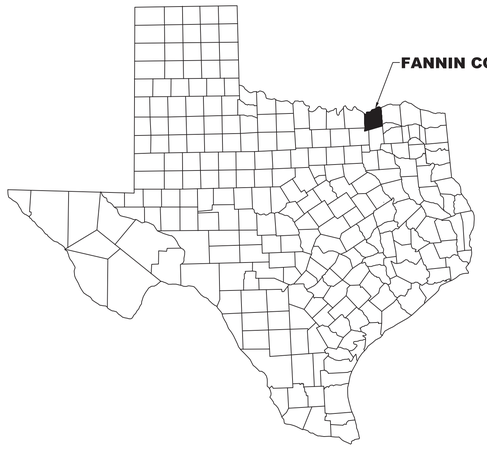
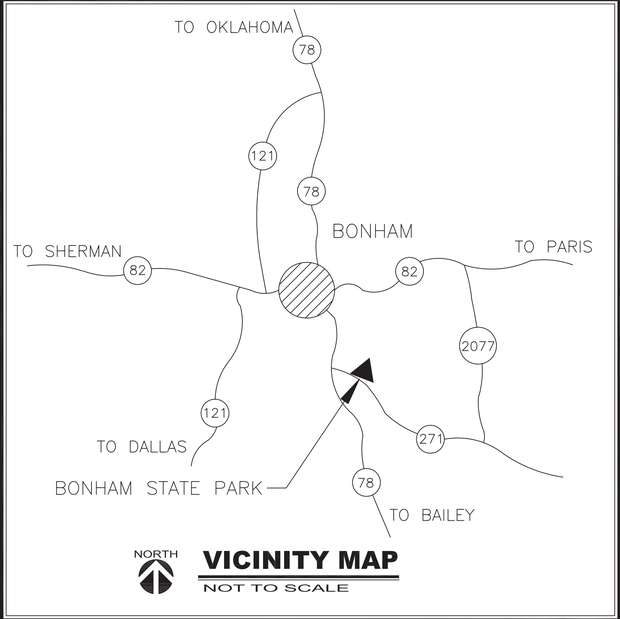


NORTH

COUNTY LOCATION MAP

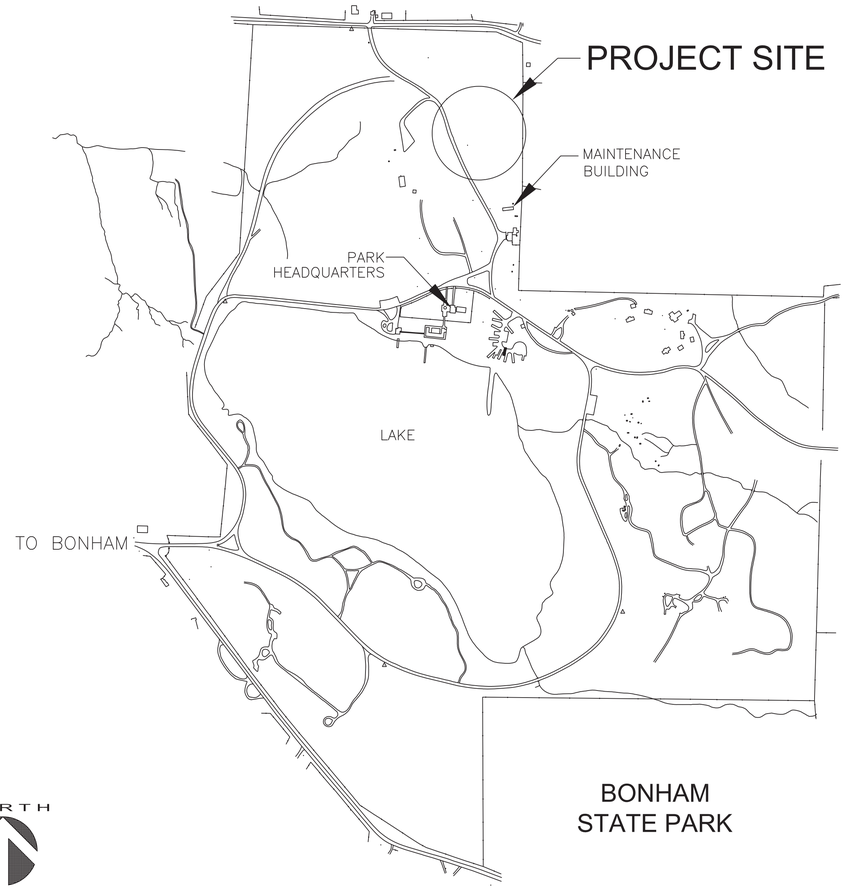
NOT TO SCALE



NORTH

VICINITY MAP

NOT TO SCALE



NORTH

SITE LOCATION MAP

NOT TO SCALE

PROJECT

BONHAM STATE PARK

REPLACE SEPTIC SYSTEM AT PARK

PROJECT NO: 1210853

DATE: 6/24/2020

INDEX OF DRAWINGS

SHEET NO.	DESCRIPTION
-	COVER SHEET
E1.1	ELECTRICAL PARTIAL SITE PLAN
E3.1	ELECTRICAL ONE-LINE RISER SYMBOLS LEGEND, SCHEDULES AND DETAILS
E5.1	ELECTRICAL SPECIFICATIONS

BUILDING CODE SUMMARY

A. INTERNATIONAL CODE COUNCIL ADOPTIONS*

1. BUILDING CODE	INTERNATIONAL BUILDING CODE 2015
2. STRUCTURAL CODE	INTERNATIONAL BUILDING CODE 2015
3. PLUMBING CODE	INTERNATIONAL PLUMBING CODE 2015
4. MECHANICAL CODE	INTERNATIONAL MECHANICAL CODE 2015
5. GAS CODE	INTERNATIONAL FUEL GAS CODE 2015
6. RESIDENTIAL CODE	INTERNATIONAL RESIDENTIAL CODE 2015
7. EXISTING BUILDINGS	INTERNATIONAL EXISTING BUILDINGS CODE 2015

* International Fire Code omitted in lieu of TPWD's implementation of National Fire Protection Association codes. International Energy Conservation Code 2015 omitted in lieu of Energy Standard for Buildings, ASHRAE/IESNA Standard 90.1 (2013).

B. NATIONAL FIRE PROTECTION ASSOCIATION

1. ELECTRIC CODE	NATIONAL ELECTRIC CODE NFPA-70 2017
2. FIRE CODE	NFPA - 1 2015
3. LIFE SAFETY CODE	NFPA - 101 2015

C. STATE ENERGY CONSERVATION OFFICE (SECO)/TEXAS COMPTROLLERS OFFICE

1. ENERGY CODES FOR STATE BUILDINGS - Energy Conservation Design Standards: Texas Administrative Code, Title 34, Part 1,Ch.19, Subchapter C
   a. COMPLIANCE WITH THE ENERGY CONSERVATION DESIGN STANDARD OF THE AMERICAN SOCIETY OF HEATING, REFRIGERATION AND AIR CONDITIONING ENGINEERS (ASHRAE) /ILLUMINATING ENGINEERING SOCIETY OF NORTH AMERICA (IESNA), ENERGY STANDARD FOR BUILDINGS, ASHRAE/IESNA STANDARD 90.1 (2013)
   See SECO website for State Funded Buildings, New Construction and Major Renovation Requirements and SECO Compliance Certification Forms
2. WATER CONSERVATION STANDARDS FOR STATE BUILDINGS - Energy Conservation Design Standards: Texas Administrative Code, Title 34, Part 1,Ch.19, Subchapter C
   a. COMPLIANCE WITH THE WATER CONSERVATION DESIGN STANDARDS FOR STATE BUILDINGS AND INSTITUTIONS OF HIGHER EDUCATION FACILITIES, STATE ENERGY CONSERVATION OFFICE (SECO), 2016
   See SECO website for Texas Water Conservation Design Standards, Requirements and SECO Compliance Certification / Reporting Form

D. ACCESSIBILITY CODES

1. US DEPT. OF JUSTICE, 2010 ADA STANDARDS FOR ACCESSIBLE DESIGN
2. ARCHITECTURAL BARRIERS ACT ACCESSIBILITY GUIDELINES; OUTDOOR DEVELOPED AREAS, NOVEMBER 25, 2013
3. ARCHITECTURAL BARRIERS ACT ACCESSIBILITY GUIDELINES; OUTDOOR DEVELOPED AREAS, NOVEMBER 25, 2013

E. PLAYGROUND SAFETY CODE

1. ASTM F1487-17, STANDARD CONSUMER SAFETY PERFORMANCE SPECIFICATIONS FOR PLAYGROUND EQUIPMENT FOR PUBLIC USE
2. ASTM F2223-15, STANDARD GUIDE FOR ASTM STANDARDS ON PLAYGROUND SURFACING

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SCOPE OF WORK

PROVIDE, ALL LABOR, MATERIALS, TOOLS, EQUIPMENT, AND INCIDENTALS TO:

REPLACE SEPTIC SYSTEM AT PARK WITH A NEW AEROBIC ON-SITE SEWAGE FACILITY, INCLUDING ELECTRICAL SERVICE AND REQUIRED PERMITTING WITH THE COUNTY.

RELEASED FOR SOLICITATION

Douglas F. Sauvé — Digitally signed by Douglas F. Sauvé DN: cn=Douglas F. Sauvé, o=Texas Parks & wildlife Department, ou=Infrastructure, email=doug.sauve@tpwd.texas.gov, c=US Date: 2020.07.14 14:17:31 -05'00' — 2020.07.14

PROJECT MANAGER, INFRASTRUCTURE DIVISION — DATE

for Lori Sons — Christy Seals — Digitally signed by Christy Seals DN: c=US, E=christy.seals@tpwd.texas.gov, O=TPWD, ou=Infrastructure Division, cn=Christy Seals Date: 2020.07.17 14:02:26-05'00' — 2020.07.17

DESIGN BRANCH HEAD, INFRASTRUCTURE DIVISION — DATE

TEXAS PARKS & WILDLIFE

TEXAS PARKS AND WILDLIFE

INFRASTRUCTURE DIVISION

4200 SMITH SCHOOL ROAD · AUSTIN, TEXAS 78744-3292

CONSTRUCTION DRAWINGS

PROJECT NUMBER: 1210853
DRAWING NUMBER: CVR

SET NO:

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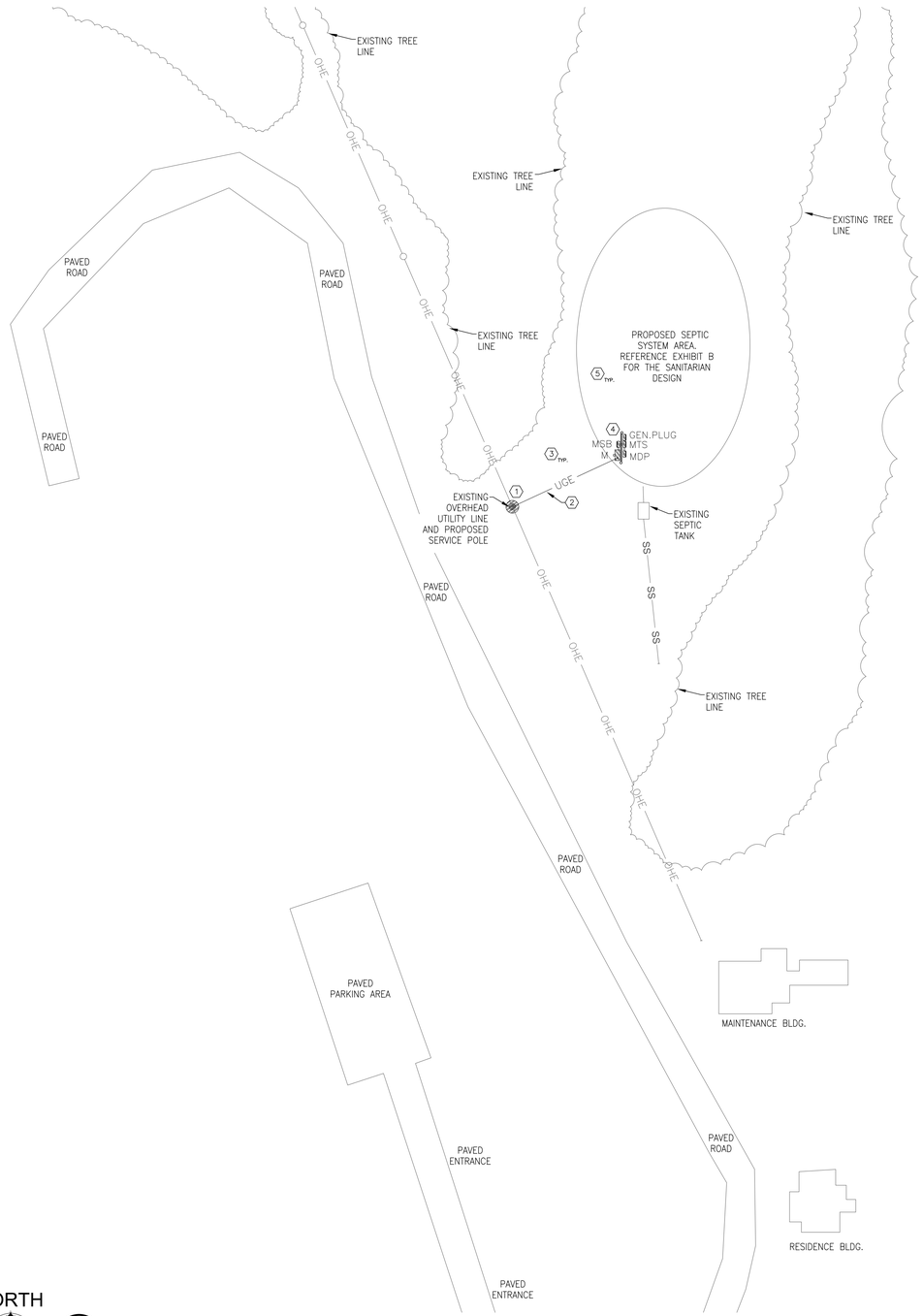


NORTH

1 ELECTRICAL PARTIAL SITE PLAN IN MAINTENANCE YARD AREA FOR UPGRADED SEPTIC AND NEW ELECTRICAL SYSTEM

SCALE: NOT TO SCALE DIMENSIONS SHOWN ARE APROXIMATIE FIELD VERIFY ALL DIMINENSIONS PRIOR TO BID

SITE PLAN KEYED NOTES -

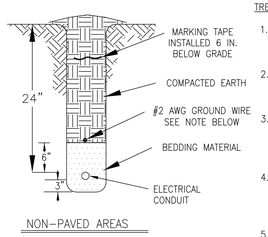
1. THE UTILITY PROVIDER WILL PROVIDE A AERIAL MOUNTED TRANSFORMER ON THE EXISTING SCHEDULED TO BE REPLACED UTILITY POLE. THE CONTRACTOR SHALL PROVIDE A NEW UNDERGROUND SECONDARY AND ESTABLISH A NEW SERVICE PER THE UTILITY PROVIDER REQUIREMENTS. CONTRACTOR SHALL PROVIDE A NEW SERVICE RACK, UNDERGROUND METER CABINET, UNDERGROUND SECONDARY TRENCH, CONDUIT AND PULL ROPE PER THE UTILITY PROVIDER'S REQUIREMENTS. ONCOR WILL FURNISH AND INSTALL THE SECONDARY SERVICE CONDUCTORS FROM THE TRANSFORMER TO THE METER CABINET. THE CONTRACTOR SHALL CONTACT AND COORDINATE WITH THE LOCAL UTILITY PROVIDER. CONTACT PERSON AT ONCOR IS NOLAN GRAHAM, (903)-647-8426. THE OWNER SHALL PAY ALL UTILITY PROVIDER ASSOCIATED FEES.
2. PROVIDE A 2" NEW UNDERGROUND CONDUIT FROM THE EXITING UTILITY POLE TO THE RACK MOUNTED METER CABINET. SEE SHEET E3.1/DETAIL#1.
3. ELECTRICALLY TRACE THE EXISTING UNDERGROUND UTILITIES TO AVOID DAMAGING THE EXISTING UNDERGROUND UTILITIES AND TO COORDINATE THE FINAL LAYOUT. FLAG AND MARK ALL EXISTING UNDERGROUND UTILITIES. FLAG AND MARK THE PROPOSED UNDERGROUND CONDUIT LAYOUT, SAFETY DISCONNECTS, LOAD CENTER, CONTROL PANEL, SERVICE POLE AND RACK LOCATIONS FOR FINAL APPROVAL BY THE DESIGNATED OWNER REPRESENTATIVE AND UTILITY PROVIDER PRIOR TO INSTALLING EQUIPMENT.
4. CENTRALLY LOCATE THE ELECTRICAL SERVICE RACK. COORDINATE FINAL LOCATIONS IN THE FIELD WITH THE DESIGNATED OWNER REPRESENTATIVE. LOCATE THE ELECTRICAL EQUIPMENT ADJACENT TO THE EQUIPMENT IT SERVES. PROVIDE A 20-AMP, COMMERCIAL GRADE WEATHER RATED GFCI DUPLEX SERVICE OUTLET INSIDE A DIE-CAST ALUMINUM NEMA-3R ENCLOSURE, WITH A DIE CAST IN-USE WEATHER RATED COVER. RACK MOUNTED. SEE SHEET E3.1/DETAIL#1.
5. PRIOR TO TRENCHING ALL TOP SOIL AND ORGANIC SURFACE MATERIALS SHALL BE EXCAVATED AND STOCKPILED SEPARATELY AND RETURNED TO THE SURFACE AT THE TOP OF THE TRENCH. SALVAGE, STRIP AND SET ASIDE TOP SOIL FOR REUSE. DRESS ALL DISTURBED AREAS INCLUDING ALL TRENCHES AND EXCAVATED AREAS WITH SALVAGED TOP SOIL FROM EXCAVATED AREAS SEE SPECIFICATIONS ON SHEET E5.1 AND DETAIL#1 ON SHEET SHEET E3.1 AND E1.1 FOR TRENCHING REQUIREMENTS.

SEE E3.1 FOR SCHEDULES AND ONE-LINE DIAGRAMS

SEE E5.1 FOR SPECIFICATIONS

GENERAL NOTES APPLIES TO ALL E-SHEETS

1. THE LOCATION OF ELECTRICAL ITEMS ON THE ELECTRICAL DRAWINGS ARE DIAGRAMMATIC AND ARE NOT INTENDED TO GIVE COMPLETE AND ACCURATE DETAILS IN REGARD TO LOCATION. EXACT LOCATION SHOULD BE DETERMINED BY ACTUAL MEASUREMENTS ON SITE, AND WILL IN ALL CASES BE SUBJECT TO THE APPROVAL OF THE ENGINEER. THE ENGINEER RESERVES THE RIGHT TO MAKE ANY REASONABLE CHANGES IN THE LOCATIONS INDICATED WITHOUT ADDITIONAL COST. THE CONTRACTOR SHALL REPAIR ALL DAMAGES CREATED TO THE SITE DUE TO CONSTRUCTION. ALL REPAIRS SHALL BE MADE TO MATCH THE PRE-CONSTRUCTION CONDITIONS. IF THE CONSTRUCTION PLANS ARE NOT CLEAR OR A CONTRADICTION EXIST THE CONTRACTOR SHALL REQUEST ADDITIONAL WRITTEN DIRECTION IN ADVANCE PRIOR TO PROCEEDING WITH CONSTRUCTION.
2. CONFLICTING REQUIREMENTS: WHERE COMPLIANCE WITH WITH TWO OR MORE STANDARDS OR REQUIREMENTS IS SPECIFIED, AND THEY ESTABLISH DIFFERENT OR CONFLICTING REQUIREMENTS FOR MINIMUM QUANTITIES OR QUALITY LEVELS, THE MOST STRINGENT AND GREATER VALUE REQUIREMENT WILL BE ENFORCED. SUBMIT A REQUEST FOR INFORMATION IF THE BID DOCUMENTS CONFLICT OR CREATE UNCERTAINTIES AS TO WHICH QUALITY LEVEL IS MORE STRINGENT TO THE ENGINEER OF RECORD FOR A DECISION BEFORE PROCEEDING.
3. ALL CONDUITS SHALL RUN PARALLEL AND PERPENDICULAR TO THE FOLLOW THE BUILDING LINES. PROVIDE KNOCKOUT PLUGS ON ALL UNUSED EMPTY CONDUIT ENTRIES TO ALL EXISTING AND NEW JUNCTION BOXES AND ENCLOSURES. ALL RACEWAYS SHALL BE SECURED AND SUPPORTED. PROVIDE PULL BOXES AS REQUIRED NOT TO EXCEED 270 DEGREES IN BENDS. PROVIDE FACE PLATES COVER UP PLATES FOR ALL JUNCTION BOXES ABANDONED IN PLACE. ALL CONDUIT SIZES INDICATED ON THE PLANS ARE THE MINIMUM TRADE SIZES.
4. THE ELECTRICAL DISTRIBUTION SYSTEM SIZING IS BASED ON EQUIPMENT DATA FROM THE SPECIFIED SUPPLIER OR A TYPICAL SUPPLIER. THE CONTRACTOR IS FULLY RESPONSIBLE FOR PROVIDING THE CORRECTLY SIZED ELECTRICAL SYSTEM TO MATCH THE REQUIREMENTS OF THE NEW EQUIPMENT. ALL ENCLOSURES LOCATED IN DAMP AREAS OR OUTDOORS SHALL BE WEATHER RATED AND RAINTIGHT.
5. THE ELECTRICAL SYSTEM SHALL BE GROUNDED IN ACCORDANCE WITH ARTICLE 250 OF THE NATIONAL ELECTRICAL CODE. ALL ELECTRICAL SYSTEMS RECEPTACLES, CABINETS, JUNCTION BOXES, MOTOR FRAMES, MISCELLANEOUS EQUIPMENT, ETC. SHALL BE GROUNDED BY A GREEN-WIRE GROUND CONDUCTOR.
6. DO NOT SPLICE CONDUCTORS, UNLESS OTHERWISE NOTED.
7. WHERE CALLED FOR, USE 2 OR 3 POLE BREAKERS. TYING SINGLE POLE BREAKERS TOGETHER TO CREATE A 2 OR 3 POLE BREAKER IS PROHIBITED. THE USE OF TANDEM BREAKERS IN LOAD CENTERS IS PROHIBITED.
8. THE BIDDER SHALL VISIT THE SITE OF THE PROPOSED WORK AND SHALL FULLY INFORM HIMSELF REGARDING THE FACILITIES. NO ADDITIONAL COMPENSATION WILL BE ALLOWED FOR WORK OR MATERIALS OMITTED FROM BIDDER'S CONTRACT PROPOSAL DUE TO HIS FAILURE TO INFORM HIMSELF BY SUCH INVESTIGATION.
9. THE ELECTRICAL CONTRACTOR SHALL GUARANTEE AGAINST DEFECTS IN ANY OR ALL MATERIALS, EQUIPMENT, OR WORKMANSHIP COVERED BY THE ELECTRICAL SPECIFICATIONS, EXCEPT SUCH MATERIALS, EQUIPMENT, OR WORKMANSHIP FURNISHED BY OTHERS AND SHALL MAKE GOOD, REPAIR, OR REPLACE, AT HIS OWN EXPENSE, ANY DEFECTIVE WORK, MATERIAL OR PART WHICH MAY BECOME EVIDENT WITHIN A PERIOD OF ONE YEAR AFTER FINAL ACCEPTANCE OF THE WORK. NECESSARY SERVICE AND ADJUSTMENT DURING THE EARLY STAGES OF OPERATION AFTER OCCUPANCY SHALL BE PROVIDED BY THE CONTRACTOR WITHOUT ADDITIONAL COST TO THE OWNER.
10. CONTRACTOR SHALL FURNISH ALL LABOR, MATERIALS TOOLS AND EQUIPMENT NECESSARY TO ACCOMPLISH THE REQUIRED EXCAVATION AND TRENCHING. CONTRACTOR SHALL LOCATE ALL UNDERGROUND UTILITIES PRIOR TO STARTING EXCAVATION OR TRENCHING. COSTS OF REPAIRING DAMAGE TO EXISTING UNDERGROUND UTILITIES OR FACILITIES SHALL BE REPAIRED AT CONTRACTORS EXPENSE.
11. TRASH AND DEBRIS SHALL BE REMOVED FROM THE PARK PROPERTY.
12. PROVIDE NEW LABELS FOR ALL BRANCH CIRCUITS AND ALL DISCONNECTS, ELECTRICAL DEVICES AND PANEL SCHEDULES TO MATCH ASBUILT CONDITIONS.
13. SUBMIT FOR REVIEW FINAL ASBUILT DRAWINGS TO REFLECT ALL MODIFICATIONS TO THE EXISTING AND PROPOSED ELECTRICAL SHEETS.
14. ALL ADJACENT BUILDINGS, STRUCTURES, PARKING LOTS, STREET PAVEMENTS, UTILITY LINES, SITE UTILITIES, UTILITY STRUCTURES, TREES, PLANTINGS, AND APPURTENANCES OTHER THAN SHOWN FOR REPLACEMENT SHALL BE PROTECTED FROM DAMAGE DURING CONSTRUCTION. IF DAMAGE OCCURS, THE CONTRACTOR SHALL RESTORE THE DAMAGE TO PRIOR CONDITIONS AT NO ADDITIONAL COST TO THE OWNER. CONTRACTOR SHALL COORDINATE WITH CALL BEFORE YOU DIG TEXAS 811.
15. THE SITE WILL REMAIN OPEN TO THE PUBLIC DURING THE COURSE OF CONSTRUCTION. IT IS THE CONTRACTOR'S RESPONSIBILITY TO PROTECT AND SECURE THE CONSTRUCTION AREAS AND EQUIPMENT, AND TO ENSURE THAT ALL CONSTRUCTION ACCESS AND STORAGE IS LIMITED TO THE AREAS AGREED UPON WITH THE DESIGNATED OWNER REPRESENTATIVE.



NON-PAVED AREAS

TRENCHING NOTES

1. CONTRACTOR SHALL FURNISH ALL LABOR, MATERIALS TOOLS AND EQUIPMENT NECESSARY TO ACCOMPLISH THE REQUIRED TRENCHING. CONTRACTOR SHALL LOCATE ALL UNDERGROUND UTILITIES PRIOR TO STARTING EXCAVATION. COSTS OF REPAIRING DAMAGE TO EXISTING UNDERGROUND UTILITIES OR FACILITIES SHALL BE BORNE BY THE CONTRACTOR. CONTRACTOR SHALL CALL 811 BEFORE YOU DIG, TO ASSIST IN AVOIDING EXISTING UNDERGROUND UTILITIES.
2. TRENCHES SHALL BE EXCAVATED TO THE DEPTHS AND LINES PLACED AS SHOWN ON THESE DETAILS. THE WIDTH OF ANY TRENCHES SHALL BE BETWEEN SIX AND TWELVE INCHES. WHERE ROOTS OR STUMPS ARE ENCOUNTERED THEY SHALL BE REMOVED AND DISPOSED OF BY THE CONTRACTOR. LARGE ROOTS SHALL BE CUT OFF FLUSH WITH THE SIDES OF THE TRENCH USING A PRUNING SAW OR PRUNING LOPERS.
3. BEDDING MATERIAL SHALL BE BEDDED AROUND ALL CONDUITS. THE BEDDING MATERIAL SHALL BE A NATIVE SAND OR OTHER SUITABLE NATIVE BEDDING MATERIAL THAT PASSES A 3/8" SIEVE TEST. THE COMPACTED EARTH FILL MATERIAL SHALL BE FREE OF MUD, CLAY LUMPS, VEGETATION, DEBRIS AND ROCKS EXCEEDING 6" IN IN THEIR GREATEST DIMENSION. THE "FINES" RESULTING FROM THE USE OF A TRENCHING MACHINE MAY ONLY BE USED AS COMPACTED EARTH BACKFILL UNLESS SPECIFICALLY APPROVED BY THE TPWD ENGINEER.
4. THE BEDDING MATERIAL SHALL BE WATER-TAMPED AROUND ALL LINES BY FLOODING THE TRENCH WITH WATER AND ALLOWING THE MATERIAL TO SETTLE IN AS THE WATER RECEDES AND IS ABSORBED. AFTER THIS FLOODING THE BEDDING MATERIAL DEPTHS ABOVE AND BELOW THE LINES SHALL STILL ADHERE TO THE DETAIL DIMENSIONS. THE COMPACTED EARTH BACKFILL SHALL BE COMPACTED IN 6" LIFTS. HAND TAMPING SHALL BE DONE WITH A MECHANICAL TAMPER. THE TOP OF THE BACKFILLED TRENCH SHALL BE SLIGHTLY MOUNDED ABOVE THE SURROUNDING GRADE TO ALLOW FOR SETTLEMENT.
5. ELECTRICAL MARKING TAPE SHALL BE BURIED AT THE DEPTHS SHOWN IN TRENCHES CARRYING ELECTRIC CONDUIT.
6. WHERE MORE THAN ONE CONDUIT IS INSTALLED IN A TRENCH, THE CONDUITS SHALL BE SEPARATED BY A MINIMUM OF 4" OF BEDDING MATERIAL AND THE TRENCH DEPTH SHALL BE ADJUSTED AS NECESSARY TO ACCOMMODATE MULTIPLE CONDUITS.
7. CONTRACTOR SHALL TRENCH UNDER ALL KNOWN UNDERGROUND UTILITIES CROSSINGS BY HAND WITHOUT DAMAGING EXISTING PIPES AND CONDUITS. CONTRACTOR SHALL INSTALL CONDUITS UNDER THE EXISTING PIPING TO MEET MINIMUM COVER. CONTRACTOR SHALL FIELD INVESTIGATE PRIOR TO PLACING BID.
8. ANY EARTHWORK MATERIALS BROUGHT INTO THE PARK FROM OUTSIDE OF THE PARK SHALL ONLY BE PLACED OR STORED ON PAVED SURFACES OR OTHER AREAS APPROVED BY TPWD PERSONNEL. ALL IMPORTED SOILS SHALL BE FREE OF CULTURAL RESOURCES (E.G. ARTIFACTS, BUILDING MATERIALS, ETC.). ALL IMPORTED SOILS MUST BE APPROVED BY THE DESIGNATED OWNER REPRESENTATIVE PRIOR TO DELIVERY.
9. SOIL PILES CREATED BY THE EARTHWORK OPERATIONS SHALL ONLY BE PLACED OR STORED ON PAVED SURFACES OR OTHER AREAS APPROVED BY TPWD PERSONNEL. ANY EXCESS SOIL AND TOPSOIL FROM EARTHWORK OPERATIONS THAT IS NOT NEEDED IN THE PARK SHALL BE DISPOSED OF AT AN OFFSITE LOCATION BY THE CONTRACTOR, UNLESS DIRECTED OTHERWISE BY A DESIGNATED OWNER REPRESENTATIVE..

AS AN ALTERNATE TRENCH METHOD IF SOLID ROCK OR LARGE ROCK SHELVES ARE ENCOUNTERED AT A SHALLOW DEPTH THAT WILL NOT ALLOW THE CONDUIT TO BE PLACED AT 24" DEEP WITHOUT USING A ROCK SAW:

1. THE CONTRACTOR MAY INSTALL PVC CONDUIT AT A MINIMUM OF 8" DEEP AND CAP THE CONDUIT WITH 4" OF RED CONCRETE. LAY THE MARKING TAPE ON TOP OF THE CONCRETE CAP. BEDDING MATERIAL WILL STILL BE REQUIRED UNDER THE PVC CONDUIT.

OR:

2. THE CONTRACTOR MAY INSTALL RIGID METAL CONDUIT AT A MINIMUM OF 8" DEEP AND CORROSION PROTECT THE CONDUIT BY WRAPPING THE CONDUIT WITH CORROSION PROTECTION TAPE ALONG THE CONDUIT'S ENTIRE LENGTH OR BY USING PVC COATED RIGID METAL CONDUIT. BEDDING MATERIAL WILL STILL BE REQUIRED AS NOTED ON THE DETAIL. PLACE THE MARKING TAPE ON TOP OF THE BEDDING MATERIAL.

ANY PVC CONDUIT BURIED SHALLOWER THAN 18" WILL REQUIRE A 4" RED CONCRETE CAP.

THE TRENCH GROUND WIRE DESCRIBED ABOVE SHALL NOT BE INSTALLED IN THESE SHALLOW TRENCHES. PLACE THE TRENCH GROUND WIRE IN AN ALTERNATE TRENCH THAT IS INSTALLED FROM THE SAME SERVICE POINT.

1 TRENCHING & EXCAVATION DETAILS & NOTES-ELECTRICAL

SCALE: NOT TO SCALE

TEXAS PARKS & WILDLIFE

STATE OF TEXAS
CARL OWEN NIX
93674
REGISTERED PROFESSIONAL ENGINEER

BONHAM STATE PARK SITE
REPLACE SEPTIC SYSTEM AT PARK
PROJECT: 1210853

DATE: 06-24-2020
DESIGNED BY: CN
DRAWN BY: CN
REVIEWED BY: CN
REVISED:
REVISED:
REVISED:

SHEET TITLE
ELECTRICAL PARTIAL SITE PLAN

SHEET NUMBER
E1.1

CONSTRUCTION DRAWINGS

MAXIMUM FAULT CURRENT / REQUIRED NAMEPLATE

PROVIDE LABEL STATING EQUIPMENT SHALL BE DE-ENERGIZED, PRIOR TO PERFORMING MAINTENANCE OR REMOVAL OF DEAD FRONT. PROVIDE LABEL STATING MAXIMUM FAULT CURRENT WITH DATE.

MAXIMUM SHORT CIRCUIT CURRENT BASED ON POINT TO POINT CALCULATIONS. ASSUMING INFINITE BUSS WITH ALL PHASES BOLTED TOGETHER AND AT THE MAXIMUM UL LISTED TOLERANCE OF ± 10% IMPEDANCE TOLERANCE

EXISTING TRANSFORMER IS ASSUMING A 25 KVA / 120/240 1Ø / ASSUMING 2.3% TRANSFORMER IMPEDANCE.

SINGLE PHASE TRANSFORMER FULL LOAD CURRENT = TRANSFORMER KVA*1000/VOLTAGE = 25*1000/240= 104 AMPS.

SHORT CIRCUIT CURRENT (ISC LINE TO LINE)= TRANSFORMER FULL LOAD CURRENT / TRANSFORMER IMPEDANCE (Z).= 104/.023 = 4,520 AMPS AT TRANSFORMER LUGS.

ASSUMING NO SIGNIFICANT MOTOR CONTRIBUTIONS. ASSUME MAXIMUM WORST CASE FULL LOAD AMPS OF TRANSFORMER FAULT CURRENT = 104 AMPS MULTIPLY BY FOUR = 104*4 = 416 AMPS

MAXIMUM WORST CASE FAULT CURRENT WITH MOTOR CONTRIBUTIONS AND ASSUMED NO GENERATOR CONTRIBUTIONS = 4,520 + 416 = 4,944 AMPS.

THE CONTRACTOR SHALL PROVIDE A NAMEPLATE ON THE ELECTRICAL DISCONNECTS THAT STATES THE AVAILABLE FAULT CURRENT IS 5,000 AMPS.

LOAD CENTER "MDP" 100 A MCB

SERVICE 240/120V, 1ø, 3 WIRE — **AIC 10,000** — **NEMA-3R**

CONDUIT & WIRE	CRT#	BKR / P	ITEM DESCRIPTION	AMPS	A	B	AMPS	ITEM DESCRIPTION	BKR / P	CRT#	CONDUIT & WIRE
	1	30 / 2	EFFLUENT CONTROL PANEL	16.0	17.5		1.5	SERVICE OUTLET WP/GFCI	20 / 1	2	1 -3/4"C w/ 2-#12 + 1-#12(G)EA
SEE ONE-LINE RISER DIAGRAM	3		DUPLEX PUMPS	16.0		36.0	20.0	DUPLEX DOSING 30 AMP CONTROL PANEL	30 / 1	4	SEE ONE-LINE RISER DIAGRAM
SEE ONE-LINE RISER DIAGRAM	5	20 / 1	AEROBIC TREATMENT UNIT#1	10.0	20.0		10.0	AEROBIC TREAMENT UNIT#3	20 / 1	6	SEE ONE-LINE RISER DIAGRAM
SEE ONE-LINE RISER DIAGRAM	7	20 / 1	AEROBIC TREATMENT UNIT#2	10.0		10.0	0.0	SPARE BREAKER	35 / 1	8	
INSTALL PER MANUFACTURER INSTRUCTIONS	9	20 / 2	SPD TYPE-2	0.0	0.0		0.0	SURGE	20 / 2	10	INSTALL PER MANUFACTURER INSTRUCTIONS
	11		SURGE PROTECTION	0.0		0.0	0.0	CAPACITOR		12	
	13	30 / 2	SPARE	0.0	0.0		0.0	SPARE BREAKER	30 / 1	14	
	15		BREAKER	0.0		0.0	0.0	SPARE	60 / 2	16	
	17	40 / 1	SPARE BREAKER	0.0	0.0		0.0	BREAKER		18	
	19		NO ADDITIONAL	0.0		0.0	0.0	NO ADDITIONAL		20	
	21		SPACES REQUIRED	0.0	0.0		0.0	SPACES REQUIRED		22	
	23			0.0		0.0	0.0			24	
	25			0.0	0.0		0.0			26	
	27			0.0		0.0	0.0			28	
	29			0.0	0.0		0.0			30	
	31			0.0		0.0	0.0			32	
	33			0.0	0.0		0.0			34	
	35			0.0		0.0	0.0			36	
	37			0.0	0.0		0.0			38	
	39			0.0		0.0	0.0			40	
	41			0.0	0.0		0.0			42	
					37.5	**46.0**					

* GFCI BREAKER

**PROVIDE A CIRCUIT BREAKER CAPABLE OF BEING LOCKED IN THE OPEN POSITION.

CONTRACTOR SHALL SUPPLY APPROPRIATE FRAME RATING TO ACCOMMODATE FEEDER WIRE SIZE AND BRANCH CIRCUIT WIRES FOR ALL BEAKERS ON THIS PROJECT

ELECTRICAL SYMBOLS AND LEGEND

THE DRAWING PLAN SET USES THE ELECTRICAL SYMBOLS AND LEGEND TO DEFINE QUALITY CONTROL, TERMINATIONS, SWITCHES, RECEPTACLES, LIGHTING CONTROLS, LOAD CENTERS, ELECTRICAL EQUIPMENT, ABBREVIATIONS AND LINE TYPES THAT MAY BE CALLED OUT IN THE DRAWING PLAN SET. REFER TO ALL ELECTRICAL SHEETS TO IDENTIFY ALL REQUIREMENTS.

- DUPLEX RECEPTACLE
- QUAD RECEPTACLE
- DISCONNECT SWITCH
- DISTRIBUTION PANEL OR LOAD CENTER
- (J) JUNCTION BOX
- 120V 1PH CONNECTION
- 208V 1PH CONNECTION
- 208V 3PH CONNECTION
- 240V 1PH CONNECTION
- 240V 3PH CONNECTION
- (PC) TWIST LOCK PHOTO – CELL
- (MS) SELF CONTAINED PASSIVE INFRARED LIGHTING MOTION SENSOR CONTROL
- $ 20 AMP, WALL SWITCH
- $T 20 AMP, COUNT DOWN TIMER SWITCH
- $3 20 AMP, 3-WAY WALL SWITCH
- $DP 20 AMP, DOUBLE POLE SINGLE, THROW WALL SWITCH
- $M 16 AMP, 1 HP RATED FRACTIONAL HORSEPOWER MANUAL MOTOR STARTER W/ THERMAL OVERLOADS
- LIGHT FIXTURE
- EXIT SIGN
- EMERGENCY LIGHTING FIXTURE
- PP MODULAR FURNITURE POWER POLE
- FPP ELECTRICAL CONTRACTOR PROVIDED FREE STANDING POWER POLE WITH TWO RECESSED RECEPTACLES AND ONE STANDARD 2-DATA OUTLET

BRANCH CIRCUIT & WIRE NOTATION

A1–10 (SC) — SPLIT CIRCUIT
PANEL AND CIRCUIT NUMBERS
EQUIPMENT GROUND
ISOLATED GROUND
SWITCH LEG
HOT
NEUTRAL

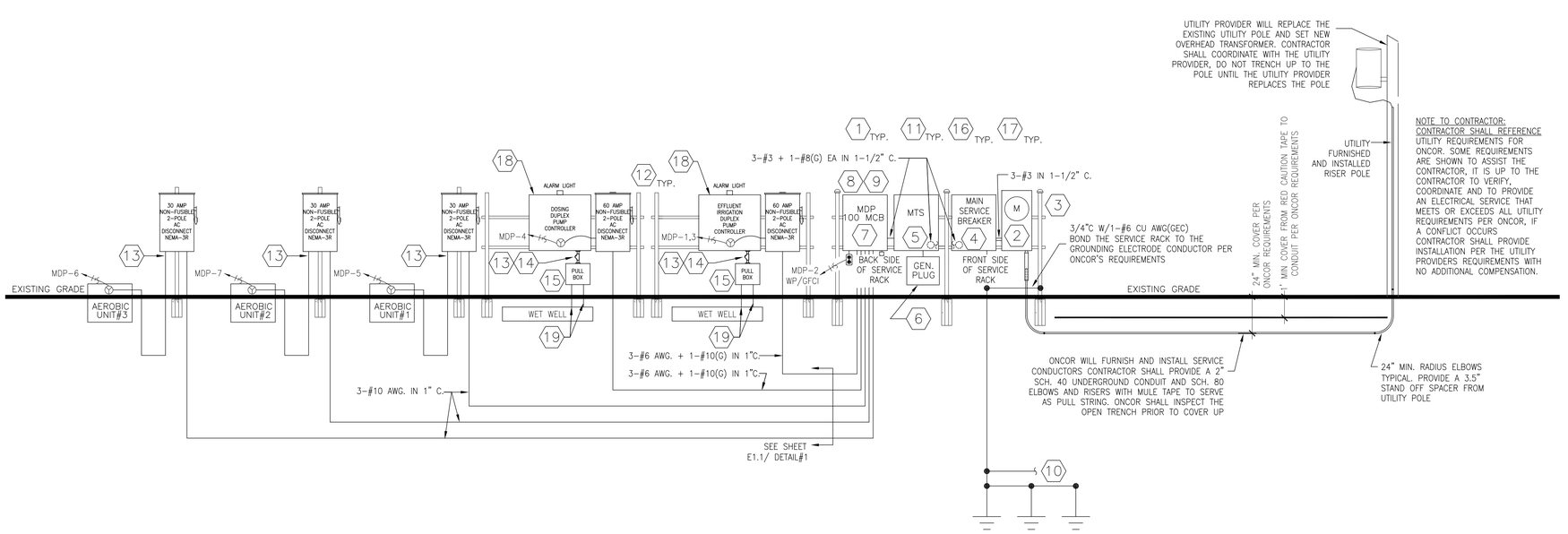
LISTED ABBREVIATIONS

BOF	BOTTOM OF FIXTURE
GFCI	GROUND FAULT CIRCUIT INTERRUPTER BREAKER OR OUTLET
WP	IN-USE WEATHERPROOF DEVICE OR ENCLOSURE
RGS	RIGID GALVANIZED STEEL CONDUIT
PVC	POLY VINYL CHLORIDE CONDUIT
EMT	ELECTRICAL METALLIC TUBING CONDUIT
AFR	ABOVE FINISHED ROOF
AFF	ABOVE FINISHED FLOOR
BFG	BELOW FINISHED GRADE
AFG	ABOVE FINISHED GRADE
SCH.	SCHEDULE
TYP.	TYPICAL

UGE — UNDERGROUND ELECTRICAL
UVD — UNDERGROUND VOICE DATA
UGT — UNDERGROUND TELEPHONE SERVICE
REF — UNDERGROUND REFRIGERANT LINES
W — UNDERGROUND WATER LINE

SEE E1.1 FOR SITE PLAN AND GENERAL NOTES

SEE E5.1 FOR SPECIFICATIONS



1 PROPOSED ONE-LINE RISER DIAGRAM
SCALE: NOT TO SCALE

KEYED NOTE "⬡"

1. PROVIDE NEW IDENTIFICATION NAMEPLATE LABELS FOR ALL ENCLOSURES. CENTRALLY LOCATE THE ELECTRICAL SERVICE. COORDINATE FINAL LOCATIONS IN THE FIELD WITH THE DESIGNATED OWNER REPRESENTATIVE. LOCATE THE ELECTRICAL EQUIPMENT ADJACENT TO THE EQUIPMENT IT SERVES, TYPICAL.
2. CONTRACTOR SHALL PROVIDE A 200 AMP RINGLESS-LEVER BYPASS UNDERGROUND METER CABINET APPROVED BY THE UTILITY PROVIDER. PROVIDE BARREL COPPER COMPRESSION LUGS. DO NOT BOND OR GROUND METER CABINET. DO NOT CROSS LINE AND LOAD SERVICE CONDUCTORS INSIDE CABINET. PROVIDE A SLIP METER RISER CONDUIT SERVICE ENTRY. MOUNT THE CENTER OF THE METER 48 TO 72 INCHES ABOVE GRADE.
3. PROVIDE A ELECTRICAL SERVICE RACK PER THE UTILITY PROVIDERS REQUIREMENTS. PROVIDE 2 QTY 3" X 3" X 1/4" X 8'-0" GALVANIZED STEEL ANGLE IRON OR GALVANIZED STEEL CHANNEL STRUT POST. SET EACH POST 2 FEET DEEP IN 3,000 PSI SACKCRETE WRAP POST IN CONTACT WITH CONCRETE OR EARTH WITH SCOTCHWRAP 50. SPAN POST TO POST WITH 2 1/2"X 2 1/2"X 1/8" GALVANIZED ANGLE IRON OR GALVANIZED STEEL CHANNEL STRUT IN 3 PLACES TO SUPPORT ENCLOSURES AND CONDUITS REFER TO UTILITY PROVIDER FOR CHANNEL STRUT SPACING REQUIREMENTS. GROUND SMOOTH AND PAINT CUTS WITH COLD GALVANIZING PAINT, 2" MAX EXTENSIONS. MOUNT THE DOUBLE THROW SWITCH AND LOAD CENTER ON THE BACKSIDE OF THE SERVICE RACK. THE TOTAL WIDTH OF THE SERVICE RACK SHALL BE 24 TO 48 INCHES WIDE PER UTILITY PROVIDER REQUIREMENTS.
4. PROVIDE A 240 VOLT RATED 100 AMP OUTDOOR & SERVICE RATED ENCLOSED BREAKER WITH A 100 AMP MAIN BREAKER TO SERVE AS THE MAIN OVER CURRENT PROTECTION DEVICE. PROVIDE A NAMEPLATE LABEL AND A MAXIMUM FAULT CURRENT LABEL. BOND THE NEUTRAL GROUND IN THIS ENCLOSURE.
5. PROVIDE A 100 AMP, 240-VOLT NON-FUSED OUTDOOR RATED NEMA-3R, GENERAL DUTY DOUBLE-THROW SAFETY SWITCH. PROVIDE NAMEPLATE LABELING FOR ALL THREE POSITIONS. CONNECT THE NORMAL POWER FEED TO THE TOP OF THE SWITCH, THE GENERATOR RECEPTACLE FEED TO THE BOTTOM OF THE SWITCH, AND THE LOAD WIRING TO THE CENTER CONNECTIONS IN THE SWITCH. PROVIDE A SOLID NEUTRAL BAR AND A SEPARATE GROUND BUSS. DO NOT BOND THE NEUTRAL & GROUND WIRES IN THIS DISCONNECT SWITCH.
6. PROVIDE TWIST-LOCK GENERATOR PLUG 50 AMP, 125/250V AC, 3-POLE, 4WIRE GROUNDING FLANGED INLET IN NEMA-3R ENCLOSURE WITH WEATHERPROOF COVER. PROVIDE 3#8 1-#10(G) EA IN 3/4" C. THE NEW GENERATOR RECEPTACLE SHALL MATCH THE MATING PLUG THAT IS INSTALLED ON TPWD'S EXISTING TRAILER MOUNTED GENERATOR. THE CONTRACTOR SHALL COORDINATE THAT THE LIFT STATION GENERATOR RECEPTACLE MATES WITH TPWD'S GENERATOR MATING PLUG.
7. PROVIDE A 100 AMP OUTDOOR RATED LOAD CENTER WITH A 100 AMP MAIN BREAKER. SEE LOAD CENTER SCHEDULE ON THIS SHEET. TANDEM BREAKERS ARE PROHIBITED.
8. CONTRACTOR SHALL PROVIDE A UL-LISTED TYPE 2 SPD, SURGE PROTECTIVE DEVICE IN THE PROPOSED ELECTRICAL LOAD CENTER SHOWN ON THE RISER DIAGRAM. THE PROVIDED SURGE PROTECTIVE DEVICES SHALL BE MOUNTED TO THE ENCLOSURE WITH A CIRCUIT BREAKER TO PROVIDE OVERLOAD PROTECTION PER THE MANUFACTURERS INSTRUCTIONS. THE SURGE PROTECTIVE DEVICE SHALL HAVE SURGE CURRENT RATING EQUAL TO 50,000 AMPS PER LEG. SURGE PROTECTIVE DEVICE SHALL HAVE A LED OPERATION STATUS INDICATION IN A WEATHERPROOF ENCLOSURE. TERMINATE THE LEADS TO A BREAKER TRIP SETTING SIZED BASED ON THE MANUFACTURER RECOMMENDATIONS FOR THE SURGE PROTECTIVE DEVICE PROVIDED.
9. THE CONTRACTOR SHALL PROVIDE A SURGE CAPACITOR (DELTA # CA-302RG W/ SEPARATE GROUND LEAD OR EQUAL) ON THE BOTTOM OF THE NEW LOAD CENTER ENCLOSURE. TERMINATE THE LEADS FROM EACH SURGE CAPACITOR DEVICE TO A DEDICATED NEW CIRCUIT BREAKER IN THE LOAD CENTER PER THE MANUFACTURERS INSTRUCTIONS.
10. PROVIDE 3 GROUND RODS IN A TRIAD CONFIGURATION WITH A 10 FOOT SEPARATION. THE CONTRACTOR SHALL ALSO PROVIDE A BARE, #2 AWG COPPER WIRE IN ONE CONTINUOUS LENGTH TO HELP ACHIEVE 25 OHMS OR LESS. THE BARE COPPER WIRE SHALL BE RUN UP TO 100' ROUTE AWAY FROM ELECTRICAL SERVICE IN A COMMON TRENCH WITH UNDERGROUND CONDUITS, LACE IN TRENCH IF NECESSARY. DO NOT BRING THIS WIRE UP A PULL BOX OR ENCLOSURE. THIS WIRE WILL ONLY BE CONNECTED TO THE MAIN GROUND ROD. THE PURPOSE OF THIS WIRE IS TO PROVIDE A LOW RESISTANCE GROUND PATH IN ADDITION TO THE GROUND RODS. PROVIDE A EXOTHERMIC WELDED CONNECTION.
11. PROVIDE WATERTIGHT WET LISTED SEALING LOCKING NUTS AND GROUNDING BUSHINGS ON BRANCH FEEDER CIRCUIT ENTRANCE ENCLOSURE CONDUIT ENTRIES ON THE SERVICE RATED ENCLOSED BREAKER, DOUBLE THROW SAFETY SWITCH AND LOAD CENTER. PROVIDE WET LISTED LOCKING NUTS AND PLASTIC NYLON BUSHING INSULATORS ON ALL OTHER CONDUIT ENTRIES
12. PROVIDE 1-5/8" GALVANIZED STEEL CHANNEL STRUT POST TO SUPPORT ENCLOSURES AND CONDUITS. SET EACH POST 24 INCHES DEEP IN 3,000 PSI SACKCRETE GROUND SMOOTH AND PAINT CUTS WITH COLD GALVANIZING PAINT, 2" MAX EXTENSION TYPICAL ON BOTH ENDS. STOP CONCRETE JUST BELOW GRADE. WRAP POST IN CONTACT WITH CONCRETE OR EARTH WITH SCOTCHWRAP 50.
13. PROVIDE A SCH. 80. PVC CONDUIT TO PULL BOX. SIZED TO BE DETERMINED BY SEPTIC EQUIPMENT REQUIREMENTS. PROVIDE A EYS SEAL TRANSITION WITH PVC CONDUIT ADAPTERS IN EACH CONDUIT. THE SIZE OF THE CONDUIT AND SEAL SHALL BE DETERMINED BY SEPTIC EQUIPMENT REQUIREMENTS FILL EYS SEAL WITH SPRAY FOAM INSULATION OR DUCT SEAL AFTER THE PROJECT IS COMPLETED AND THE DESIGNATED OWNER REPRESENTATIVE GRANTS PERMISSION TO FILL THE SEALS.
14. PROVIDE SINGLE CONDUCTORS FROM THE CONTROL PANEL TO THE JUNCTION BOX TERMINAL STRIPS AND GROUND BUSS.
15. PROVIDE A NEMA 4X, NON-METALLIC JUNCTION BOX WITH BACKING PLATE AND TERMINAL BLOCKS FOR FLOATS AND PUMP WIRING. (SIZE BOX PER N.E.C.) SEAL CONDUITS TO WET WELL AT BOTH ENDS. SIZE BOX PER N.E.C. FOR THE CONDUIT SIZES AND NUMBER OF CONDUCTORS & TERMINATIONS IN THE BOX. ALL POWER, CONTROL, AND GROUNDING TERMINAL BLOCKS SHALL HAVE A SUFFICIENT NUMBER AND SIZE OF TERMINATION POINTS FOR A SINGLE POINT CONNECTION FOR ALL CONDUCTORS.
   A. INSTALL TERMINAL BLOCKS ON THE BACK PANEL OF THE J-BOX.
   B. TERMINATE ALL SINGLE CONDUCTORS ROUTED TO THE WET WELL AND WIRE AND CABLES FROM THE FLOAT SWITCHES TO PRESSURE PLATE DIN RAIL TYPE TERMINAL BLOCKS.
   C. ALL POWER, CONTROL, AND GROUNDING TERMINAL BLOCKS SHALL HAVE A SUFFICIENT NUMBER AND SIZE OF TERMINATION POINTS FOR SINGLE POINT CONNECTION OF ALL CONDUCTORS. PROVIDE THE TERMINAL BLOCK MANUFACTURER'S JUMPER TABS FOR ANY TERMINATIONS THAT REQUIRE MULTIPLE WIRE CONNECTIONS SUCH AS GROUND WIRES.
   D. PROVIDE A SEPARATE GROUND BUSS FOR THE TERMINATION OF ALL EQUIPMENT GROUNDING CONDUCTORS.
   E. PERMANENTLY IDENTIFY THE TERMINAL BLOCKS AND THE CONDUCTORS WITH WIRE MARKERS EQUAL TO BRADY. THE IDENTIFICATION NUMBERING SHALL MATCH THE WIRE NUMBERS SHOWN ON THE CONTROL PANEL FABRICATOR'S SCHEMATIC DIAGRAM FOR THE CONTROL PANEL
16. SUPPORT AND SECURE ALL CONDUIT BELOW EACH ENCLOSURE.
17. FURNISH AND INSTALL ADHESIVE OSHA SAFETY SIGNS ON THE FRONT OF ALL ENCLOSURES. TWO BILINGUAL SIGNS THAT ARE PRINTED IN ENGLISH AND SPANISH ARE REQUIRED. ONE SIGN SHALL READ "DANGER! HIGH VOLTAGE" AND THIS SIGN SHALL HAVE A WHITE BACKGROUND WITH RED AND BLACK LETTERING, BE AT LEAST 3-1/2" WIDE BY 5" HIGH, BE SUITABLE FOR OUTDOOR LOCATIONS AND BE EQUAL TO SETON #07989. THE SECOND SIGN SHALL BE AN ARC FLASH WARNING SIGN AND THIS SIGN SHALL HAVE A WHITE BACKGROUND WITH ORANGE AND BLACK LETTERING, BE AT LEAST 6" WIDE BY 3-1/2" HIGH, BE SUITABLE FOR OUTDOOR LOCATIONS, AND SHALL BE EQUAL TO SETON #84624 OR #94311. REFER TO SHEET E3.1/DETAIL#1 TO IDENTIFY ALL ELECTRICAL EQUIPMENT.
18. ELECTRICAL CONTROL ENCLOSURE SHALL BE A NEMA 4X NON-METALLIC ENCLOSURE WITH POWER DISTRIBUTION BLOCKS FOR POWER WIRING CONNECTIONS & TAPS. DOOR SHALL BE HINGED, NEOPRENE GASKETED, AND EQUIPPED WITH PAD LOCKABLE CLOSING HARDWARE. CONTROL COMPONENTS SHALL BE MOUNTED ON BACK PANELS WITHIN THE CONTROL ENCLOSURE. CONTROL PANEL SHALL HAVE CIRCUIT OVERCURRENT PROTECTION BY MEANS OF CIRCUIT BREAKERS FOR EACH PUMP AND THE ALARM.
19. PROVIDE TWO SCH. 80. PVC CONDUITS, ONE FOR CONTROL CABLES AND ONE FOR PUMP POWER CABLES TO WET WELL. SIZED TO BE DETERMINED BY SEPTIC EQUIPMENT REQUIREMENTS. PROVIDE A EYS SEAL TRANSITION WITH PVC CONDUIT ADAPTERS IN EACH CONDUIT. THE SIZE OF THE CONDUIT AND SEAL SHALL BE DETERMINED BY SEPTIC EQUIPMENT REQUIREMENTS FILL EYS SEAL WITH SPRAY FOAM INSULATION OR DUCT SEAL AFTER THE PROJECT IS COMPLETED AND THE DESIGNATED OWNER REPRESENTATIVE GRANTS PERMISSION TO FILL THE SEALS. PROVIDE PVC BELL END IN WET WELL.

TEXAS PARKS & WILDLIFE

STATE OF TEXAS
CARL OWEN NIX
93674
REGISTERED PROFESSIONAL ENGINEER
6/24/2020

BONHAM STATE PARK SITE
REPLACE SEPTIC SYSTEM AT PARK
PROJECT: 121085300

CONSTRUCTION DRAWINGS

DATE: 06-24-2020
DESIGNED BY: CN
DRAWN BY: CN
REVIEWED BY: CN
REVISED:
REVISED:
REVISED:

SHEET TITLE
ELECTRICAL ONE-LINE RISER SYMBOLS LEGEND, SCHEDULES AND DETAILS

SHEET NUMBER
E3.1

DIVISION 26 ELECTRICAL SPECIFICATIONS

SECTION 26 00 00 – BASIC ELECTRICAL REQUIREMENTS

PART 1 – GENERAL

1.1 CODES AND STANDARDS:

CODES AND STANDARDS: ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE 2017 EDITION OF THE NATIONAL ELECTRIC CODE. THE PROJECT ELECTRICAL WORK SHALL BE PERFORMED BY A CONTRACTOR LICENSED WITH TDLR TO PERFORM ELECTRICAL WORK. THE ELECTRICAL WORK SHALL BE PERFORMED UNDER THE DIRECT, ON-SITE SUPERVISION OF A LICENSED, MASTER OR JOURNEYMAN ELECTRICIAN. SUBMIT COPIES OF THE LICENSES FOR ALL OF THE ELECTRICIANS THAT WILL PERFORM THE WORK. SUBMIT THIS INFORMATION AS PART OF THE PROJECT CONSTRUCTION SUBMITTAL INFORMATION.

1.2 MATERIAL SUBMITTALS:

A. SUBMIT UNDER PROVISIONS OF "TERMS AND CONDITIONS" OF THE CONTRACT.

B. MARK ALL SUBMITTAL LITERATURE TO INDICATE THE PRECISE SELECTION OF MATERIALS, DIMENSIONS AND EQUIPMENT SUBMITTED. NOTE THAT IF THE SPECIFIC MODEL OR MATERIAL IS NOT INDICATED IN THE SUBMITTAL, AND THERE IS MORE THAN ONE CHOICE POSSIBLE, THE SUBMITTAL MAY BE REJECTED AND A RESUBMITTAL WILL BE REQUIRED.

C. PROPOSED SUBMITTAL LIST SHALL INCLUDE ALL EQUIPMENT WITH MANUFACTURER OR MODEL NUMBERS CALLED OUT IN THE DRAWINGS. WHERE THE PLANS AND SPECIFICATIONS CALL OUT A MANUFACTURER OR MODEL NUMBER, CONTRACTOR SHALL PROVIDE AND SUBMIT THE EXACT MANUFACTURER AND MODEL NUMBER OR EQUAL PRODUCT PER THE TERMS AND CONDITIONS. REFERENCE THIS SHEET FOR THE REQUIRED SUBMITTALS INDICATED IN THE CONTRACTOR'S PROJECT SUBMITTAL LIST.

PART 2 – PRODUCTS

2.1 NONMETALLIC CONDUIT:

A. ALL UNDERGROUND CONDUIT SHALL BE PVC SCHEDULE 40. ALL ELBOWS, RISERS AND ABOVEGROUND RACEWAYS SHALL BE PVC HEAVY WALL SCHEDULE 80. ALL CONDUIT SHALL BE 90 C, UL RATED, CONSTRUCT OF POLYVINYL CHLORIDE AND CONFORMING TO NEMA TC-2, FOR DIRECT BURIAL, OR NORMAL ABOVE GROUND USE, UL-LISTED AND IN CONFORMITY WITH NEC ARTICLE 352. FITTINGS FOR NON-METALLIC CONDUIT SHALL CONFORM TO NEMA TC3 AND SHALL BE SPECIFICALLY MANUFACTURED FOR ELECTRICAL CONDUIT. WATER PIPE FITTINGS WILL NOT BE ACCEPTED.

2.2 UNDERGROUND WARNING TAPE:

PROVIDE A DETECTIBLE CAUTION TAPE FOR THE LENGTH OF THE TRENCH. CAUTION TAPE SHALL BE MANUFACTURED BY PRO-LINE'S DETECTABLE MARKING TAPE CONSISTS OF A MINIMUM 5.0 MIL OVERALL THICKNESS. CONSTRUCTION IS 0.8 MIL CLEAR VIRGIN POLYPROPYLENE FILM, REVERSE PRINTED AND LAMINATED TO A 0.35 SOLID ALUMINUM FOIL CORE AND THEN LAMINATED TO A 3.75 MIL CLEAR VIRGIN POLYETHYLENE FILM. TAPE SHALL BE PRINTED WITH APWA RED COLOR-CODED, PATENTED "DIAGONALLY STRIPED" DESIGN WITH BIG, BOLD, BLACK LETTERING TO IDENTIFY THE ELECTRICAL BURIED UTILITY LINE.

2.3 CONDUCTOR MATERIALS AND ACCESSORIES:

A. GENERAL USE SOLID SINGLE CONDUCTOR WIRE SHALL BE COPPER, TYPE THHN/THWN-2, UL LISTED FOR GENERAL USE AT A MAXIMUM OF 600 VOLTS AND A MAXIMUM TEMPERATURE OF 75 DEGREES C SUITED FOR DRY AND WET LOCATIONS AND GASOLINE PRESENT LOCATIONS. NUMBER 8 AWG AND LARGER SHALL BE STRANDED.

B. WIRE COLOR CODING FOR ALL NEW WIRING:

SYSTEM – 240/120 VAC, SINGLE PHASE

PHASE A	PHASE B	NEUTRAL	GROUND
BLACK	RED	WHITE	GREEN

WIRE COLORS SHALL BE INTEGRAL PIGMENTATION COLOR CODING FOR #8 AWG AND SMALLER WIRES, INCLUDING GROUND WIRES. FOR #6 AWG AND LARGER WIRES, COLORED PHASE TAPE SHALL BE APPLIED TO THE WIRE FOR IDENTIFICATION. TAPE SHALL BE APPLIED IN A SPIRAL, HALF-LAP MANNER OVER EXPOSED CONDUCTOR PORTIONS OF THE NEW AND EXISTING SERVICE AND FEEDER WIRING IN ATS SWITCHES, GENERATORS, SERVICE PEDESTALS, JUNCTION BOXES, LOAD CENTERS, PANELBOARDS, AND OTHER ENCLOSURES.

2.4 GROUNDING MATERIAL: SEE GROUND ELECTRODE TESTING IN THIS SPECIFICATION, PART 3.5.

A. NEW GROUND ELECTRODES: 3/4" X 10' LONG COPPER-BONDED GROUND RODS OR OTHER SPECIALLY DESIGNED GROUNDING SYSTEMS AS DESIGNATED BY THE ENGINEER. THE CONTRACTOR SHALL PROVIDE TWO SUPPLEMENTAL GROUND RODS TO THE GROUNDING SYSTEM FOR A TOTAL OF 3 GROUND RODS, EACH ELECTRODE SHALL BE INSTALLED WITH A MINIMUM OF 10' SEPARATION FROM EACH ELECTRODE IN AT TRIAD CONFIGURATION AND CONNECTED USING A BARE, #6 AWG, COPPER WIRE, EMBED IN COMPACTED BACKFILL SOIL.

B. GROUNDING ELECTRODE CONDUCTOR (GEC) CONNECTIONS: ALL GEC CONNECTIONS TO NEW GROUND ELECTRODES SHALL BE EXOTHERMIC TYPE CONNECTIONS. USING MECHANICAL OR COMPRESSION CLAMPS WILL NOT BE ALLOWED FOR CONNECTIONS TO GROUND ELECTRODES.

PART 3 – EXECUTION

3.1 INSTALLATION OF CONDUITS:

A. MECHANICALLY FASTEN TOGETHER METAL CONDUITS, ENCLOSURES, AND RACEWAYS FOR CONDUCTORS TO FORM CONTINUOUS ELECTRICAL CONDUCTOR.

B. CONDUITS SHALL HAVE OPENINGS TEMPORARILY PLUGGED TO EXCLUDE FOREIGN MATERIALS AND BE RIGIDLY SUPPORTED SO AS TO PREVENT UNDUE STRESS OR STRAIN ON THE COUPLINGS, CONNECTORS OR FITTINGS.

C. ON ALL METAL CONDUITS, BUSHINGS SHALL BE OF THE INSULATED TYPE. RMC CONDUIT SHALL BE ATTACHED TO ENCLOSURES WITH DOUBLE LOCKNUTS AND BUSHINGS.

D. ALL CONDUIT SYSTEMS MUST BE INSTALLED COMPLETE BEFORE CONDUCTORS ARE PULLED IN AND BE ELECTRICALLY CONTINUOUS THROUGHOUT.

E. USE SCHEDULE RGS CONDUIT FOR ALL NEW RISERS INTO THE ENCLOSURES UNLESS OTHERWISE INDICATED.

F. CONDUIT ENTRIES INTO THE TOPS OF ENCLOSURES SHALL USE WEATHER-PROOF HUBS. CONDUIT ENTRIES IN THE SIDES OR BACKS OF ENCLOSURES SHALL USE SEALING LOCKNUTS.

3.2 UNDERGROUND CONDUIT INSTALLATION:

A. ALL NEW UNDERGROUND CONDUIT AND CONDUIT IN CONTACT WITH EARTH OR CONCRETE SHALL BE SCHEDULE 80 PVC CONDUIT WITH PLASTI-BOND UL-LISTED PVC COATED RGS 90 ELBOWS CONDUIT STUB-UPS AND RISERS EXTENDED PVC COATED RGS UP TO THE BOTTOM OF EACH ENCLOSURE UNLESS NOTED OTHERWISE. SEAL ALL THREADS AND COUPLINGS ON PVC COATED RGS CONDUIT WITH PLASTI-BOND GRAY SEALANT TOUCH UP COMPOUND DESIGNED TO REPAIR MINOR DAMAGE TO THE PVC FACTORY COATING.

B. FOR UNDERGROUND CONDUIT SEE THE TRENCH DETAIL AND NOTES ON THE DRAWINGS. RUN CONDUIT IN STRAIGHT LINES EXCEPT WHERE A CHANGE OF DIRECTION IS NECESSARY. PROVIDE NOT LESS THAN 3 INCHES CLEARANCE FROM THE CONDUIT TO EACH SIDE OF THE TRENCH. AS EACH CONDUIT RUN IS COMPLETE, ASSURE THAT THE CONDUIT INTERIOR IS FREE FROM DIRT OR DEBRIS. THEN IMMEDIATELY INSTALL CONDUIT PLUGS OR OTHERWISE COVER END OF CONDUIT TO PREVENT ENTRY OF FOREIGN MATERIAL UNTIL WIRE IS PULLED INTO CONDUIT. EXCEPT AT CONDUIT RISERS; ACCOMPLISH CHANGES IN DIRECTION OF RUNS EXCEEDING A TOTAL OF 10 DEGREES, EITHER VERTICAL OR HORIZONTAL, WITH LONG SWEEP BENDS. MANUFACTURED BENDS SHALL HAVE A MINIMUM RADIUS OF 18 INCHES FOR USE WITH CONDUITS OF LESS THAN 3 INCHES IN DIAMETER.

C. ALL UNDERGROUND ELECTRICAL CONDUITS SHALL BE PERMANENTLY IDENTIFIED WITH A COLORED, ELECTRICAL IDENTIFICATION TAPE OVER THE CONDUIT SYSTEMS BEFORE BACKFILLING TRENCHES. ALL TAPE SHALL BE INSTALLED WITH THE WRITING FACE UP.

3.3 CONDUCTOR INSTALLATION:

A. SINGLE CONDUCTOR WIRING SHALL BE INSTALLED IN CONDUIT, A RACEWAY, BOX OR OTHER ENCLOSURE. NO CONDUCTORS OR CABLES SHALL BE INSTALLED IN CONDUITS, DUCT, OR RACEWAYS UNTIL THE RACEWAY OR CONDUIT SYSTEM HAS BEEN COMPLETED. WHEN INSTALLING CONDUCTORS, THE CONTRACTOR SHALL USE WIRE-PULLING COMPOUND WHEN INSTALLING ALL WIRING AND SHALL EXERCISE DUE CARE TO PREVENT DAMAGE TO CONDUCTORS OR INSULATION AND REPLACE ALL DAMAGED CABLE. TYPE THWN WIRING WITH THE OUTER NYLON JACKET DAMAGED WILL NOT BE ACCEPTED.

B. NO NEUTRAL WIRE OR GROUND WIRE SHALL BE TRIMMED OR SPLIT TO FIT SMALLER SIZED LUGS. IF OVERSIZED LUGS ARE INSTALLED ON A NEUTRAL OR GROUND BUSS TO ACCOMMODATE THE LARGER WIRE SIZES, WIRE SHALL BE ROUTED INTO THESE LUGS USING THE PROPER BENDING RADIUS AND TERMINATION METHODS.

C. ALL WIRING SHALL BE TERMINATED ON MAIN BREAKER LUGS, BRANCH BREAKER LUGS, SWITCH LUGS, NEUTRAL BAR/BUSS, OR GROUND BAR/BUSS. NO NEW CONDUCTOR SPLICES SHALL BE MADE IN AUTOMATIC TRANSFER SWITCHES, GENERATORS, CIRCUIT BREAKER ENCLOSURES, LOAD CENTERS, OR OTHER ELECTRICAL ENCLOSURES UNLESS SPECIFICALLY ALLOWED ON THE DRAWINGS.

3.4 IDENTIFICATION AND MARKINGS:

A. ON ALL ENCLOSURES INSTALL AN ENGRAVED, PLASTIC NAMEPLATE ON THE FRONT DOOR OF THE ENCLOSURE THAT STATES THE NAME, PHASE AND VOLTAGE OF THE EQUIPMENT. THE NAMEPLATES SHALL BE BLACK WITH WHITE LETTERS WITH A MINIMUM LETTER HEIGHT OF 1/4". THE NAMEPLATES SHALL BE INSTALLED ON THE DOOR WITH CORROSION RESISTANT RIVETS OR SCREWS THAT ARE SHORT ENOUGH TO PREVENT ANY CONTACT WITH LIVE PARTS INSIDE THE ENCLOSURE. FOR EXAMPLE EQUIPMENT NAMES ON THE NAMEPLATES SHOULD BE "LC" FOR LOAD CENTERS.

B. ON THE EXISTING OR NEW LOAD CENTERS AT THE ELECTRIC SERVICE POINTS: INSTALL AN ENGRAVED, PLASTIC NAMEPLATE ON THE INTERIOR COVER OF THE ENCLOSURE NEXT TO EACH LOAD BREAKER THAT STATES WHAT LOAD IS CONTROLLED BY THE BREAKER. THE NAMEPLATES SHALL BE BLACK WITH WHITE LETTERS WITH A MINIMUM LETTER HEIGHT OF 1/4". THE NAMEPLATES SHALL BE INSTALLED ON THE INTERIOR COVER WITH CORROSION RESISTANT RIVETS OR SCREWS THAT ARE SHORT ENOUGH TO PREVENT ANY CONTACT WITH LIVE PARTS INSIDE THE ENCLOSURE.

C. EACH NEW CONDUCTOR GROUP IN LOAD CENTERS, CIRCUIT BREAKER ENCLOSURES, AUTOMATIC TRANSFER SWITCHES, GENERATOR ELECTRICAL ENCLOSURE, OR OTHER ENCLOSURES SHALL HAVE A PERMANENT, LEGIBLE WIRE MARKING LABEL WITH SUITABLE NUMBERS TO SHOW THE DESTINATION AND SOURCE OF THE WIRING. THIS DESIGNATION SHALL CALL OUT THE DESTINATION AND SOURCE OF THE NEW WIRING SUCH AS "FROM MDP TO ATS-1".

3.5 GROUND SYSTEM TESTS:

ALL ELECTRICAL, OPERATIONAL, AND GROUND SYSTEM TESTS SHALL BE WITNESSED BY TPWD CONSTRUCTION PERSONNEL.

A. THE GROUNDING SYSTEM WILL BE TESTED BY A TPWD ELECTRICAL INSPECTOR AFTER INSTALLATION USING A GROUND ROD RESISTANCE TESTER EQUAL TO AEMC MODEL #6416 OR USING A FALL-OF-POTENTIAL GROUND RESISTANCE TESTER. IF THE GROUNDING SYSTEM HAS A RESISTANCE HIGHER THAN 25 OHMS, CONTACT THE ENGINEER TO VERIFY IF ANY ADDITIONAL ACTION IS REQUIRED.

3.6 ALL ELECTRICAL, OPERATIONAL, AND CONDUCTOR INSULATION TEST SHALL BE WITNESSED BY TPWD CONSTRUCTION PERSONNEL.

A. TEST INSTALLATION AFTER NEW WIRING IS COMPLETED AND WHEN EQUIPMENT IS CONNECTED AND READY FOR USE.

B. RESISTANCE BETWEEN CONDUCTORS AND BETWEEN EACH CONDUCTOR AND GROUND SHALL BE TESTED FOR ALL SERVICE ENTRANCE CONDUCTORS AND BRANCH FEEDER CONDUCTORS FOR ALL CONDUCTORS #4 AND LARGER. CONDUCTORS SHALL PASS A 500 VOLT MEGGER TEST PRIOR TO PLACING IN SERVICE WITH A MINIMUM ACCEPTABLE INSULATION RESISTANCE EQUAL TO OR GREATER THAN 100 MEG OHMS.

DIVISION 31 EARTHWORK SPECIFICATIONS

SECTION 31 20 00 – EARTH MOVING

PART 1 – GENERAL

1.1 HISTORICAL, ARCHEOLOGICAL, AND CULTURAL RESOURCES:

A. CONTRACTOR MAY ENCOUNTER HISTORICAL, ARCHEOLOGICAL, OR CULTURAL RESOURCES WITHIN THE WORK AREA.

B. RESOURCES INCLUDE BUT NOT LIMITED TO ANY HUMAN SKELETAL REMAINS OR BURIAL, ARTIFACTS, SHELL, MIDDEN, BONE, CHARCOAL, OR OTHER DEPOSITS, PAVING, WALL OR OTHER CONSTRUCTED FEATURE AND ANY INDICATION OF AGRICULTURAL OR OTHER HUMAN ACTIVITIES.

C. TPWD STAFF WILL CLOSELY MONITOR ALL TRENCHING DURING EXCAVATION. CONTRACTOR SHALL INFORM TPWD PERSONNEL OF HIS SCHEDULE AT LEAST SEVEN DAYS PRIOR TO INITIATION OF THE WORK TO ALLOW FOR SCHEDULING OF PERSONNEL TO OVERSEE THE WORK.

D. NO WORK SHALL COMMENCE UNTIL TPWD STAFF IS ON SITE TO OBSERVE THE EXCAVATION WORK. CONTRACTOR SHALL ADHERE TO ANY INSTRUCTIONS OR DIRECTIONS AS GIVEN BY TPWD REPRESENTATIVE.

E. IF DURING THE COURSE OF CONSTRUCTIONS ACTIVITIES, ANY RESOURCES ARE DISCOVERED, ALL ACTIVITIES THAT MAY DAMAGE OR ALTER SUCH RESOURCES SHALL BE TEMPORARILY SUSPENDED UNTIL OTHERWISE DIRECTED BY THE OWNER.

1.2 MATERIAL SUBMITTALS:

A. SUBMIT UNDER PROVISIONS OF "TERMS AND CONDITIONS" OF THE CONTRACT.

B. MARK ALL SUBMITTAL LITERATURE TO INDICATE THE PRECISE SELECTION OF MATERIALS, DIMENSIONS AND EQUIPMENT SUBMITTED. NOTE THAT IS THE SPECIFIC MODEL OR MATERIAL IS NOT INDICATED IN THE SUBMITTAL, AND THERE IS MORE THAN ONE CHOICE POSSIBLE, THE SUBMITTAL MAY BE REJECTED AND A RESUBMITTAL WILL BE REQUIRED.

C. PROPOSED SUBMITTAL LIST SHALL INCLUDED ALL EQUIPMENT WITH MANUFACTURER OR MODEL NUMBERS CALLED OUT IN THE DRAWINGS. WHERE THE PLANS AND SPECIFICATIONS CALL OUT A MANUFACTURER OR MODEL NUMBER, CONTRACTOR SHALL PROVIDE AND SUBMIT THE EXACT MANUFACTURER AND MODEL NUMBER OR EQUAL PRODUCT PER THE TERMS AND CONDITIONS.

CONTRACTOR'S PROJECT SUBMITTAL LIST:

CONTRACTOR'S LIST OF MATERIALS AND PRODUCTS REQUIRING A SUBMITTAL FOR REVIEW PRIOR TO INSTALLATION	MANUFACTURER'S PRODUCT INFO	INSTALLATION INSTRUCTIONS	MANUFACTURER MODEL NUMBER AND DESCRIPTION	LEGIBLE TYPE AND STYLE OF LAMP	LEGIBLE LENGTH AND QUANTITY OF LAMPS PER FIXTURE	METHOD DESCRIPTION	PROOF OF SKETCH
LOAD CENTERS AND BREAKERS	YES		YES				
SINGLE & DOUBLE THROW SAFETY DISCONNECTS	YES		YES				
GROUND RODS	YES		YES				
GROUND ROD TERMINATION CONNECTIONS	YES		YES				
SURGE PROTECTION DEVICES	YES	YES	YES				
CONDUCTORS, CABLES AND CONDUIT	YES		YES				

YES --MEANS YOU MUST SUBMIT THIS
either--MEANS YOU MUST SEND IN ONE OR THE OTHER.

WARRANTY (SUBMITTED AT CLOSE OUT.)
A. CONTRACTOR'S ONE YEAR LABOR AND MATERIAL WARRANTY CERTIFICATE WITH INSTRUCTIONS AND CONTACT INFORMATION OR WARRANTY WORK.
B. MANUFACTURER'S EXTENDED WARRANTIES.

TEXAS PARKS & WILDLIFE

STATE OF TEXAS
CARL OWEN NIX
93674
REGISTERED PROFESSIONAL ENGINEER
6/24/2020

CONSTRUCTION DRAWINGS

BONHAM STATE PARK SITE
REPLACE SEPTIC SYSTEM AT PARK
PROJECT: 1210853

DATE: 06-24-2020
DESIGNED BY: CN
DRAWN BY: CN
REVIEWED BY: CN
REVISED:
REVISED:
REVISED:

SHEET TITLE
ELECTRICAL SPECIFICATIONS

SHEET NUMBER
E5.1