ROCK SHALL BE INSTALLED TO A MINIMUM DEPTH OF FOUR INCHES.

FIBER INSTALLATION NOTES:

1. THE VENDOR SHALL FURNISH AND INSTALL A 4-PORT ENTRY PORT ON THE WEST SIDE OF THE COMMUNICATIONS SHELTER TO ACCOMMODATE ENTRY OF FIBER OPTIC AND COMMUNICATIONS CABLING.
2. THE VENDOR SHALL FURNISH AND INSTALL A SUITABLY SIZED WEATHERPROOF NEMA ENCLOSURE ON WEST SIDE OF COMMUNICATIONS SHELTER COVERING THE TELEPHONE/FIBER OPTIC CABLE ENTRY BULKHEAD DESCRIBED IN NOTE #1, ABOVE.
3. THE VENDOR SHALL FURNISH AND INSTALL THREE (3) 4" HDPE CONDUIT, BETWEEN THE "FHP" FIBER SPLICE BOX AND THE WEST SIDE OF COMMUNICATIONS SHELTER, TO STUB OUT ON INTO THE NEMA ENCLOSURE DESCRIBED ABOVE.
4. THE VENDOR SHALL FURNISH AND INSTALL A 1.25" HDPE CONDUIT, BETWEEN THE "FDOT" FIBER SPLICE BOX AND THE WEST SIDE OF COMMUNICATIONS SHELTER, TO STUB OUT INTO THE NEMA ENCLOSURE DESCRIBED ABOVE.
5. THE VENDOR SHALL FURNISH AND INSTALL A 1RU FIBER PATCH PANEL WITH SC CONNECTORS IN THE "HARRIS" EQUIPMENT MICROWAVE/FIBER EQUIPMENT RACK. THE PATCH PANEL WILL BE CONFIGURED TO TERMINATE 12 STRANDS OF SINGLE MODE FIBER. THE EQUIPMENT RACK WILL BE FURNISHED AND INSTALLED BY OTHERS.
6. THE VENDOR SHALL FURNISH AND INSTALL A 1RU FIBER PATCH PANEL WITH SC CONNECTORS WITHIN THE RTMC BUILDING, FHP EQUIPMENT ROOM NUMBER 131, INTO THE HARRIS EQUIPMENT RACK. THE EQUIPMENT RACK WILL BE FURNISHED AND INSTALLED BY OTHERS. SEE REGIONAL TRANSPORTATION MANAGEMENT CENTER, FINANCIAL PROJECT ID 437100-1-52-01, DRAWING NUMBERS AN-101, AT-111, AND A-T-503 FOR FURTHER DETAIL.
7. THE VENDOR SHALL FURNISH, INSTALL AND TERMINATE A 12F SM FOC, BETWEEN FIBER PATCH PANELS IDENTIFIED ABOVE IN NOTE #5 AND #6 INTO ONE OF THE VACANT 4" HDPE "FHP" CONDUITS. VENDOR SHALL LEAVE A 30 LINEAR FOOT SLACK LOOP ON EACH END, COILED NEATLY ON THE CABLE TRAYS.
8. THE VENDOR SHALL FURNISH AND INSTALL A 1 RU FIBER PATCH PANEL WITH LC CONNECTORS IN THE FDOT FIBER RACK SHOWN ON SHEET A-22. THE PATCH PANEL WILL BE CONFIGURED TO TERMINATE 24 STRANDS OF SINGLE MODE FIBER.
9. THE VENDOR SHALL FURNISH, INSTALL AND TERMINATE A 24F SM FOC BETWEEN THE FIBER PATCH PANEL IDENTIFIED IN NOTE #8, ABOVE, AND THE "FDOT" SPLICE BOX. VENDOR SHALL LEAVE A SLACK LOOP OF 50 LINEAR FEET OF FOC WITHIN THE SPLICE BOX, AND 30 LINEAR FEET OF SLACK INSIDE THE COMMUNICATIONS SHELTER, COILED NEATLY ON THE CABLE TRAY.
10. THE VENDOR SHALL SPLICE 12F OF THE 24F SM FOC INTO THE 144F SM FOC WITHIN THE "FDOT" SPLICE BOX. SPLICE DETAIL CAN BE FOUND ON SHEET A-25 OF THESE PLANS.
11. THE VENDOR SHALL PERFORM OTDR TESTING OF ALL FURNISHED AND INSTALLED FIBER END TO END BETWEEN PATCH PANELS IN THE COMMUNICATIONS SHELTER AND RTMC BUILDING TO ENSURE CONTINUITY OF SIGNAL. END TO END SIGNAL LOSS BETWEEN PATCH PANELS OF GREATER THAN 1.75 DB WILL BE CONSIDERED A FAILED TEST. VENDOR SHALL PROVIDE FDOT WITH ONE HARD COPY AND ONE ELECTRONIC COPY OF FIBER OTDR TEST RESULTS.

DATE	REV.	DESCRIPTION	DATE	REV.	DESCRIPTION	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			INSTALLATION NOTES	SHEET NO.
2/12/2018	1	UPDATED INSTALLATION NOTE 9				SITE NAME	COUNTY	FINANCIAL PROJECT ID		A-4
						D5 RTMC	SEMINOLE	424401-1-52-01		



FLORIDA DEPARTMENT OF TRANSPORTATION
 605 SUWANNEE ST. MS 90
 TALLAHASSEE, FL 32399-0450
 PH. (850)-410-5600
 FAX. (850)-410-5501

INSPECTION NOTES:

1. THE INSPECTION SHALL BE PERFORMED BY THE VENDOR AND WITNESSED BY FDOT. THE VENDOR SHALL NOTIFY FDOT AT LEAST 10 DAYS PRIOR TO COMPLETION OF INSTALLATION. THE VENDOR AND FDOT SHALL VERIFY JOINTLY THAT ALL INSTALLATION WORK IS CORRECTLY INSTALLED AND FUNCTIONAL.
2. THE VENDOR SHALL NOTIFY FDOT AT LEAST TWO DAYS PRIOR TO COMPLETION OF GROUNDING INSTALLATION FOR INSPECTION. BELOW GRADE GROUNDING INSTALLATIONS AND GROUND CONNECTIONS SHALL NOT BE BACKFILLED UNTIL INSPECTED AND APPROVED BY THE FDOT.

GROUNDING SHALL BE INSPECTED FOR PROPER CONNECTION TYPES, TIGHTNESS, WORKMANSHIP, AND CONFORMANCE WITH THE APPROVED DESIGN. ANY EXOTHERMIC BONDS THAT ARE DEEMED UNSATISFACTORY SHALL BE REPAIRED BY THE VENDOR WITH NEW BONDS, WITHOUT CLAIM.
3. THE INSTALLATION OF DRILLED SHAFT FOUNDATIONS SHALL BE INSPECTED IN ACCORDANCE WITH THE RECOMMENDATIONS OF FHWA-NHI-10-016 "DRILLED SHAFTS: CONSTRUCTION PROCEDURES AND LRFD DESIGN METHODS" AND ACI 336.3R-93 "DESIGN AND CONSTRUCTION OF DRILLED PIERS". NON-DESTRUCTIVE INTEGRITY TESTS ARE NOT REQUIRED FOR THIS TELECOMMUNICATIONS PROJECT.

FDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION SECTION 455 DOES NOT APPLY FOR THIS PROJECT.
4. THE SITE SHALL BE INSPECTED TO BE FREE OF DEBRIS AND THAT EXCAVATIONS ARE BACKFILLED AND COMPOUND RESTORED.
5. FOLLOWING THE COMPLETION OF INSPECTIONS, THE INSTALLED EQUIPMENT AND FACILITIES SHALL BE SUBJECT TO A MINIMUM 20-DAY PERFORMANCE PERIOD. FOR THE PURPOSE OF THE SUCCESSFUL PERFORMANCE PERIOD, FAILURE OF OPERATION IS DEFINED AS THE FAILURE OF A MAJOR COMPONENT OF THE SITE. THE PERFORMANCE VERIFICATION SHALL BE ACCOMPLISHED WITH THE FDOT. UPON ACCEPTANCE OF THE PERFORMANCE AND TEST CRITERIA BY FDOT, THE 20-DAY PERFORMANCE PERIOD SHALL BEGIN.

TEMPORARY TRAFFIC CONTROL – NOTES:

1. THE VENDOR IS RESPONSIBLE FOR ALL TEMPORARY TRAFFIC CONTROL, INCLUDING THE TRAFFIC CONTROL PLAN. THE TEMPORARY TRAFFIC CONTROL FOR THIS PROJECT SHALL BE PER THE CURRENT FDOT DESIGN STANDARDS. ALL RELATED ITEMS AS REQUIRED BY THE STANDARD INDEX 600 SERIES. THE VENDOR MAY BE REQUIRED TO PERFORM SOME WORK ACTIVITIES AT NIGHT AND/OR OUTSIDE OF PEEK TRAFFIC HOURS.
2. THE VENDOR SHALL SUBMIT THE TTC PLAN TO THE FDOT FOR REVIEW AND APPROVAL. AFTER APPROVAL OF THE TTC PLAN, THE VENDOR SHALL PROVIDE A TWO-WEEK NOTICE PRIOR TO IMPLEMENTATION TO ALLOW FOR APPROPRIATE NOTIFICATION.
3. ANY ALTERNATIVE TO THIS TTC APPROACH SHALL BE APPROVED BY DISTRICT 5 TRAFFIC OPERATIONS BEFORE IMPLEMENTATION.
4. INSTALL CONSTRUCTION SIGNS PRIOR TO COMMENCEMENT OF CONSTRUCTION AND MAINTAIN SAME PER THE CURRENT FDOT DESIGN STANDARDS AND FDOT INDEXES.
5. THE VENDOR SHALL ADHERE TO STANDARD TTC INDEXES WHEN WORK TAKES PLACE NEAR OR OVER SHOULDER LANE, OR NEAR OR OVER TRAVEL LANES.
6. GROUND MOUNTED SIGNS MAY BE USED IN LIEU OF POST MOUNTED SIGNS ONLY IF INSTALLATION OPERATIONS WILL NOT EXCEED A 12 HOUR PERIOD. SIGNS ARE TO BE PER THE FDOT STANDARD INDEX 600 SERIES AND AS SPECIFIED IN THE MUTCD.
7. ALL SPECIFIC SIGNS SHALL BE COMPLETELY COVERED OR REMOVED WHEN NOT IN USE.
8. INSTALL ADVANCE WARNING SIGNS AND TRAFFIC CONTROL DEVICES UTILIZING FDOT STANDARD INDEX NO. 600 SERIES.
9. IMMEDIATELY INFORM THE ENGINEER WHEN IDENTIFYING ANY ERRORS OR OMISSIONS IN THE TRAFFIC CONTROL PLAN OR MAKING ANY MODIFICATION OR CHANGE TO THE TRAFFIC CONTROL PLAN TO OBTAIN APPROVAL BY THE ENGINEER PRIOR TO WORK COMMENCING OR BEING RESUMED THAT IS AFFECTED BY ERRORS OR OMISSIONS.
10. INFORM THE ENGINEER OF ANY HAZARDS WITHIN THE WORK AREA NOT ADDRESSED BY THE TRAFFIC CONTROL PLAN AND ANY POTENTIAL IMPROVEMENTS TO PROPOSED OR IMPLEMENTED PHASES OF THE TRAFFIC CONTROL PLANS.

CONTRACT PLANS RECORD

DATE	REV.	DESCRIPTION	DATE	REV.	DESCRIPTION



FLORIDA DEPARTMENT OF TRANSPORTATION
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**STATE OF FLORIDA
 DEPARTMENT OF TRANSPORTATION**

SITE NAME	COUNTY	FINANCIAL PROJECT ID
D5 RTMC	SEMINOLE	424401-1-52-01

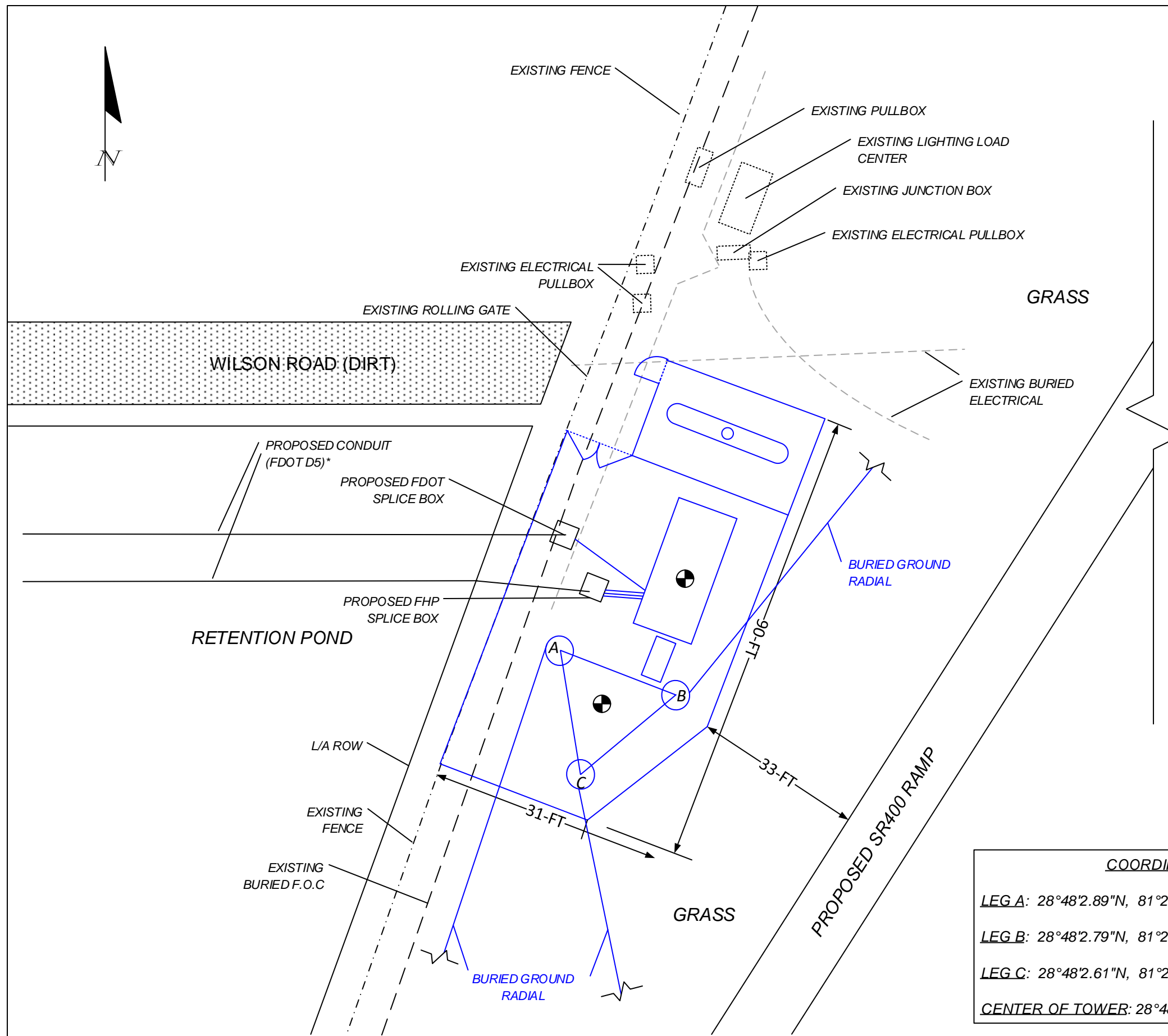
**INSPECTION AND TTC
 NOTES**

SHEET NO.

A-5

PROJECT PLAN:

1. THE VENDOR SHALL SUBMIT TOWER, FOUNDATIONS, SITE LAYOUT, SHELTER AND CONSTRUCTION STAGING AREA DESIGN PLANS TO THE FDOT PROJECT MANAGER FOR REVIEW AND APPROVAL.
TOWER AND FOUNDATIONS DESIGNS MUST INCLUDE A FABRICATION REPORT, ERECTING PLAN, AND ANCHOR BOLT TEMPLATE.
 2. THE VENDOR SHALL FURNISH AND INSTALL TOWER AND SHELTER FOUNDATIONS PER THESE PLANS.
 3. THE VENDOR SHALL FURNISH AND INSTALL A NEW 250 FT. GALVANIZED SOLID ROD MEMBER SELF-SUPPORTING TOWER PER THESE PLANS. THE TOWER SHALL BE DESIGNED TO SUPPORT THE ANTENNAS, LINES, AND APPURTENANCES, AND PER THE DESIGN CRITERIA DELINEATED ON SHEET A-3 AND A-8.
 4. THE VENDOR SHALL SECURE THE TOWER SITE COMPOUND AT ALL TIMES. ADDITIONAL OR TEMPORARY TYPE B FENCING MAY BE REQUIRED. THE VENDOR SHALL BE RESPONSIBLE FOR ALL ADDITIONAL FENCING, AT NO ADDITIONAL COST TO FDOT.
 5. THE VENDOR SHALL FURNISH AND INSTALL A TOWER SAFETY CLIMBING ASSEMBLY ON THE NEW 250 FT. SELF-SUPPORTING TOWER. THE CLIMBING ASSEMBLY SHALL BE MANUFACTURED SPECIFICALLY FOR THE TOWER THAT IS INSTALLED. THE CLIMBING ASSEMBLY MAY INCLUDE STEP BOLTS OR A CLIMBING LADDER.
 6. THE VENDOR SHALL FURNISH AND INSTALL AN OBSTRUCTION LIGHTING SYSTEM AND SURGE PROTECTION. THE VENDOR SHALL SUBMIT A DETAILED OBSTRUCTION LIGHTING SYSTEM DESIGN PLAN TO THE FDOT PROJECT MANAGER FOR REVIEW AND APPROVAL.
 7. THE VENDOR SHALL SUBMIT A DETAILED INTERIOR AND EXTERIOR CABLE MANAGEMENT DESIGN PLAN TO THE FDOT PROJECT MANAGER FOR REVIEW AND APPROVAL.
 8. THE VENDOR SHALL INSTALL THE GROUNDING SYSTEM PER SHEET A-10.
 9. THE FDOT OR APPROVED REPRESENTATIVE SHALL INSPECT TOWER, SHELTER AND GROUNDING SYSTEM INSTALLATIONS.
 10. THE VENDOR SHALL INSTALL NEW PERIMETER FENCE PER SHEET A-10. ALL FENCING SHALL BE INSTALLED TO ALLOW A MINIMUM OF 5-FOOT SPACING FROM ANY ABOVE GROUND STRUCTURE OR ITEM FOR ACCESSIBILITY AND MAINTENANCE PURPOSES.
 11. THE VENDOR SHALL DESIGN AND CONSTRUCT THE SITE COMPOUND SUCH THAT ITS GRADE IS SUITABLY LEVEL TO SUPPORT THE CONSTRUCTION OF THE SHELTER, TOWER, AND LPG FUEL TANK. THE VENDOR SHALL SUBMIT THE COMPOUND EXCAVATION/GRADING DESIGN FOR REVIEW AND APPROVAL BY THE FDOT, PRIOR TO CONSTRUCTION. THE VENDOR'S COMPOUND CONSTRUCTION DESIGN SHALL CONSIDER THE EXISTING GROUND ELEVATIONS AND SLOPES, AS REFERENCED ON SHEET A-7. THE DESIGN SHALL ALSO CONSIDER STORM WATER DRAINAGE REQUIREMENTS TO PROTECT THE SHELTER FROM FLOODING.
- * SEE REGIONAL TRANSPORTATION MANAGEMENT CENTER, FINANCIAL PROJECT ID 437100-1-52-01, DRAWING NUMBERS AN-101, AT-111, AND AT-503 FOR FURTHER DETAIL.



COORDINATES	
LEG A:	28°48'2.89"N, 81°20'40.19"W
LEG B:	28°48'2.79"N, 81°20'39.89"W
LEG C:	28°48'2.61"N, 81°20'40.13"W
CENTER OF TOWER:	28°48'2.76"N, 81°20'40.07"W

LEGEND:	
	NEW INSTALLATION
	SOIL BORING

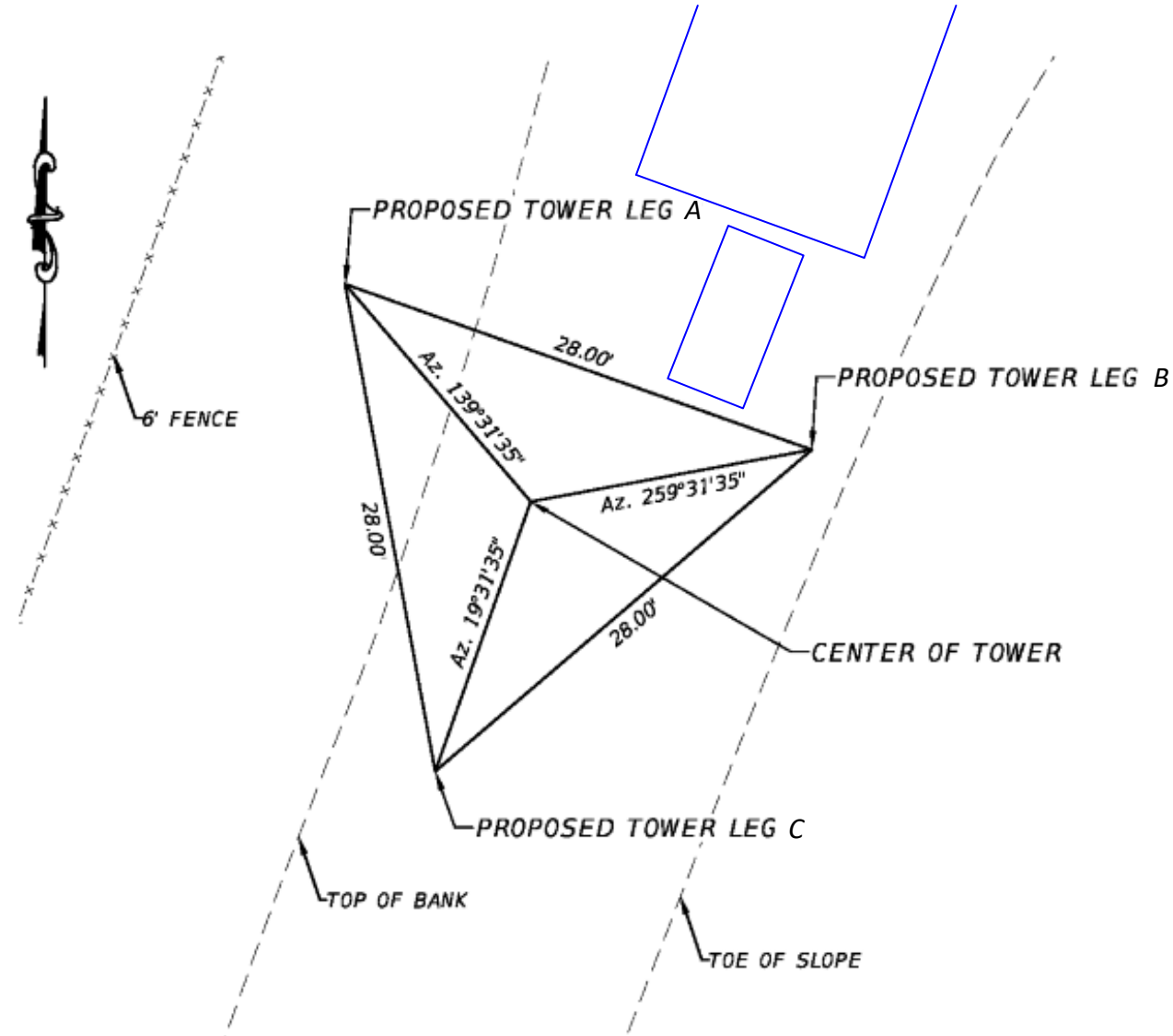
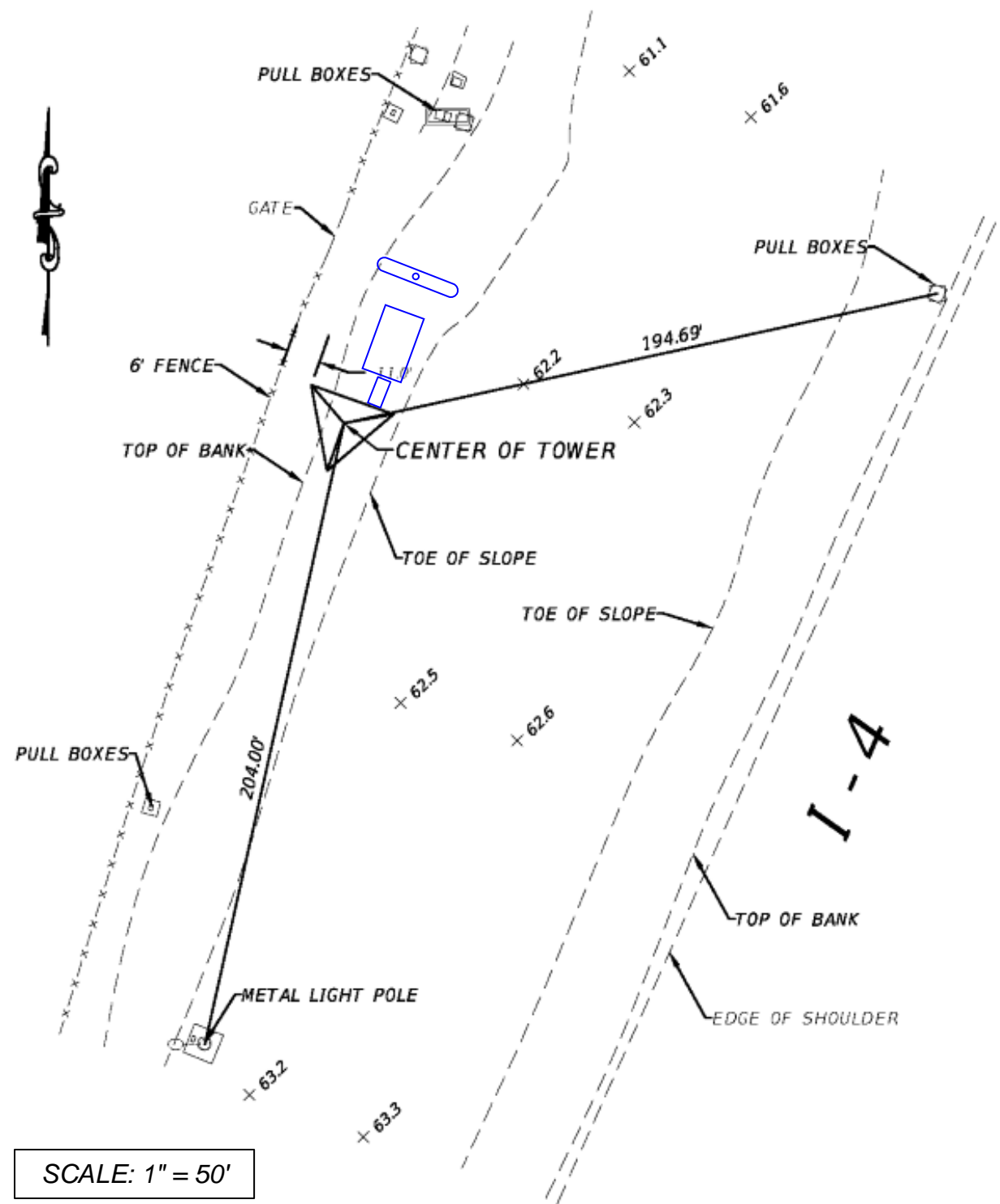
CONTRACT PLANS RECORD					
DATE	REV.	DESCRIPTION	DATE	REV.	DESCRIPTION

FDOT **FLORIDA DEPARTMENT OF TRANSPORTATION**
 605 SUWANNEE ST. MS 90
 TALLAHASSEE, FL 32399-0450
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STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION		
SITE NAME	COUNTY	FINANCIAL PROJECT ID
D5 RTMC	SEMINOLE	424401-1-52-01

**COMMUNICATIONS
FACILITIES PERIMETER
LAYOUT PLAN**


SHEET NO.
A-6



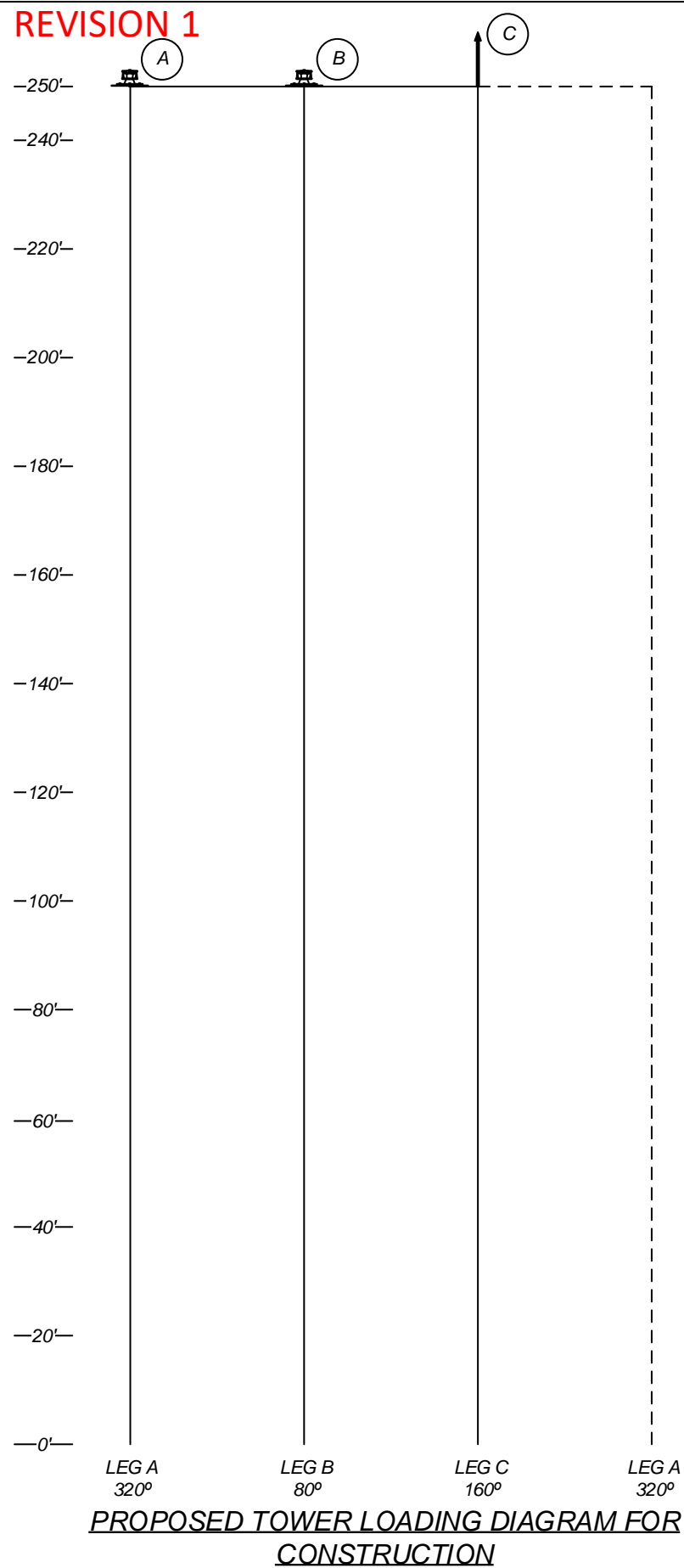
PROPOSED D5 RTMC TOWER					
NORTHING	EASTING	LATITUDE	LONGITUDE	ELEVATION	DESCRIPTION
1624007.04	545843.77	N 28° 48' 02.76"	W 81° 20' 40.07"	66.05	CENTER OF TOWER
1623991.80	545838.37	N 28° 48' 02.61"	W 81° 20' 40.13"	65.47	PROPOSED TOWER LEG C
1624019.34	545833.28	N 28° 48' 02.89"	W 81° 20' 40.19"	68.28	PROPOSED TOWER LEG A
1624009.98	545859.67	N 28° 48' 02.79"	W 81° 20' 39.89"	62.60	PROPOSED TOWER LEG B

ALL COORDINATES AND AZIMUTH SHOWN HEREON ARE BASED UPON THE FLORIDA STATE PLANE COORDINATE SYSTEM NAD83. ELEVATION SHOWN HEREON ARE BASED UPON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

NOTES:
 1. GROUND ELEVATIONS AND SLOPES AS OF 01/10/2018. SUBJECT TO CHANGE WITH I-4 REALIGNMENT PROJECT

CONTRACT PLANS RECORD						 FLORIDA DEPARTMENT OF TRANSPORTATION 605 SUWANNEE ST. MS 90 TALLAHASSEE, FL 32399-0450 PH. (850)-410-5600 FAX. (850)-410-5501	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			PROPOSED TOWER SITE SURVEY	SHEET NO. A-7
DATE	REV.	DESCRIPTION	DATE	REV.	DESCRIPTION		SITE NAME	COUNTY	FINANCIAL PROJECT ID		
						D5 RTMC	SEMINOLE	424401-1-52-01			

REVISION 1



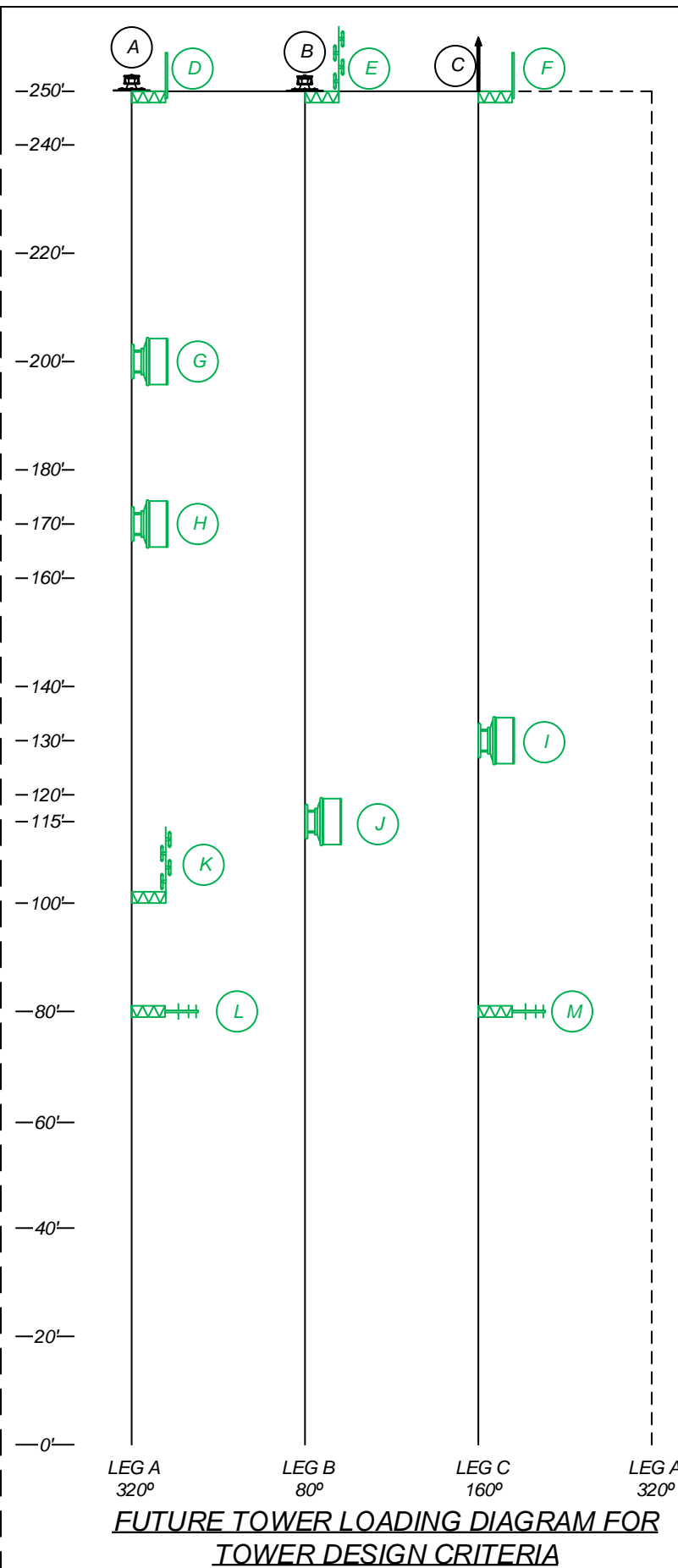
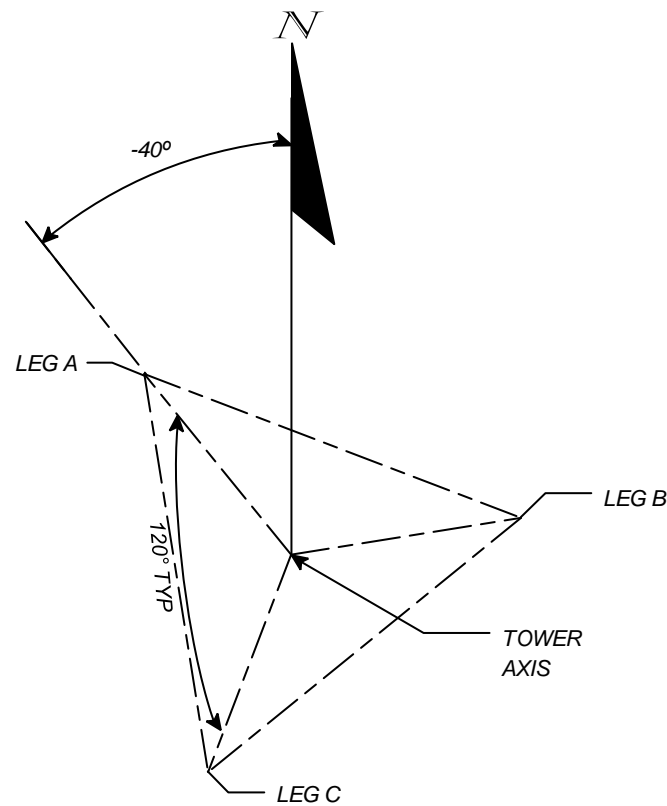
ID	MODEL	MTG. HGT.	LEG/FACE	AZIM.	TX LINE	NOTES
A	TECHNOSTROBE WHITE LED FLASH HEAD	250' (BASE)	A	-	CONDUIT	1
B	TECHNOSTROBE WHITE LED FLASH HEAD	250' (BASE)	B	-	SAME CONDUIT	1
C	LIGHTNING ROD	250' (BASE)	C	-	-	-

NOTES:

1. ALL TOWER LIGHT CONTROL WIRING SHALL BE INSTALLED IN THE SAME GALVANIZED RIGID STEEL CONDUIT OF SIZE RECOMMENDED BY THE MANUFACTURER.

THE LED LIGHTING SYSTEM SHALL BE TECHNOSTROBE MODEL D1-1-LED-B-WHITE-48VDC-SNMP-C-APT-DS

THE VENDOR SHALL INSTALL THE NEW TOWER LIGHTING SYSTEM WITH ASSOCIATED PHOTOCELL, SURGE PROTECTION AND GROUNDING.



ID	MODEL	MTG. HGT.	LEG/FACE	AZIM.	TX LINE	NOTES
A	TECHNOSTROBE WHITE LED FLASH HEAD	250' (BASE)	A	-	CONDUIT	2
B	TECHNOSTROBE WHITE LED FLASH HEAD	250' (BASE)	B	-	SAME CONDUIT	2
C	LIGHTNING ROD	250' (BASE)	C	-	-	-
D	DS8A06F36U-N W/ 6' SIDE ARM	245' (BASE)	A	320°	7/8"	1
E	DB340-1 W/ 6' SIDE ARM	245' (BASE)	B	80°	7/8"	1
F	DS8A06F36U-N W/ 6' SIDE ARM	245' (BASE)	C	160°	7/8"	1
G	DA8-W57ACU	200' (C.L.)	A	9.6°	EP65J	1
H	DA8-W57ACU	170' (C.L.)	A	9.6°	EP65J	1
I	DA8-W57ACU	130' (C.L.)	C	198.6°	EP65J	1
J	DA8-W57ACU	115' (C.L.)	B	19.8°	EP65J	1
K	DB224 W/ 6' SIDE ARM	100' (BASE)	A	80°	7/8"	1
L	DB493 W/ 6' SIDE ARM	80' (C.L.)	A	20°	1/2"	1
M	DB493 W/ 6' SIDE ARM	80' (C.L.)	C	175°	1/2"	1

NOTES:

1. THIS IS A FUTURE LOAD ANTENNA SYSTEM TO BE CONSIDERED FOR TOWER CAPACITY DESIGN, NOT TO BE FURNISHED OR INSTALLED AS A PART OF THIS PROJECT.

2. ALL TOWER LIGHT CONTROL WIRING SHALL BE INSTALLED IN THE SAME GALVANIZED RIGID STEEL CONDUIT OF SIZE RECOMMENDED BY THE MANUFACTURER.

THE LED LIGHTING SYSTEM SHALL BE TECHNOSTROBE MODEL D1-1-LED-B-WHITE-48VDC-SNMP-C-APT-DS

THE VENDOR SHALL INSTALL THE NEW TOWER LIGHTING SYSTEM WITH ASSOCIATED PHOTOCELL, SURGE PROTECTION AND GROUNDING.

CONTRACT PLANS RECORD					
DATE	REV.	DESCRIPTION	DATE	REV.	DESCRIPTION
2/12/2018	1	UPDATED TO WER LOADING AND TOWER LIGHT MODEL			

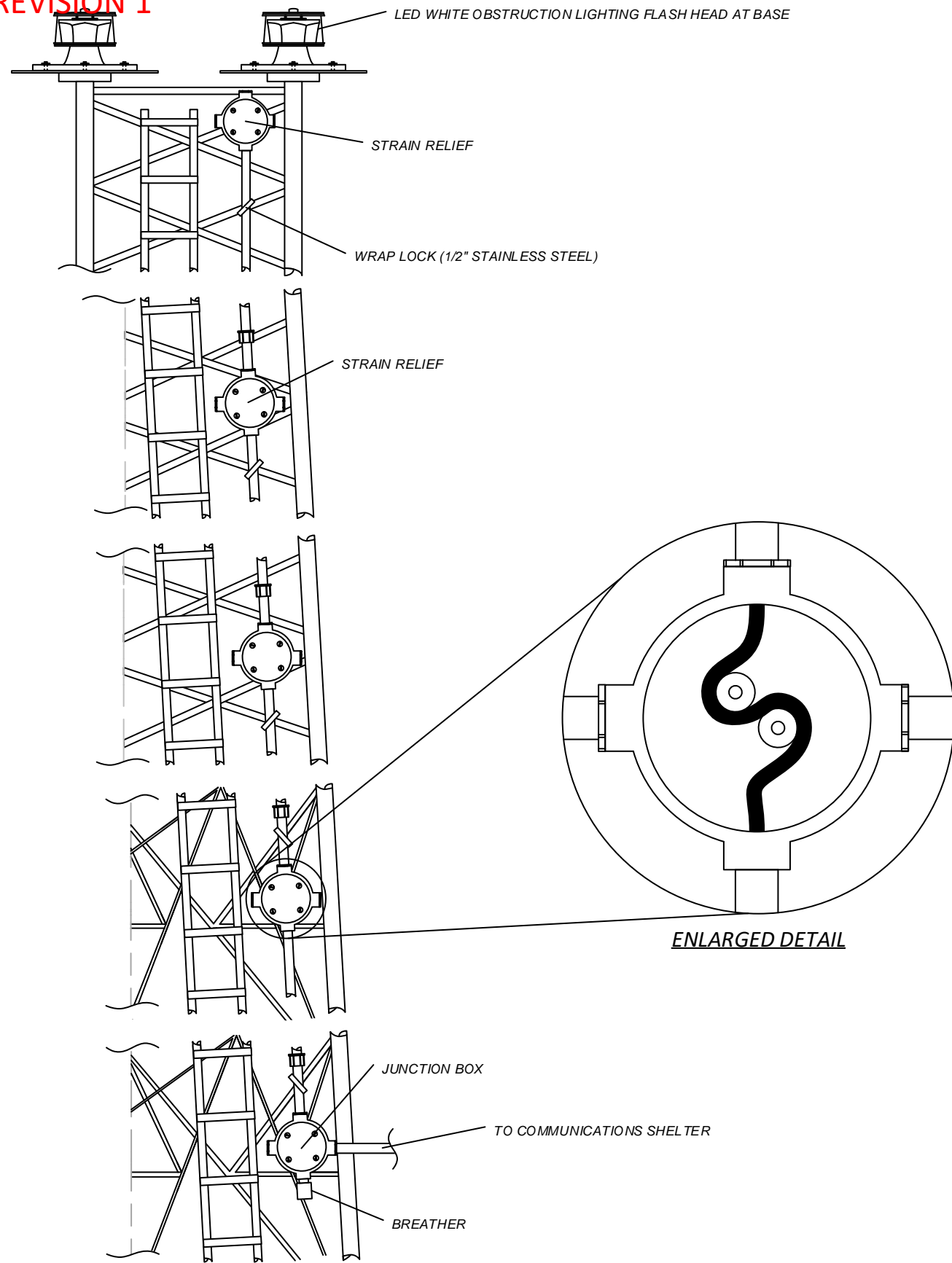
FLORIDA DEPARTMENT OF TRANSPORTATION
 605 SUWANNEE ST. MS 90
 TALLAHASSEE, FL 32399-0450
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STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION		
SITE NAME	COUNTY	FINANCIAL PROJECT ID
D5 RTMC	SEMINOLE	424401-1-52-01

**TOWER LOADING
DIAGRAM**

SHEET NO. A-8

REVISION 1



TOWER OBSTRUCTION LIGHTING INSTALLATION DETAIL

INSTALLATION NOTES:

1. THE VENDOR SHALL PROVIDE AND INSTALL THE TOWER LIGHTNING PROTECTION AND GROUNDING SYSTEM PER THESE PLANS.
2. THE OBSTRUCTION LIGHTING SYSTEM SHALL BE MOUNTED TO THE TOWER WITH GALVANIZED OR STAINLESS STEEL HARDWARE. ALL TOWER LIGHTING CABLES SHALL BE INSTALLED IN APPROPRIATELY SIZED GALVANIZED RIGID STEEL CONDUIT. THE CONDUIT SYSTEM SHALL BE EQUIPPED WITH CABLE STRAIN RELIEF JUNCTION BOXES EVERY 100 FT. (MAXIMUM). ALL TOWER LIGHTING SYSTEM CONDUIT SHALL BE SECURED TO THE TOWER USING GALVANIZED OR STAINLESS STEEL 1/2 INCH BOLT-ON WRAP LOCKS. SNAP-IN HARDWARE IS NOT PERMITTED.
3. THE VENDOR SHALL PROVIDE AND INSTALL A NEW TOWER OBSTRUCTION LIGHTING SYSTEM PER THESE PLANS. THE TECHNOSTROBE TOWER LIGHT CONTROLLERS SHALL BE MECHANICALLY BONDED TO THE COMMUNICATIONS BUILDING'S INTERIOR GROUND.
THE VENDOR SHALL INSTALL A #12 AWG WHITE INSULATED CONDUCTOR FROM THE NEGATIVE DC POWER TERMINAL OF THE TOWER LIGHTING SYSTEM TO THE -48 VDC POWER DISTRIBUTION RACK BREAKER PANEL. THE VENDOR SHALL INSTALL A #12 AWG BLACK INSULATED CONDUCTOR FROM THE POSITIVE DC POWER TERMINAL OF THE TOWER LIGHTING SYSTEM TO THE -48 VDC POWER SYSTEM (GROUNDED) RETURN BUS BAR. THE VENDOR SHALL INSTALL A 15 AMP BREAKER IN THE -48 VDC POWER DISTRIBUTION RACK BREAKER PANEL.
4. GROUND CONDUCTORS SHALL BE DOWNWARD COURSING AND VERTICAL, AS MUCH AS POSSIBLE, AND BE AS SHORT AND STRAIGHT AS PRACTICAL. SHARP BENDS AND MULTIPLE BENDS IN CONDUCTORS SHALL BE AVOIDED IN ALL CASES. THE MINIMUM BEND RADIUS SHALL BE EIGHT (8) INCHES PER NFPA 780.
5. ALL ABOVE GROUND GROUNDING CONNECTIONS SHALL BE MECHANICAL CLAMP, OR IRREVERSIBLE CRIMP CONNECTIONS.
6. THE VENDOR SHALL CLEAN AND PREPARE ALL GROUND CONDUCTORS AND SURFACES PRIOR TO PERFORMING EXOTHERMIC BONDS. ALL NON-CONDUCTING SURFACE COATINGS SHALL BE REMOVED BEFORE EACH CONNECTION IS MADE.

SPARE PARTS:

1. THE VENDOR SHALL PROVIDE THE FOLLOWING SPARE PARTS FOR THE TECHNOSTROBE OBSTRUCTION LIGHTING SYSTEM TO BE LEFT INSIDE THE SHELTER:
 - A. LCMRO-G2-USA-48VDC-PS (POWER SUPPLY BOARD COMPLETE)
 - B. LCMRO-G2-USA-48VDC-CC (CONTROL CARD)
 - C. LCMRO-G3-USA-48VDC-IC (INTERFACE CARD)
 - D. LCMRO-G3-USA-48VDC-CAP (CAPACITOR)
 - E. LCMRO-G3-USA-FAN (FAN)
 - F. LCMRO-G3-USA-ILS (INTERLOCK SWITCH)
 - G. PME120 (SNMP BOARD WITH CABLE)
 - H. PEC-03 (PHOTOCELL)

CONTRACT PLANS RECORD					
DATE	REV.	DESCRIPTION	DATE	REV.	DESCRIPTION
2/12/2018	1	UPDATED DRAWING TO REFLECT CORRECT TOWER LIGHTING SYSTEM MODEL, UPDATED SPARE PARTS			

FDOT **FLORIDA DEPARTMENT OF TRANSPORTATION**
 605 SUWANNEE ST. MS 90
 TALLAHASSEE, FL 32399-0450
 PH. (850)-410-5600
 FAX. (850)-410-5501

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION		
SITE NAME	COUNTY	FINANCIAL PROJECT ID
D5 RTMC	SEMINOLE	424401-1-52-01

**OBSTRUCTION
LIGHTING
INSTALLATION**



SHEET NO.
A-9

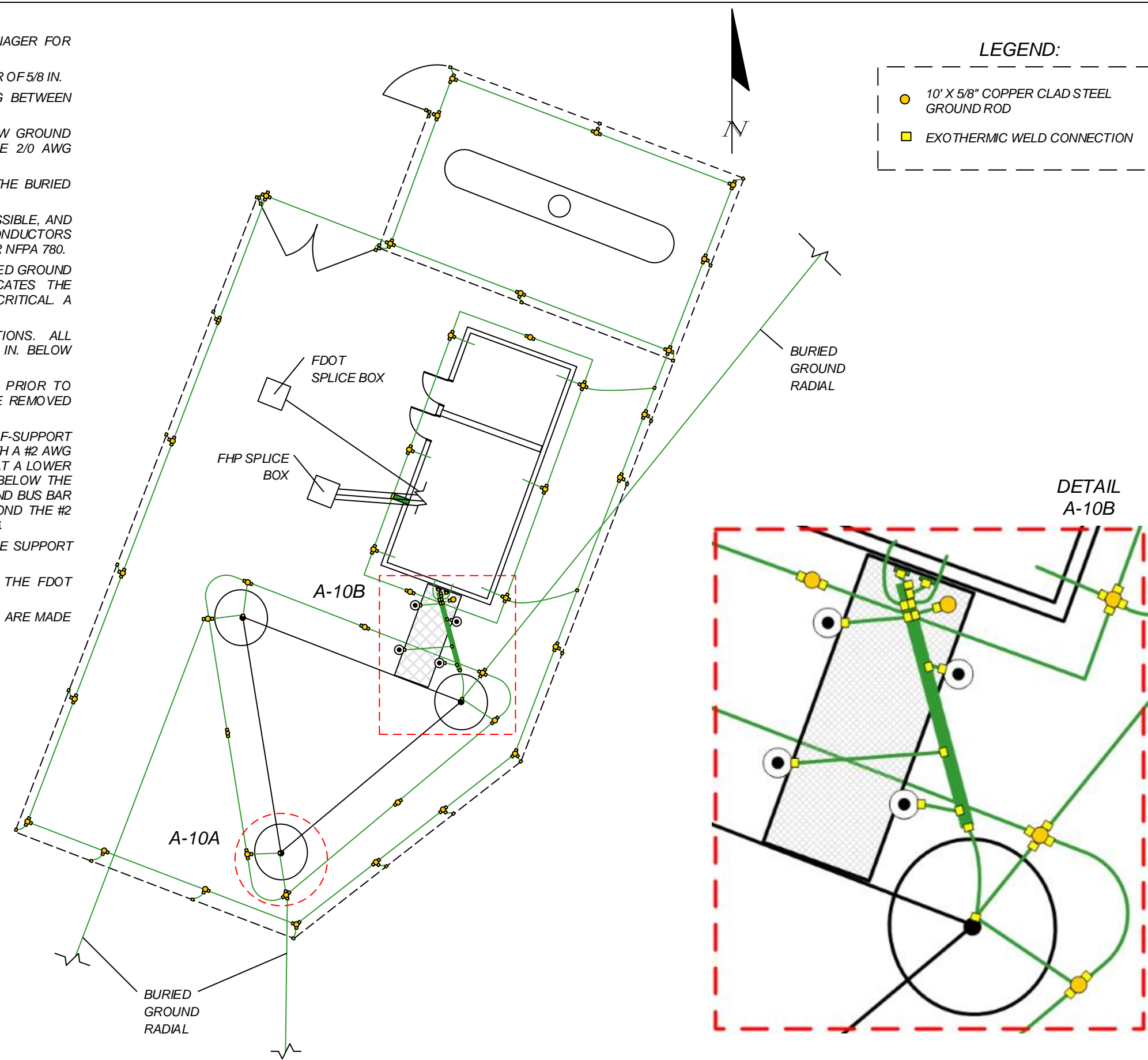
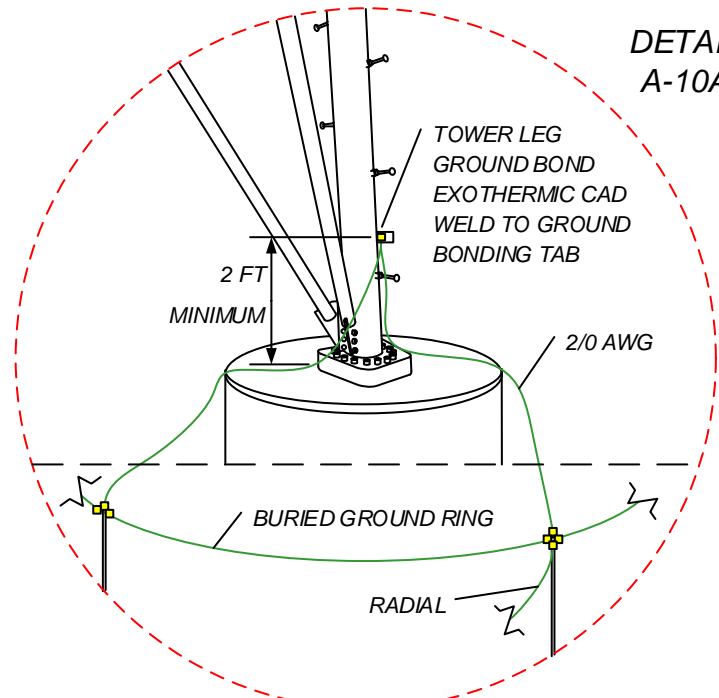
GROUNDING NOTES:

1. THE VENDOR SHALL SUBMIT A DETAILED GROUNDING PLAN TO THE FDOT PROJECT MANAGER FOR REVIEW AND APPROVAL.
2. ALL GROUND RODS SHALL BE 10 FEET LONG, COPPER-CLAD STEEL WITH A MINIMUM DIAMETER OF 5/8 IN.
3. THE INSTALLATION OF GROUND RODS SHALL BE PER THESE SPECIFICATIONS. SPACING BETWEEN GROUND RODS SHALL BE 20 FT. MAXIMUM.
4. #2 AWG TINNED SOLID COPPER WIRE IS REQUIRED FOR ALL ABOVE GROUND AND BELOW GROUND INSTALLATIONS OF GROUND WIRE. ALL FENCE GATE GROUND CONDUCTORS SHALL BE 2/0 AWG STRANDED WELDING CABLE WITH BLACK INSULATION.


2/0 AWG IS REQUIRED TO BOND THE GROUND BONDING TAB ON EACH TOWER LEG TO THE BURIED GROUND RING AS SHOWN IN DETAIL A-10A.
5. GROUND CONDUCTORS SHALL BE DOWNWARD COURSING AND VERTICAL, AS MUCH AS POSSIBLE, AND BE AS SHORT AND STRAIGHT AS PRACTICAL. SHARP BENDS AND MULTIPLE BENDS IN CONDUCTORS SHALL BE AVOIDED IN ALL CASES. THE MINIMUM BEND RADIUS SHALL BE EIGHT (8) INCHES PER NFPA 780.
6. A BURIED GROUNDING RADIAL SHALL BE INSTALLED AT EACH TOWER LEG CONNECTION. BURIED GROUND RADIALS SHALL BE 2/0 AWG TINNED STRANDED COPPER WIRE. THE DETAIL INDICATES THE APPROXIMATE AZIMUTH ORIENTATION. THE RADIALS' UNOBSTRUCTED LENGTH IS NOT CRITICAL A TARGET LENGTH OF 90 FEET IS DESIRED.
7. ALL BELOW GROUND GROUNDING CONNECTIONS SHALL BE EXOTHERMIC BOND CONNECTIONS. ALL BELOW GROUND GROUNDING CONDUCTORS SHALL BE INSTALLED AT A MINIMUM OF 36 IN. BELOW GRADE.
8. THE VENDOR SHALL CLEAN AND PREPARE ALL GROUND CONDUCTORS AND SURFACES PRIOR TO PERFORMING EXOTHERMIC BONDS. ALL NON-CONDUCTING SURFACE COATINGS SHALL BE REMOVED BEFORE EACH CONNECTION IS MADE.
9. THE VENDOR SHALL INSTALL A GROUND BUS BAR AT THE BASE OF THE NEW 250 FT. SELF-SUPPORT TOWER PER THESE PLANS. THE GROUND BUS BAR SHALL BE TINNED COPPER, EQUIPPED WITH A #2 AWG TINNED SOLID COPPER WIRE PIGTAIL. THE VENDOR SHALL INSTALL THE GROUND BUS BAR AT A LOWER HEIGHT THAN THE HORIZONTAL TRANSMISSION LINE BRIDGE, BUT NO MORE THAN 2 FT. BELOW THE HEIGHT OF THE HORIZONTAL TRANSMISSION LINE BRIDGE TRAPEZE ASSEMBLIES. THE GROUND BUS BAR SHALL BE INSULATED FROM THE TOWER STEEL. THE VENDOR SHALL EXOTHERMICALLY BOND THE #2 AWG TINNED SOLID COPPER PIGTAIL OF THE GROUND BUS BAR TO THE TOWER GROUND RING.
10. THE VENDOR SHALL EXOTHERMICALLY BOND ALL HORIZONTAL TRANSMISSION LINE BRIDGE SUPPORT POLES TO THE NEW TOWER GROUND RING WITH #2 AWG TINNED SOLID COPPER WIRE.
11. ALL EXOTHERMIC BONDS SHALL BE ONESHOT UNLESS PRE-APPROVED IN WRITING BY THE FDOT PROJECT MANAGER.
12. THE VENDOR SHALL NOT BACKFILL OPENINGS WHERE UNDERGROUND EXOTHERMIC BONDS ARE MADE UNTIL FDOT HAS INSPECTED AND APPROVED THE GROUNDING SYSTEM.
13. NEW FENCING SHALL BE PER FDOT DESIGN STANDARDS FOR FENCE TYPE B, INDEX NO 802.

LEGEND:

-  10' X 5/8" COPPER CLAD STEEL GROUND ROD
-  EXOTHERMIC WELD CONNECTION



CONTRACT PLANS RECORD					
DATE	REV.	DESCRIPTION	DATE	REV.	DESCRIPTION

FDOT  **FLORIDA DEPARTMENT OF TRANSPORTATION**
 605 SUWANNEE ST. MS 90
 TALLAHASSEE, FL 32399-0450
 PH. (850)-410-5600
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STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION		
SITE NAME	COUNTY	FINANCIAL PROJECT ID
D5 RTMC	SEMINOLE	424401-1-52-01

**SITE GROUNDING
DETAIL**

SHEET NO.
A-10

COMMUNICATIONS EQUIPMENT SHELTER:

GENERAL

1. THE VENDOR SHALL PROVIDE A CONCRETE OR CONCRETE COMPOSITE COMMUNICATIONS EQUIPMENT SHELTER AND INCLUDE ALL LABOR, EQUIPMENT, MATERIALS, FOUNDATIONS, AND PERFORMANCE OF ALL NECESSARY OPERATIONS FOR THE INSTALLATION OF A COMPLETE COMMUNICATIONS EQUIPMENT SHELTER. IT IS INTENDED THAT THE COMMUNICATIONS EQUIPMENT SHELTER BE A STANDARD ITEM PROVIDED BY ANY OF SEVERAL MANUFACTURERS.
2. THE COMMUNICATIONS EQUIPMENT SHELTER SHALL BE DESIGNED FOR THE EXPRESS PURPOSE OF HOUSING ELECTRONIC COMMUNICATIONS EQUIPMENT, POWER SUPPLIES, AND RELATED COMPONENTS WITHIN A CONTROLLED ENVIRONMENT NECESSARY FOR THE PROPER OPERATING CONDITIONS FOR THE EQUIPMENT TO BE INSTALLED.
3. THE COMMUNICATIONS EQUIPMENT SHELTER SHALL COME COMPLETE WITH TWO SECURE DOORS, AC POWER DISTRIBUTION PANEL, 48VDC DC BATTERY PLANT, HEAT/AIR CONDITIONING SYSTEM, LIGHTNING PROTECTION, GROUNDING SYSTEM, AND OTHER NECESSARY APPURTENANCES TO PROVIDE FOR AN INTEGRATED COMMUNICATIONS EQUIPMENT SHELTER.

DIMENSIONS

4. THE COMMUNICATIONS EQUIPMENT SHELTER SHALL PROVIDE TWO ROOMS: EQUIPMENT ROOM AND GENERATOR ROOM. THE INTERIOR DIMENSIONS OF THE EQUIPMENT ROOM SHALL BE MINIMUM 10-FEET 7-INCHES BY 16-FEET 11.25-INCHES. THE INTERIOR DIMENSIONS OF THE GENERATOR ROOM SHALL BE MINIMUM 10-FEET 7-INCHES BY 8-FEET. THE MINIMUM CEILING HEIGHT OF THE COMMUNICATIONS EQUIPMENT SHELTER SHALL BE 9-FEET ABOVE FINISHED FLOOR.

FLOORS AND FOUNDATION

5. THE SUPPORTING FLOOR OF THE COMMUNICATIONS EQUIPMENT SHELTER SHALL BE CONCRETE OR A CONCRETE COMPOSITE MATERIAL. OTHER SIMILAR SUITABLE CONSTRUCTION WILL BE ACCEPTABLE ONLY IF PRE-APPROVED BY THE FDOT PROJECT MANAGER.
6. THE FOUNDATION FOR THE COMMUNICATIONS EQUIPMENT SHELTER SHALL BE A MONOLITHIC SLAB WITH FOOTING FOUNDATION. THE FOUNDATION DESIGN FOR THE COMMUNICATIONS EQUIPMENT SHELTER SHALL BE DESIGNED APPROPRIATELY BY THE VENDOR TO THE SPECIFIC REQUIREMENTS OF THE SITE. THE TOP OF THE FOUNDATION SHALL BE A MINIMUM OF TWO FEET ABOVE GRADE.
7. SUFFICIENT STEEL OR WOOD CROSS BRACING SHALL BE PROVIDED TO PREVENT THE COMMUNICATIONS EQUIPMENT SHELTER STRUCTURE FROM BENDING OR BREAKING DURING MOVING, TOWING, OR HOISTING, AND TO ENSURE MINIMUM WARPING AFTER THE COMMUNICATIONS EQUIPMENT SHELTER HAS BEEN PLACED ON THE FOUNDATION WITH THE COMMUNICATIONS EQUIPMENT INSTALLED.
8. THE EQUIPMENT ROOM FINISH FLOOR COVERING SHALL BE INDUSTRIAL GRADE VINYL FLOORING FASTENED IN A PROPER MANNER TO THE SUBFLOOR WITH WATERPROOF GLUE. THE SUBFLOOR SHALL BE MASTERTOP® 110 PLUS UNDERLAYMENT BY BASF BUILDING SYSTEMS OR APPROVED EQUAL. THE MASTERTOP® 110 PLUS UNDERLAYMENT SHALL BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURE'S INSTALLATIONS SPECIFICATIONS.
9. A VAPOR BARRIER SHALL BE PROVIDED BENEATH AND ABOVE THE SLAB PORTION OF THE COMMUNICATIONS EQUIPMENT SHELTER FOUNDATION. THE VAPOR BARRIER BENEATH THE SLAB SHALL BE 6 MIL. VISQUENE, OR APPROVED EQUIVALENT. THE VAPOR BARRIER ABOVE THE SLAB SHALL BE NO. 30 FELT. THE FLOOR SHALL BE INSULATED WITH POLYSTYRENE FOAM TO PROVIDE A MINIMUM INSULATING FACTOR OF R11.

DOOR

10. EXTERIOR PRE-HUNG, INSULATED, GALVANIZED STEEL DOORS WITH BAKED ENAMEL FINISH, DOOR CHECK, DOORSTOP, WITH MORTISED DEADBOLT SECURITY COMMON KEYED LOCK (MEDECO CO., FOR CONSISTENCY WITH FDOT SITES) SHALL BE PROVIDED. FOR THE EQUIPMENT ROOM, THE DOOR SHALL BE 34 INCHES BY 78 INCHES. FOR THE GENERATOR ROOM, THE DOOR SHALL BE 48 INCHES BY 78 INCHES. THE KEYS TO THE DOOR LOCK SHALL BE PROVIDED TO THE FDOT. DOORS SHALL HAVE A HANDLE ON BOTH THE INSIDE AND OUTSIDE FOR OPENING AND CLOSING.

WALL SECTIONS

11. THE WALL SECTIONS SHALL BE EQUIPPED WITH A VAPOR SHIELD TO PREVENT PROBLEMS WITH MOISTURE PENETRATION. FOR CONCRETE WALLS, THE VAPOR BARRIER SHALL BE INSTALLED AGAINST THE CONCRETE. THE WALLS SHALL BE INSULATED WITH INSULATION HAVING A MINIMUM INSULATING FACTOR OF R11. INTERIOR SURFACES SHALL HAVE A WHITE TEXTURED FINISH WALL COVERING WITH MOLDING ON ALL CORNERS AND SEAMS. ALL FLOOR/WALL INTERSECTIONS SHALL HAVE FOUR-INCH VINYL BASEBOARDS INSTALLED USING WATERPROOF GLUE.

CEILING

12. THE CEILING SHALL BE CAPABLE OF SUPPORTING THE PROPOSED ELECTRICAL FIXTURES AND CABLE TRAYS.

ROOF SECTION

13. THE ROOF SECTION SHALL BE DESIGNED AND CONSTRUCTED WITH A 1/8-INCH PER FOOT (MINIMUM) PITCH FOR DRAINAGE. ALL VOIDED AREAS BETWEEN THE ROOF AND THE CEILING SHALL BE FILLED WITH INSULATION (R11 MINIMUM) AND INCLUDE A VAPOR SHIELD.

THERMAL REQUIREMENTS AND INSULATION

14. HEAT TRANSFER COEFFICIENT SHALL NOT EXCEED 0.07 BTU PER HOUR PER SQUARE FOOT PER F DEGREE.
15. INSULATION SHALL BE R11 MINIMUM FOR WALLS, CEILING, AND FLOOR.

FLOOR AND ROOF LOADING

16. THE FLOOR SHALL BE DESIGNED AND CONSTRUCTED TO SUPPORT A LIVE LOAD OF 150 POUNDS PER SQUARE FOOT MINIMUM. IN ADDITION, AT THE LOCATIONS SPECIFIED ON THE FLOOR PLAN ON SHEET A-16, THE FLOOR SHALL BE DESIGNED AND CONSTRUCTED TO SUPPORT THE CONCENTRATED LOADS OF THE DC BATTERY PLANT (2,600 POUNDS INSTALLED ON THE FLOOR) AND THE EMERGENCY POWER GENERATOR (1,300 POUNDS MOUNTED ON SKID BASE).
17. THE ROOF SHALL BE DESIGNED AND CONSTRUCTED TO SUPPORT A LIVE LOAD OF 100 POUNDS PER SQUARE FOOT MINIMUM.

COMMUNICATIONS EQUIPMENT SHELTER (CONT'D.):

WIND LOADING

18. THE COMMUNICATIONS EQUIPMENT SHELTER SHALL BE BUILT AND CONSTRUCTED TO THE WIND LOADING AS REQUIRED BY THE FLORIDA BUILDING CODE.

EXTERIOR CONSTRUCTION AND COLOR

19. THE COMMUNICATIONS EQUIPMENT SHELTER SHALL BE PROVIDED WITH A CONCRETE AGGREGATE FINISH AND BULLET RESISTIVE SURFACE IN ACCORDANCE WITH UL 752. THE DOORS SHALL ALSO BE BULLET RESISTIVE IN ACCORDANCE WITH UL 752.
20. THE EXTERIOR COLOR OF THE COMMUNICATIONS EQUIPMENT SHELTER SHALL BE EARTH TONE TO BLEND INTO ITS SURROUNDINGS.

ENTRANCE

21. THE VENDOR SHALL FURNISH AND INSTALL TWO SETS OF FABRICATED CONCRETE STEPS TO PROVIDE PROPER WALKWAY ENTRANCE INTO THE GENERATOR ROOM AND EQUIPMENT ROOM OF THE COMMUNICATIONS EQUIPMENT SHELTER. THE CONCRETE STEPS SHALL BE INSTALLED SUCH THAT THE DISTANCE FROM THE GRADE OR FINAL STEP TO THE COMMUNICATIONS EQUIPMENT SHELTER FLOOR DOES NOT EXCEED EIGHT INCHES. THE CONCRETE STEPS SHALL BE INSTALLED LEVEL, AND IN ACCORDANCE WITH THE FLORIDA BUILDING CODE.

THE STEPS LEADING UP TO EACH DOOR SHALL BE INSTALLED WITH SAFETY HAND RAILS, AND IN ACCORDANCE WITH THE FLORIDA BUILDING CODE. THE HAND RAILS AND ALL MOUNTING HARDWARE SHALL BE GALVANIZED STEEL.

ELECTRICAL

22. THE STANDARD ELECTRICAL CONFIGURATION FOR THE COMMUNICATIONS EQUIPMENT SHELTER SITE SHALL BE 120/240 VOLTS AC, 60 HZ, SINGLE PHASE, 200-AMPERE SERVICE. THE VENDOR SHALL PROVIDE THE NECESSARY POWER SERVICE DROP AND SITE SPECIFIC POWER NEEDS. ALL COSTS ASSOCIATED WITH PROVIDING POWER SERVICE SHALL BE THE RESPONSIBILITY OF THE VENDOR. THE VENDOR SHALL INSTALL THE POWER SERVICE IN ACCORDANCE WITH SECTION 639 OF THE FDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION.

THE VENDOR SHALL PROVIDE UNDERGROUND POWER SERVICE TO THE COMMUNICATIONS EQUIPMENT SHELTER. THE VENDOR SHALL PROVIDE ALL ELECTRICAL CONNECTIONS FROM THE SERVICE DROP TO THE COMMUNICATIONS EQUIPMENT SHELTER'S SERVICE PANEL. SEE SHEET A-24 FOR A ELECTRICAL RISER DIAGRAM.

SURGE PROTECTIVE DEVICES (SPDS)

TYPE 1 PRIMARY AC POWER SPD

23. THE PRIMARY AC SPD SHALL BE AN ANSI C62.41, CATEGORY C RATED, UL 1449 THIRD EDITION, TYPE 1, AC POWER SPD. THE ENCLOSURE FOR THE SPD SHALL BE A NEMA TYPE 1 COMPLIANT PRODUCT APPROPRIATE FOR USE AT THE DEVICE'S DESIGNATED LOCATION WITHIN THE SHELTER. THE SPD SHALL BE ADVANCED PROTECTION TECHNOLOGIES (APT), MODEL TE01XAS30E1XD-W2.

THE VENDOR SHALL PROVIDE A SPARE FIELD REPLACEABLE MOV PRIMARY AC POWER SPD UNIT. FOR SUBSTITUTE PRODUCT APPROVAL, THE VENDOR SHALL SUBMIT A CERTIFIED, SIGNED AND SEALED STATEMENT FROM A FLORIDA REGISTERED PROFESSIONAL ENGINEER THAT THE REPLACEMENT DEVICE MEETS OR EXCEEDS ALL REQUIREMENTS OF THIS SECTION.

THE VENDOR SHALL CONNECT THE PRIMARY AC POWER SPD AS DESIGNATED ON SHEET A-24. THE SPD SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS AND SHALL BE CONNECTED TO THE GROUNDING SYSTEM.

TYPE 1 SECONDARY AC POWER SPD

24. THE SECONDARY AC POWER SPD SHALL BE AN ANSI C62.41, CATEGORY C RATED, UL 1449 THIRD EDITION, TYPE 1, AC POWER SPD. ENCLOSURE RATINGS SHALL BE THE APPROPRIATE NEMA 1 LISTING FOR THE SPD LOCATION APPLICATION POINT. THE SECONDARY SPD SHALL BE APT MODEL TE01XDS204XA-W2.

THE VENDOR SHALL PROVIDE A SPARE FIELD REPLACEABLE MOV SECONDARY AC POWER SPD UNIT. FOR SUBSTITUTE PRODUCT APPROVAL, THE VENDOR SHALL SUBMIT A CERTIFIED, SIGNED AND SEALED STATEMENT FROM A FLORIDA REGISTERED PROFESSIONAL ENGINEER THAT THE REPLACEMENT DEVICE MEETS OR EXCEEDS ALL REQUIREMENTS OF THIS SECTION.

THE VENDOR SHALL CONNECT THE SECONDARY AC POWER SPD AS DESIGNATED ON SHEET A-24. THE SPD SHALL BE INSTALLED ON A APPROPRIATELY SIZED BREAKER IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS AND SHALL BE CONNECTED TO THE EXISTING GROUNDING SYSTEM.

WORKMANSHIP AND MATERIALS


25. THE RECEPTACLES, SWITCHES, AND LIGHT FIXTURES SHALL BE WIRED UTILIZING A MINIMUM OF #12AWG COPPER WIRES. ALL WIRES SHALL BE RUN IN MINIMUM 3/4-INCH EMT CONDUIT. ALL ELECTRICAL CONDUITS SHALL BE INSTALLED IN A NEAT AND ORDERLY FASHION. SYMMETRY SHALL BE EMPLOYED THROUGHOUT.

THE ELECTRICAL LOADS SHALL BE DIVIDED AMONG AS MANY LOAD CENTERS AS NECESSARY TO CONTAIN THE QUANTITY OF CIRCUIT BREAKERS REQUIRED TO PROTECT THE COMMUNICATIONS EQUIPMENT SHELTER FACILITY. THE LOAD CENTERS SHALL CONTAIN SEPARATE, APPROPRIATELY SIZED CIRCUIT BREAKERS FOR THE HVAC UNITS, DC RECTIFIERS, AND, AS NECESSARY, EACH MAJOR BRANCH.

AC POWER RECEPTACLES

26. SINGLE TWIST-LOCK RECEPTACLES SHALL BE CEILING MOUNTED ABOVE THE EQUIPMENT RACK POSITIONS AS SHOWN ON SHEET IT-23. EACH TWIST-LOCK RECEPTACLE SHALL BE PROTECTED BY A SEPARATE 20A CIRCUIT BREAKER. THE TWIST-LOCK RECEPTACLES SHALL BE NEMA L5-20R.

CONVENIENCE POWER OUTLETS CONSISTING OF FOUR-PLEX RECEPTACLES (DUAL DUPLEX) SHALL BE INSTALLED EVERY FOUR FEET ON EACH WALL OF THE EQUIPMENT ROOM. THE WALL RECEPTACLE LOADS SHALL BE PROTECTED BY DEDICATED 20A CIRCUIT BREAKERS.

CONTRACT PLANS RECORD						 FLORIDA DEPARTMENT OF TRANSPORTATION 605 SUWANNEE ST. MS 90 TALLAHASSEE, FL 32399-0450 PH. (850)-410-5600 FAX. (850)-410-5501	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			SHEET NO. SHELTER SPECIFICATIONS
DATE	REV.	DESCRIPTION	DATE	REV.	DESCRIPTION		SITE NAME	COUNTY	FINANCIAL PROJECT ID	
						D5 RTMC	SEMINOLE	424401-1-52-01	A-11	

COMMUNICATIONS EQUIPMENT SHELTER (CONT'D):

LIGHTING

27. THE COMMUNICATIONS EQUIPMENT SHELTER SHALL UTILIZE LED EQUIVALENT DUAL-BULB 32W FLUORESCENT SURFACE-MOUNTING FIXTURES. A SUFFICIENT QUANTITY OF LIGHT FIXTURES SHALL BE SUPPLIED TO PROVIDE A UNIFORM LIGHT LEVEL (VOID OF SHADOWS) THROUGHOUT THE BUILDING OF 150 FOOT-CANDLES AT FOUR FEET ABOVE THE FLOOR. AN INTERIOR LIGHT SWITCH SHALL BE MOUNTED ADJACENT TO THE ENTRY DOORS.
28. THE VENDOR SHALL FURNISH AND INSTALL ONE 35W HIGH-PRESSURE SODIUM VANDAL RESISTANT FLOODLIGHT MOUNTED ON THE OUTSIDE NEAR EACH ENTRANCE DOOR. A PHOTOCCELL AND INTERIOR LIGHT SWITCH SHALL BE FURNISHED AND INSTALLED TO CONTROL THE LIGHTS.
29. THE VENDOR SHALL FURNISH AND INSTALL ONE INTERIOR TWO-HEAD EMERGENCY LIGHT WITH RECHARGEABLE BATTERIES, CHARGER, PILOT, AND TEST LIGHT, WIRED UN-SWITCHED TO THE INTERIOR LIGHTING CIRCUIT IN EACH ROOM OF THE COMMUNICATIONS EQUIPMENT SHELTER.
30. LIGHTING CIRCUITS SHALL BE SPLIT BETWEEN TWO 20A SINGLE POLE CIRCUIT BREAKERS.

HVAC SYSTEM

31. REDUNDANT EXTERIOR VERTICAL WALL-MOUNTED AIR CONDITIONERS SHALL BE PROVIDED FOR THE BUILDING. THE HVAC SYSTEM SHALL PROVIDE AN ALARM THAT INDICATES FAILURE (DRY CONTACT CLOSURE ALARM POINT).
32. THE HVAC UNITS SHALL HAVE AN ADJUSTABLE TIME DELAY (INITIALLY SET TO FIVE MINUTES) TO PREVENT COMPRESSOR DAMAGE OR GENERATOR STALL IF UTILITY POWER SERVICE IS PREMATURELY RESTORED FOLLOWING A POWER FAILURE. THE UNITS SHALL ALSO HAVE A HARD START DEVICE INSTALLED TO REDUCE THE STARTING CURRENT REQUIRED DURING A COLD START OR HIGH HEAD PRESSURE CONDITIONS. THE UNITS SHALL BE CAPABLE OF SAFELY OPERATING WHEN THE OUTSIDE TEMPERATURE FALLS BELOW 60 DEGREES F, ALLOWING CONTINUOUS INTERIOR EQUIPMENT COOLING AND DEHUMIDIFICATION IN COLD WEATHER. EACH UNIT SHALL BE CAPABLE OF HANDLING A MINIMUM HEAT LOAD OF 3.0 AC TONS, 36,000 BTU/H.

THE HVAC UNITS SHALL BE MARVAIR MODEL HVESA 36AC A050 NU. THE HVAC UNITS SHALL BE EQUIPPED WITH BLANK OFF PLATE TO RESTRICT OUTSIDE AIR OR DIRT FROM ENTERING THE SHELTER. THE VENDOR SHALL REPLACE THE MOUNTING HARDWARE PROVIDED BY THE MANUFACTURER WITH STAINLESS STEEL HARDWARE. THE HVAC UNITS SHALL COME WITH A MINIMUM 2-YEAR EXTENDED WARRANTY FOR PARTS AND LABOR.
33. THE VENDOR SHALL GROUND THE OUTDOOR HOUSING OF EACH HVAC UNIT TO THE EXTERIOR PERIMETER GROUND HALO WITH #2 AWG TINNED SOLID COPPER CONDUCTORS. THE VENDOR SHALL MECHANICALLY BOND THE HVAC HOUSING TO THE #2 AWG TINNED SOLID COPPER GROUND CONDUCTORS USING TWO-HOLE LUG BARREL COMPRESSION LUGS.
34. UPON COMPLETION OF SHELTER INSTALLATION ACTIVITIES, THE VENDOR SHALL DEHUMIDIFY THE COMMUNICATIONS SHELTER. THE VENDOR SHALL KEEP THE COMMUNICATIONS ROOM DOOR CLOSED FOR A PERIOD OF 15-MINUTES AND CYCLE THE HEAT WITH THE THERMOSTAT SET ON 85 DEGREES FAHRENHEIT. THE VENDOR SHALL RETURN THE HVAC UNITS TO NORMAL OPERATION MODE ONCE THE DEHUMIDIFICATION PROCESS IS COMPLETE.

HVAC CONTROLLER

35. THE HVAC UNITS SHALL BE EQUIPPED WITH A LEAD/LAG CONTROLLER THAT ENABLES REMOTE CONTROL AND MONITORING OF THE HVAC SYSTEM VIA IPV4/IPV6 NETWORK COMMUNICATIONS.
36. CONTROLS TWO AIR CONDITIONING UNITS FOR COOLING, HEATING, VENT AND ECONOMIZER, PLUS A SEPARATE EXHAUST FAN. SUPPORTS SINGLE STAGE, TWO STAGE COOLING AND HEAT PUMPS.
37. ANALOG OUTPUTS FOR DIRECT CONTROL OF DAMPERS AND VARIABLE SPEED SUPPLY FANS.
38. ALARM OUTPUTS FOR HIGH TEMPERATURE, LOW TEMPERATURE, SMOKE/FIRE, HVAC UNIT POWER FAILURE, COMPRESSOR LOCKOUT, GENERATOR RUNNING, AND CONTROLLER FAILURE SHALL BE WIRED TO A SITE ALARM PUNCHBLOCK.
39. CONTROLS, MONITORS, AND ALARMS INSIDE TEMPERATURE AND HUMIDITY.
40. LEAD/LAG OR LEAD/STANDBY CONTROL OF AC UNITS WITH PROGRAMMABLE CHANGEOVER TIME OF 1-168 HOURS.
41. AUTOMATIC CHANGEOVER UPON HVAC FAILURE.
42. MENU-DRIVEN INTERFACE.
43. EXHAUST FAN CONTROL TO PURGE FACILITY WHEN GAS IS PRESENT OR IN A HIGH TEMPERATURE CONDITION. AUTOMATIC SHUTDOWN WHEN SMOKE OR FIRE IS DETECTED.
44. REDUNDANT POWER- 24VAC POWER FROM AC#1, AC#2 OR EXTERNAL TRANSFORMER PLUS 48VDC POWER FROM DC PLANT.
45. ETHERNET COMMUNICATIONS WITH SUPPORT FOR IPV6 , IPV4, HTTP, HTTPS, SNMP, AND SMTP.
46. DATA LOGGING TO MONITOR PERFORMANCE OF THE FACILITY AND HVAC SYSTEMS, TO INCLUDE COMPRESSOR, RUNTIME & CYCLES, INDOOR & OUTDOOR TEMPERATURE/HUMIDITY, SUPPLY & MIXED AIR TEMPERATURES, ENERGY CONSUMPTION, ETC.
47. THE HVAC CONTROLLER SHALL BE MARVAIR COMMSTAT TOUCH HVAC CONTROLLER.

COMMUNICATIONS EQUIPMENT SHELTER (CONT'D):

CABLE TRAYS

48. THE COMMUNICATIONS EQUIPMENT SHELTER SHALL BE EQUIPPED WITH CABLE TRAYS OF WIDTH SPECIFIED ON SHEET A-23, AND OF SUFFICIENT STRENGTH TO SUPPORT THE ELECTRICAL POWER CONDUITS AND DUPLEX CIRCUITS, IN ADDITION TO THE TRANSMISSION LINES, AND CONTROL AND ALARM WIRES ASSOCIATED WITH THE RADIO COMMUNICATIONS EQUIPMENT. CABLE TRAY CONSTRUCTION SHALL BE IRIDITE STEEL OR ALUMINUM. THE CABLE TRAYS SHALL BE SUPPORTED BY CONNECTIONS TO THE WALLS. CABLE TRAYS MAY BE SUSPENDED FROM THE CEILING ONLY AS REQUIRED TO PROVIDE ADDITIONAL SUPPORT. ALL CABLE TRAYS SHALL BE FABRICATED IN AN OPEN LADDER-TYPE ARRANGEMENT TO PERMIT EASY CABLE ROUTING. IN ADDITION, ALL EQUIPMENT RACKS, CABLE ASSEMBLIES AND HARDWARE SHALL BE ELECTRICALLY BONDED TOGETHER. PAINT AND OTHER NONCONDUCTIVE COATINGS SHALL BE REMOVED IN THE AREA OF THE CONNECTION TO ALLOW FOR ELECTRICAL BONDING. FLAT WASHERS SHALL BE USED TO FACILITATE RACK BONDING ON NON-PAINTED SURFACE AREAS. FOLLOWING BONDING, THESE AREAS SHALL BE COVERED WITH AN ANTI-OXIDANT COMPOUND. THE CABLE TRAY ASSEMBLIES SHALL ALSO BE GROUNDED TO THE COMMUNICATIONS EQUIPMENT SHELTER INTERIOR GROUND.
49. THE CABLE TRAYS SHOULD BE MOUNTED AT A HEIGHT TO SECURE THE EQUIPMENT RACKS TO. SEE SHEET A-22 FOR DETAIL.

COMMUNICATIONS CABLE WALL ENTRY

50. THE COMMUNICATIONS EQUIPMENT SHELTER SHALL BE EQUIPPED WITH ONE POLYPHASER 4-PORT MODULAR EARTHED ENTRANCE PANEL FOR FIBER OPTIC CABLE ENTRY TO BE LOCATED ON THE WEST WALL OF THE COMMUNICATIONS EQUIPMENT SHELTER PER DRAWINGS ON SHEET A-17 AND A-21.

TRANSMISSION LINE ENTRANCE PANEL

51. THE COMMUNICATIONS EQUIPMENT SHELTER SHALL BE EQUIPPED WITH TWO SOLID COPPER BULKHEAD PANELS FOR TRANSMISSION LINE ENTRY. THE BULKHEAD PANELS SHALL BE POLYPHASER 8-PORT MODULAR EARTHED ENTRANCE PANEL, MODEL 8PEEP-M, OR APPROVED EQUIVALENT.
52. ALL BULKHEAD PANEL PORTS SHALL ACCOMMODATE 1/2-INCH TO 1-5/8-INCH COAXIAL TRANSMISSION LINES, AS WELL AS ELLIPTICAL WAVEGUIDES. THE BULKHEAD PANELS SHALL BE EQUIPPED WITH REMOVABLE PRE-PUNCHED/PRE-DRILLED SURGE PROTECTOR MOUNTING PLATES. THE BULKHEAD PANELS SHALL BE EQUIPPED TO ACCOMMODATE TYPE DIN FEMALE CONNECTORS. THE BULKHEAD PANELS SHALL BE EQUIPPED WITH TWO FOUR-INCH WIDE BY 1/8-INCH THICK WIDE COPPER STRAPS FOR CONNECTION TO THE BUILDING EXTERNAL SINGLE POINT GROUND. THE VENDOR SHALL REPLACE THE MANUFACTURER PROVIDED BRASS SCREWS WITH STAINLESS STEEL SCREWS OF SUITABLE LENGTH TO ACCOMMODATE THE 1/8-INCH THICK COPPER STRAP. SEE SHEET A-18 AND A-20 FOR DETAILS.

FIRE DETECTION AND SUPPRESSION

SMOKE AND HEAT DETECTOR

53. THE COMMUNICATIONS EQUIPMENT SHELTER SHALL INCLUDE ONE CEILING MOUNTED -48VDC PHOTOELECTRIC 4-WIRE SMOKE DETECTOR EQUIPPED WITH FORM C RELAYS FOR ALARM MONITORING. THE SMOKE DETECTOR SHALL BE MOUNTED IN THE EQUIPMENT ROOM OF THE COMMUNICATIONS EQUIPMENT SHELTER.
54. THE GENERATOR ROOM SHALL INCLUDE ONE CEILING MOUNTED -48 VDC FIXED TEMPERATURE 190° F HEAT DETECTOR WITH FORM C RELAYS FOR ALARM MONITORING. THE HEAT DETECTOR SHALL BE MOUNTED IN THE GENERATOR ROOM OF THE COMMUNICATIONS EQUIPMENT SHELTER.

ALL CONDUITS NECESSARY FOR INSTALLING THE SMOKE DETECTOR AND HEAT DETECTOR SHALL BE 3/4-INCH EMT CONDUIT. ALL MOUNTING HARDWARE SHALL BE STAINLESS STEEL OR HOT DIPPED GALVANIZED.

ALL ALARM POINT CABLING SHALL BE CATEGORY 5 DATA CABLING, USING WHITE WITH BLUE COLOR CODING.

PORTABLE FIRE EXTINGUISHERS


55. THE VENDOR SHALL PROVIDE A TOTAL OF THREE FIRE EXTINGUISHERS: ONE LOCATED INSIDE THE EQUIPMENT ROOM OF THE COMMUNICATIONS EQUIPMENT SHELTER, AND TWO LOCATED ON THE EXTERIOR OF THE COMMUNICATIONS EQUIPMENT SHELTER NEXT TO THE EQUIPMENT ROOM DOOR AND THE GENERATOR ROOM DOOR.
56. ALL EXTERIOR PORTABLE FIRE EXTINGUISHERS SHALL BE HOUSED IN STAINLESS STEEL, WEATHER RESISTANT, GLASS-FRONT CABINETS. THE CABINETS SHALL BE PAINTED RED AND CLEARLY VISIBLE FROM THE COMMUNICATIONS EQUIPMENT SHELTER ENTRANCE AND FUEL TANKS. ALL MOUNTING AND INSTALLATION HARDWARE SHALL BE STAINLESS STEEL.
57. THE INTERIOR AND EXTERIOR PORTABLE FIRE EXTINGUISHERS SHALL BE IN ACCORDANCE WITH NFPA 10: STANDARD FOR PORTABLE FIRE EXTINGUISHERS. ALL MOUNTING AND INSTALLATION HARDWARE SHALL BE STAINLESS STEEL.

ALARMS

58. THE FOLLOWING COMMUNICATIONS EQUIPMENT SHELTER ALARMS SHALL BE PROVIDED, BUT NOT LIMITED TO THIS LIST.

DOOR ALARM
HIGH TEMPERATURE THRESHOLD
AIR CONDITIONER FAILURE ALARM (FOR EACH INSTALLED UNIT), DRY CONTACT TYPE
SMOKE ALARM, FIRE HEAT ALARM
MDP POWER FAILURE (WIRED FROM A DEDICATED CIRCUIT BREAKER)
COMMERCIAL POWER FAIL ALARM (WIRED FROM MAIN FUSED DISCONNECT)

ALL ALARMS MUST BE WIRED TO A SINGLE TYPE 66 PUNCH BLOCK. THE VENDOR SHALL LABEL EACH TERMINATION AND DEMARCAION. ALARMS SHALL BE ARRANGED ON THE 66 BLOCK AS SPECIFIED ON SHEET A-21.

CONTRACT PLANS RECORD						 FLORIDA DEPARTMENT OF TRANSPORTATION 605 SUWANNEE ST. MS 90 TALLAHASSEE, FL 32399-0450 PH. (850)-410-5600 FAX. (850)-410-5501	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			SHELTER SPECIFICATIONS	SHEET NO.
DATE	REV.	DESCRIPTION	DATE	REV.	DESCRIPTION		SITE NAME	COUNTY	FINANCIAL PROJECT ID		A-12
						D5 RTMC	SEMINOLE	424401-1-52-01			

EMERGENCY GENERATOR POWER SYSTEM:

GENERAL

1. A EMERGENCY STANDBY GENERATOR SHALL BE PROVIDED WITH THE COMMUNICATIONS EQUIPMENT SHELTER. THE GENERATOR SHALL BE A 40 KW/50 KVA CUMMINS C40 N6.
2. THE GENERATOR SHALL BE CONFIGURED FOR INDOOR INSTALLATION AND BE FURNISHED COMPLETE WITH ALL ACCESSORIES AND EQUIPMENT NEEDED FOR THE PROPER INDOOR OPERATION OF THE UNIT. THE ACCESSORIES AND EQUIPMENT SHALL INCLUDE, BUT NOT BE LIMITED TO, COOLING DUCTS AND INTAKE PIPING, STARTING BATTERIES, BATTERY RACKS, BATTERY CHARGERS, BATTERY CABLES, COOLING SYSTEMS, RESIDENTIAL GRADE EXHAUST SILENCERS WITH EXHAUST PIPES AND RAIN CAPS, AUTOMATIC FREQUENCY REGULATORS, VIBRATION ISOLATORS, FUEL LINES, FUEL REGULATORS, FUEL STORAGE TANK, CONDUITS, JUNCTIONS BOXES, WIRING, INSTRUMENT PANELS, LOCAL POWER DUPLEX RECEPTACLE, REMOTE ALARM PANELS MOUNTED INSIDE THE EQUIPMENT ROOM OF THE COMMUNICATIONS EQUIPMENT SHELTER, MOUNTING BASES, ETC.
3. THE VENDOR SHALL DEVELOP THE MINIMUM REQUIRED POWER UTILIZING LP GAS FUEL, INSTALLED PER THE MANUFACTURER'S RECOMMENDATIONS AND IN CONFORMANCE WITH ANY APPLICABLE LOCAL CODES. THE EMERGENCY GENERATOR POWER SYSTEM SHALL BE CONFIGURED FOR VP VAPOR WITHDRAWAL.
4. ALL FUEL, WATER, AND EXHAUST SYSTEMS PLUMBING SHALL BE FLEXIBLE TO MEET VIBRATION DESIGN CRITERIA AND MEET APPLICABLE SAFETY CODES. THE GENERATOR MOUNTING BASE SHALL ALSO BE INSTALLED TO MEET VIBRATION DESIGN CRITERIA.

ENGINE, ALTERNATOR, AND ENGINE COOLING SYSTEM

5. THE GENERATOR SET SHALL BE EQUIPPED WITH A HIGH PERFORMANCE ALTERNATOR FOR IMPROVED MOTOR STARTING CAPABILITIES.
6. THE ENGINE SHALL BE RADIATOR COOLED BY AN ENGINE MOUNTED RADIATOR SYSTEM INCLUDING BELT-DRIVEN FAN, COOLANT PUMP, AND THERMOSTAT TEMPERATURE CONTROL.
7. THE RADIATOR SHALL BE PROVIDED WITH A DUCT ADAPTER FLANGE PERMITTING THE ATTACHMENT OF AN AIR DISCHARGE DUCT TO DIRECT THE DISCHARGE OF RADIATOR AIR THROUGH LOUVERS OR DAMPERS IN THE GENERATOR ROOM WALLS OF THE COMMUNICATIONS EQUIPMENT SHELTER.
9. THE VENDOR SHALL PROVIDE A 120VAC COOLANT HEATER SYSTEM. THE COOLANT HEATER SHALL BE PROVIDED WITH A THERMOSTAT, INSTALLED AT THE ENGINE THERMOSTAT HOUSING. THE COOLANT HEATER SHALL BE SIZED AS RECOMMENDED BY THE ENGINE MANUFACTURER.

EXHAUST SYSTEM

10. AN EXHAUST SYSTEM WITH A RESIDENTIAL TYPE MUFFLER (EXHAUST SILENCER) AND RAIN CAP SHALL BE PROVIDED WITH THE ENGINE (SIZE AS RECOMMENDED BY THE MANUFACTURER). THE VENDOR SHALL MOUNT THE MUFFLER SUCH THAT ITS WEIGHT IS NOT SUPPORTED BY THE ENGINE. THE MUFFLER AND EXHAUST PIPE SYSTEM SHALL BE INSULATED TO PROTECT HUMANS FROM BURN HAZARD.
11. FLEXIBLE EXHAUST CONNECTION(S) SHALL BE PROVIDED AS REQUIRED FOR CONNECTION BETWEEN ENGINE EXHAUST MANIFOLD(S) AND EXHAUST LINE, IN COMPLIANCE WITH APPLICABLE CODES AND REGULATIONS.
12. THE ENGINE SHALL BE EQUIPPED WITH AN EXHAUST CONDENSATION TRAP WITH MANUAL DRAIN VALVE TO TRAP AND DRAIN OFF EXHAUST CONDENSATION AND TO PREVENT CONDENSATION FROM ENTERING THE ENGINE.
13. THE VENDOR SHALL MOUNT AND INSTALL ALL EXHAUST COMPONENTS AS RECOMMENDED BY THE MANUFACTURER AND AS REQUIRED TO COMPLY WITH ALL APPLICABLE CODES AND REGULATIONS. ALL COMPONENTS SHALL BE PROPERLY SIZED TO ENSURE PROPER OPERATION WITHOUT EXCESSIVE BACK PRESSURE WHEN INSTALLED. THE INSTALLATION SHALL ALLOW FOR PIPE EXPANSION AND CONTRACTION.

EMERGENCY GENERATOR POWER SYSTEM (CONT'D):

14. THE GENERATOR SHALL BE EQUIPPED WITH THE FOLLOWING CONFIGURATIONS AND OPTIONS

- GENERATOR RATING:** EMERGENCY STANDBY POWER (ESP)
VOLTAGE: 120/240VAC, SINGLE PHASE
FUEL SYSTEM: SINGLE FUEL – PROPANE VAPOR
 LOW FUEL GAS PRESSURE WARNING
ENGINE: EXTENSION – OIL DRAIN
 SHUT DOWN – LOW OIL PRESSURE
 ENGINE AIR CLEANER
ALTERNATOR: 221°F TEMPERATURE RISE ALTERNATOR
 EXCITATION BOOST SYSTEM (EBS)
 ALTERNATOR HEATER, 120V
CONTROL: AC OUTPUT ANALOG METERS
 STOP SWITCH – EMERGENCY
 AUXILIARY OUTPUT RELAYS (2)
 REMOTE ANNUNCIATOR WITH (3) CONFIGURABLE INPUTS AND (4) CONFIGURABLE OUTPUTS
 AUXILIARY, CONFIGURABLE SIGNAL INPUTS (8) AND CONFIGURABLE RELAY OUTPUTS (8)
 DIGITAL GOVERNING
 I/O EXPANSION (AUX 101)
ELECTRICAL: SINGLE CIRCUIT BREAKER 80% RATED
ENCLOSURE: OPEN SET
COOLING SYSTEM: SHUTDOWN – LOW COOLANT LEVEL
 EXTENSION – COOLANT DRAIN
 40°F COLD WEATHER OPTION
EXHAUST SYSTEM: EXHAUST CONNECTOR NPT
GENERATOR SET APPLICATION: BATTERY RACK, LARGER BATTERY
 RADIATOR OUTLET DUCT ADAPTER
 GENERATOR SET BASE MOUNT
WARRANTY: STANDBY, 5 YEAR, 1500 HOUR, PARTS, LABOR AND TRAVEL
GENERATOR SET ACCESSORIES: ANNUNCIATOR PANEL WITH ENCLOSURE
 MUFFLER – RESIDENTIAL

AUTOMATIC TRANSFER SWITCH (ATS)

15. AN ATS CUMMINS MODEL OTEC 150 CONFIGURED FOR 120/240VAC, SINGLE-PHASE ELECTRIC SERVICE SHALL BE PROVIDED TO TRANSFER THE AC LOAD BETWEEN COMMERCIAL POWER AND THE STANDBY EMERGENCY GENERATOR POWER SPECIFIED HEREIN. THE TRANSFER SWITCH SHALL COMPLY WITH UL, NEMA, NEC, ANSI AND NFPA STANDARDS. THE UNIT SHALL BE COMPLETELY FACTORY-ASSEMBLED AND WIRED SO THAT ONLY EXTERNAL CIRCUIT CONNECTIONS ARE REQUIRED IN THE FIELD.
16. THE AUTOMATIC LOAD TRANSFER CONTROL UNIT SHALL BE INSTALLED INSIDE THE EQUIPMENT ROOM AND CONTAINED IN A NEMA TYPE 1 ENCLOSURE. THE CONTROL UNIT SHALL BE FURNISHED WITH ALL NECESSARY RELAYS, COMPONENT PARTS, AND CIRCUITS, TOGETHER WITH U.L. LISTED AND TESTED ELECTRICAL AND MECHANICAL INTERLOCK CONTACTOR OR CIRCUIT BREAKERS. THE ATS SHALL BE EQUIPPED WITH A FULLY-PROGRAMMABLE 7-DAY EXERCISER CLOCK TO PROVIDE FLEXIBILITY IN SCHEDULING EXERCISER PERIODS.

17. THE ATS SHALL BE EQUIPPED WITH THE FOLLOWING CONFIGURATIONS AND OPTIONS:

- VOLTAGE RATING:** 240 V
POLE CONFIGURATION: 3 POLES (SOLID NEUTRAL)
FREQUENCY: 60 HZ
APPLICATION: UTILITY TO GENSET
SYSTEM OPTIONS: SINGLE PHASE, 3-WIRE
ENCLOSURE: TYPE 1: GENERAL PURPOSE INDOOR
STANDARDS: UL 1008/CSA CERTIFICATION
CONTROL VOLTAGE: 12V, GENSET STARTING VOLTAGE
CONTROL OPTIONS: EXTERNAL EXERCISE CLOCK
BATTERY CHARGER: 15 AMPS, 12 VOLTS
AUXILIARY RELAYS: (1) 12VDC COIL – EMERGENCY POSITION AND (1) 12 VDC COIL – NORMAL POSITION
WARRANTY: 5 YEAR COMPREHENSIVE

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DATE	REV.	DESCRIPTION	DATE	REV.	DESCRIPTION



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**STATE OF FLORIDA
 DEPARTMENT OF TRANSPORTATION**

SITE NAME	COUNTY	FINANCIAL PROJECT ID
D5 RTMC	SEMINOLE	424401-1-52-01

**EMERGENCY STANDBY
 GENERATOR**

SHEET NO.

A-13

EMERGENCY GENERATOR POWER SYSTEM (CONT'D):

FUEL SYSTEM AND STORAGE

1. THE VENDOR SHALL PROVIDE ALL FUEL SYSTEM PIPING SIZED AS REQUIRED FOR PROPER FUEL FLOW TO THE ENGINE AS REQUIRED BY THE GENERATOR MANUFACTURER. ADDITIONALLY, ALL SUPPLY, RETURN, VENT, AND FUEL LINES, CONDUIT, GAUGES, VALVES, ALARM MONITORING POINTS, FUEL STORAGE TANK, FITTINGS, AND WIRING SHALL BE PROVIDED BY THE VENDOR FOR THE GENERATOR FUEL STORAGE SYSTEM.
ALL CONNECTIONS AND PLUMBING TO CONNECT THE FUEL SYSTEMS TO THE ENGINE, WHERE APPLICABLE, SHALL BE UNDERGROUND AND IN COMPLIANCE WITH APPLICABLE CODES AND REGULATIONS.
2. FUEL STORAGE EQUIPMENT SHALL CONSIST OF AN APPROVED 2000 GALLON LPG FUEL STORAGE TANK. THE 2000 GALLON TANK MUST BE DESIGNED AND APPROVED BY THE MANUFACTURER FOR DIRECT BURIAL. THE TANK SHALL BE FACTORY COATED WITH AN EPOXY COATING AND HAVE AN ATTACHMENT STUD OR SIMILAR MECHANISM TO ALLOW CONNECTION OF SACRIFICIAL ANODES. THE 2000 GALLON TANK SHALL BE BURIED BELOW GROUND. THE VENDOR SHALL INSTALL THE UNDERGROUND TANK IN ACCORDANCE WITH THESE TECHNICAL SPECIFICATIONS AND MANUFACTURER'S RECOMMENDATIONS.
3. THE GENERATOR SET SHALL UTILIZE A LIQUID PROPANE VAPOR FUEL LINE AND THE NECESSARY SUPPORT EQUIPMENT. THE GRADE RELATIVE TO FUEL SOURCE/FUEL INLET SHALL BE APPROPRIATELY CONSIDERED. LPG FUEL TANKS SHALL UTILIZE A FUEL VENT PRESSURE RELIEF VALVE. THE RELIEF VALVE VENT SHALL BE DIRECTED AWAY FROM THE TANK, SOURCES OF IGNITION, AND FLAMMABLE MATERIAL. THE FUEL LINE VENTILATION CONDUIT SHALL BE ULTRA VIOLET (UV) EXPOSURE RATED. WHITE PVC (POLYVINYL CHLORIDE) CONDUIT SHALL NOT BE USED SINCE IT IS NOT RATED FOR UV EXPOSURE. GREY PVC WITH DESIGNATED CONDUIT MARKINGS FOR UV EXPOSURE IS REQUIRED. THE PVC VENTILATOR CONDUIT SHALL BE INSTALLED OUTWARD AND AWAY FROM THE GENERATOR IGNITION SOURCE(S) A MINIMUM OF 10 FEET. SINCE THE 2000 GALLON FUEL TANK IS A BELOW GROUND INSTALLATION, IT SHALL BE INSTALLED IN SUCH A WAY THAT FUEL IS EXTRACTED FROM THE TOP OF THE TANK.
4. THE VENDOR SHALL ENGINEER, FURNISH, AND INSTALL ALL FUEL STORAGE EQUIPMENT. THIS INCLUDES ALL LABOR, MATERIALS, AND SERVICES, INCLUDING THE CONNECTION OF THE FUEL STORAGE EQUIPMENT TO THE EMERGENCY GENERATOR. AN APPROVED ENVIRONMENTAL PROTECTION AGENCY (EPA), 2000 GALLON LPG FUEL TANK FOR BELOW GROUND INSTALLATION MUST BE USED. ALL APPROPRIATE SHUT-OFF VALVES AND PRESSURE GAUGES MUST BE INCLUDED. THE LPG TANK SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDED DISTANCE FROM OPEN FLAMES, SPARKS, OR OTHER SYSTEMS THAT CAN CAUSE IGNITION. THE LPG TANK SHALL ALSO BE INSTALLED, INSPECTED, AND STAMPED IN ACCORDANCE WITH THE APPROPRIATE AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME) BOILER AND PRESSURE VESSEL CODE INDICATING THAT THE STAMPED VESSEL CONFORMS TO THE LATEST EDITION OF THE ASME BOILER AND PRESSURE VESSEL CODES SAFETY STANDARDS AND COMPLIES WITH THE LAWS AND REGULATIONS IN ALL 50 US STATES FOR PRESSURE VESSEL CONSTRUCTION.

FUEL TANK AND CORROSION PROTECTION

5. THE UNDERGROUND PROPANE TANK SHALL BE PROTECTED FROM CORROSION BY THE USE OF BOTH CATHODIC PROTECTION AND EXTERNAL COATING. CATHODIC PROTECTION IS REQUIRED FOR IN-GROUND INSTALLED LPG TANKS TO REDUCE CORROSION DUE TO AN ELECTROCHEMICAL REACTION BETWEEN THE TANK AND THE SURROUNDING SOIL. SACRIFICIAL ANODES WILL BE CONNECTED TO THE TANK TO REDUCE TANK CORROSION. THE SACRIFICIAL ANODES SHALL BE H-1 RATED (STANDARD POTENTIAL MAGNESIUM ANODES). FOUR 17 LB. BAGS OF SACRIFICIAL MAGNESIUM ANODES ARE REQUIRED FOR THE 2000 GALLON TANK INSTALLATION. THE SACRIFICIAL ANODES SHALL BE LOCATED A MINIMUM DISTANCE OF 24 INCHES FROM THE SIDE OF THE TANK AND AT A DEPTH BELOW THE CENTERLINE OF THE TANK. THE ANODE CONDUCTORS (#12 THERMOPLASTIC MOISTURE RESISTANT INSULATED WIRE (TW)) SHALL BE CONNECTED TO THE FACTORY INSTALLED ATTACHMENT STUD ON THE TANK WITH HARGER MODEL GECLB SERIES TWO-HOLE LONG BARREL COMPRESSION LUGS, OR APPROVED EQUIVALENT. ALL NON-CONDUCTING SURFACE COATINGS SHALL BE REMOVED FROM THE CONNECTORS AND ATTACHMENT LUG BEFORE EACH CONNECTION IS MADE. AFTER THE CONNECTION IS MADE, AN ANTI-OXIDANT COMPOUND ("NO-OX" OR EQUIVALENT) SHALL BE APPLIED TO ALL OF THE CONNECTIONS.
6. THE UNDERGROUND PROPANE TANK AND FUEL PIPE MUST BE ELECTRICALLY ISOLATED TO ENSURE PROPER OPERATION OF THE ANODES. THERE SHALL NOT BE ANY GROUND RODS ATTACHED TO THE TANK OR THE FUEL PIPE. A DIELECTRIC UNION SHALL BE INSTALLED AT THE CONNECTION BETWEEN THE FUEL PIPE AND THE GENERATOR REGULATOR TO ELECTRICALLY ISOLATE THE FUEL PIPE AND THE TANK FROM THE GENERATOR.
7. SINCE THE FUEL TANK WILL BE UNDERGROUND, IT SHALL BE WEIGHTED TO REDUCE ZERO FUEL WEIGHT BUOYANCY. THIS WILL BE ACCOMPLISHED BY USING CONCRETE TO ADD ADDITIONAL WEIGHT TO THE TANK. THE GROUND SHALL BE EXCAVATED TO CREATE A HOLE LARGE ENOUGH FOR THE TANK AND THE ANODES TO BE PLACED PROPERLY. CONCRETE WILL BE POURED INTO THE HOLE TO A DEPTH OF AT LEAST 10 INCHES. BEFORE THE CONCRETE CURES THE TANK WILL BE LOWERED INTO THE FRESH CONCRETE AND REMAIN IN PLACE SUCH THAT THE CONCRETE CURES AROUND THE LEGS OF THE TANK. SEE SHEET A-26 FOR DETAIL.

FUEL SENSOR

8. THE SENSING DEVICE SHALL BE SQUIBB TAYLOR, INC. STATIONARY TANK MONITOR, OR APPROVED EQUIVALENT. A FUEL LEVEL SENSING DEVICE SHALL BE INSTALLED ON THE MAIN FUEL TANK. THE SENSING DEVICE SHALL PROVIDE AN ANALOG VOLTAGE ALARM MONITORING POINT. THE SENSING DEVICE SHALL BE ADJUSTED TO ACTIVATE A LOW FUEL LEVEL ALARM WHEN THE TANK CONTAINS ONE EIGHTH (1/8) OF THE FULL VOLUME. THE SENSING DEVICE SHALL ALSO PROVIDE A VISUAL INDICATION (BAR GRAPH, METER READING, OTHER, ETC.) DEPICTING THE FUEL LEVEL AND SHALL PROVIDE AN ANALOG OUTPUT THAT PROVIDES A VOLTAGE LEVEL PROPORTIONAL TO THE FUEL LEVEL. AN SPD DEVICE SHALL BE INSTALLED ON THE FUEL SENSING PROBE CABLE AS IT ENTERS/EXITS THE EQUIPMENT BUILDING. THE SPD SHALL BE ADVANCED PROTECTION TECHNOLOGIES, MODEL D60 401 005 S, OR APPROVED EQUIVALENT.

FUELING REQUIREMENT

9. THE VENDOR SHALL FUEL THE TANK TO NO GREATER THAN 80% OF THE TANK'S RATED VOLUME. THE VENDOR SHALL RE-FUEL THE TANK TO NO GREATER THAN 80% OF THE TANK'S RATED VOLUME AFTER SUCCESSFUL COMPLETION OF THE 20-DAY PERFORMANCE PERIOD.

EMERGENCY GENERATOR POWER SYSTEM (CONT'D):

EMERGENCY GENERATOR TESTING

10. THE EMERGENCY GENERATOR SHALL BE INSPECTED FOR PROPER ELECTRICAL AND MECHANICAL/PHYSICAL INSTALLATION. THE VENDOR SHALL DEMONSTRATE THAT THE GENERATOR IS FUNCTIONING PROPERLY BY RUNNING THE GENERATOR FOR FOUR (4) CONTINUOUS HOURS UNDER FULL LOAD (100% RATING) CONDITIONS. THE VENDOR SHALL DEMONSTRATE THAT THE GENERATOR OPERATES AT THE PROPER VOLTAGE, CURRENT, AND FREQUENCY OUTPUT. THE VENDOR SHALL DEMONSTRATE THAT THE GENERATOR ALARMS OPERATE PROPERLY. IF THE TEST FAILS, THE VENDOR SHALL CORRECT THE PROBLEM AND REPEAT THE TEST.
11. THE VENDOR SHALL TEST THE GENERATOR AT 100% OF NAMEPLATE KVA TO VALIDATE THE GENERATOR'S CAPACITY. THE VENDOR SHALL PROVIDE THE NECESSARY LOAD BANK AND EQUIPMENT TO PERFORM THE LOAD TEST ON SITE.
12. THE VENDOR SHALL PROVIDE THE SERVICES OF A FACTORY-AUTHORIZED, FACTORY-TRAINED REPRESENTATIVE OF THE LPG ENGINE-GENERATOR SET MANUFACTURER TO INSPECT FIELD-ASSEMBLED COMPONENTS, EQUIPMENT INSTALLATION AND SUPERVISE THE FIELD TESTS. IF A COMPLETE AUXILIARY ELECTRICAL POWER SYSTEM IS INSTALLED, PRIOR TO THE FINAL INSPECTION, ALL COMPONENTS OF THE SYSTEM SHALL BE TESTED IN THE PRESENCE OF THE FDOT PROJECT MANAGER FOR PROPER OPERATION OF THE INDIVIDUAL COMPONENTS AND THE COMPLETE SYSTEM AND TO ELIMINATE ELECTRICAL AND MECHANICAL DEFECTS. THE VENDOR SHALL FURNISH FUEL, LUBRICATING OIL, ANTI-FREEZE LIQUID, WATER TREATMENT/RUST INHIBITOR AND A RESISTIVE LOAD BANK FOR TESTING OF THE LPG ENGINE-GENERATOR SET.
13. THE ENGINE-GENERATOR SET WILL BE TESTED FOR FOUR (4) HOURS OF CONTINUOUS OPERATION AS FOLLOWS:
 - (1) 100 PERCENT OF ITS SPECIFIED KILOWATT RATING FOR FOUR (4) HOURS OF OPERATION
 - (2) IF THE LPG ENGINE SHUTS DOWN, OR THE FULL KILOWATT RATING OF THE LOAD BANK IS NOT ACHIEVED DURING THE FOUR (4) HOURS OF OPERATION, THE TEST IS NULL AND VOID. THE TEST(S) SHALL BE REPEATED UNTIL SATISFACTORY RESULTS ARE OBTAINED.
 - (3) THE VENDOR OR VENDOR'S REPRESENTATIVE SHALL BEAR THE FULL COST OF REPEATING THESE TESTS IF NECESSARY TO OBTAIN SATISFACTORY RESULTS; INCLUDING THE COST OF ADDITIONAL MATERIAL AND MAN-HOURS.
14. THE FOLLOWING TEST DATA WILL BE RECORDED AT 30 MINUTE INTERVALS:

TIME OF DAY
 READING OF RUNNING TIME INDICATOR
 VOLTAGE ON EACH PHASE
 AMPERES ON EACH PHASE
 ENGINE RPM
 FREQUENCY
 ENGINE WATER TEMPERATURE
 FUEL PRESSURE
 OIL PRESSURE
 OUTDOOR TEMPERATURE
 AVERAGE AMBIENT TEMPERATURE IN THE VICINITY OF THE LPG ENGINE
 AVERAGE AMBIENT TEMPERATURE IN THE VICINITY OF THE STARTING BATTERIES

15. THE VENDOR SHALL DEMONSTRATE THAT THE ENGINE-GENERATOR SET WILL REACH PROPER VOLTAGE AND FREQUENCY, AND WILL ACCEPT 100 PERCENT BLOCK LOAD WITHIN 10 SECONDS OF A COLD START AFTER THE CLOSING OF A SINGLE CONTACT.
16. THE VENDOR SHALL DEMONSTRATE THAT THE BATTERIES AND CRANKING MOTOR ARE CAPABLE OF FIVE (5) STARTING ATTEMPTS. EACH ATTEMPT SHALL INCLUDE A 10-SECOND CRANKING INTERVAL, WITH A 10-SECOND INTERVAL BETWEEN STARTING ATTEMPTS. DURING THESE TESTS AND INTERVALS BETWEEN, THE BATTERY CHARGER SHALL BE TURNED OFF.
17. THE VENDOR SHALL TEST THE LOCAL AND REMOTE ANNUNCIATOR PANEL. THE VENDOR SHALL SIMULATE ENGINE FAILURES WHILE CHECKING FOR PROPER OPERATION OF EACH INDICATING LAMP, ALARM DEVICE AND RESET BUTTON.
18. AT THE COMPLETION OF THE FIELD TESTS, THE VENDOR SHALL FILL THE STORAGE TANK WITH FUEL OF GRADE AND QUALITY AS RECOMMENDED BY THE MANUFACTURER OF THE ENGINE. WHEN ANY DEFECTS ARE DETECTED DURING THE TESTS, THE VENDOR SHALL CORRECT DEFICIENCIES AND REPEAT THE FOUR HOUR CONTINUOUS TEST AS REQUESTED BY THE FDOT PROJECT MANAGER, AND DO SO AT NO ADDITIONAL COST TO THE FDOT. THE VENDOR SHALL PROVIDE TEST AND INSPECTION RESULTS IN WRITING TO THE FDOT PROJECT MANAGER WITHIN A TWO WEEK WORK PERIOD.

CONTRACT PLANS RECORD

DATE	REV.	DESCRIPTION	DATE	REV.	DESCRIPTION



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**STATE OF FLORIDA
 DEPARTMENT OF TRANSPORTATION**

SITE NAME	COUNTY	FINANCIAL PROJECT ID
D5 RTMC	SEMINOLE	424401-1-52-01

**EMERGENCY STANDBY
 GENERATOR**

SHEET NO.

A-14

-48VDC BATTERY PLANT REQUIREMENTS:

-48VDC BATTERY SYSTEM

1. THE VENDOR SHALL PROVIDE ALL NEW EQUIPMENT AND MATERIALS. ALL EQUIPMENT AND MATERIALS SHALL BE FREE OF CORROSION, SCRATCHES, BURRS, OR ANY OTHER SUCH DEFECTS. NO PART SHALL BE SUBSTITUTED OR APPLIED CONTRARY TO THE MANUFACTURER'S RECOMMENDATIONS AND STANDARD PRACTICES.
2. THE VENDOR SHALL FURNISH AND INSTALL A -48VDC BATTERY PLANT IN ACCORDANCE WITH THESE TECHNICAL SPECIFICATIONS AND MANUFACTURER SPECIFICATIONS. THE -48VDC BATTERY SHALL BE EXIDE ABSOLYTE GP MODEL 90G15.

THE BATTERY MODULES SHALL BE AT 100% FACTORY CELL FORMATION UPON INSTALLATION.

3. THE INSTALLATION SHALL INCLUDE ALL ASSOCIATED MOUNTING, CONDUIT, CABLING, AND GROUNDING MATERIALS AS SPECIFIED IN THE MANUFACTURERS' RECOMMENDED INSTALLATION PROCEDURES AND IN ACCORDANCE WITH THIS TECHNICAL SPECIFICATION. THE BATTERY MODULES SHALL BE INSTALLED ON A LOAD SPREADING PLATE. ALL TERMINALS AND STRAPPING SHALL BE CLEANED. THE TERMINAL AND STRAPPING ENDS SHALL BE DIPPED IN MELTED NO-OX GREASE AND INSTALLED PER MANUFACTURER'S INSTRUCTIONS.
4. THE VENDOR SHALL USE 2/0 AWG STRANDED RED JACKETED CABLE FOR THE NEGATIVE CONNECTION, AND 2/0 AWG STRANDED BLACK JACKETED CABLE FOR THE RETURN. THE VENDOR SHALL USE #6 AWG GREEN JACKETED CABLE FOR GROUNDING, AND SHALL BOND AND GROUND THE BATTERY PLANT IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.
5. THE VENDOR SHALL PERFORM A BATTERY CAPACITY TEST IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS, AND THE LATEST REVISION OF IEEE STD 1188 – IEEE RECOMMENDED PRACTICE FOR MAINTENANCE, TESTING, AND REPLACEMENT OF VALVE-REGULATED LEAD-ACID (VRLA) BATTERIES FOR STATIONARY APPLICATIONS.

DC POWER RECTIFIERS

6. THE VENDOR SHALL FURNISH AND INSTALL A ELTEK TRILOGY WITH SMARTPACK2 CONTROLLER -48DC POWER SYSTEM FOR A 19-INCH RACK, MODEL FP216 PWRCR -48250 3 DA32.
7. THE DC POWER RECTIFIER AND BATTERY PLANT POSITIVE RETURN SHALL BE BONDED TO THE SHELTER'S INTERIOR GROUNDING SYSTEM WITH 2/0 AWG STRANDED BLACK JACKETED CABLE
8. THE -48VDC BATTERY RECTIFIER SYSTEM SHALL CONSIST OF THE FOLLOWING ITEMS:
 - (1) SMARTPACK2 CONTROLLER
 - (4) FLATPACK2 HE RECTIFIER 48VDC/3KW
 - (2) MANUFACTURER'S RECOMMENDED BREAKER SIZE FOR MAIN DISTRIBUTION PANEL. A SINGLE BREAKER WILL SUPPLY POWER TO TWO RECTIFIERS
 - (1) LOW VOLTAGE BATTERY DISCONNECT (LVBD) AND LOW VOLTAGE LOAD DISCONNECT (LVLD)
 - (15) SINGLE POLE, 30A BULLET BREAKER FOR THE LOAD DISTRIBUTION
 - (4) SINGLE POLE, 20A BULLET BREAKER FOR THE LOAD DISTRIBUTION (TO BE INSTALLED TO THE EXTREME RIGHT OF THE DISTRIBUTION TO BE USED FOR OTHERS)
 - (1) SINGLE POLE, 15A BULLET BREAKER FOR THE LOAD DISTRIBUTION (TO BE USED FOR LED TOWER LIGHTING SYSTEM)
 - (*) ANY NECESSARY CABLING AND MOUNTING HARDWARE
9. THE VENDOR SHALL SET THE FLOAT VOLTAGE, EQUALIZE VOLTAGE, LVBD, AND LVLD APPROPRIATELY IN ACCORDANCE WITH THE BATTERY MANUFACTURER'S RECOMMENDATIONS.

BATTERY MANAGEMENT SYSTEM

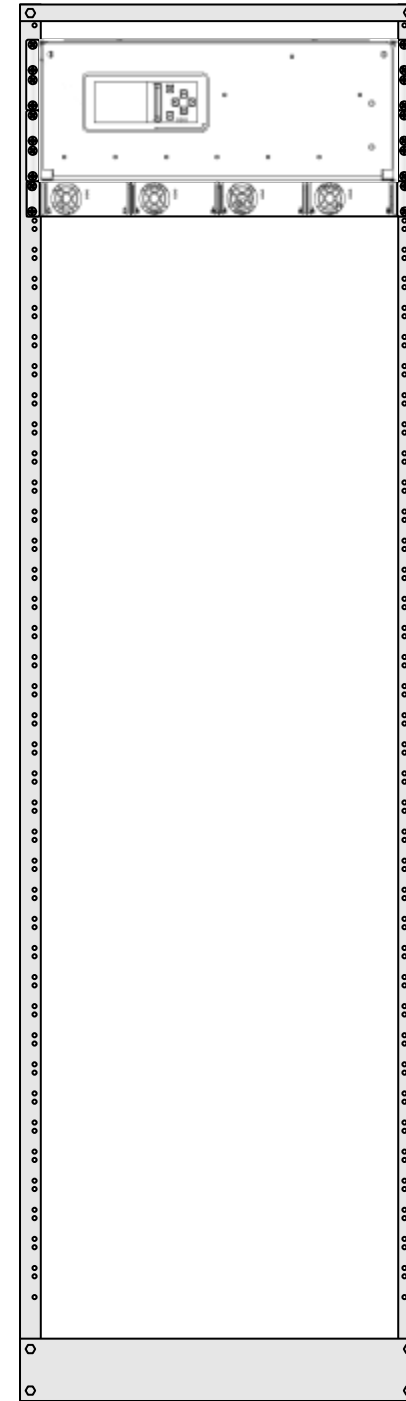
10. THE VENDOR SHALL FURNISH AND INSTALL BATTERY MANAGEMENT SYSTEMS WITH MONITORING DEVICES ON EACH CELL OF THE NEW BATTERY PLANT INSTALLATIONS IN ACCORDANCE WITH MANUFACTURER'S PROCEDURES.

THE BATTERY MANAGEMENT SYSTEM SHALL BE:

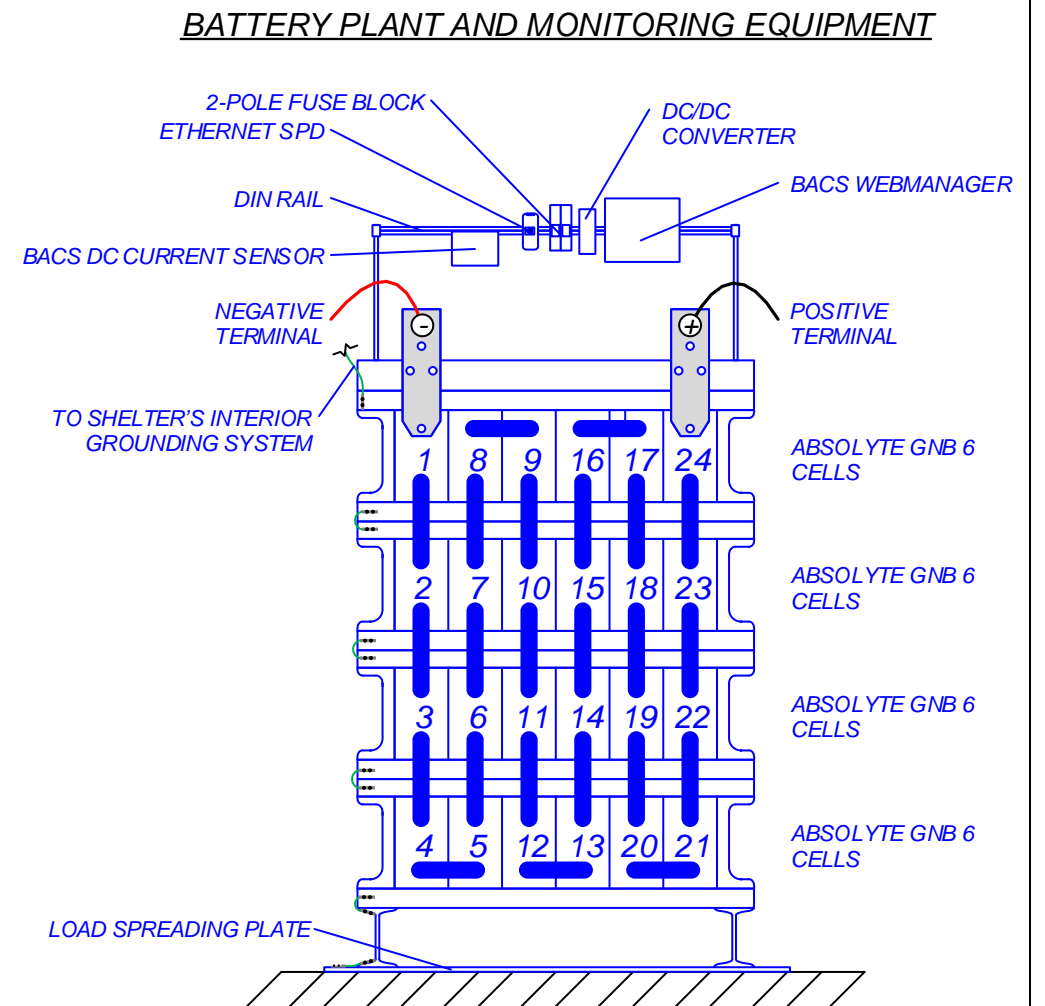
 - (1) GENEREX BACS WEBMANAGER BUDGET 18V-72V EQUIPPED WITH TRACOPower DC/DC CONVERTER, MODEL BACSKB4_72
 - (1) BACS WEBMANAGER MOUNTING KIT, MODEL BACS_MNT_II
 - (24) BACS C40 MODULES, MODEL BACSC40
 - (24) BACS DOUBLE RING MEASURING CABLES, MODEL BC4B-XXXXX
 - (1) BACS DC CURRENT SENSOR 500, MODEL BACS_CS500
 - (*) BUS CABLES IN ASSORTED LENGTHS, MODEL B4BCRJX. QUANTITY AS NEEDED FOR PROPER INSTALLATION
 - (1) 2-POLE FUSE BLOCK LITTELFUSE POWER-SAFE LPSM CH SERIES MIDGET FUSE HOLDER MODEL LPSM002
 - (2) 5A FUSES FOR THE 2-POLE FUSE BLOCK, VENDOR SPECIFY
 - (2) ATLANTIC SCIENTIFIC ETHERNET SPD, MODEL ZB24540
 - (1) APPROPRIATELY SIZED DIN RAIL
11. THE VENDOR SHALL HAVE FACTORY TRAINING AND CERTIFICATION FOR THE INSTALLATION AND MAINTENANCE OF THE GENEREX BATTERY MONITORS.
12. THE VENDOR SHALL CONFIGURE THE BACS WEBMANAGER IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. THE NETWORK CONFIGURATIONS WILL BE PROVIDED BY THE FDOT TO THE AWARDED VENDOR.

-48VDC BATTERY SYSTEM COVER AND CABLE MANAGEMENT

13. THE VENDOR SHALL FURNISH AND INSTALL A NEW COVER FOR THE -48 VDC BATTERY SYSTEM THAT WILL FULLY ENCLOSE AND PROTECT THE BATTERY SYSTEM, BATTERY MONITORING DEVICES, AND ASSOCIATED CABLING. THE VENDOR SHALL FURNISH AND INSTALL A CABLE MANAGEMENT SYSTEM THAT KEEPS ALL MONITORS AND ASSOCIATED CABLED ORGANIZED AND OFF THE FLOOR. THE VENDOR SHALL PREPARE AND SUBMIT A DETAILED DESIGN DRAWING TO THE FDOT PROJECT MANAGER FOR REVIEW AND APPROVAL PRIOR TO ANY SITE WORK.



-48VDC DISTRIBUTION RACK



CONTRACT PLANS RECORD					
DATE	REV.	DESCRIPTION	DATE	REV.	DESCRIPTION



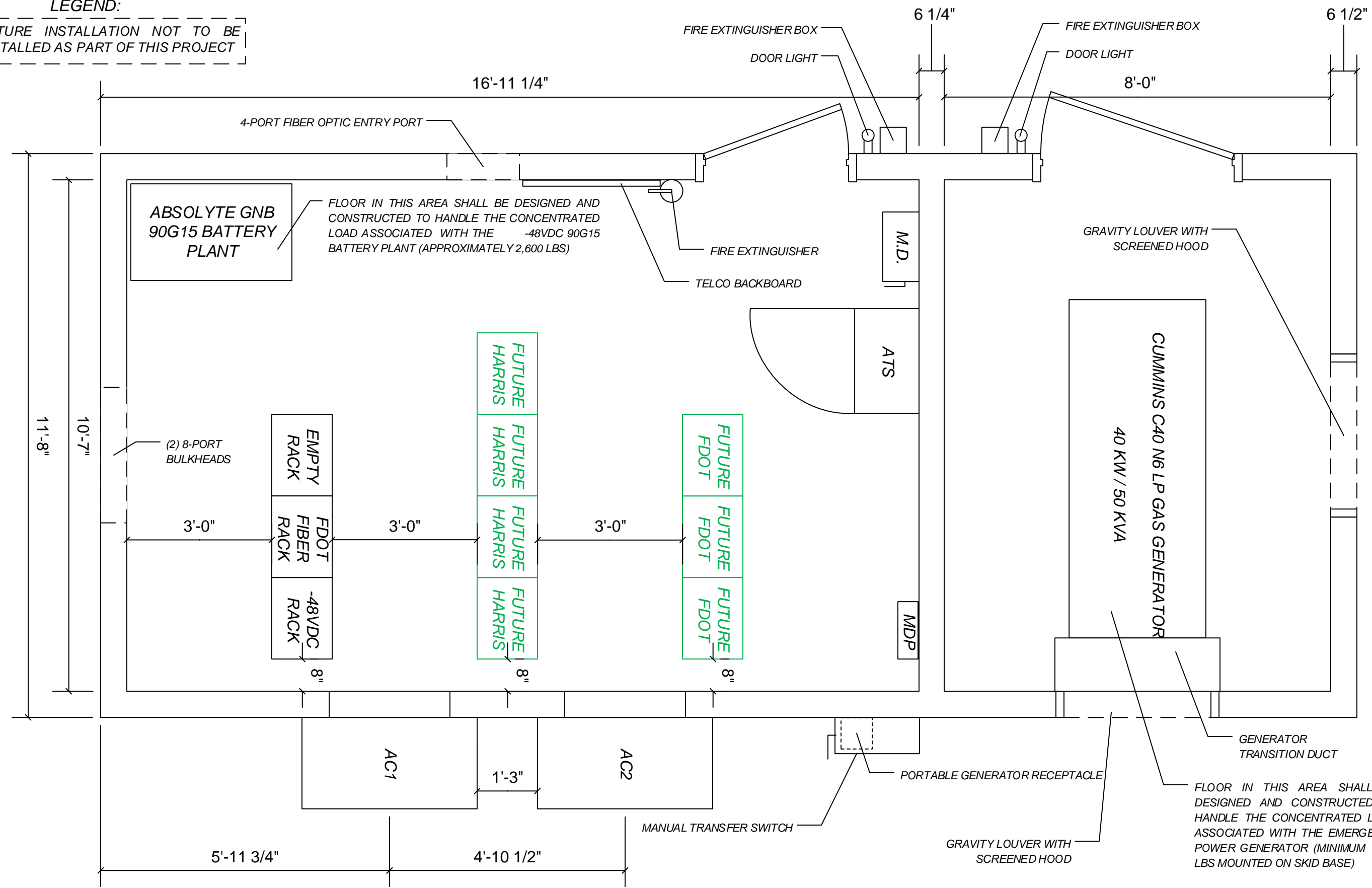
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STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION		
SITE NAME	COUNTY	FINANCIAL PROJECT ID
D5 RTMC	SEMINOLE	424401-1-52-01

<i>-48VDC POWER REQUIREMENTS</i>		SHEET NO.
<i>A-15</i>		A-15

LEGEND:

— FUTURE INSTALLATION NOT TO BE INSTALLED AS PART OF THIS PROJECT



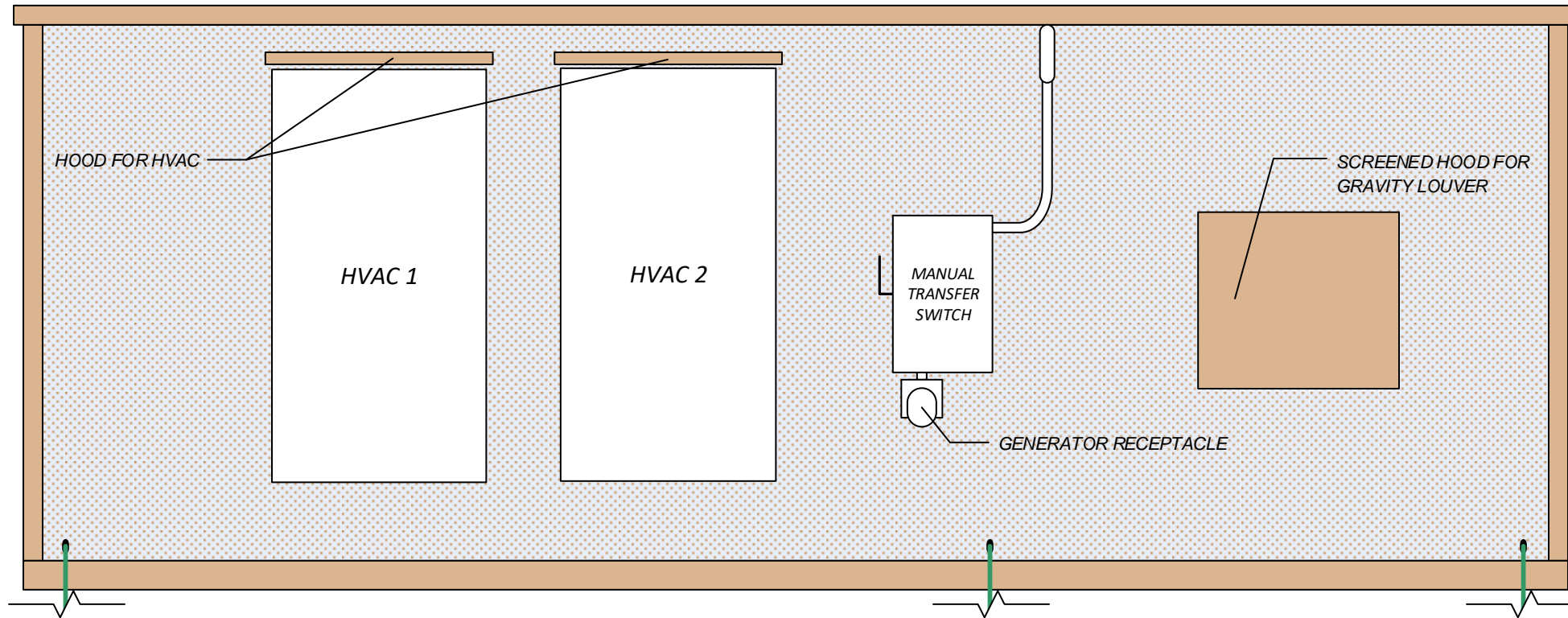
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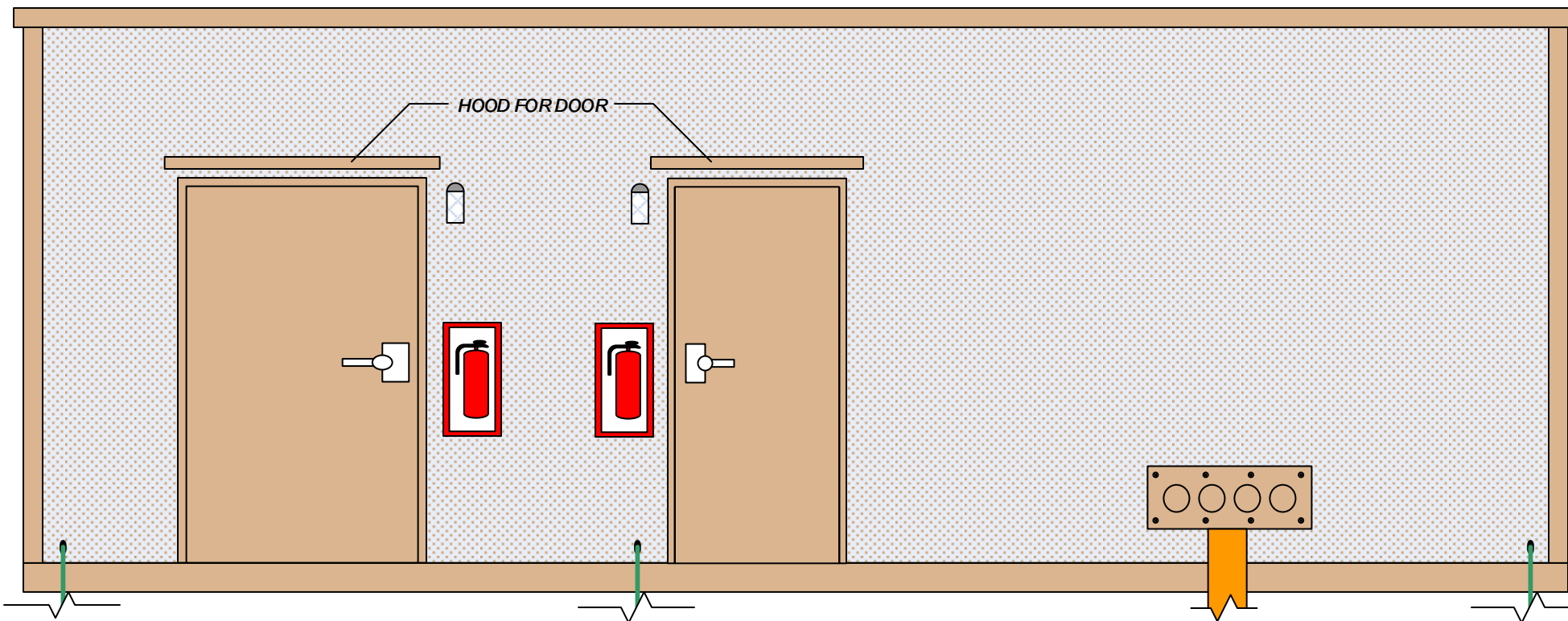
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION		
SITE NAME	COUNTY	FINANCIAL PROJECT ID
D5 RTMC	SEMINOLE	424401-1-52-01

<i>SHELTER FLOOR PLAN</i>	SHEET NO. A-16
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EXTERIOR EAST WALL



EXTERIOR WEST WALL

CONTRACT PLANS RECORD					
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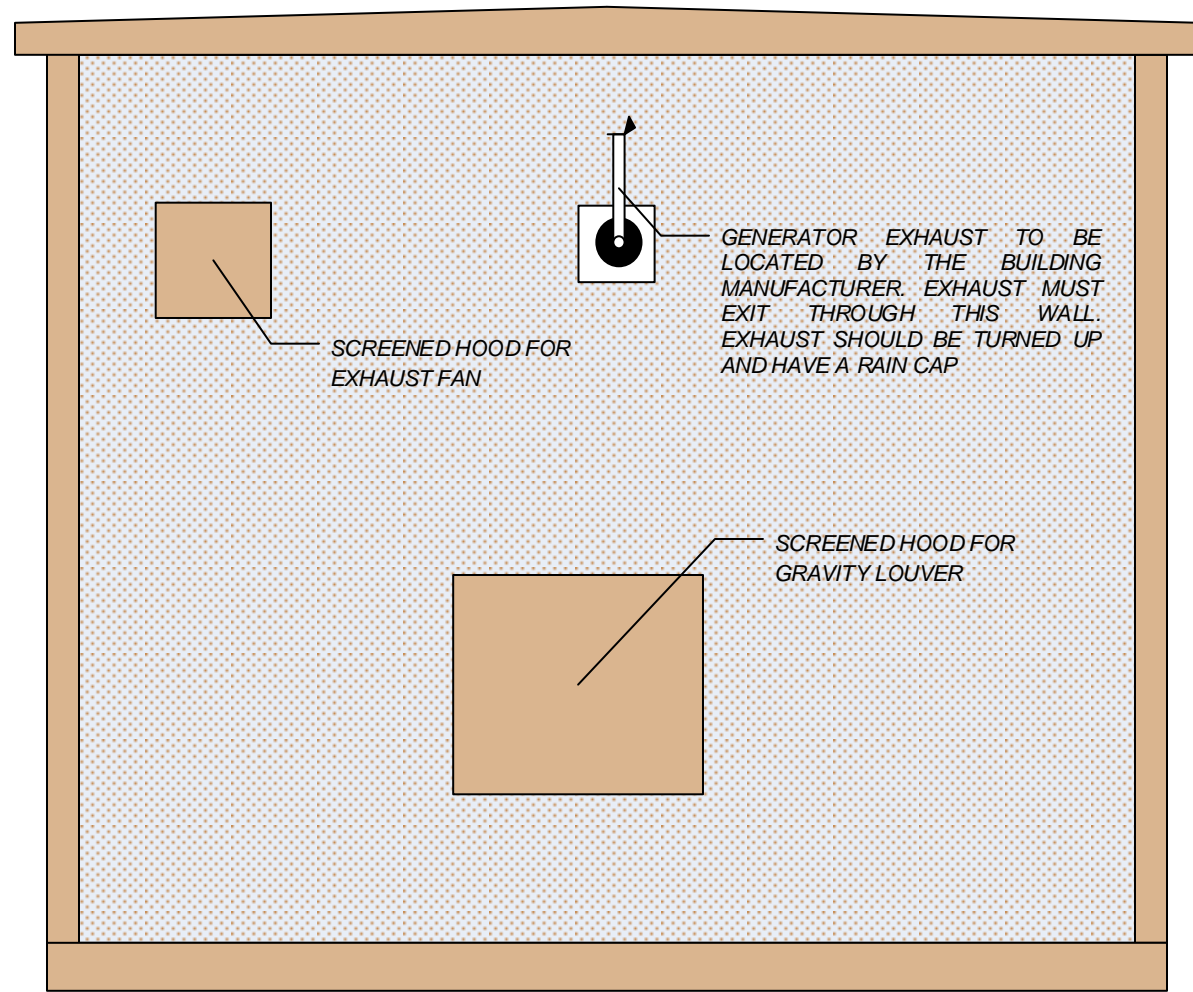


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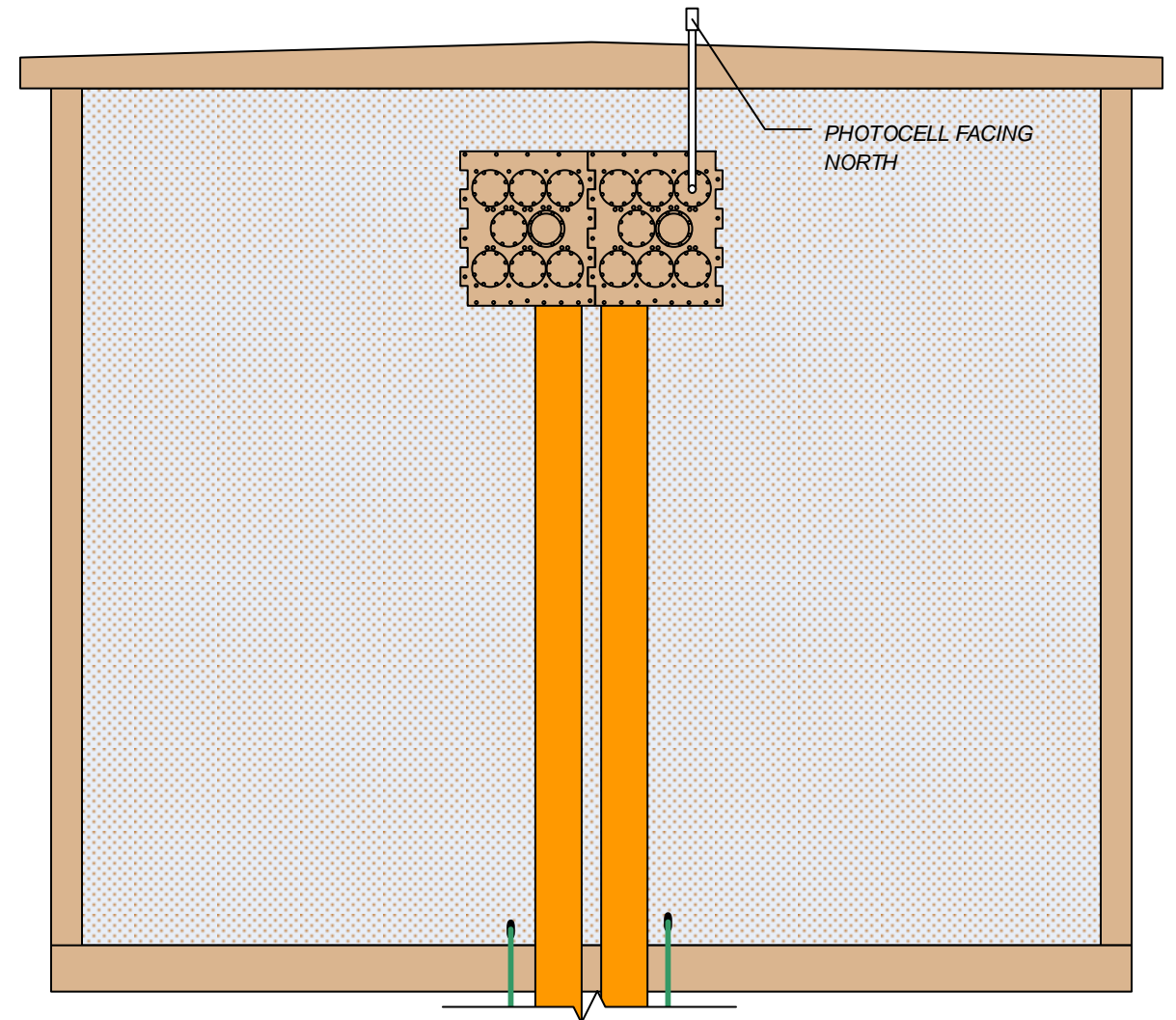
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION		
SITE NAME	COUNTY	FINANCIAL PROJECT ID
D5 RTMC	SEMINOLE	424401-1-52-01

*SHELTER EXTERIOR
 EAST & WEST WALL*

SHEET NO.
 A-17



EXTERIOR NORTH WALL



EXTERIOR SOUTH WALL

CONTRACT PLANS RECORD

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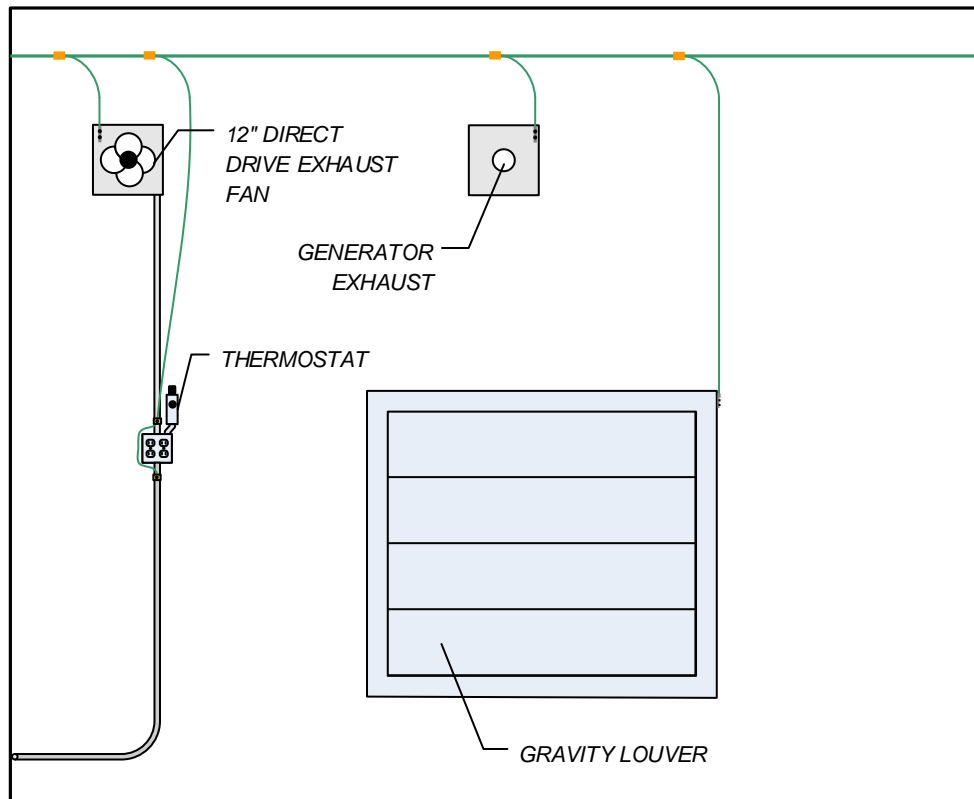
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

SITE NAME	COUNTY	FINANCIAL PROJECT ID
D5 RTMC	SEMINOLE	424401-1-52-01

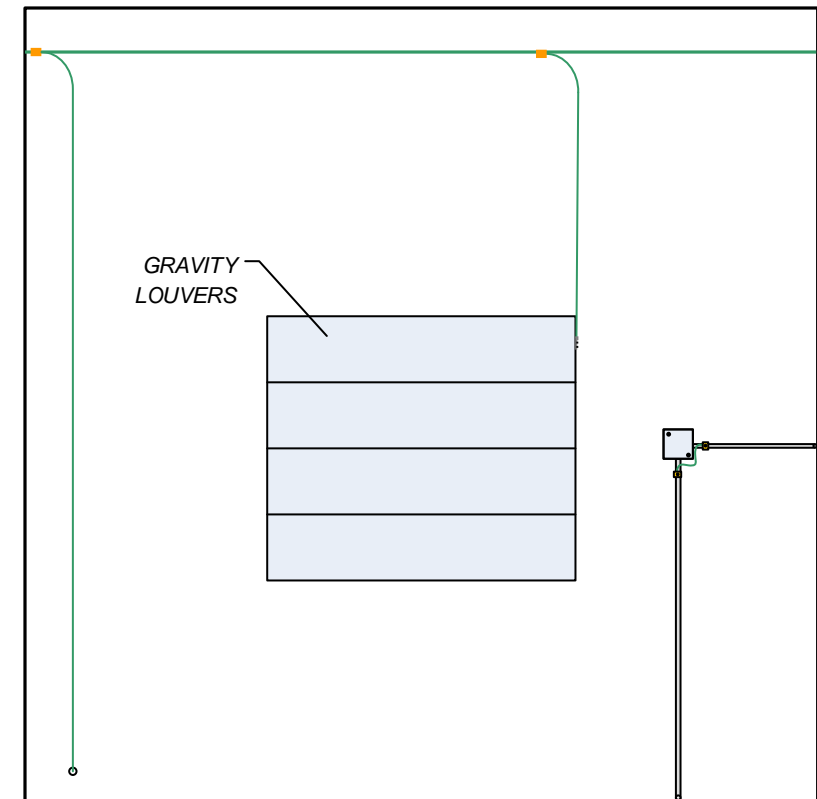
SHELTER EXTERIOR
NORTH & SOUTH WALL

SHEET NO.

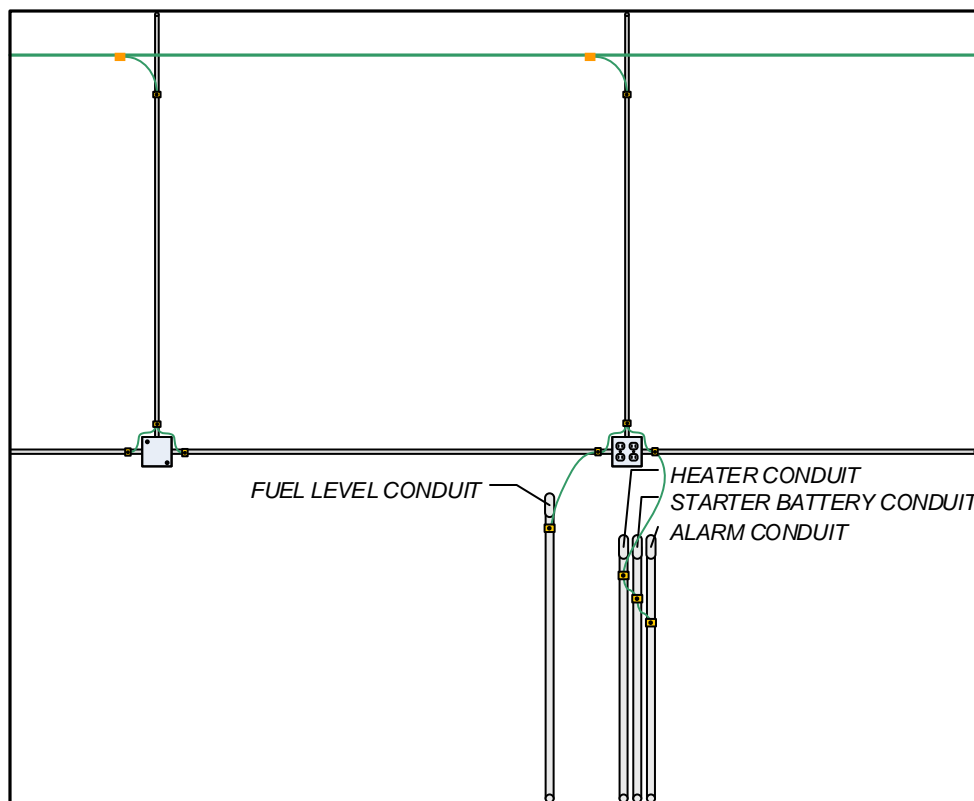
A-18



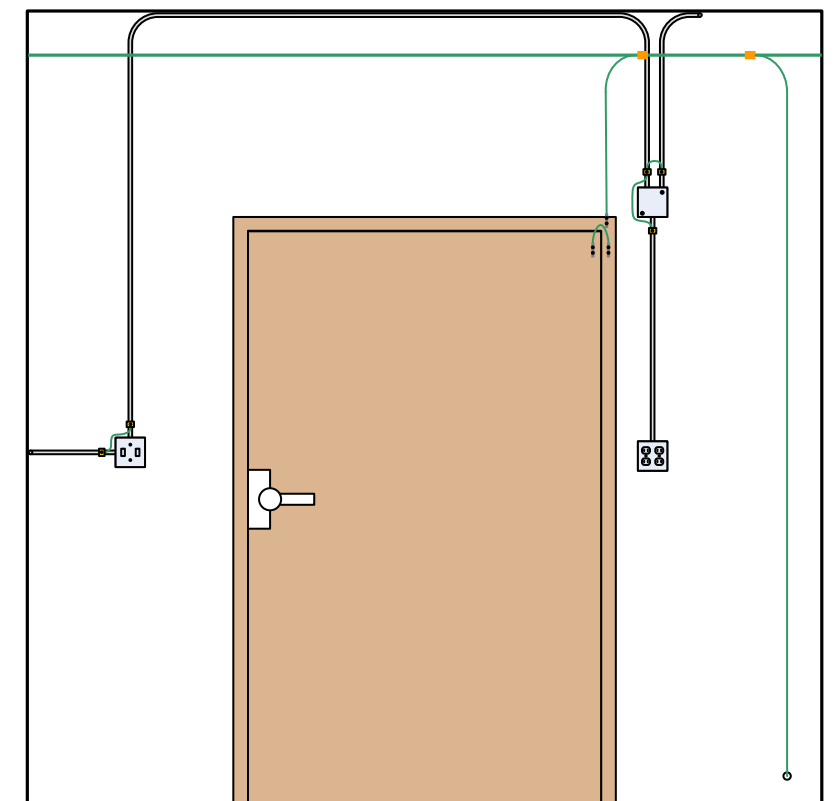
GENERATOR ROOM INTERIOR NORTH WALL



GENERATOR ROOM INTERIOR EAST WALL



GENERATOR ROOM INTERIOR SOUTH WALL



GENERATOR ROOM INTERIOR WEST WALL

CONTRACT PLANS RECORD					
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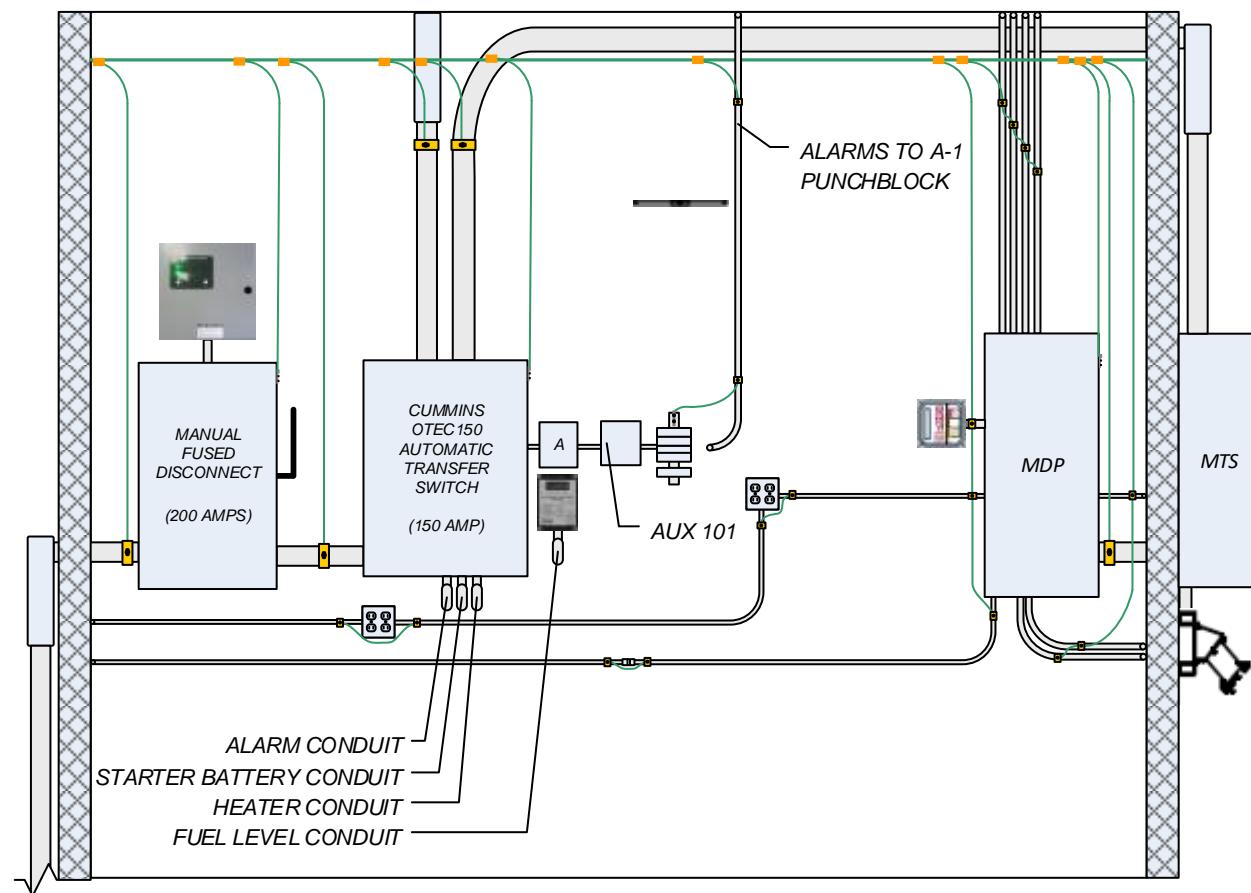


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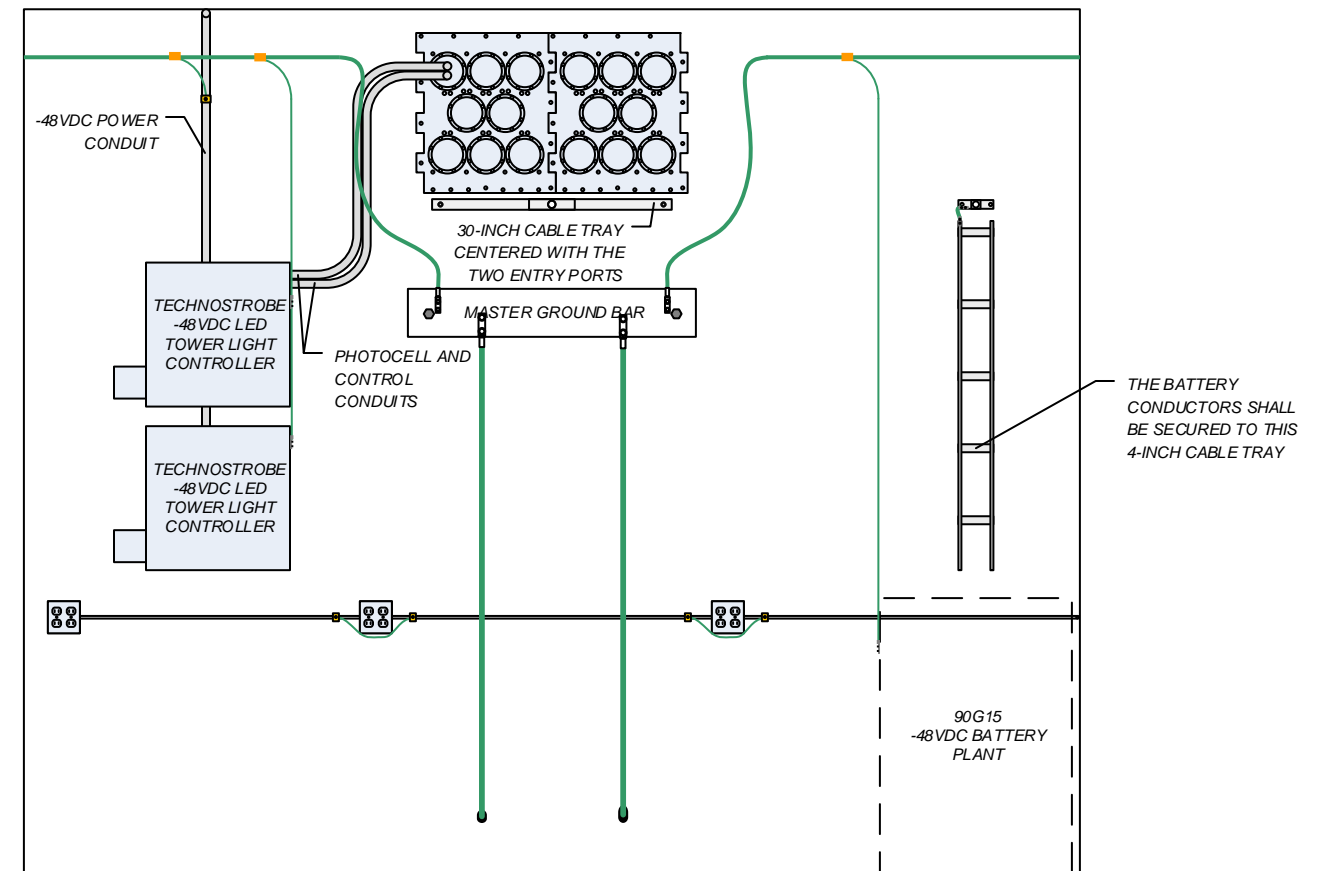
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SITE NAME	COUNTY	FINANCIAL PROJECT ID
D5 RTMC	SEMINOLE	424401-1-52-01

*GENERATOR ROOM
INTERIOR WALLS*

SHEET NO.
A-19



EQUIPMENT ROOM INTERIOR NORTH WALL



EQUIPMENT ROOM INTERIOR SOUTH WALL

P	A	N	I
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SURGE PRODUCERS	SURGE ABSORBERS	NON IGZ	ISOLATED GROUND ZONES (IGZ)
<ul style="list-style-type: none"> RF SPD TEL. SPD CABLE SHIELDS ESD GENERATOR FRAME 	<ul style="list-style-type: none"> AC NG BOND BUILDING STEEL WATER LINE METALIC PIPING CONCRETE ENCASED ELECTRODE GROUND RINGS 	<ul style="list-style-type: none"> -48VDC GND. 24VDC GND. CABLE TRAY EQUIP. FRAME BATTERY RACK ANCILLARY EQUIP. 	<ul style="list-style-type: none"> LOGIC GROUND IGZ ZONES

NOTES:

THE MASTER GROUND BAR (MGB) SHALL BE AT LEAST 30-INCHES WIDE AND BE EQUIPPED WITH TWO HOLE LUG CONNECTIONS.

THE "P" SECTION OF THE BAR IS RESERVED FOR LOADS THAT COULD BE SURGE PRODUCERS.

THE "A" SECTION OF THE BAR IS RESERVED FOR AVAILABLE GROUNDING ELECTRODE SYSTEMS THAT ARE SURGE ABSORBERS. THIS SECTION IS STRATEGICALLY LOCATED NEXT TO THE SURGE PRODUCER SECTION IN ORDER TO EXPEDITE THE CONDUCTION OF UNWANTED ENERGY TO EARTH.

THE "N" SECTION OF THE BAR IS RESERVED FOR LOADS THAT ARE NEITHER SURGE PRODUCERS NOR ABSORBERS, TYPICALLY REFERRED TO AS THE NON-ISOLATED GROUND ZONE (NON-IGZ) SECTION.

THE "I" SECTION, KNOWN AS THE ISOLATED GROUND ZONE (IGZ) SECTION, IS RESERVED FOR SENSITIVE LOADS THAT REQUIRE GROUND ISOLATION FROM THE REMAINING GROUNDING SYSTEMS OF THE FACILITY.

CONTRACT PLANS RECORD

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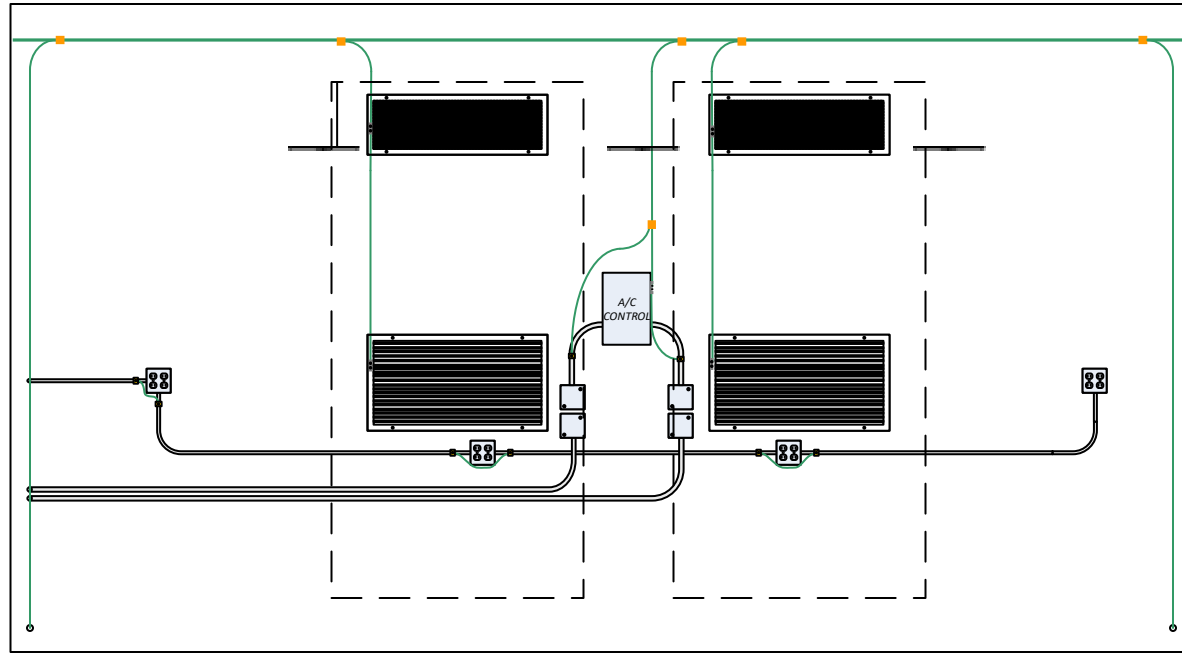
STATE OF FLORIDA
 DEPARTMENT OF TRANSPORTATION

SITE NAME	COUNTY	FINANCIAL PROJECT ID
D5 RTMC	SEMINOLE	424401-1-52-01

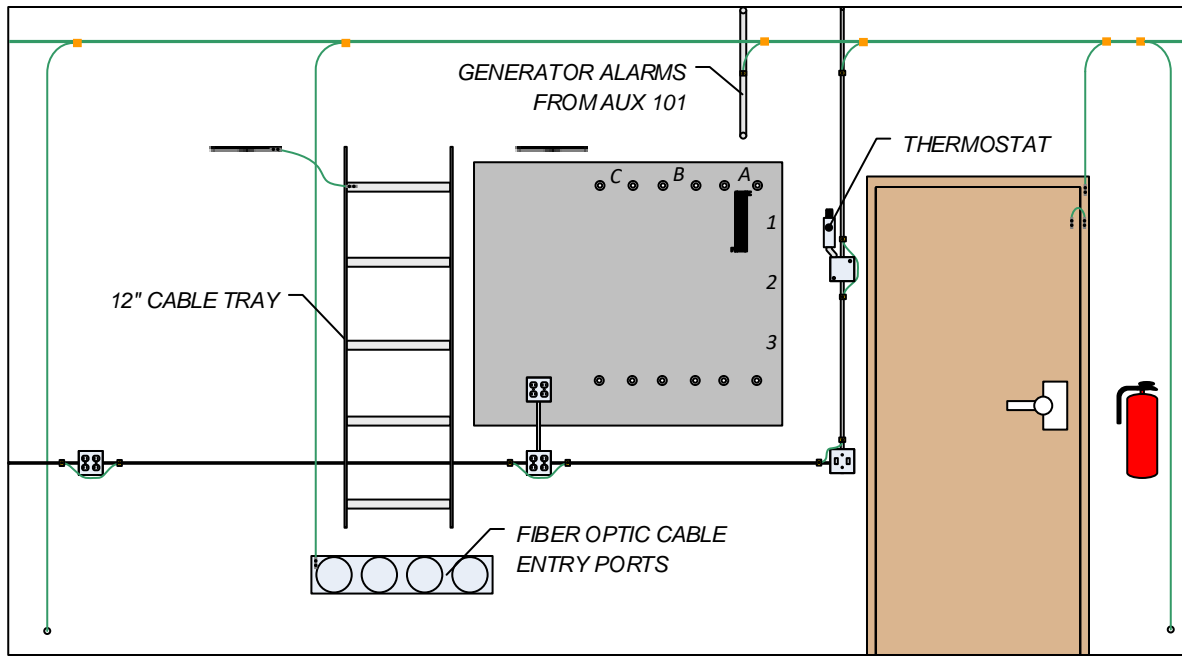
EQUIPMENT ROOM INTERIOR
 NORTH & SOUTH WALL

SHEET NO.

A-20



EQUIPMENT ROOM INTERIOR EAST WALL



EQUIPMENT ROOM INTERIOR WEST WALL

NOTES:

- 1. THE TYPE 66 PUNCHBLOCK SHALL BE SIEMON 157A OR APPROVED EQUIVALENT

D5 RTMC Housekeeping Block A-1

Pair	Point	Alarm	Connection
1	1	DOOR (Equipment Room)	T
	2		R
2	3	DOOR (Generator Room)	T
	4		R
3	5	HIGH TEMP	T
	6		R
4	7	LOW TEMP	T
	8		R
5	9	SMOKE DETECTOR	T
	10		R
6	11	HEAT DETECTOR	T
	12		R
7	13	SURGE ARRESTOR SPD PRIMARY	T
	14		R
8	15	SURGE ARRESTOR SPD SECONDARY	T
	16		R
9	17	HVAC #1 FAIL	T
	18		R
10	19	HVAC #2 FAIL	T
	20		R
11	21	MAIN FUSE	T
	22		R
12	23	BLANK	
	24		
13	25	ANALOG BATT. VOLTAGE	+
	26		-
14	27	REMOTE GENERATOR START	T
	28		R
15	29	GENERATOR RUNNING	T
	30		R
16	31	POWER FAIL	T
	32		R
17	33	CONTROL SWITCH NOT IN AUTO	T
	34		R
18	35	BATT CHARGER ALARM	T
	36		R
19	37	HIGH BATT	T
	38		R
20	39	LOW BATT	T
	40		R
21	41	LOW OIL PRESSURE	T
	42		R
22	43	HIGH COOLANT TEMP	T
	44		R
23	45	OVERSPEED	T
	46		R
24	47	LOW ENGINE TEMP	T
	48		R
25	49	OVERCRANK	T
	50		R

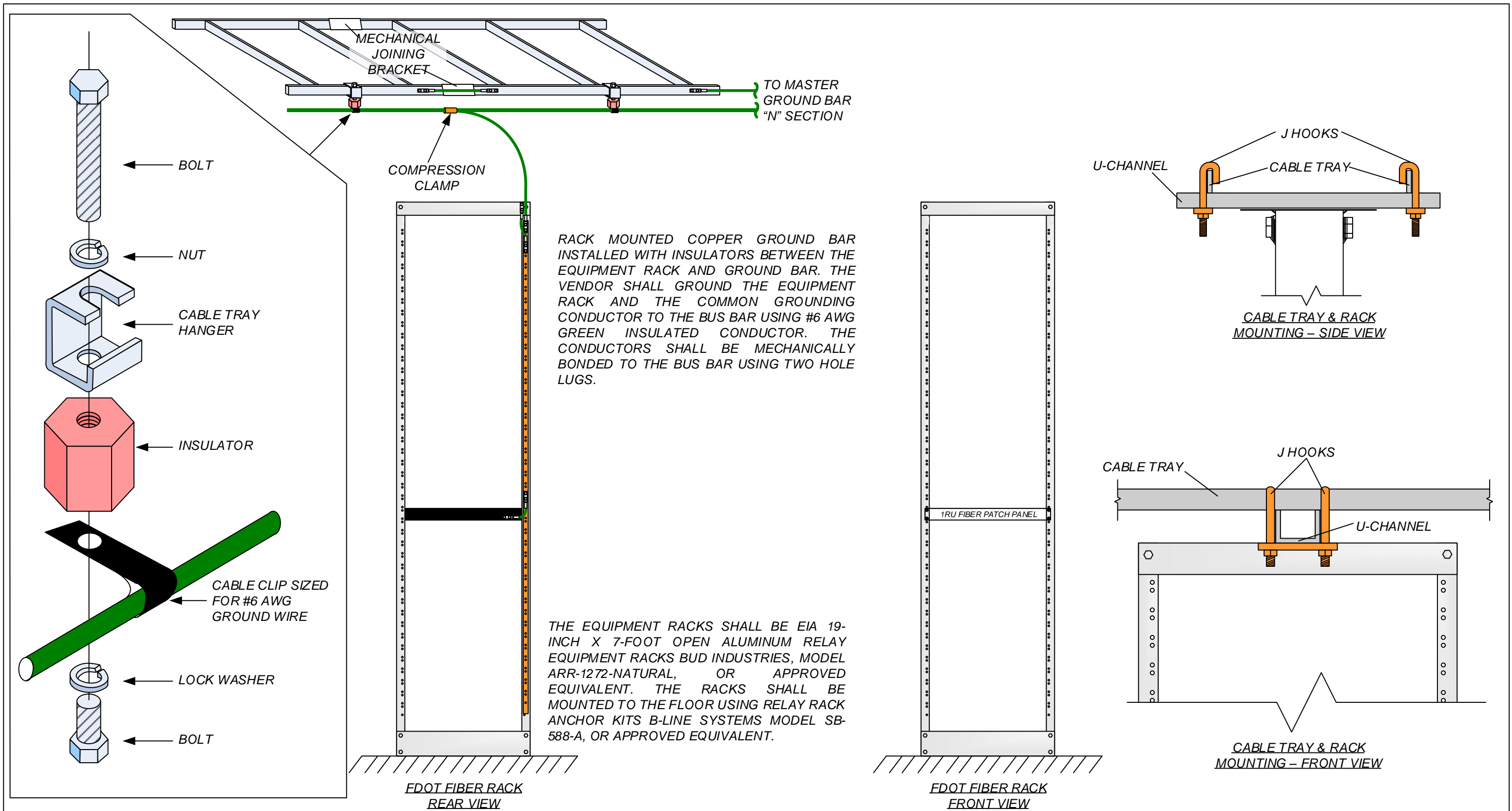
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**EQUIPMENT ROOM INTERIOR
EAST & WEST WALL**

SHEET NO.
A-21



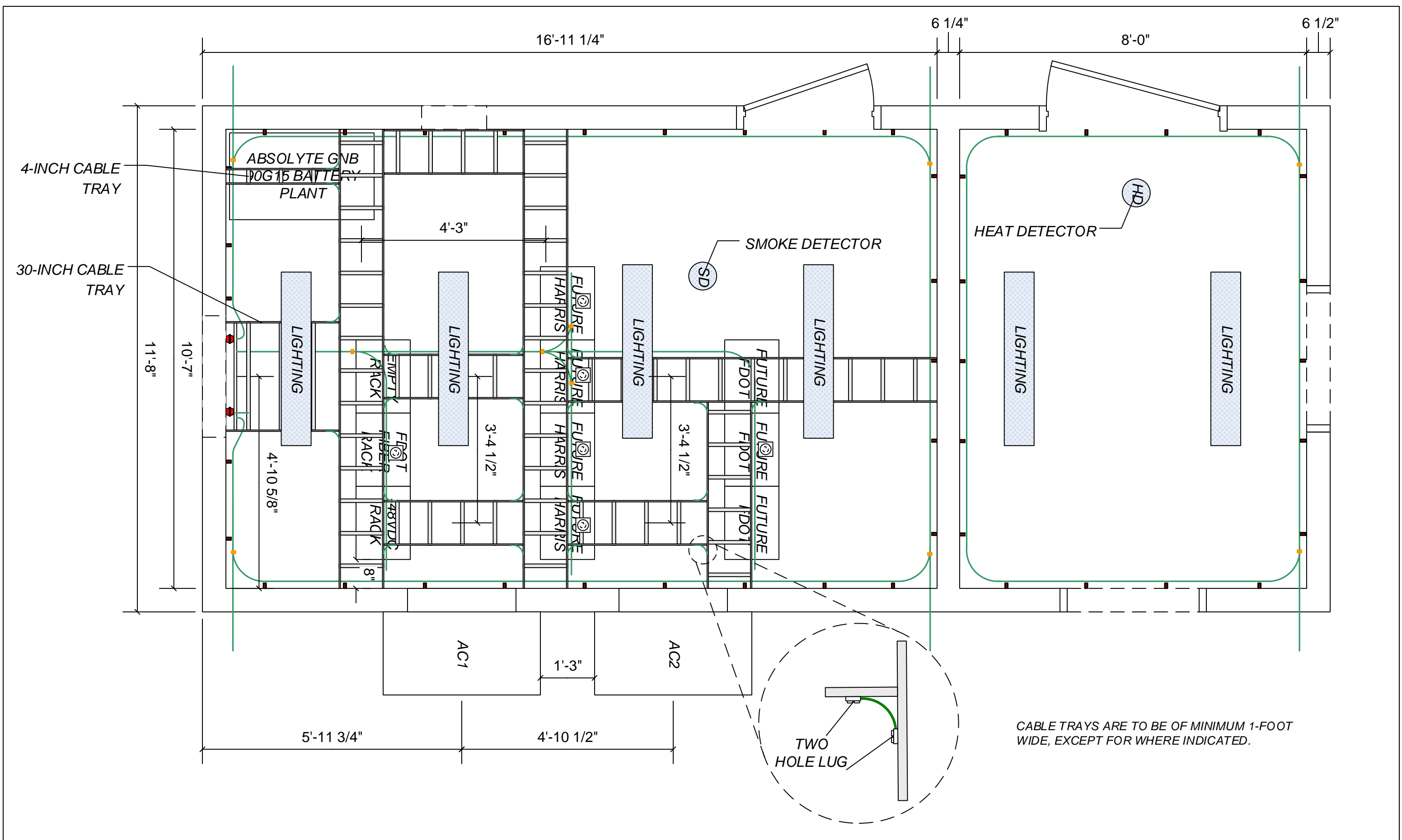
CONTRACT PLANS RECORD					
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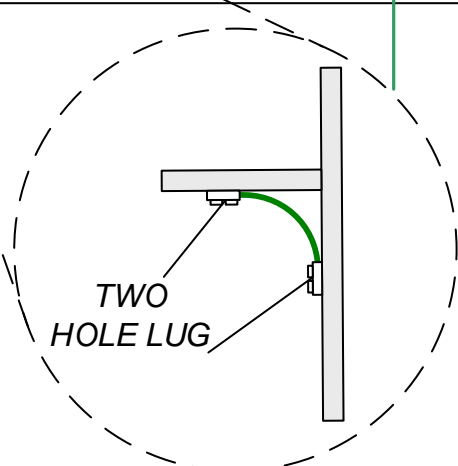
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION		
SITE NAME	COUNTY	FINANCIAL PROJECT ID
D5 RTMC	SEMINOLE	424401-1-52-01

CABLE TRAY GROUNDING DETAIL		SHEET NO.
		A-22

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CABLE TRAYS ARE TO BE OF MINIMUM 1-FOOT WIDE, EXCEPT FOR WHERE INDICATED.



CONTRACT PLANS RECORD					
DATE	REV.	DESCRIPTION	DATE	REV.	DESCRIPTION

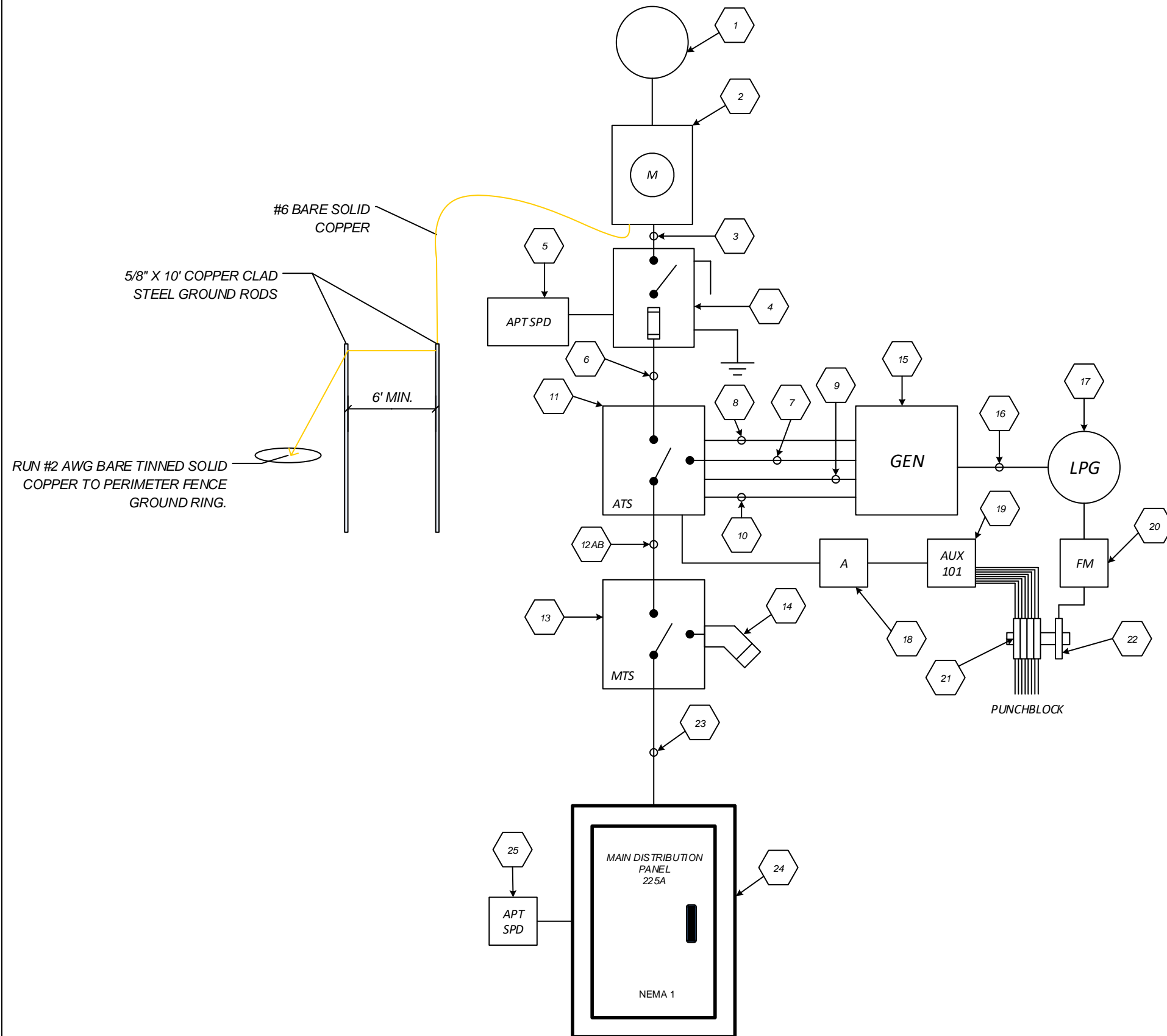
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CABLE TRAY CEILING PLAN

SHEET NO.
A-23

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INSTALLATION PLAN:

1. INCOMING POWER CONDUIT
2. POWER METER
3. 120/240V SINGLE PHASE CONDUCTORS IN ACCORDANCE WITH THE NEC IN APPROPRIATELY SIZED GALVANIZED RIGID STEEL (GRC) CONDUIT TO MAIN SERVICE DISCONNECT
4. 200A, MAIN DISCONNECT
5. ADVANCED PROTECTION TECHNOLOGIES (APT), MODEL TE01XAS30E1-0W2
6. 120/240V SINGLE PHASE CONDUCTORS IN ACCORDANCE WITH THE NEC IN APPROPRIATELY SIZED ELECTRICAL METALLIC TUBING (EMT) CONDUIT TO AUTOMATIC TRANSFER SWITCH
7. 120/240V SINGLE PHASE CONDUCTORS IN ACCORDANCE WITH THE NEC IN APPROPRIATELY SIZED EMT CONDUIT FROM 40KW GENERATOR WITHIN GENERATOR ROOM TO ATS WITHIN EQUIPMENT ROOM
8. APPROPRIATELY SIZED EMT CONDIT FOR HEATER
9. APPROPRIATELY SIZED EMT CONDIT FOR STARTER BATTERY CHARGER
10. APPROPRIATELY SIZED EMT CONDIT FOR ALARMS
11. CUMMINS AUTOMATIC TRANSFER SWITCH (ATS) MODEL OTEC 150AMP, 3P NEMA 1 ENCLOSURE
12. 120/240V SINGLE PHASE CONDUCTORS IN ACCORDANCE WITH THE NEC IN APPROPRIATELY SIZED EMT CONDUIT TO DUAL INPUT MANUAL TRANSFER SWITCH
- A. LINE SIDE
B. LOAD SIDE
13. 240VAC, 2-POLE, 200A, NON FUSIBLE, DUAL INPUT MANUAL TRANSFER SWITCH, NEMA 3R
14. APPLETON 4 WIRE, 4-POLE, 200A GENERATOR RECEPTACLE
15. CUMMINS 40KW 240V, SINGLE PHASE LPG STANDBY EMERGENCY GENERATOR
16. LPG FUEL LINE
17. 2000 GALLON BELOW GROUND LIQUID PROPANE GAS TANK
18. ANNUNCIATOR
19. I/O EXPANSION, MODEL AUX 101
20. FUEL LEVEL MONITOR SQUIBB TAYLOR, MODEL STM94442A
21. (4) APT SPD, MODEL D60 401 060 S MOUNTED ON DIN RAIL
22. APT SPD, MODEL D60 401 005 S MOUNTED ON DIN RAIL
23. 120/240V SINGLE PHASE CONDUCTORS IN ACCORDANCE WITH THE NEC IN APPROPRIATELY SIZED ELECTRICAL METALLIC TUBING (EMT) CONDUIT TO MAIN DISTRIBUTION PANEL
24. MAIN DISTRIBUTION PANEL, 225A LUGGED 120/240VAC SINGLE PHASE 32 POSITIONS
25. APT SPD, MODEL TE01XDS204XA-W2

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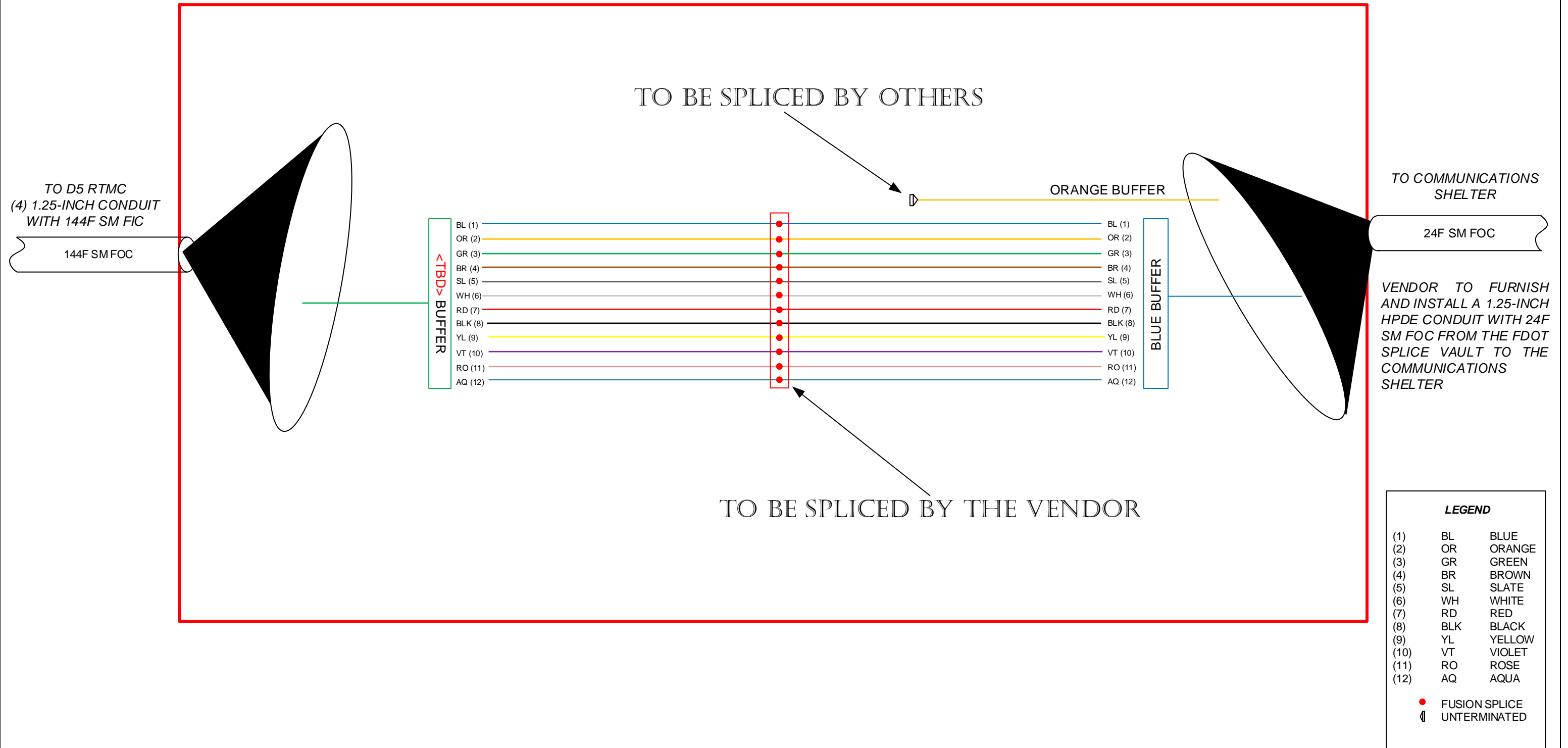
SITE NAME	COUNTY	FINANCIAL PROJECT ID
D5 RTMC	SEMINOLE	424401-1-52-01

*ELECTRICAL RISER
 DIAGRAM*

SHEET NO.

A-24

FDOT SPLICE VAULT



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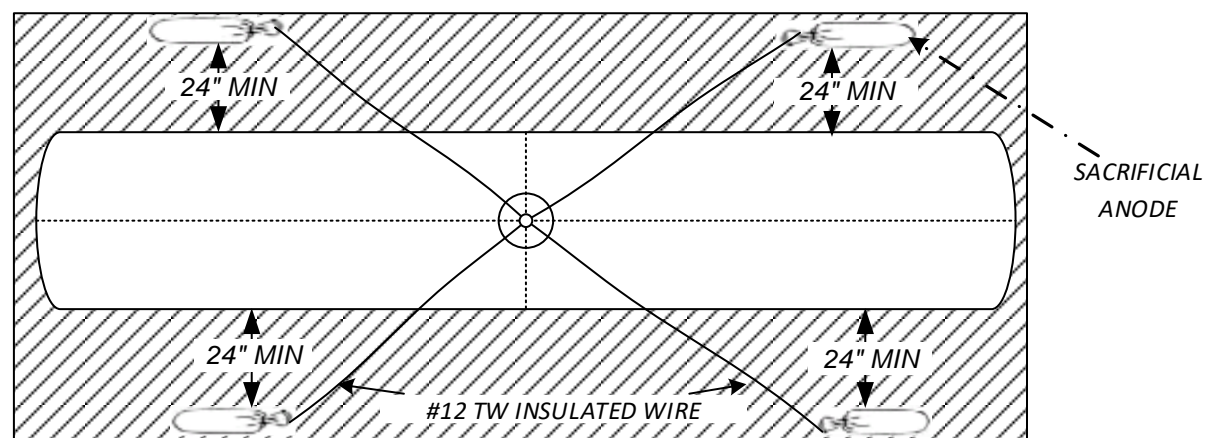
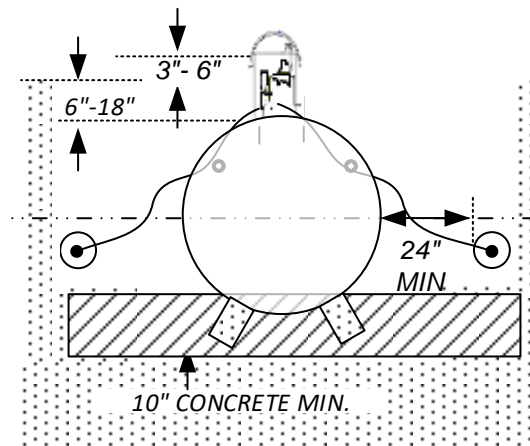
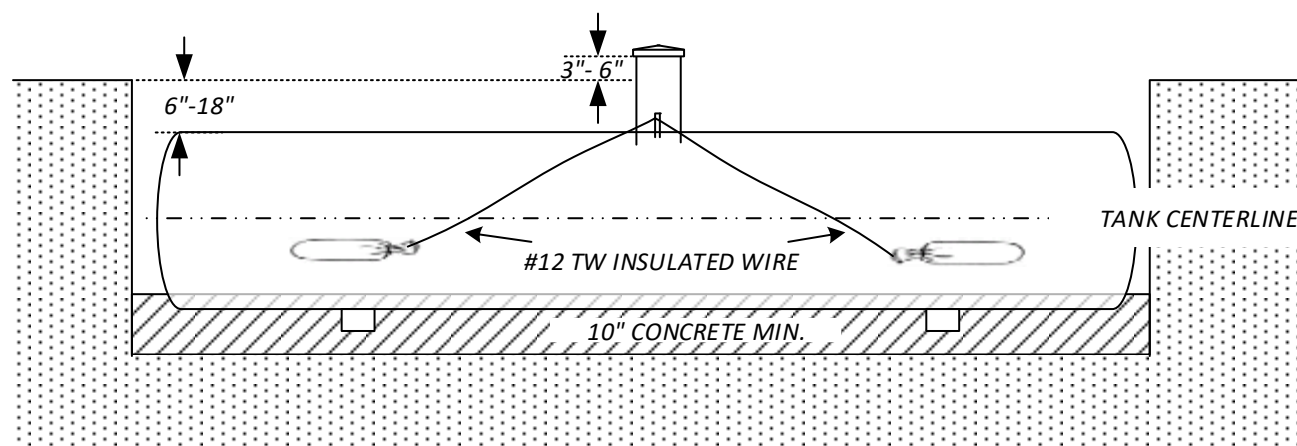


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SITE NAME	COUNTY	FINANCIAL PROJECT ID
D5 RTMC	SEMINOLE	424401-1-52-01

*FDOT SPLICE BOX
DETAIL*


SHEET NO.
A-25



NOT TO SCALE

NOTES:

1. 2000 GALLON LPG FUEL STORAGE TANK DESIGNED AND APPROVED BY THE MANUFACTURER FOR DIRECT BURIAL, FACTORY COATED WITH AN EPOXY COATING WITH ATTACHMENT STUD FOR SACRIFICIAL ANODE LEADS.
2. CATHODIC PROTECTION - INSTALL FOUR 17 LB. ANODES, 24" MINIMUM HORIZONTAL SEPARATION FROM THE TANK AND VERTICALLY BELOW THE CENTERLINE OF THE TANK. CONNECT ANODE LEADS (#12 TW INSULATED WIRE) TO ATTACHMENT STUD NEAR FUEL FILL NOZZLE.
3. CONCRETE WILL BE POURED INTO THE HOLE TO A DEPTH OF AT LEAST 10 INCHES. BEFORE THE CONCRETE CURES THE TANK WILL BE LOWERED INTO THE FRESH CONCRETE AND REMAIN IN PLACE SUCH THAT THE CONCRETE CURES AROUND THE LEGS OF THE TANK.
4. MINIMUM DISTANCE BETWEEN TANK AND BUILDING WALLS PER NFPA 58, FOR AN UNDERGROUND TANK IS 10 FEET SEPARATION.

CONTRACT PLANS RECORD						 FLORIDA DEPARTMENT OF TRANSPORTATION 605 SUWANNEE ST. MS 90 TALLAHASSEE, FL 32399-0450 PH. (850)-410-5600 FAX. (850)-410-5501	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			UNDERGROUND LP TANK DETAIL	SHEET NO.
DATE	REV.	DESCRIPTION	DATE	REV.	DESCRIPTION		SITE NAME	COUNTY	FINANCIAL PROJECT ID		A-26
						D5 RTMC	SEMINOLE	424401-1-52-01			

Geotechnical Engineering Report

**Regional Transportation Management
Center Tower and Support Structures**

Seminole County, Florida

FDOT FIN: 437100-1-52-01

-for-

Contract No. C-9V35

TWO No. 1.11

February 1, 2018

Project No. H1175277 Task 11

Prepared for:

Florida Department of Transportation
District 5 Materials and Research Office
Deland, Florida

Prepared by:

Terracon Consultants, Inc.
Winter Park, Florida

February 1, 2018

Florida Department of Transportation
1650 N. Kepler Road
Mail Station 519
Deland, Florida 32724

Attn: Mr. Eric W. Nagowski, E.I.
P: [386] 740 3498
E: Eric.Nagowski@dot.state.fl.us

Re: Subsurface Exploration and Geotechnical Engineering Evaluation
**Regional Transportation Management
Center Tower and Support Structures
FDOT FIN: 437100-1-52-01
-FOR-
Contract No. C-9V35
TWO No. 1.11
Seminole County, Florida
Terracon Project Number: H1175277 Task 11**

Dear Mr. Nagowski:


Terracon Consultants, Inc. (Terracon) is pleased to present this report of our subsurface exploration and geotechnical engineering evaluation for the above-referenced project. This report presents the results of our field exploration, laboratory testing and recommendations for the proposed tower and support structure improvements in Seminole County, Florida.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report, or if we may be of further service, please contact us.

Sincerely,

TERRACON CONSULTANTS, INC.
Certificate of Authorization No. 8830

Eric A. McAra, P.E.
Project Engineer
FL Registration No. 69841


Douglas W. Baker, P.E.
Senior Associate
FL Registration No. 48943



Terracon Consultants, Inc. 1675 Lee Road Winter Park, Florida 32789
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Environmental



Facilities



Geotechnical



Materials

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APPENDIX A – FIELD EXPLORATION

Exhibit A-1	Vicinity Map
Exhibit A-2	Soils Map
Exhibit A-3	Boring Location Plan and Boring Profiles
Exhibit A-4	Soil Survey Description
Exhibit A-5	Field Exploration Description

APPENDIX B – LABORATORY TESTING RESULTS

Exhibit B-1	Corrosion Series Testing Results
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**SUBSURFACE EXPLORATION AND
 GEOTECHNICAL ENGINEERING EVALUATION
 REGIONAL TRANSPORTATION MANAGEMENT CENTER (RTMC)
 TOWER AND SUPPORTING STRUCTURES
 FDOT FIN: 437100-1-52-01
 SEMINOLE COUNTY, FLORIDA
 TERRACON PROJECT NO. H11575277 TASK 11
 February 1, 2018**

1.0 INTRODUCTION

The proposed improvements consist of a new tower with supporting structures for the generator pad and a fuel storage tank in Seminole County, Florida. A vicinity map showing the proposed alignment is presented on the attached Exhibit A-1 in Appendix A. Based on information provided, it is our understanding the tower is anticipated to be support on drilled shaft foundations and the structures will be shallow foundations. At this time, the location of the fuel tank is being considered to also be shallow foundation but could alternatively be buried to a depth up to 12 feet.

Boring locations are referenced by latitude and longitude coordinate system.

2.0 PROJECT INFORMATION

2.1 Project Description

Item	Description
Site Layout	See Appendix, Exhibit A-3.
Tower	Anticipated to be supported by deep foundations such as drilled shafts.
Support Structures	The support structure is anticipated to be slab on grade and will house the back-up generator. The fuel tank will either be buried or slab on grade.

2.2 Site Location and Description

Item	Description
Location	The project site is located along the westbound I-4 (State Road 400) Right-of-Way south of the State Road 46 interchange and north of the State Road 417 interchange in Seminole County, Florida.
Current Ground Cover	Grassed.

Subsurface Exploration and Geotechnical Engineering Evaluation

RTMC Tower and Supporting Structures ■ Seminole County, Florida

February 1, 2018 ■ Project No. H1175277 Task 11

Item	Description
Existing Topography	Review of the USGS topographic quadrangle map “Sanford, Florida” show that the natural ground surface elevation for the area is about +70 feet, referencing the National Geodetic Vertical Datum of 1929 (NGVD29).
Potentiometric Surface	Based on review of the St. Johns River Water Management District (SJRWMD) potentiometric maps of the upper Floridan Aquifer for the project area, the estimated elevation of the artesian head is near +25 feet, NGVD. Based on these maps, results of the boring, and the proposed construction, artesian conditions are not anticipated to be a concern for this project.

3.0 SUBSURFACE CONDITIONS

3.1 Soil Survey

The Soil Survey of Seminole County, Florida as prepared by the United States Department of Agriculture (USDA), the Natural Resource Conservation Service - NRCS, shown on Exhibit A-2, identifies one soil type at the subject site. It should be noted that the Soil Survey is not intended as a substitute for site-specific geotechnical exploration; rather, it is a useful tool in planning a project scope in that it provides information on soil types likely to be encountered. Boundaries between adjacent soil types on the Soil Survey maps should be considered approximate. Descriptions of the mapped soil units are included on Exhibit A-4 in Appendix A.

3.2 Fieldwork Program

Field exploration performed for the tower consisted of one Standard Penetration Test (SPT) boring performed to a depth of 91 feet. Sampling was performed on 2.5-foot centers.

Field exploration performed for the supporting structures consisted of one SPT boring performed to a depth of 20 feet. Sampling was performed on 2.5-foot centers.

Boring locations were provided by Florida Department of Transportation D-5 Materials Office. The approximate location for each boring is shown on Exhibit A-3 in Appendix A. The borings were located in the field by the use of a handheld GPS unit and the coordinates are provided adjacent to the boring profiles.

Descriptions of our field exploration are included as Exhibit A-5 in Appendix A.

4.0 GENERAL SUBSURFACE CONDITIONS

Based on the results of the borings, subsurface conditions for the project site generally consisted of loose to medium dense fine sand (SP), fine sands with silt (SP-SM) and silty fine sands (SM) from the existing ground surface to a depth of about 70 feet. These soils were underlain by medium dense clayey fine sands with cemented sands (SC) and very dense cemented silty fine sands with phosphates (SM) to the maximum boring termination depth of 91 feet.

Isolated layers of very loose silty fine sand (SM) were noted in Boring B-1 from 25 to 35 feet. Another exception to this generalized profile is in boring B-1 between the depths of 21 to 23 feet where firm sandy clay to clay (CH) was encountered.

Conditions encountered at the boring location are indicated on the individual boring log. Stratification boundaries on the boring log represent the approximate location of changes in soil types; in-situ, the transition between materials may be gradual. Details of the boring can be found on the boring log in Appendix A of this report.

4.1 Groundwater

The borehole was observed during drilling for the presence and level of groundwater. Groundwater was observed at a depth of about 5 feet below grade at the time of drilling (January 2018). Longer term monitoring in cased holes or piezometers, possibly installed to greater depths than explored under this project scope, would be required to better define groundwater conditions at the site.

It should be recognized that fluctuations of the groundwater table will occur due to seasonal variations in the amount of rainfall, runoff and other factors not evident at the time the boring was performed. In addition, perched water can develop within higher permeability soils overlying less permeable soils. Therefore, groundwater level during construction or at other times in the future may be higher or lower than the level indicated on the boring log.

We estimate that during the normal wet season with rainfall and recharge at a maximum, the groundwater level is estimated to be at a depth of about 0.5 feet below the existing grade. The normal seasonal high groundwater level is shown adjacent to the boring profile on Exhibit A-3 in Appendix A. Our estimate of the seasonal groundwater conditions are based on the USDA Soil Survey, available survey data, the encountered soil types, recent weather conditions, and the observed water level.

Subsurface Exploration and Geotechnical Engineering Evaluation

RTMC Tower and Supporting Structures ■ Seminole County, Florida

February 1, 2018 ■ Project No. H1175277 Task 11

Seasonal water table estimates do not represent the temporary rise in water table that occurs immediately following a storm event, including adjacent to other storm water management facilities. This is different from static groundwater level in wet ponds and/or drainage canals which can affect the design water levels of new, nearby ponds. The seasonal high water table may vary from normal when affected by extreme weather changes, localized or regional flooding, karst activity, future grading, drainage improvements, or other construction that may occur on or around the site following the date of this report.

5.0 LABORATORY TESTING

The soil samples retrieved from the boring locations were transported to our laboratory for visual examination and selective soil testing. Laboratory testing included single sieve grain size analyses, moisture content, and Atterberg Limits testing on samples of various soil types encountered. The results of these tests are presented adjacent to the boring profiles on Exhibit A-3 in Appendix A. Testing was performed in general accordance with appropriate Florida methods.

5.1 Environmental Classification

Two corrosion series test were performed on soils obtained from the borings. These results indicate that the substructure environment classifies as extremely aggressive (pH = 5.9) for selection of an appropriate class of steel and moderately aggressive for concrete, in accordance with the Florida Department of Transportation (FDOT) standards. The environmental classifications are based on the Structures Design Guidelines. The corrosion series test results are summarized in Exhibit B-1.

6.0 RECOMMENDATIONS FOR DESIGN AND CONSTRUCTION

6.1 Geotechnical Considerations

Materials that were encountered during exploration generally consisted of loose to medium dense fine sand (SP), fine sands with silt (SP-SM) and silty fine sands (SM) from the existing ground surface to a depth of about 70 feet followed by medium dense clayey fine sands with cemented sands (SC) and very dense cemented silty fine sands with phosphates (SM) to the maximum boring termination depth of 91 feet. Sands encountered within the borings are generally suitable for use as back fill following the recommendations of this report. The general guidelines included in this report are not intended to supersede any more stringent requirements mandated by FDOT specifications.

Subsurface Exploration and Geotechnical Engineering Evaluation

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6.2 Tower Structure

As previously mentioned, it is our understanding that a new tower with a drilled shaft foundation system is anticipated. One SPT boring, sampled on 2.5-foot intervals, was performed to a depth of 91 feet at the foundation location.

Based on the results of our exploration and our understanding of the project, it appears that the soil and groundwater conditions are suitable for construction of the proposed tower utilizing the desired drilled shaft foundations. Site grades should consider groundwater levels temporarily perching on the low permeability soils encountered at depth of about 2 feet. The following table presents soil design parameters which should be used in designing the tower location:

Groundwater = 0.5 feet

Depth From / To (ft)	Soil Type	Equivalent N ₆₀	Effective Unit Weight (pcf)	Ultimate Unit Skin Friction (psf)
0 – 0.5	Sand	4	100	60
0.5 - 21	Sand	7	43	500
21 – 23	Clay	6	53	700
23 – 41	Silty Sand	4	38	900
41 – 49	Sand	18	48	1,200
49 – 56	Sand	6	43	1,000
56 – 63	Sand	25	53	1,300
63 – 68	Sand	45	58	1,600
68 – 71	Clayey Sand	11	48	1,200
71 - 90	Silty Sand	>50	58	1,800

6.3 Support Structures

6.3.1 Site Preparation

Prior to placing any fill, all vegetation, topsoil, and any otherwise unsuitable material should be removed from the construction areas. Wet or dry material should either be removed or moisture conditioned and re-compacted. After stripping and grubbing and achieving cut grades, the exposed surface should be compacted to a depth of at least 1 foot. Unstable soil (pumping) should be removed or moisture conditioned and compacted in place prior to placing fill. Selection of compaction equipment should consider nearby structures as well as any excavation the compaction equipment may be operating inside.

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If construction is to proceed without dewatering, the time between installing the below grade tank and connecting piping to the below grade tank should be maximized, allowing time for as much settlement as possible to occur prior to connecting piping.

6.3.2 Material Requirements

Compacted structural fill should meet the following material property requirements:

Fill Type ^{1,2}	USCS Classification	Acceptable Location for Placement
General	SP (fines content < 5%)	All locations and elevations
	SP-SM (fines content between 5 and 12%)	All locations and elevations. Strict moisture control will be required during placement, particularly during the rainy season.

1. Controlled, compacted fill should consist of approved materials that are free of organic matter and debris.
2. Compaction should be in accordance with FDOT Specifications.

In general, the near surface soils encountered in the borings appear suitable for use in grading purposes, site leveling, general engineering fill, structural fill and backfill. All fill should be evaluated and placed in accordance with FDOT Specifications.

6.3.3 Earthwork Considerations

After initial proofrolling and compaction, unstable subgrade conditions could develop during general construction operations, particularly if the soils are wetted and/or subjected to repetitive construction traffic. Upon completion of filling and grading, care should be taken to maintain the subgrade moisture content prior to construction of floor slabs and pavements. Construction traffic over the completed subgrade should be avoided to the extent practical. The site should also be graded to prevent ponding of surface water on the prepared subgrades or in excavations. If the subgrade should become desiccated, saturated, or disturbed, the affected material should be removed or these materials should be scarified, moisture conditioned, and re-compacted prior to floor slab and pavement construction.

Trees or other vegetation whose root systems have the ability to remove excessive moisture from the subgrade and foundation soils should not be planted next to the structure.

6.3.4 Foundations

In our opinion, the proposed foundation for the support structure can be supported as a slab-on-grade bearing on native soil or newly placed fill extending to native soil. Design recommendations for the foundation are presented in the following sections.

Subsurface Exploration and Geotechnical Engineering Evaluation

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6.3.5 Foundation Design Recommendations

Description	Column Footing	Wall Footing	Monolithic Slab Foundation
Net allowable bearing pressure ¹	2,500 psf	2,500 psf	2,500 psf
Minimum width	30 inches	18 inches	12 inches
Minimum embedment below finished grade ²	24 inches	18 inches	12 inches
Compaction requirements	In accordance with FDOT Specifications		
Approximate total settlement ³	<1 inch	<1 inch	<1 inch
Estimated differential settlement ³	<½ inch between columns	<½ inch over 40 feet	<½ inch over 40 feet

1. The recommended net allowable bearing pressure is the pressure in excess of the minimum surrounding overburden pressure at the footing base elevation. Assumes any unsuitable fill or soft soils, if encountered, will be undercut and replaced with engineered fill.
2. For erosion protection and to reduce effects of seasonal moisture variations in subgrade soils.
3. The foundation settlement will depend upon the variations within the subsurface soil profile, the structural loading conditions, the embedment depth of the footings, the thickness of compacted fill, and the quality of the earthwork operations. The above settlement estimates have assumed that the maximum footing width is 7.5 feet for column footings and 1.5 feet for continuous footings.

6.3.6 Foundation Considerations

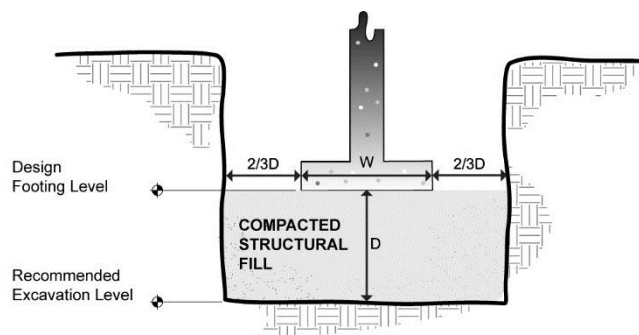
The base of all foundation excavations should be free of water and loose soil and debris prior to placing concrete. Concrete should be placed soon after excavating to reduce bearing soil disturbance. Should the soils at bearing level become excessively dry, disturbed or saturated, the affected soil should be removed or moisture conditioned and re-compacted prior to placing concrete. Place a lean concrete mud-mat over the bearing soils if the excavations must remain open over night or for an extended period of time.

If unsuitable bearing soils are encountered in footing excavations, the excavations should be extended deeper to suitable soils and the footings could bear directly on these soils at the lower level or on lean concrete backfill placed in the excavations. The footings could also bear on properly compacted backfill extending down to the suitable soils. Overexcavation for compacted backfill placement below footings should extend laterally beyond all edges of the footings at least 8 inches per foot of overexcavation depth below footing base elevation. The overexcavation should then be backfilled up to the footing base elevation with granular material and compacted in accordance with FDOT Specifications. The overexcavation and backfill procedures are described in the following figure.

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Overexcavation / Backfill

Note: Excavations in sketch are shown vertical for convenience. Excavations should be sloped for safety.

6.3.7 Floor Slab Design Recommendations

Item	Description
Floor slab support	Free draining granular material meeting the general fill specification ¹
Modulus of subgrade reaction	100 pounds per square inch per inch (psi/in) for point loading conditions
Compaction requirements	In accordance with FDOT Specifications

1. We recommend subgrades be maintained in a relatively moist condition until floor slabs are constructed. If the subgrade should become desiccated prior to construction of floor slabs, the affected material should be removed or the materials scarified, moistened, and recompact. Upon completion of grading operations in the building areas, care should be taken to maintain the recommended subgrade moisture content and density prior to construction of the building floor slabs.

Where appropriate, saw-cut control joints should be placed in the slab to help control the location and extent of cracking. For additional recommendations refer to the ACI Design Manual.

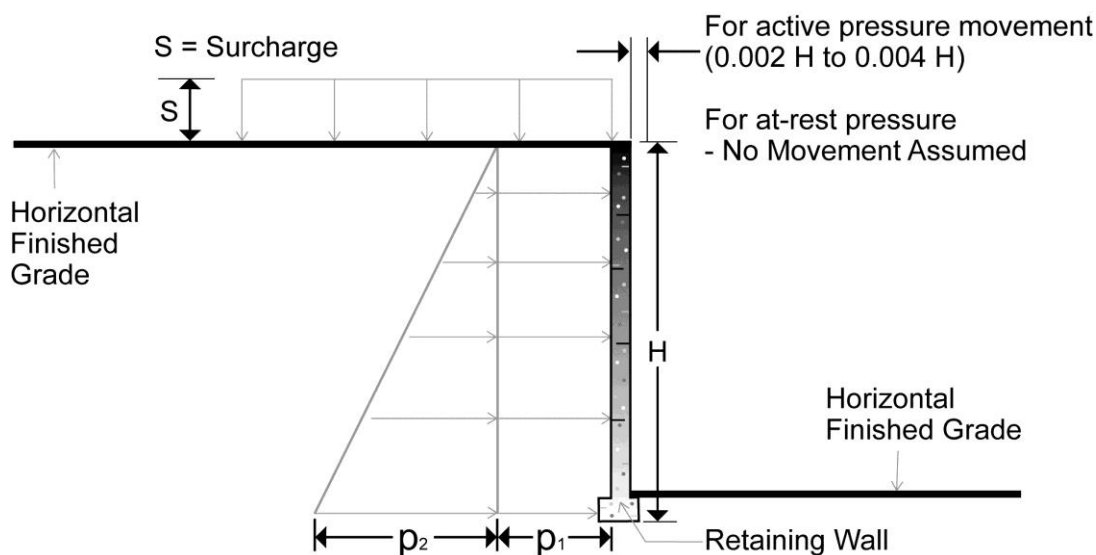
6.3.8 Floor Slab Considerations

On most project sites, the site grading is generally accomplished early in the construction phase. We recommend the area underlying the floor slab be rough graded and then thoroughly proofrolled prior to final grading. However as construction proceeds, the subgrade may be disturbed due to utility excavations, construction traffic, desiccation, rainfall, etc. As a result, the floor slab subgrade may not be suitable for placement of concrete and corrective action will be required.

Particular attention should be paid to high traffic areas that were rutted and disturbed earlier and to areas where backfilled trenches are located. Areas where unsuitable conditions are located should be repaired by removing and replacing the affected material with properly compacted fill. All floor slab subgrade areas should be moisture conditioned and properly compacted to the recommendations in this report immediately prior to placement of concrete.

6.3.9 Lateral Earth Pressures

At this time, it is unknown if the fuel tank will be submerged or be placed at grade. If the tank is anticipated to be submerged, reinforced concrete walls with unbalanced backfill levels on opposite sides should be designed for earth pressures at least equal to those indicated in the following table. Earth pressures will be influenced by structural design of the walls, conditions of wall restraint, methods of construction and/or compaction and the strength of the materials being restrained. Two wall restraint conditions are shown. Active earth pressure is commonly used for design of free-standing cantilever retaining walls and assumes wall movement. The "at-rest" condition assumes no wall movement, such as a basement wall that is structurally confined at both the top and bottom of the wall. The recommended design lateral earth pressures do not include a factor of safety and do not provide for possible hydrostatic pressure on the walls.



Earth Pressure Coefficients

Earth Pressure Conditions	Coefficient for Backfill Type	Equivalent Fluid Density (pcf)	Surcharge Pressure, p_1 (psf)	Earth Pressure, p_2 (psf)
Active (K_a)	Granular - 0.33	40	$(0.33)S$	$(40)H$
At-Rest (K_o)	Granular - 0.46	55	$(0.46)S$	$(55)H$
Passive (K_p)	Granular - 3.0	360	---	---

Subsurface Exploration and Geotechnical Engineering Evaluation

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February 1, 2018 ■ Project No. H1175277 Task 11

Applicable conditions to the above include:

- Uniform surcharge, where S is surcharge pressure
- In-situ soil backfill weight a maximum of 120 pcf
- Horizontal backfill, compacted between 95 and 98 percent of modified Proctor maximum dry density
- Loading from heavy compaction equipment not included
- No hydrostatic pressures acting on wall
- No dynamic loading
- No safety factor included in soil parameters

Backfill placed against structures should consist of granular soils. For the granular values to be valid, the granular backfill must extend out from the base of the wall at an angle of at least 45 and 60 degrees from vertical for the active and passive cases, respectively. To calculate the resistance to sliding, a value of 0.32 should be used as the ultimate coefficient of friction between the footing and the underlying soil.

To control hydrostatic pressure behind the wall we recommend that a drain be installed at the foundation wall with a collection pipe leading to a reliable discharge. If this is not possible, then combined hydrostatic and lateral earth pressures should be calculated for sandy clay backfill using an equivalent fluid weighing 90 and 100 pcf for active and at-rest conditions, respectively. For granular backfill, an equivalent fluid weighing 85 and 90 pcf should be used for active and at-rest, respectively. These pressures do not include the influence of surcharge, equipment or floor loading, which should be added. Heavy equipment should not operate within a distance closer than the exposed height of retaining walls to prevent lateral pressures more than those provided.

6.4 Construction Considerations

The overall site preparation and construction should be in accordance with the FDOT Specifications and Standard Index requirements.

6.4.1 Temporary Side Slopes and Excavations

Temporary side slopes and excavations should comply with the Occupational Safety and Health Administration's (OSHA) trench safety standards, 29 C.F.R., s. 1926.650, Subpart P, all subsequent revisions or updates of OSHA's referenced standard adopted by the Department of Labor and Employment Security and Florida's Trench Safety Act, Section 553.62, Florida Statutes. Excavated materials should not be stockpiled at the top of the slope within a horizontal distance equal to the excavation depth.

6.4.2 Temporary Dewatering

Temporary dewatering may be required to facilitate construction, backfill, submerged storage tank and compaction in the dry. Regarding dewatering, we offer the following recommendations:

- Dewatering operations at this site should be accomplished with a properly designed dewatering system operating outside the excavation limits. Design of the system should be done by and experienced contractor.
- The dewatering system should be adequate to lower groundwater level to at least 2 feet below the lowest compaction surface and keep the groundwater below that level during pipe repair and proper compaction of backfill soils.
- The contractor should review the boring profile prior to implementing the dewatering system to be aware of anticipated soils.
- The construction should be sequenced so that the dewatering system is not turned off until the pipe has enough weight placed over it to counteract an uplift force equivalent to the height of standing water above the base of the pipe. The resisting weight of soil over the pipe should be calculated using the buoyant unit weight of the soil.

Evaluation of a suitable outfall for temporary dewatering system is beyond the scope of our services.

7.0 GENERAL COMMENTS

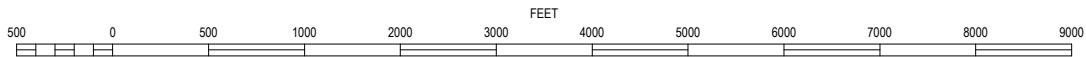
The analysis and recommendations presented in this report are based upon the data obtained from the borings performed at the indicated locations and from other information discussed in this report. This report does not reflect variations that may occur between borings, across the site, or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction. If variations appear, we should be immediately notified so that further evaluation and supplemental recommendations can be provided.

This report has been prepared for the exclusive use of our client for specific application to the project discussed and has been prepared in accordance with generally accepted geotechnical engineering practices. No warranties, either express or implied, are intended or made. Site safety, excavation support, and dewatering requirements are the responsibility of others. In the event that changes in the nature, design, or location of the project as outlined in this report are planned, the conclusions and recommendations contained in this report shall not be considered valid unless Terracon reviews the changes and either verifies or modifies the conclusions of this report in writing.

APPENDIX A
FIELD EXPLORATION



SCALE 1"=1000'



SANFORD, FLORIDA
 ISSUED: 1988
 7.5 MINUTE SERIES (QUADRANGLE)



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Project Mngr:	EAM
Drawn By:	AS
Checked By:	EAM
Approved By:	DWB

Project No.	H1175277-11
Scale:	AS SHOWN
File No.	H1175277-11
Date:	1-30-18

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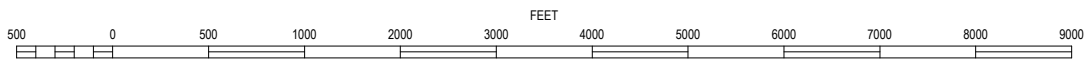
TOPOGRAPHIC VICINITY MAP
 GEOTECHNICAL ENGINEERING REPORT
 RTMC TOWER AND SUPPORTING STRUCTURES
 EAST TERMINUS OF WILSON ROAD 1-4 WB
 SANFORD, SEMINOLE COUNTY, FLORIDA

EXHIBIT
A-1

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SCALE 1"=1000'



U.S.D.A. SOIL SURVEY FOR SEMINOLE COUNTY, FLORIDA

SOIL LEGEND

31 TAVARES-MILLHOPPER COMPLEX, 0 TO 5 PERCENT SLOPES



Project Mngr:	EAM
Drawn By:	AS
Checked By:	EAM
Approved By:	DWB

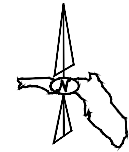
Project No.	H1175277-11
Scale:	AS SHOWN
File No.	H1175277-11
Date:	1-30-18

Terracon
Consulting Engineers and Scientists

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SOILS-MAP
GEOTECHNICAL ENGINEERING REPORT
RTMC TOWER AND SUPPORTING STRUCTURES
EAST TERMINUS OF WILSON ROAD 1-4 WB
SANFORD, SEMINOLE COUNTY, FLORIDA

EXHIBIT
A-2



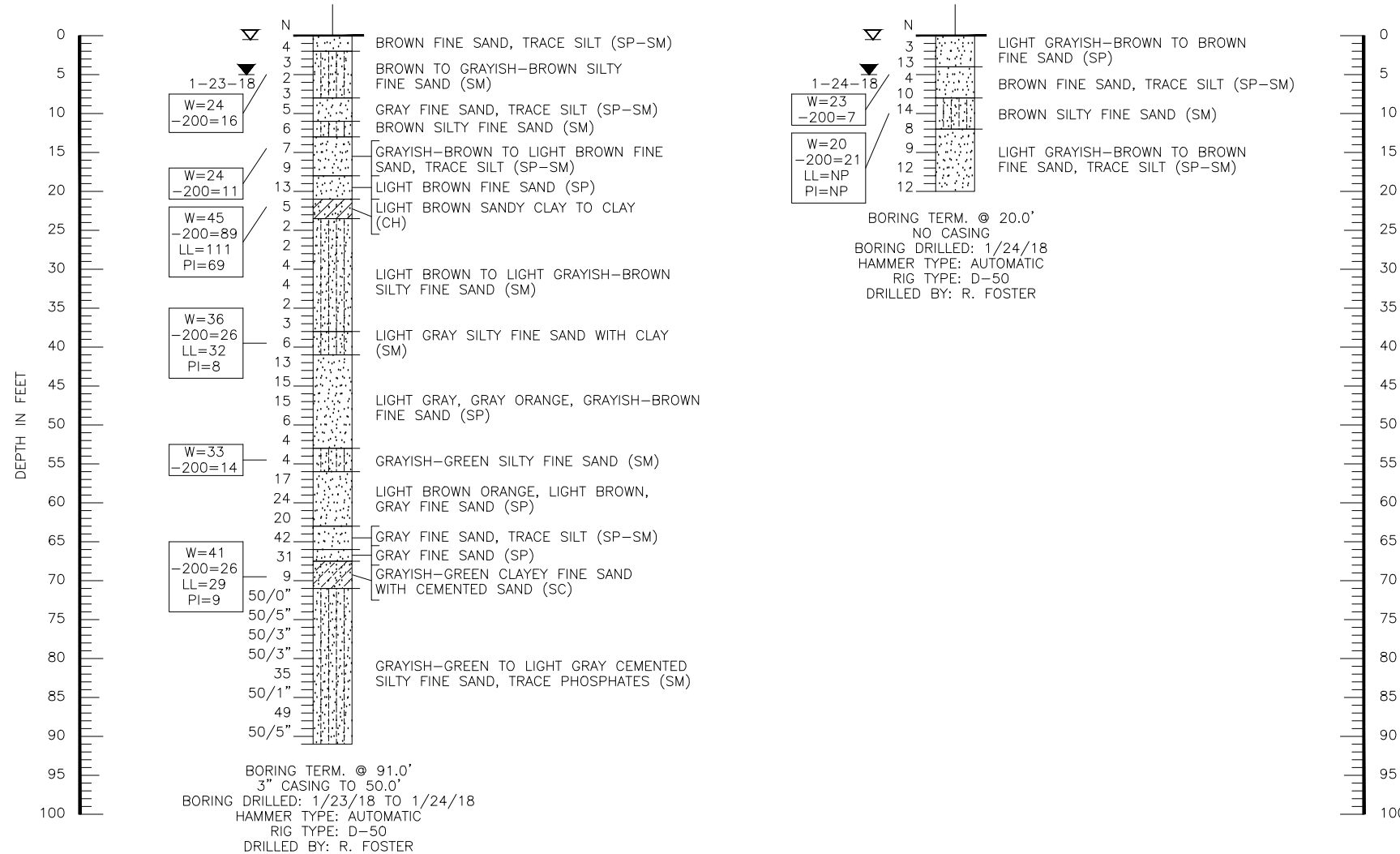
LEGEND
 APPROXIMATE LOCATION OF STANDARD PENETRATION TEST BORING



- LEGEND**
- SAND
 - SILTY SAND
 - CLAYEY SAND
 - SANDY CLAY
 - (SP) UNIFIED SOIL CLASSIFICATION GROUP SYMBOL
 - 1-24-18 ENCOUNTERED GROUNDWATER LEVEL (DATE OF READING)
 - ESTIMATED NORMAL SEASONAL HIGH GROUNDWATER LEVEL
 - W=0 NATURAL MOISTURE CONTENT (%)
 - 200=0 FINES PASSING No. 200 SIEVE (%)
 - LL=0 LIQUID LIMIT (%)
 - PI=0 PLASTICITY INDEX (%)
 - N STANDARD PENETRATION RESISTANCE IN BLOWS PER FOOT UNLESS OTHERWISE NOTED
 - 50/6" NUMBER OF BLOWS REQUIRED (50) TO DRIVE SAMPLING SPOON (6) INCHES

BORING No.: B-1
 LATITUDE: 28.800721
 LONGITUDE: -81.344420

BORING No.: B-2
 LATITUDE: 28.800916
 LONGITUDE: -81.344338



AUTOMATIC HAMMER
 STANDARD PENETRATION TEST DATA

SPOON INSIDE DIA.	1 3/8 in.
SPOON OUTSIDE DIA.	2 in.
ASTM STANDARD DROP AUTOMATIC HAMMER	
AVG. HAMMER DROP	30 in.
HAMMER WEIGHT	140 lbs.

GRANULAR MATERIALS

RELATIVE DENSITY	SPT (BLOWS/FOOT)
VERY LOOSE	LESS THAN 3
LOOSE	3-8
MEDIUM DENSE	8-24
DENSE	24-40
VERY DENSE	GREATER THAN 40

SILTS AND CLAYS

CONSISTENCY	SPT (BLOWS/FOOT)
VERY SOFT	LESS THAN 1
SOFT	1-3
FIRM	3-6
STIFF	6-12
VERY STIFF	12-24
HARD	GREATER THAN 24

- NOTES:**
- LAYER BOUNDARIES ARE APPROXIMATE AND REPRESENT SOIL LAYERS AT EACH TEST HOLE LOCATION ONLY. SUBSURFACE VARIATIONS BETWEEN BORINGS SHOULD BE ANTICIPATED.
 - BASED ON A REVIEW OF THE ST. JOHNS RIVER WATER MANAGEMENT DISTRICT POTENTIOMETRIC MAPS OF THE UPPER FLORIDAN AQUIFER FOR THIS PROJECT AREA, THE POTENTIAL ARTESIAN HEAD ELEVATION IS ESTIMATED TO BE +25 FEET NGVD. THE CONTRACTOR SHALL BE PREPARED TO HANDLE ARTESIAN WATER LEVELS UP TO ELEVATION +25 FEET NGVD.

ENVIRONMENTAL CLASSIFICATION:

SUPERSTRUCTURE: N/A
 SUBSTRUCTURE:
 STEEL: EXTREMELY AGGRESSIVE (pH=5.9)
 CONCRETE: MODERATELY AGGRESSIVE (pH=5.9)

Feb02, 2018-1:31pm

REVISIONS						DRAWN BY: MG 1-30-18	CHECKED BY: EM 1-30-18	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			SHEET TITLE: REPORT OF CORE BORINGS	REF. DWG. NO.
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION			ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
						DESIGNED BY: SR 400	SEMINOLE	437100-1-52-01	PROJECT NAME: REGIONAL TRANSPORTATION MANAGEMENT CENTER TOWER AND SUPPORTING STRUCTURES	SHEET NO. -		
DOUGLAS W. BAKER, P.E. P.E. LICENSE NUMBER 48943 TERRACON 1675 LEE ROAD WINTER PARK, FLORIDA 32789 CERTIFICATE OF AUTHORIZATION No. 8830						CHECKED BY:						

Soil Survey Descriptions

31 – Tavares-Millhopper fine sands, 0 to 5 percent slopes. This soil type is nearly level to gently sloping and moderately well drained. It is typically found on low ridges and knolls on the uplands. In its natural state and during years of normal rainfall, the soils in this map unit have a seasonal high water table at a depth of between 36 and 60 inches (3.0 and 5.0 feet) for 2 to 6 months. The seasonal high water table is apparent in Tavares soil but perched in Millhopper soil. Tavares fine sand is predominantly sandy throughout the defined profile of 80 inches (6.7 feet). Millhopper fine sand is predominantly sandy to a typical depth of 45 inches (3.8 feet), transitioning to silty sand to clayey sand thereafter (USCS Classification symbol SM to SC).

Field Exploration Description

Standard Penetration Tests (SPT) were performed continuously in the SPT boring to a depth of 10 feet and at 2.5-foot depth intervals thereafter. Each sample was removed from the sampler in the field and was examined and visually classified by an Engineering Technician. Water level was measured in the borehole at the time of our field exploration to evaluate the depth to groundwater.

Adjacent to the SPT boring profile are the “N” values. These “N” values are the number of hammer blows required to advance the split spoon sampler a distance of 12 inches. The “N” values have been empirically correlated with various soil properties and are considered to be indicative of the relative density of cohesionless soils and consistency of cohesive soils. The “N” values were obtained using an automatic hammer. The automatic hammer “N” values shall be multiplied by 1.24 to convert to the equivalent safety hammer “N” value.

Portions of the samples from the boring were sealed in glass jars to reduce moisture loss, and then the jars were taken to our laboratory for further observation and classification. Upon completion, the borehole was backfilled with the site soil.

Field log of the boring were prepared by the drill crew. This log included visual classifications of the materials encountered during drilling as well as the Driller's interpretation of the subsurface conditions between samples. The boring log included with this report represents an interpretation of the field log and include modifications based on laboratory observation of the samples.

APPENDIX B
LABORATORY TESTING RESULTS

EXHIBIT B-1
CORROSION SERIES TESTING RESULTS
REGIONAL TRANSPORTATION MANAGEMENT
CENTER TOWER AND SUPPORTING STRUCTURES
SEMINOLE COUNTY, FLORIDA
FDOT FIN NO: 437100-1-52-01
TERRACON PROJECT NO. H1175277 TASK 11

Boring Number	Sample Depth (feet)	pH	Minimum Resistivity (ohm-cm)	Chlorides (ppm)	Sulfates (ppm)	Substructural Environmental Classification	
						Concrete	Steel
B-1	0.0 - 1.0	8.2	6,000	<60	<5	Slightly Aggressive	Slightly Aggressive
B-2	0.0 - 1.0	5.9	7,600	<60	<5	Moderately Aggressive	Extremely Aggressive