

PLANS AND DETAILS FOR PROPOSED LIGHTING /ELECTRICAL CONSTRUCTION

NOTES

- 1 AT THESE LOCATIONS, PROVIDE ELECTRICAL DUCT IN ACCORDANCE WITH NEC EQUIRMENTS FOR AN APPROVED RACEWAY FOR ELECTRICAL CIRCUITS. SEE TABLE "C"
- 2 INSTALL ALL BORE PITS OUTSIDE THE CLEAR ZONE, AS DEFINED BY THE 2002 AASHTO ROADSIDE DESIGN GUIDE OR AS DIRECTED BY THE ENGINEER.
- 3 CIRCUITRY ROUTING AND JUNCTION BOXES PLACEMENT SHOWN ON THESE PLANS WAS DONE FOR VISUAL CLARITY. DURING CONSTRUCTION ROUTE CIRCUITRY AND PLACE JUNCTION BOXES FOR EASE OF INSTALLATION.
- 4 AT THESE LOCATIONS PROPOSED POST TOP FOUNDATIONS TO BE INSTALLED IN CONCRETE SIDEWALK. COORIDINATE FOUNDATION FORMING AND POURING WITH SIDEWALK FORMING AND POURING.
- 5 FOUNDATION LAYOUT BASED ON PLANS PROVIDED BY LLOYD WEATHERMAN OF PROGRESSIVE ENGINEERING CONSULTANTS, 704-545-7327.
- 6 JUNCTION BOXES ARE 18" L X 12" W X 18" H AND SHALL BE RATED A MINIMUM TIER 15 AS DEFINED BY ANSI/SCTE 77.
- 7 INSTALL JUNCTION BOXES WITHIN 2' RADIUS OF PROPOSED FOUNDATON.
- 8 INSTALL 2" RIGID GALVANIZED CONDUIT WITH WEATHERHEAD ON PROPOSED POWER POLE. CONNECTION TO TRANSFORMER TAPS TO BE PROVIDED BY OTHERS.
- 9 WHERE POSSIBLE CONDUIT AND JUNCTION BOXES SHOULD BE INSTALLED IN GRASSY AREAS BEHIND SIDEWALK AND INSIDE OF NCDOT RIGHT OF WAY. WHERE CONDUIT AND JUNCTION BOXES MUST BE INSTALLED IN CONCRETE SIDEWALK, COORDINATE EFFORTS TO TRENCH CONDUIT AND POSITION PROPOSED JUNCTION BOXES PRIOR TO SIDEWALK POURING.
- 10 INSTALL RIGID GALVANIZED CONDUIT (RGC) ABOVE GROUND, AND HIGH DENSITY POLYETHYLENE SDR 13.5 (HDPE) BELOW GROUND, EXCEPT AS MODIFIED IN THESE PLANSHEETS OR IN APPLICABLE SECTIONS OF THE ROADWAY STANDARD DRAWINGS FOR THIS PROJECT.

SCOPE OF WORK

INSTALL CONDUIT, JUNCTION BOXES AND FOUNDATIONS FOR A DECORATIVE POST TOP LIGHTING SYSTEM.

DESIGN CRITERIA

- 2005 AASHTO ROADWAY LIGHTING DESIGN GUIDE
- 2001 AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES, AND TRAFFIC SIGNALS, AND LATEST INTERIM SPECIFICATIONS VALID AT THE TIME OF LETTING
- 2008 NATIONAL ELECTRICAL CODE
- 2002 AASHTO ROADSIDE DESIGN GUIDE

ROADWAY STANDARDS

THE FOLLOWING ROADWAY ENGLISH STANDARDS AS APPEAR IN "NCDOT ROADWAY STANDARD DRAWINGS", ROADWAY DESIGN UNIT-N.C. DEPARTMENT OF TRANSPORTATION RALEIGH, N.C., DATED JULY 2006 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

STD NO.	TITLE
1405.01	STANDARD FOUNDATION
1409.01	ELECTRICAL DUCT
1411.01	ELECTRICAL JUNCTION BOXES

ALL WORK SHALL BE IN CONFORMANCE WITH DIVISION 14 OF THE STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES, DATED JULY 2006.

LEGEND

- PROPOSED FOUNDATION. CONTACT KARL CLOW WITH ELIZABETH CITY POWER (252-339-3708) FOR ANCHOR BOLT TEMPLATE. POLE TO BE INSTALLED BY OTHERS.
- JB1 PROPOSED ELECTRICAL JUNCTION BOX SEE DETAILS & TABLE B, THIS SHEET
- REFERENCE TO CORRESPONDING NOTE AS NUMBERED
- PROPOSED STREET LIGHTING CONDUIT SYSTEM. ONE (1) 2 INCH HDPE CONDUIT. CONDUIT PROVIDED BY ELIZABETH CITY POWER. CIRCUITRY TO BE PROVIDED BY OTHERS AT A LATER DATE.
- PROPOSED ELECTRICAL DUCT SIZE 4" TYPE (JA)

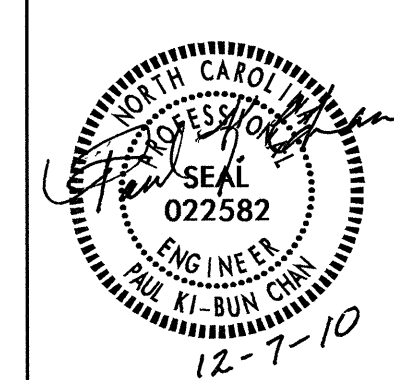
4" ELEC. DUCT JA

EQUIVALENTS		
TRADE SIZE	METRIC	ENGLISH
1/2	16mm	1/2"
3/4	21mm	3/4"
1	27mm	1"
1.5	41mm	1 1/2"
2	53mm	2"
3	78mm	3"

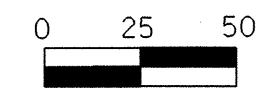
ABBREVIATIONS

BD	BURIED	PVC	PVC SCHEDULE 40 CONDUIT
LT	LIGHT	RGC	RIGID GALVANIZED STEEL CONDUIT
JA	JACKED	C	CONDUIT
MH	MOUNTING HEIGHT	CKT	CIRCUIT
Ø	PHASE	N	NEUTRAL
SER LAT	SERVICE LATERAL	G	GROUND
		HM	HIGH MAST

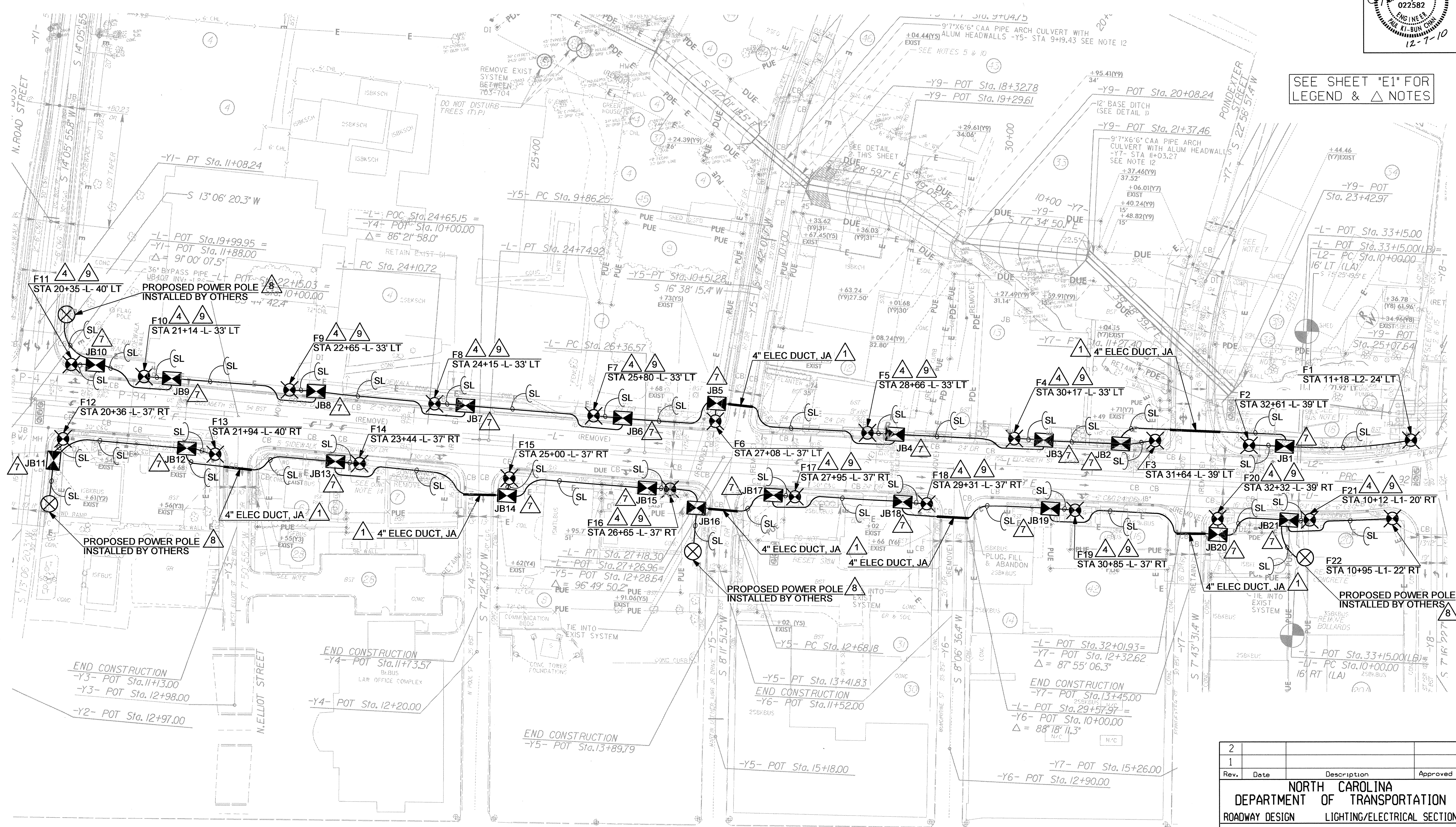
COMPUTED BY: RGH DATE: 12/07/10
 CHECKED BY: *Paul G. Chan* DATE: 12-7-10



USE FOR LIGHTING CONSTRUCTION ONLY



SEE SHEET "E1" FOR LEGEND & △ NOTES



2			
1			
Rev.	Date	Description	Approved

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
 ROADWAY DESIGN LIGHTING/ELECTRICAL SECTION
CONDUIT AND FOUNDATION LAYOUT
 US 158 - ELIZABETH CITY
 PASQUOTANK COUNTY
 Drawn By: **RGH** Approved By: **P KC** Dwg No.: **12-7-10**

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 rgh11 AT P0238321

REVISIONS
 REVISION A - PRELIMINARY, 12/06/2010
 REVISION B - PRELIMINARY, 12/14/2010
 REVISION C - PERMIT/CONSTRUCTION, 1/3/2011

GENERAL NOTES AND SPECIFICATIONS:

- ELECTRICAL CONTRACTOR SHALL FURNISH ALL LABOR, MATERIALS, EQUIPMENT AND INCIDENTALS REQUIRED TO INSTALL AND TEST, COMPLETE AND READY FOR OPERATION ALL ELECTRICAL WORK AS SPECIFIED IN THE SPECIFICATIONS AND AS SHOWN ON THE CONTRACT DRAWINGS.
- ALL ELECTRICAL DEVICES, MATERIALS, FIXTURES, EQUIPMENT AND FEEDERS SHALL BE LABEL-LISTED BY AN APPROVED THIRD PARTY TESTING AGENCY AND SHALL BE INSTALLED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS, THE MANUFACTURER'S RECOMMENDED INSTALLATION PROCEDURES, ALL APPLICABLE LOCAL AND STATE CODES, AND THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE.
- CONTRACTOR SHALL COORDINATE WITH DOT AND THE UTILITY FOR THE EXACT TRANSFORMER LOCATION, METERING REQUIREMENTS, AND SERVICE ROUTING. CONTRACTOR SHALL COORDINATE THE SCHEDULING OF THE INSTALLATION OF THE 480V, 3PH, 4W SERVICE WITH LOCAL UTILITY.
- THE CONTRACTOR SHALL CONTACT THE LOCAL ELECTRICAL UTILITY AND OBTAIN, IN WRITING, THE MAXIMUM AVAILABLE FAULT CURRENT AT THE UTILITY SERVICE POINT. THE CONTRACTOR SHALL ENSURE ALL ELECTRICAL EQUIPMENT, CIRCUIT BREAKERS, DISCONNECTS, FUSES, AND PANEL BOARDS HAVE A FAULT CURRENT INTERRUPTING RATING GREATER THAN THE AVAILABLE FAULT CURRENT.
- PROTECT EXISTING UNDERGROUND UTILITIES AND STORMWATER PIPING DURING CONSTRUCTION.
- COORDINATE ANY AND ALL WORK WITH ALL OTHER TRADES PRIOR TO INSTALLATION SO AS TO AVOID CONFLICT DURING CONSTRUCTION.
- ALL CONDUCTORS SHALL HAVE THHN/THWN INSULATION, UNLESS OTHERWISE NOTED.
- ALL DEVICE TERMINATIONS SHALL BE RATED AT 75 DEGREES C.
- UNDERGROUND CONDUIT SHALL BE RIGID PVC (SCHEDULE 40). USE SCHEDULE 80 FOR ELBOWS AND ABOVE GROUND CONDUIT. USE PVC-COATED RGS WHERE EXPOSED TO SEVERE PHYSICAL DAMAGE.
- NO MORE THAN 360 DEGREES OF BENDS SHALL BE MADE IN ANY CONDUIT WITHOUT A JUNCTION BOX OR PULL POINT.
- RTU PUMP CONTROL PANEL SHALL BE MANUFACTURED FROM 14 GAUGE 304 SS, GASKETED NEMA 12 RATED.
- CONNECT PUMP POWER AND CONTROL WIRING IN ACCORDANCE WITH CONTROLS INTERCONNECTION DIAGRAM.
- PROVIDE ADDITIONAL SUPPORT FOR DEVICES, FIXTURES, EQUIPMENT AND FEEDERS WHERE THE BUILDING CONSTRUCTION IS NOT SUITABLE FOR DIRECT MOUNTING.
- VERIFY CEILING SYSTEMS AND PROVIDE MOUNTING ACCESSORIES, TRIMS AND ALL REQUIRED MOUNTING HARDWARE TO SUIT THE PARTICULAR INSTALLATION.
- GROUND RODS SHALL BE COPPER CLAD, 10'-0" x 3/4"Ø.
- USE NON-HARDENING DUCT SEAL COMPOUND TO SEAL THE CONDUIT ENTERING MOTOR DISCONNECTS AND JUNCTION BOXES TO PREVENT MIGRATION OF MOISTURE INTO THE EQUIPMENT.

- ALL PANELS SHALL HAVE TYPED, COMPLETED DIRECTORIES INDICATING EQUIPMENT SERVED AND ROOM NUMBER (AS INDICATED ON FINAL BUILDING ROOM SIGNAGE) OF EQUIPMENT LOCATION, OR SPARE, OR SPACE.
- ALL FEEDERS AND CIRCUITRY SHALL BE TORQUED PER THE PANEL, BREAKER, AND/OR PARTICULAR EQUIPMENT MANUFACTURER'S SPECIFICATIONS.
- IN ACCORDANCE WITH NEC 702.8(A), PROVIDE SIGNAGE AT THE AUTOMATIC TRANSFER SWITCH ENCLOSURE TO READ, "EMERGENCY POWER IS SUPPLIED BY 500kW STANDBY GENERATOR LOCATED APPROXIMATELY 50 FEET FROM THE SHELTER BEYOND THE STORMWATER PIPING AND PUMPS PLATFORM."
- IN ACCORDANCE WITH NEC 702.8(B), PROVIDE SIGNAGE AT THE SERVICE DISCONNECT TO READ, "GROUNDING LOCATION FOR THE FOLLOWING POWER SOURCES: NORMAL SERVICE & 500kW STANDBY GENERATOR."
- CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL REQUIRED PERMITS.
- TURBINE AXIAL PUMPS ARE DRIVEN BY 12-POLE, LOW PF MOTORS. VFD'S SHALL BE SUITABLE FOR HIGH-AMPERAGE REQUIREMENTS OF THE MOTORS, WITHOUT INTRODUCING UNACCEPTABLE HARMONIC DISTORTION ON THE UTILITY SERVICE.
- PACKAGED ENGINE GENERATOR SET SHALL BE UL2200 LISTED, EPA TIER COMPLIANT, EQUAL TO THE FOLLOWING: CAT C15, KOHLER REOZB, OR GENERAC SD500. GENSET PACKAGE SHALL INCLUDE CRITICAL GRADE MUFFLER, SOUND-ATTENUATING ENCLOSURE FINISHED IN AN ENAMEL PAINT OF A NEUTRAL COLOR, UL142 SECONDARY CONTAINMENT DOUBLE WALL OUTDOOR USE SUB-BASE TANK, LOCAL CONTROL PANEL WITH E-STOP, AND REMOTE ANNUNCIATOR INSTALLED IN THE EQUIPMENT SHELTER.
- ATS SHALL BE 3-POLE, SOLID NEUTRAL, OPEN TRANSITION, ELECTRICALLY OPERATED & MECHANICALLY HELD, UL1008, WITH EITHER AN ADJUSTABLE TIMED DELAY IN THE NEUTRAL POSITION DURING TRANSFER OR CAPABLE OF SYNCHRONIZING PHASE WHEN SWITCHING BETWEEN ACTIVE SOURCES.

DESCRIPTION	INSTALLED KVA	DEMAND FACTOR	DEMAND KVA
LARGEST MOTOR*	143	1.25	179
ALL OTHER MOTORS*	286	1.00	286
PANEL 'LA' LOADS	11	--	12
TOTAL LOAD (kVA)	440		477
TOTAL DEMAND AMPS			574

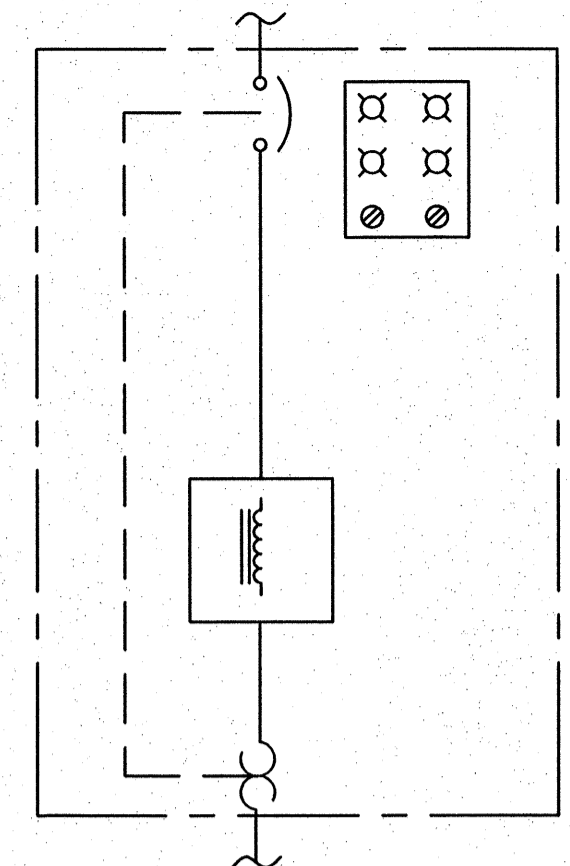
* MAXIMUM PUMP MOTOR KVA AS SEEN BY UTILITY AT VFD INPUT

ABBREVIATIONS:

- A AMP
- AFC ABOVE FINISHED CEILING
- AFF ABOVE FINISHED FLOOR
- AFG ABOVE FINISHED GRADE
- AIC AMPS INTERRUPTING CAPACITY
- ATS AUTOMATIC TRANSFER SWITCH
- BFF BELOW FINISHED FLOOR
- BFG BELOW FINISHED GRADE
- C CONDUIT
- CP CONTROL PANEL
- CU COPPER
- D DEEP
- DACT DIGITAL ALARM COMMUNICATOR TERMINAL
- D.E DUAL ELEMENT
- DED DEDICATED CIRCUIT
- DT DRY TRANSFORMER
- EG EQUIPMENT GROUND
- FACP FIRE ALARM CONTROL PANEL
- FAA FIRE ALARM REMOTE ANNUNCIATOR
- FIT FLOW INDICATING TRANSMITTER
- FMC FLEXIBLE METAL CONDUIT
- GEC GROUNDING ELECTRODE CONDUCTOR
- GEN GENERATOR
- GFCI GROUND FAULT CIRCUIT INTERRUPTER
- H HIGH
- HP HORSEPOWER
- IBC INTERNATIONAL BUILDING CODE
- IG ISOLATED GROUND
- JB JUNCTION BOX
- KW KILOWATT
- LS LIMIT SWITCH
- MCB MAIN CIRCUIT BREAKER
- MCC MOTOR CONTROL CENTER
- MLO MOTOR OPERATED VALVE
- MOV MOTOR OPERATED VALVE
- MTP MAIN TELECOMMUNICATIONS PANEL
- N NEUTRAL
- NEC NATIONAL ELECTRICAL CODE
- NFPA NATIONAL FIRE PROTECTION ASSOCIATION
- PC PHOTOCELL
- PF POWER FACTOR
- PHIT PH INDICATING TRANSMITTER
- PIT PRESSURE INDICATING TRANSMITTER
- PS PRESSURE SWITCH
- RTU REMOTE (OR RADIO) TELEMTRY UNIT
- SE SERVICE ENTRANCE
- TCL TOTAL CONNECTED LOAD
- TDL TOTAL DEMAND LOAD
- TRANSF TRANSFORMER
- TVSS TRANSIENT VOLTAGE SURGE & SPIKE
- TYP TYPICAL
- UL UNDERWRITERS LABORATORIES
- UNO UNLESS NOTED OTHERWISE
- UPS UNINTERRUPTED POWER SUPPLY
- VFD VARIABLE FREQUENCY DRIVE
- WIRE WIRE
- WP WEATHERPROOF

SYMBOL LEGEND:

- >> REMOVABLE ELEMENT
- || CONTACT (NORMALLY OPEN)
- ||| CONTACT (NORMALLY CLOSED)
- ⊕ THERMAL OVERLOAD RELAY
- ⊖ GROUND
- ⊕ HP MOTOR WITH HORSEPOWER
- ⊕ GEN GENERATOR
- ⊕ IL INDICATOR LIGHT (G=GREEN, R=RED)
- S SINGLE POLE SWITCH
- M METER
- CT CURRENT TRANSFORMER
- FUSE
- CIRCUIT BREAKER
- ⊕ DUPLX RECEPTACLE SUBSCRIPT DENOTES TYPE
GF DENOTES GROUND FAULT INTERRUPT
WP DENOTES WEATHER PROOF
- HOMERUN CONDUIT
- DISCONNECT SWITCH
- ⊕ THERMOSTAT
- S WALL SWITCH, SUBSCRIPT DENOTES TYPE
NO SUBSCRIPT DENOTES SINGLE POLE
2 DENOTES 2 WAY D DENOTES DIMMER
3 DENOTES 3 WAY P DENOTES PILOT LIGHT
4 DENOTES 4 WAY M DENOTES MOTOR STARTER
- MOV ACTUATOR
- 5/8" x 10' COPPER CLAD STEEL DRIVEN GROUND ROD
- 1/0 AWG BARE TINNED CU STRANDED UNLESS NOTED
- 4' FLUORESCENT STRIP LIGHT FIXTURE
- EXTERIOR WALL MOUNT LIGHT FIXTURE
- EMERGENCY WALL PACK WITH BATTERY



DRIVE CONTROLS & INDICATIONS

INDICATIONS
CONTROL POWER ON
RUN
FAULT
OVERLOAD

CONTROLS
TEST-NORMAL
HAND-OFF-AUTO

MOTOR DRIVE WITH DC CHOKE

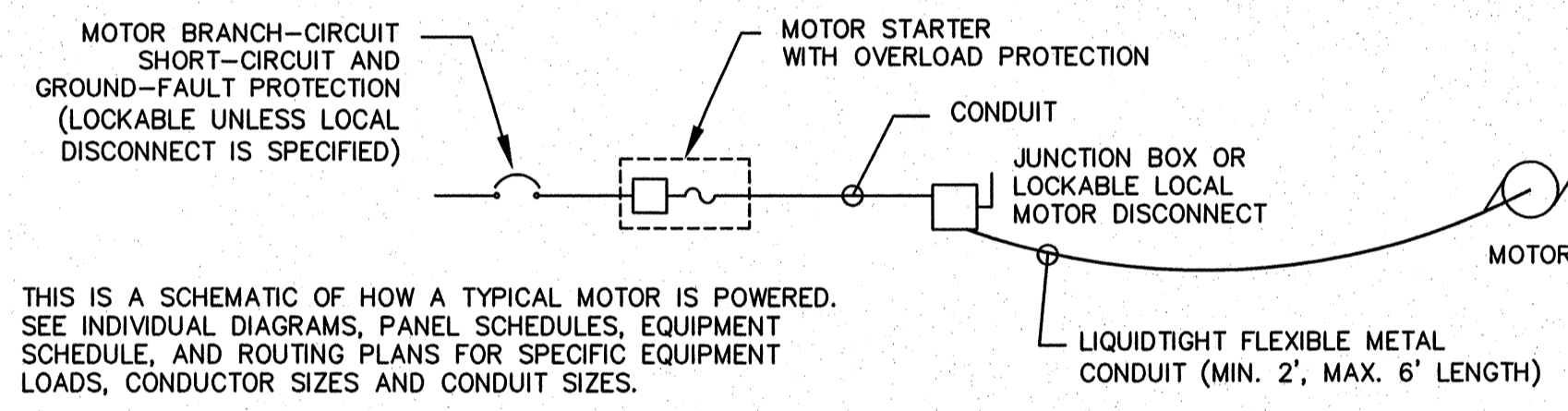
MIN. REQUIREMENTS
RATED HP: 125
RATED OUTPUT: 209A
INPUT PF: >0.95
OUTPUT PF: 0.60
INPUT THD: <6%
INPUT AMPS: 172A

4 VFD DETAIL
SCALE: NONE

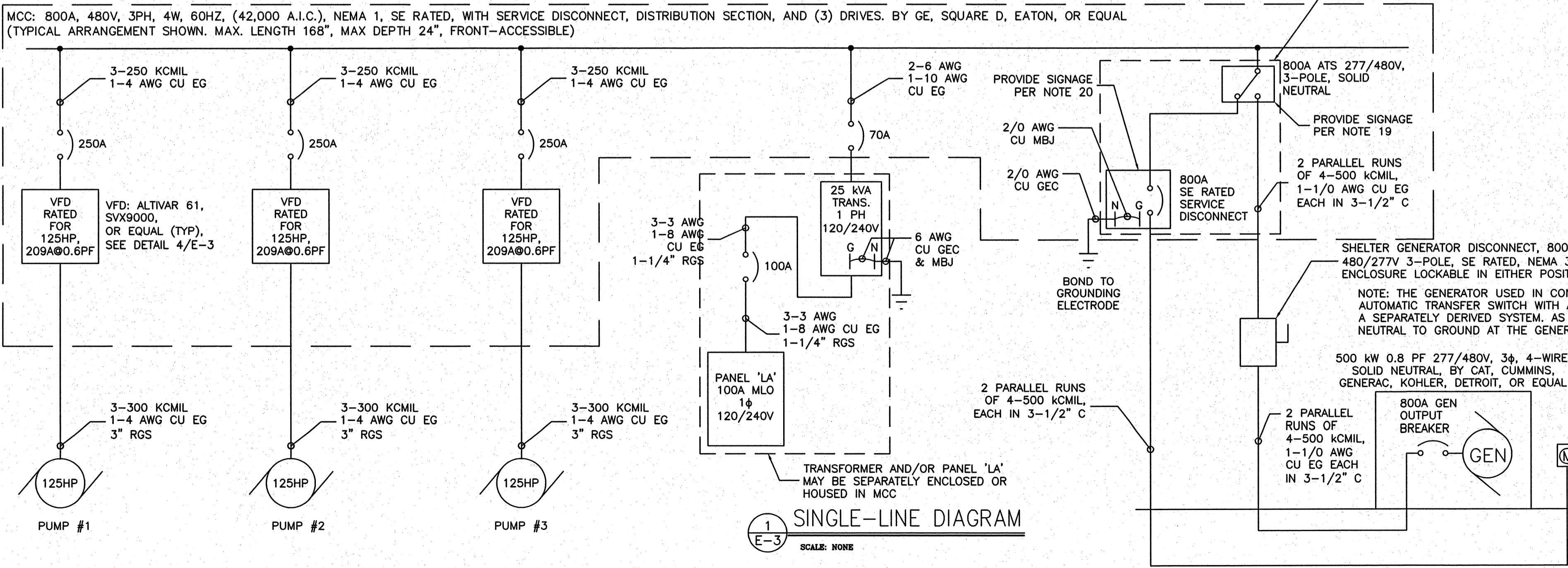
LOAD SERVED	KVA / Phase		CKT BRKR	CKT NO	NEUTRAL		CKT NO	CKT BRKR	KVA / Phase		LOAD SERVED
	A	B			A	B			A	B	
INTERIOR LIGHTING	0.25	--	--	1	1	2	2	2P-30	1.80	--	HVAC UNIT
EXTERIOR LIGHTING	--	0.10	--	3	4	4	8	2P-30	--	1.80	HVAC UNIT
RECEPTS	0.54	--	--	5	6	6	12	1P-20	0.05	--	GEN. BATT. CHARGER
EXT GFI RECEPTS	--	0.18	--	7	8	8	16	1P-20	--	1.00	GEN. BLOCK HEATER
SPACE	0.00	--	--	9	10	10	20	--	--	0.25	SCADA RTU
SPACE	--	0.00	--	11	12	12	24	1P-20	0.10	--	LEVEL/PUMP CONTROLLER
SPACE	0.00	--	--	13	14	14	28	--	--	0.00	SPACE
SPACE	--	0.00	--	15	16	16	32	--	--	0.00	SPACE
SPACE	0.00	--	--	17	18	18	36	--	--	0.00	SPACE
SPACE	--	0.00	--	19	20	20	40	--	--	0.00	SPACE
SPACE	0.00	--	--	21	22	22	44	--	--	0.00	SPACE
SPACE	--	0.00	--	23	24	24	48	--	--	0.00	SPACE
SUB TOTAL	0.79	0.28							4.75	4.85	SUB TOTAL
									5.54	5.13	TOTAL

C/B TEMP. 75 C. MOUNTING SURFACE	RATING	CONNECTED KVA		NEC DEM FACTOR	DEMAND KVA	
		A	B		A	B
ISOLATED GROUND BUS	NO	0.25	0.00	125%	0.32	0.00
MAIN CIRCUIT BREAKER	NO			<10 KVA@100%	0.54	0.18
SERVICE ENTR. RATED	NO	0.54	0.18	>10KVA@50%	0.00	0.00
MINIMUM AIC (K AMPS)	10	1.80	1.80	125%	2.25	2.25
MCB RATING MLO		2.95	3.05	100%	2.95	3.05
BUS RATING 100A		0.00	0.10	125%	0.00	0.13
NEUTRAL RATING 100%		0.00	0.00	125%	0.00	0.00
		0.00	0.00	100%	0.00	0.00
TOTAL KVA PER PHASE		5.54	5.13		6.08	5.61
TOTAL DEMAND AMPERES PER PHASE					50	47
PANEL / FEEDER (TOTAL KVA)						11.68
(TOTAL KVA) X 1000 = TOTAL AMPS VOLTS						49

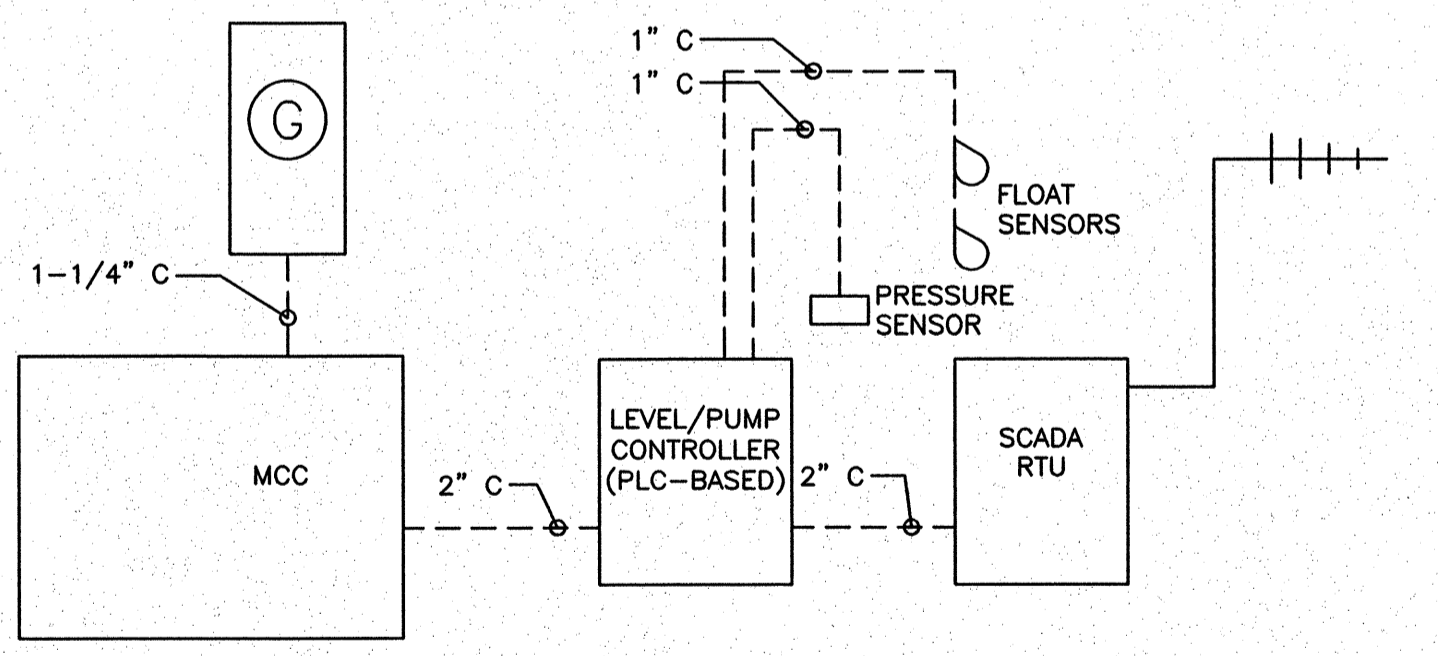
PANEL 'LA'



2 TYPICAL MOTOR SCHEMATIC
SCALE: NONE



1 SINGLE-LINE DIAGRAM
SCALE: NONE



3 CONTROLS INTERCONNECTION DIAGRAM
SCALE: NONE

PROJECT REFERENCE NO. U-4438 SHEET NO. E-3

R/W SHEET NO.

Kimley-Horn and Associates, Inc.

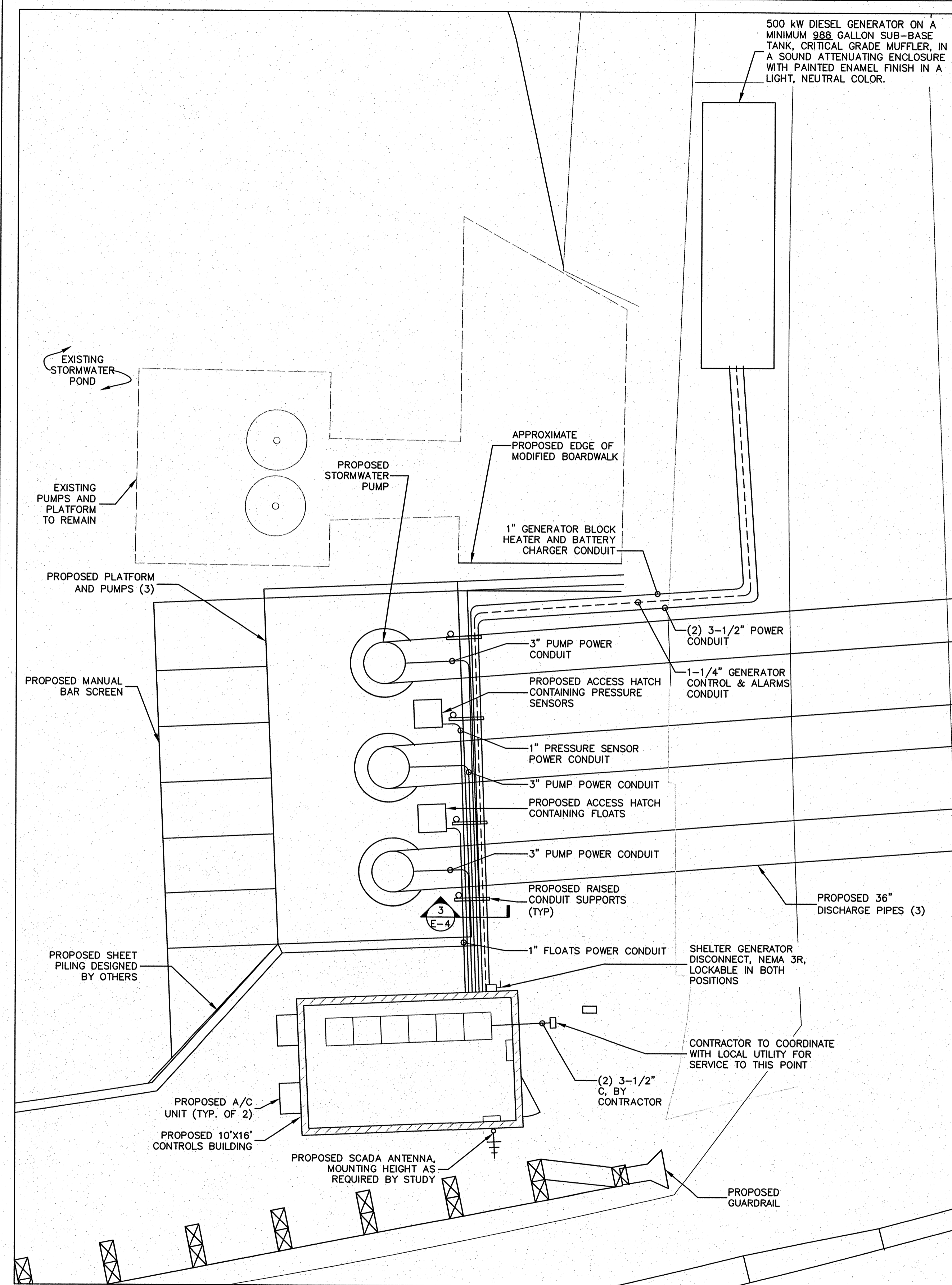
P.O. BOX 33068
RALEIGH, N.C. 27636-3068

RIGHT-OF-WAY REV.
CONST. REV.

APOGEE 7330 Chapel Hill Road Suite 202 Raleigh, N.C. 27607 (919) 858-7420 Fax (919) 858-7423 Apogee Project # 2010 201

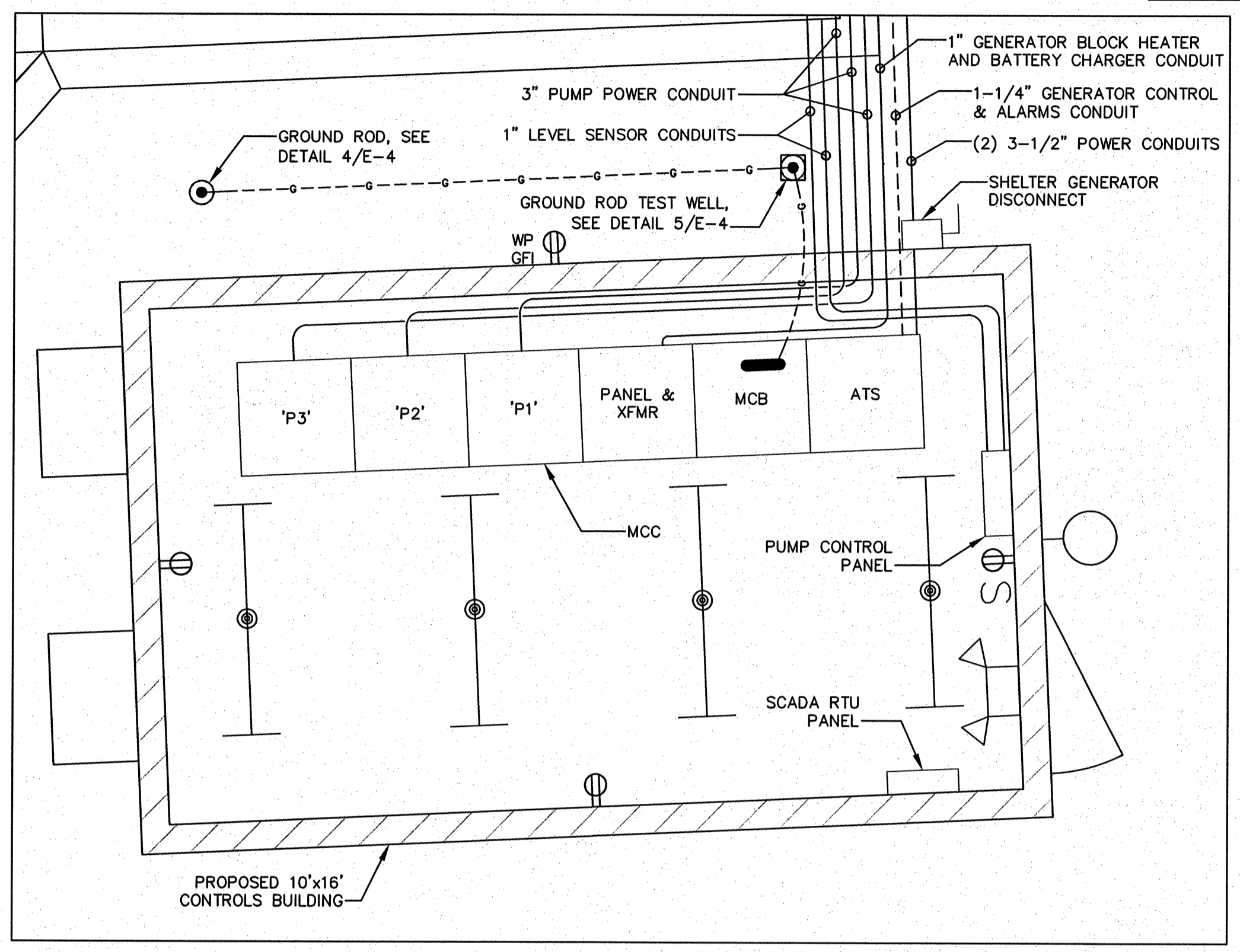
REVISIONS

REVISION A - PRELIMINARY, 12/06/2010
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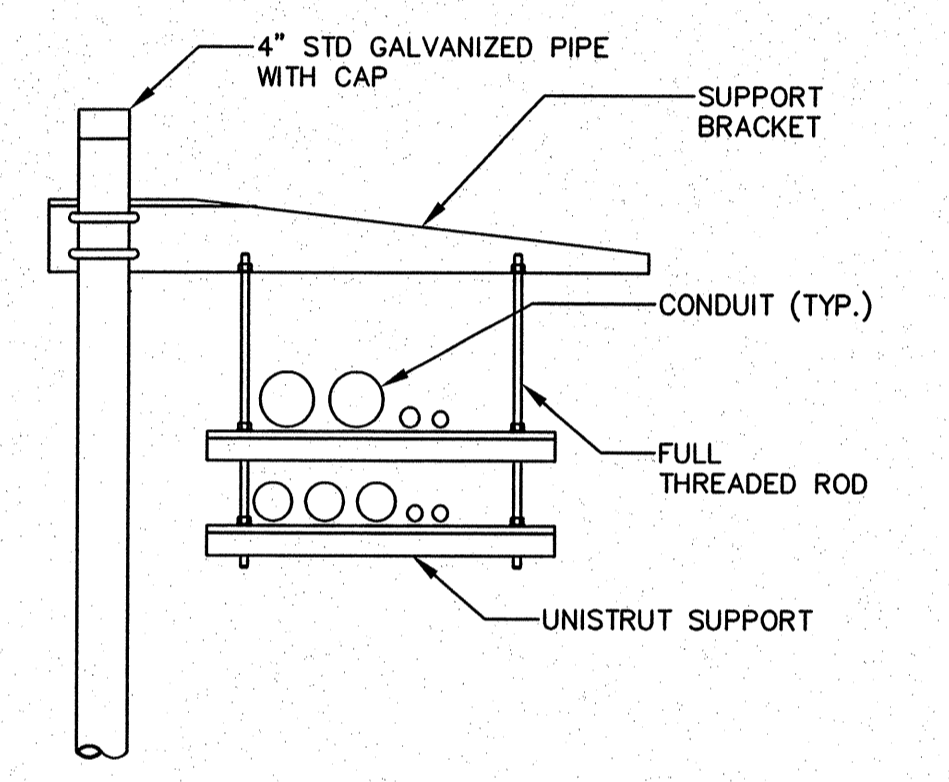


1 BASIC SERVICE ROUTING & GROUNDING PLAN
 SCALE: 1" = 6'

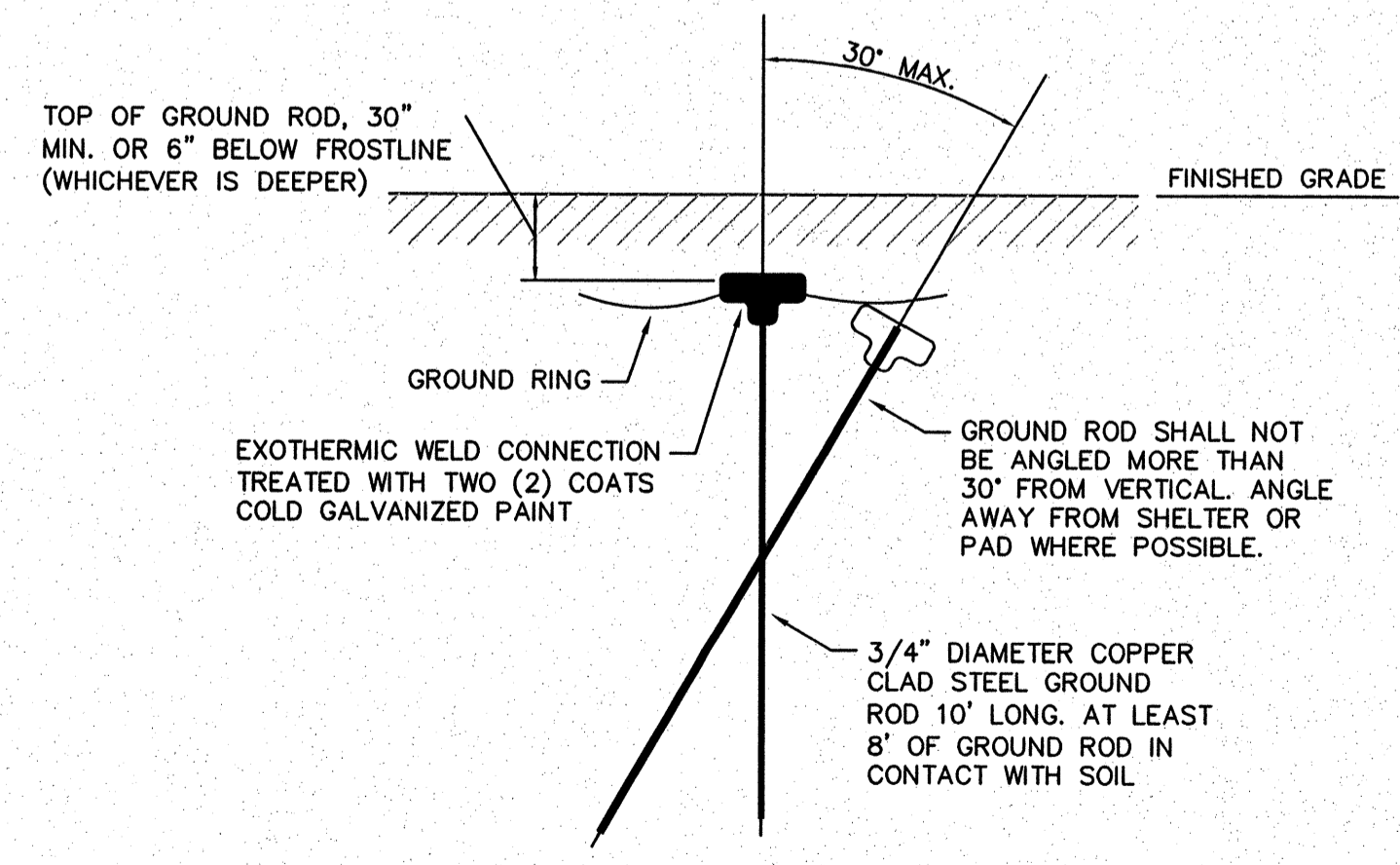
NOTES:
 1. CONDUIT ROUTINGS SHOWN FOR REFERENCE PURPOSES ONLY. CONTRACTOR TO FIELD ROUTE AS NECESSARY.
 2. ALL SHELTER RECEPTACLES, LIGHTS AND A/C UNITS TO BE PROVIDED AND WIRED BY SHELTER MANUFACTURER.



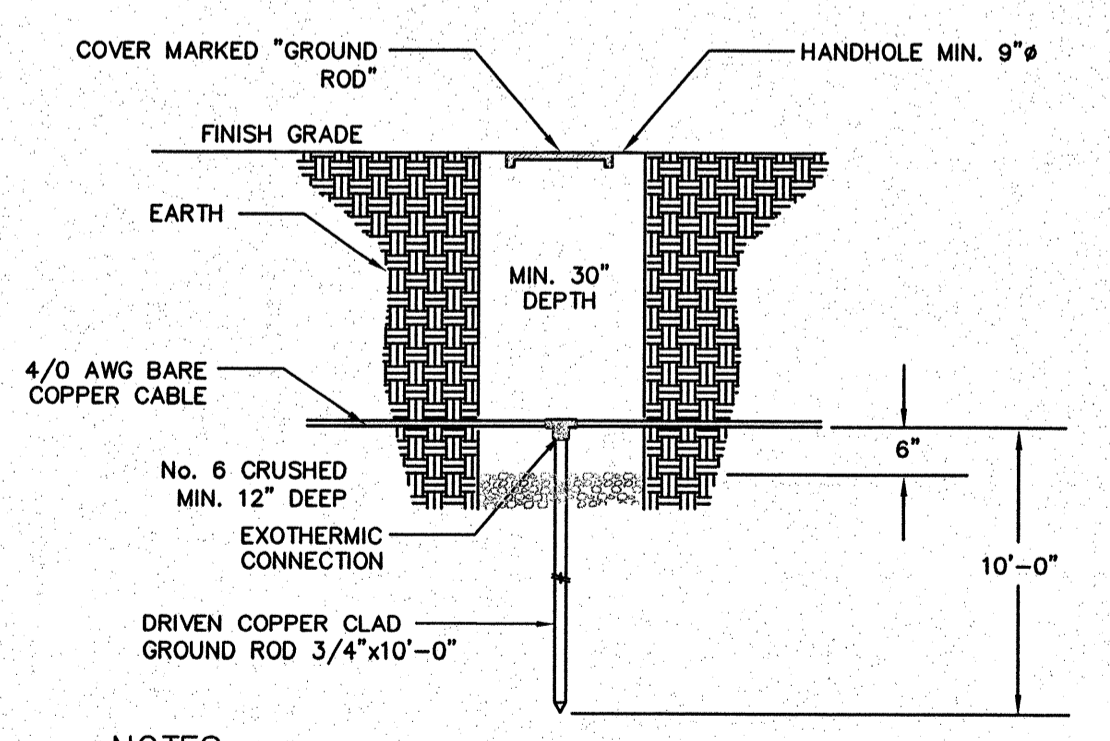
2 PROPOSED CONTROLS BUILDING DETAIL
 SCALE: 1" = 2'



3 CONDUIT SUPPORT-DETAIL
 SCALE: N.T.S.



4 GROUND ROD DETAIL
 SCALE: N.T.S.



NOTES:
 1. REFER TO JOB SPECIFICATION FOR MINIMUM SYSTEM RESISTANCE TO GROUND. IF THIS RESISTANCE CANNOT BE MET WITH SINGLE 10'-0" RODS, ADD ADDITIONAL SECTIONS TO RODS OR ADD NEW RODS AS REQUIRED, SPACED 20'-0" FROM EXISTING RODS.

5 GROUND ROD TEST WELL
 SCALE: N.T.S.

PROJECT REFERENCE NO.	SHEET NO.
U-4438	E-4
R/W SHEET NO.	

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RIGHT-OF-WAY REV.
 CONST. REV.

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