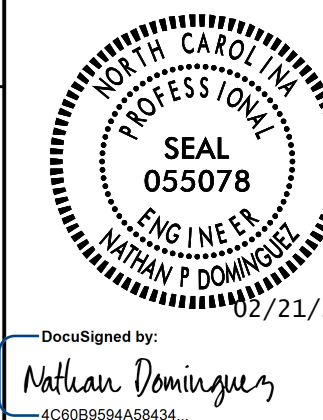


PLANS AND DETAILS FOR PROPOSED LIGHTING /ELECTRICAL CONSTRUCTION

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NOTES

- 1 AT THESE LOCATIONS, PROVIDE ELECTRICAL DUCT IN ACCORDANCE WITH NEC REQUIREMENTS FOR AN APPROVED RACEWAY FOR ELECTRICAL CIRCUITS. SEE TABLE "B".
- 2 INSTALL ALL BORE PITS OUTSIDE THE CLEAR ZONE, AS DEFINED BY THE 2011 AASHTO ROADSIDE DESIGN GUIDE OR AS DIRECTED BY THE ENGINEER.
- 3 LOCATE ALL JUNCTION BOXES OUTSIDE CLEAR ZONE AND IN AN AREA UNLIKELY TO BE USED BY TRAFFIC.
- 4 LOCATE PROPOSED CONTROL SYSTEM IN AN AREA ACCESSIBLE FOR MAINTENANCE VEHICLES AND OUTSIDE OF CLEAR ZONE AS DEFINED BY THE 2011 AASHTO ROADSIDE DESIGN GUIDE.
- 5 INSTALL RIGID GALVANIZED CONDUIT (RGC) ABOVE GROUND, AND POLYVINYL CHLORIDE (PVC) SCHEDULE 40 CONDUIT UNDERGROUND, EXCEPT AS MODIFIED ON THESE PLANSHEETS OR IN APPLICABLE SECTIONS OF THE ROADWAY STANDARD DRAWINGS FOR THIS PROJECT.
- 6 ALL IN GROUND JUNCTION BOXES SHALL BE 18" HIGH AND ALL BARRIER RAIL AND SIDEWALK JUNCTION BOXES SHALL BE 6" HIGH, UNLESS OTHERWISE NOTED.
- 7 CONTRACTOR SHALL RECORD THE GPS COORDINATES OF EACH JUNCTION BOX WITHIN 3' ACCURACY, IN THE JUNCTION BOX SUMMARY, TABLE "C". PROVIDE A COPY OF THE JUNCTION BOX SUMMARY WITH THESE COORDINATES TO THE LIGHTING ENGINEER DURING PROJECT INSPECTION.
- 8 LIGHT NUMBERING CONVENTION: CONTROL SYSTEM-LIGHT #-CKT # (A-3-2).
- 10 SERVICE POLE SHALL NOT BE INSTALLED PRIOR TO COORDINATION WITH THE LOCAL UTILITY. PROVIDE PROOF OF COORDINATION AND PROOF OF NEED TO THE ENGINEER AFTER CONSULTING WITH THE LOCAL UTILITY. THE SERVICE POLE MAY BE DELETED FROM THE CONTRACT IF NOT REQUIRED. REFER TO ARTICLE 1407-3 OF THE 2018 NCDOT STANDARD SPECIFICATIONS FOR ROADS AND BRIDGES.
- 11 WHERE A CURRENT TRANSFORMER (CT) CABINET IS REQUIRED, THE CT CABINET AND ASSOCIATED HARDWARE ARE INCIDENTAL TO THE PAY ITEM FOR THE LIGHTING CONTROL PANEL.
- 12 LIGHTING CONTRACTOR SHALL COORDINATE WORK WITH CULVERT CONTRACTOR AND MANUFACTURER. ALL CONCRETE INSERTS FOR CONDUIT SYSTEM AND LUMINAIRE BRACKETS MUST BE INSTALLED IN CULVERT DURING FABRICATION. FIELD DRILLING OF CULVERT WALL IS NOT ALLOWED.

SCOPE OF WORK

PLACE ROADWAY TUNNEL LIGHTING SYSTEM INTO SERVICE BY PROVIDING AND INSTALLING WALL MOUNT LIGHT ON BRACKET WITH LIGHT EMITTING DIODE LUMINAIRES, SURFACE MOUNTED CIRCUITRY AND A CONTROL SYSTEM.

DESIGN CRITERIA

MINIMUM 4.5 AVERAGE FOOTCANDLE WITH 3:1 AVERAGE TO MINIMUM UNIFORMITY RATIO ON TRAVEL LANES IN THE DAY TIME.
 AT DUSK HALF OF THE LIGHTS SHALL BE TURNED OFF.
 2020 NATIONAL ELECTRICAL CODE
 2011 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 JANUARY 2024 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

STD NO.	TITLE
1407.01	ELECTRIC SERVICE POLE AND LATERAL
1409.01	ELECTRICAL DUCT
1410.01	FEEDER CIRCUITS

ALL WORK SHALL BE IN CONFORMANCE WITH DIVISION 14 OF THE STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES, DATED JANUARY 2024.

LEGEND

- PROPOSED TUNNEL LUMINAIRE WITH SS MOUNTING PLATE. TYPE WM, 240V, 85W MAX. LED, 3,000K COLOR TEMPERATURE, MIN. 70 CRI.
- REFERENCE TO CORRESPONDING NOTE AS NUMBERED.
- PROPOSED FEEDER CIRCUIT. CONTROL SYSTEM (A), CIRCUIT NUMBER (1) PLAN SYMBOL (10). SEE TABLE A, THIS SHEET.
- PROPOSED CONTROL SYSTEM WITH JUNCTION BOX. SEE PLANS FOR BREAKER SIZES.
- PROPOSED ELECTRICAL JUNCTION BOX. SEE TABLE C, SHEET E1A, FOR DETAILS AND TYPE.
- REFERENCE TO CORRESPONDING NOTE AS NUMBERED.
- PROPOSED FEEDER CIRCUIT. CONTROL SYSTEM (A), CIRCUIT NUMBER (1) PLAN SYMBOL (10R). SEE TABLE A, THIS SHEET.
- PROPOSED 30' CLASS 4 SERVICE POLE AND LATERAL 3 #1/0 USE 2" CONDUIT
- PROPOSED ELECTRICAL DUCT SIZE 2", 3" OR 4" TYPE (TL) OR (BD) LOCATION: SEE TABLE B, SHEET E1A.
2", 3" OR 4" ELEC. DUCT TL & BD

TABLE "A"
CIRCUITRY CONDUCTOR CONDUIT TYPE & SIZE

PLAN SYMBOL	DESCRIPTION	CONTRACT ITEM
10R	2 #10Ø 1 #10G 1" RGS	2 AWG SIZE 10 CONDUCTOR (BK & RD) 1 AWG SIZE 10 GROUNDING CONDUCTOR 1" RIGID GALVANIZED STEEL CONDUIT
10P	2 #10Ø 1 #10G 1" PVC	2 AWG SIZE 10 CONDUCTOR (BK & RD) 1 AWG SIZE 10 GROUNDING CONDUCTOR 1" PVC CONDUIT

ABBREVIATIONS

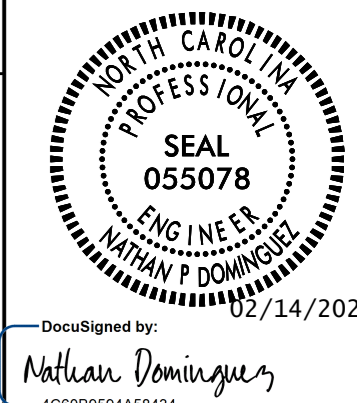
BD	BURIED	PVC	PVC SCHEDULE 40 CONDUIT
LT	LIGHT	RGS	RIGID GALVANIZED STEEL CONDUIT
TL	TRENCHLESS	C	CONDUIT
MH	MOUNTING HEIGHT	CKT	CIRCUIT
Ø	PHASE	N	NEUTRAL
SER LAT	SERVICE LATERAL	G	GROUND
IGJB	IN GROUND JUNCTION BOX	HM	HIGH MAST
LED	LIGHT EMITTING DIODE	LSJB	LIGHT STANDARD JUNCTION BOX
HMJB	HIGH MAST JUNCTION BOX	CSJB	CONTROL SYSTEM JUNCTION BOX

COMPUTED BY: RGH DATE: 02/21/2024
 CHECKED BY: NPD DATE: 02/21/2024


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**TABLE "C"
JUNCTION BOX SUMMARY**

SHEET	LABEL	LOCATION AND OFFSET	CONTROL SYSTEM "A"													GPS LOCATION 	
			TYPE, PAY ITEM & SIZE														
			IN GROUND			LIGHT STANDARD			HIGH MAST			CONTROL SYSTEM	BARRIER RAIL	SIDE WALK	LAT/LONG		
IG18 18"X12"	IG30 30"X17"	IG36 36"X24"	LS18 18"X12"	LS30 30"X17"	LS36 36"X24"	HM18 18"X12"	HM30 30"X17"	HM36 36"X24"	CS36 36"X24"	BR18 18"X12"	SW18 18"X12"						
E2	JBA1	-Y1 - STA. 10+23, 23' RT	X														
E2	CSAJB	2' FROM CSA											X				
CSA TOTALS			1										1				

**TABLE "B"
ELECTRICAL DUCT SUMMARY
(ESTIMATED LENGTH IN FEET)**

LOCATION	RACEWAY 	SHEET	TYPE														
			JACKED (JA) FEET				BURIED (BD) FEET										
			SIZE 2"	SIZE 3"	SIZE 4"	SIZE 6"	SIZE 2"	SIZE 3"	SIZE 4"	SIZE 6"							
-Y1 - STA. 10+23										70							
CSA TOTALS										70							

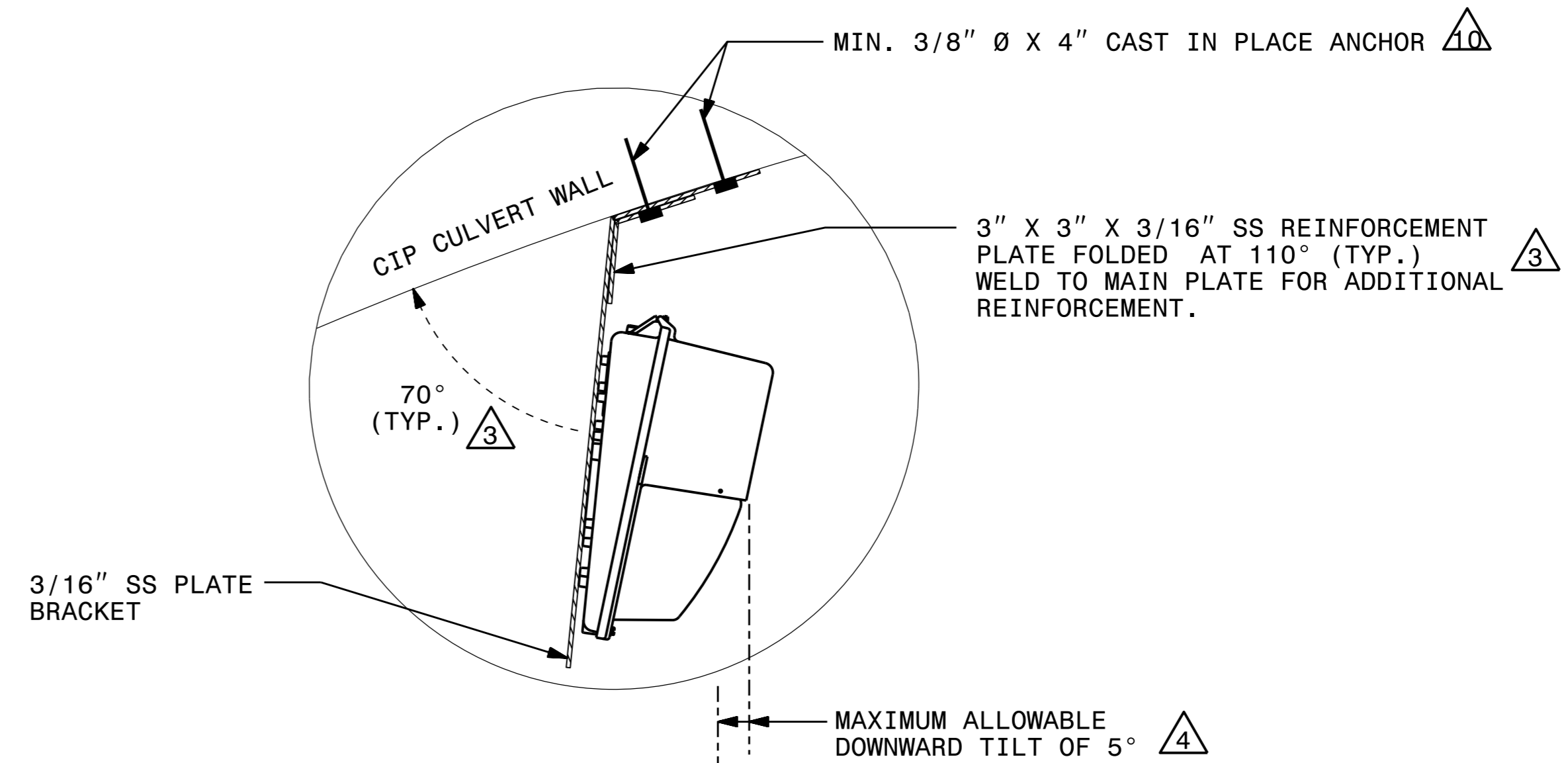
SEE SHEET "E-1" FOR
LEGEND &  NOTES

USE FOR LIGHTING CONSTRUCTION ONLY



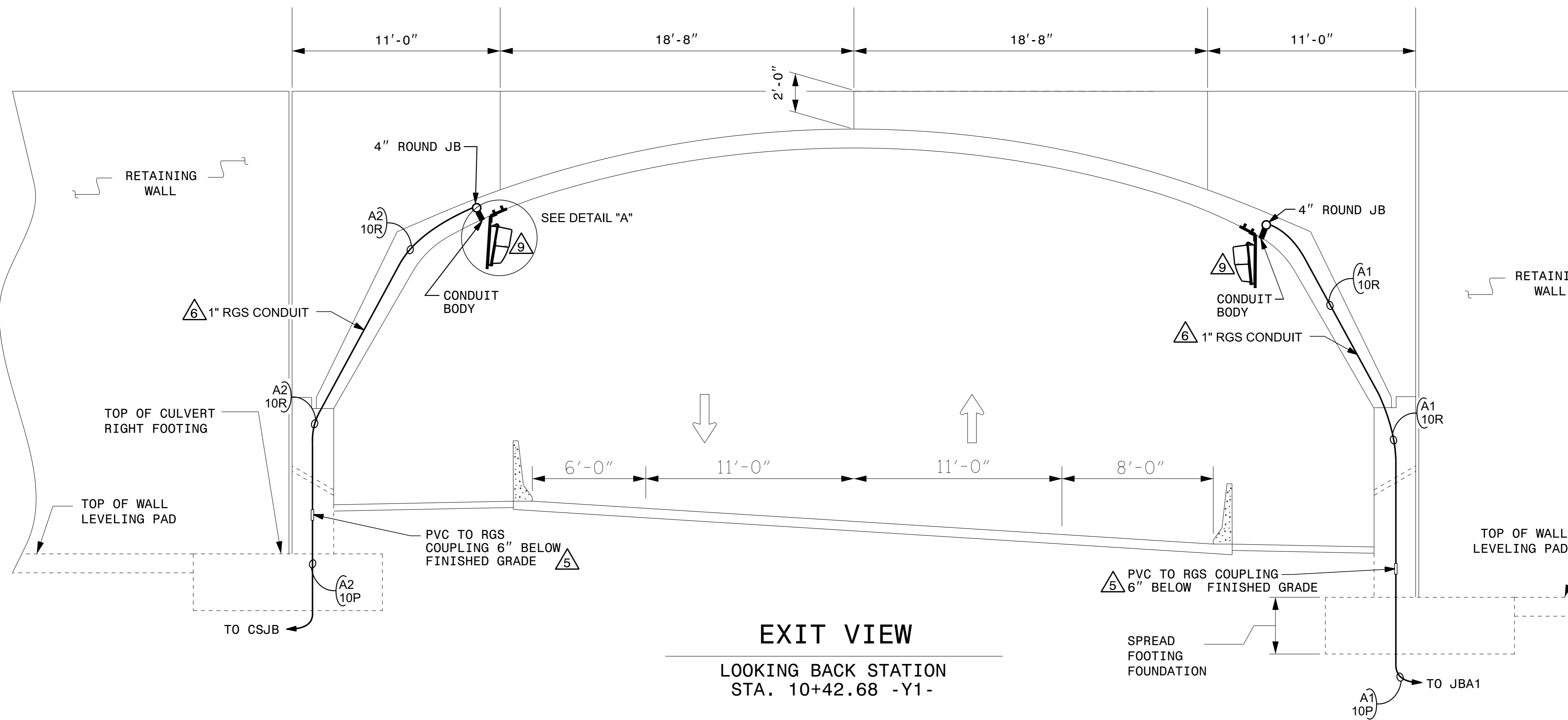
NOTES FOR THIS SHEET

- 1 INCLUDE AN RGC EXPANSION FITTING AT ALL CULVERT EXPANSION JOINTS.
- 2 CSJB IS CONTROL SYSTEM JB.
- 3 ANGLES ARE THEORETICAL ONLY. ACTUAL ANGLE MUST BE VERIFIED FROM THE SITE PRIOR TO MANUFACTURING MOUNTING PLATE.
- 4 ANGLE MAY BE FINE TUNED WITH WASHERS BETWEEN THE BACK OF THE LUMINAIRE AND THE MOUNTING PLATE.
- 5 APPLY TWO LAYERS OF BITUMINOUS COATING TO ALL RGS CONDUIT UNDERGROUND AND FOR 6" ABOVE GRADE.
- 6 USE SWEEPS AND BENDS AS REQUIRED TO MATCH CURVATURE OF CULVERT FACE.
- 7 SURFACE MOUNT 1" RGS CONDUIT ALONG FACE OF CULVERT. PROVIDE CONDUIT STRAPS W/BACK FOR SUPPORTING CONDUITS. INSTALL STRAPS AT 12' SPACING, MAXIMUM, AND INSTALL WITHIN 3' OF JUNCTION BOXES AND CONDULETS.
- 8 SEE SHEET E-3 FOR ADDITIONAL MOUNTING AND PLACEMENT DETAILS.
- 9 INSTALL MOUNTING BRACKET AND LUMINAIRE SUCH THAT FACE OF LUMINAIRE IS APPROXIMATELY 6" BEHIND THE BACK OF CONCRETE BARRIER.
- 10 LIGHTING CONTRACTOR SHALL COORDINATE WORK WITH CULVERT CONTRACTOR AND MANUFACTURER. ALL CONCRETE INSERTS FOR CONDUIT SYSTEM AND LUMINAIRE BRACKETS MUST BE INSTALLED IN CULVERT DURING CASTING. FIELD DRILLING OF CULVERT WALL IS NOT ALLOWED.



DETAIL "A"
(LUMINAIRE ON BRACKET IN TUNNEL)

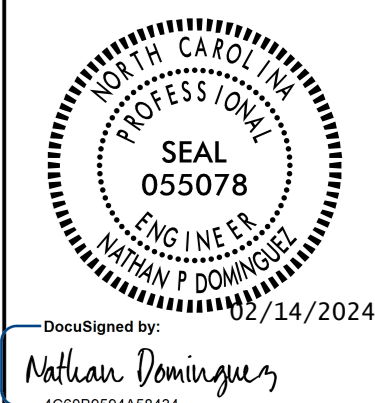
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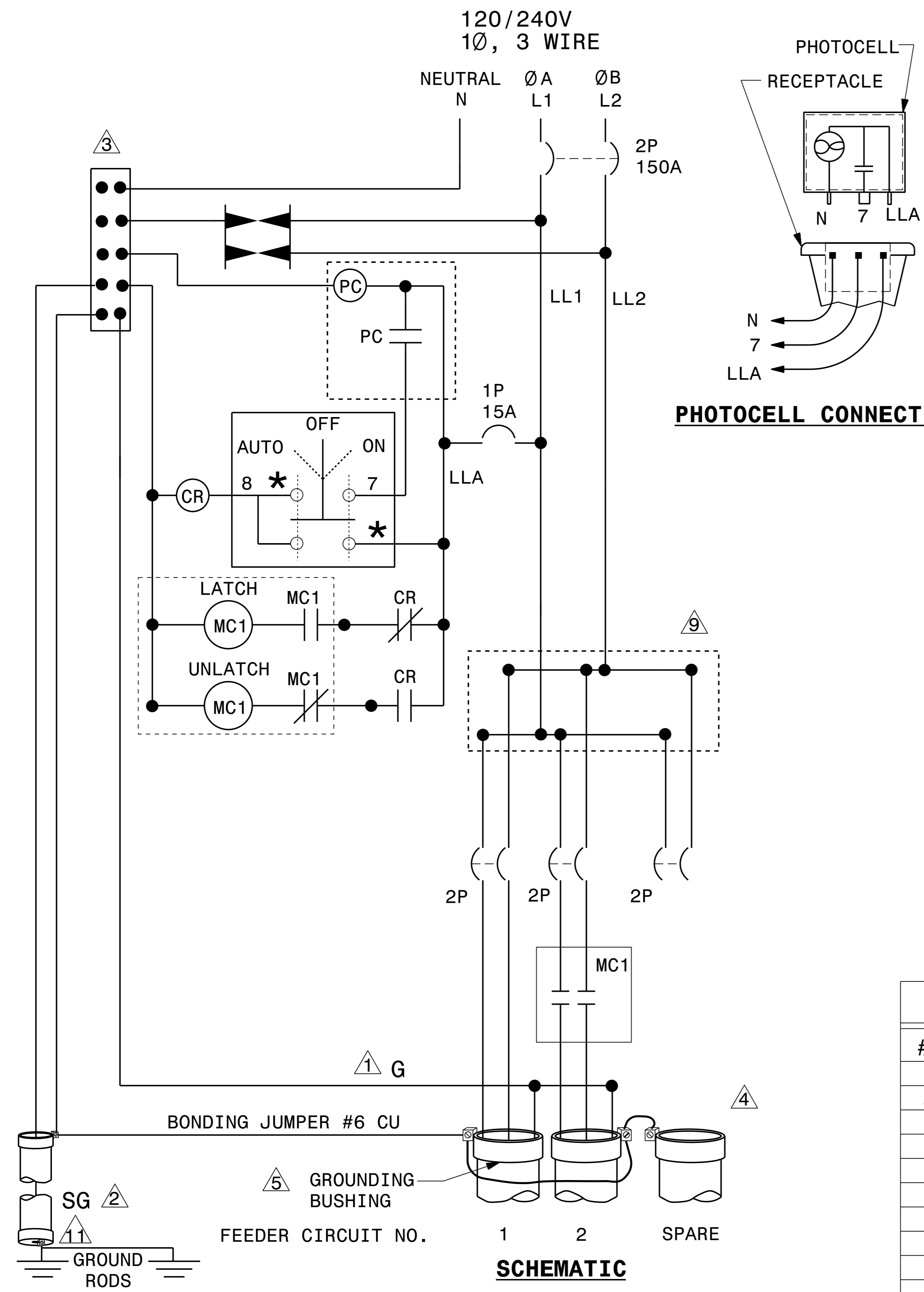
EXIT VIEW
LOOKING BACK STATION
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Rev.	Date	Description	Approved
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION ROADWAY DESIGN LIGHTING/ELECTRICAL SECTION CULVERT CONDUIT ATTACHMENT DETAILS BEAVERDAM ROAD CULVERT UNDER I-40 HAYWOOD COUNTY			
Drawn By:	Approved By:	Dwg No.:	
RGH			

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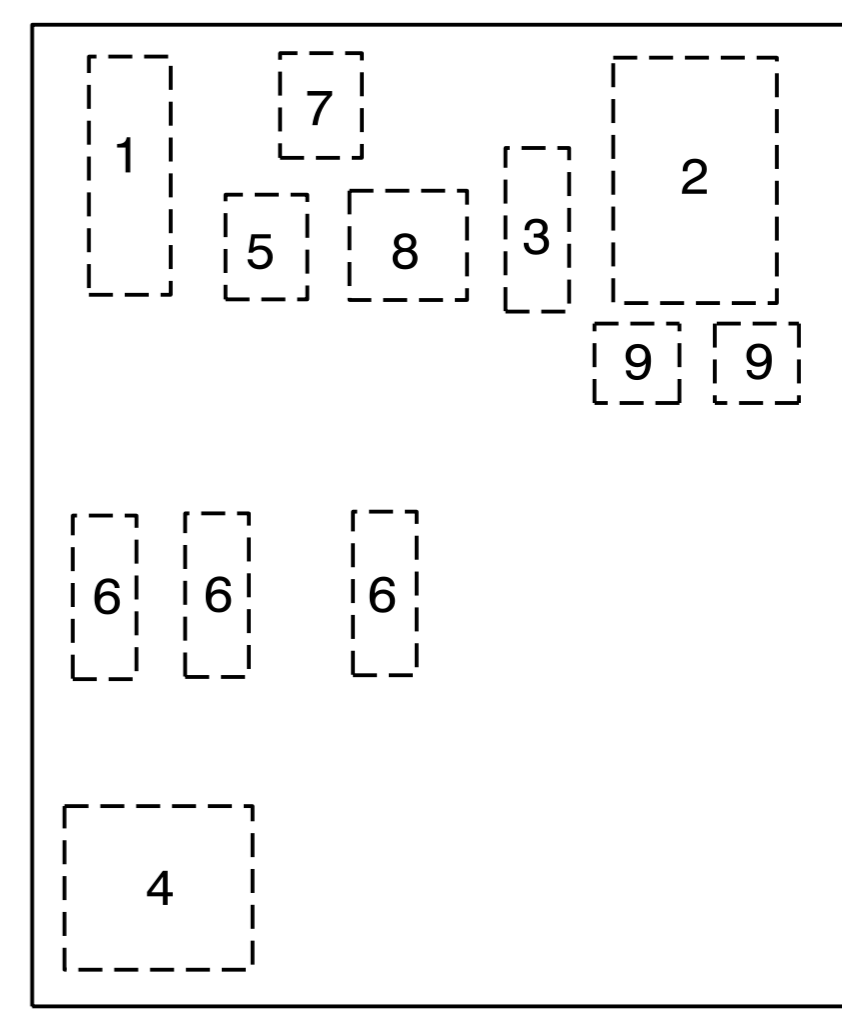
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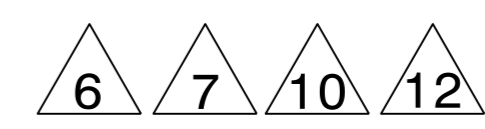
PHOTOCELL CONNECTIONS

- NOTES**
- 1 EQUIPMENT GROUNDS (G) SHALL BE SIZED ACCORDING TO CIRCUIT DESCRIPTION. SEE PLANS.
 - 2 SYSTEM GROUND (SG) SHALL BE CONTINUOUS FROM THE NEUTRAL BAR TO THE GROUNDING ELECTRODE (GROUND ROD).
 - 3 THE NEUTRAL BAR SHALL BE BONDED TO THE PANEL.
 - 4 INSTALL 3 CONDUITS AS SHOWN. UNUSED CONDUIT SHALL BE CAPPED IN THE CONTROL SYSTEM JUNCTION BOX.
 - 5 INSTALL A GROUNDING BUSHING ON EACH METAL CONDUIT. CONNECT BONDING JUMPER AS REQUIRED BY NEC.
 - 6 SEE SHEET E-6 FOR ENCLOSURE.
 - 7 THE CONTROL SYSTEM MUST BE LABELED "SUITABLE FOR USE AS SERVICE EQUIPMENT." REFER TO STANDARD SPECIFICATION 1408-2 FOR OTHER REQUIREMENTS.
 - 8 REMOVED
 - 9 PROVIDE MULTI-TAP LOAD LUGS OR POWER DISTRIBUTION BLOCKS.
 - 10 PROVIDE MANUFACTURER SUPPLIED MOUNTING BRACKETS OR SCREW STUDS PERMANENTLY ATTACHED TO THE BACK PANEL, FOR MOUNTING COMPONENTS.
 - 11 PROVIDE AND INSTALL A CONDUIT CHOKE ON THE UNDERGROUND END OF THE 3/4" RGS SYSTEM GROUND CONDUIT.

12 INCLUDE SERVICE BARRIERS AS REQUIRED BY THE NEC.



INTERIOR PANEL COMPONENT LAYOUT

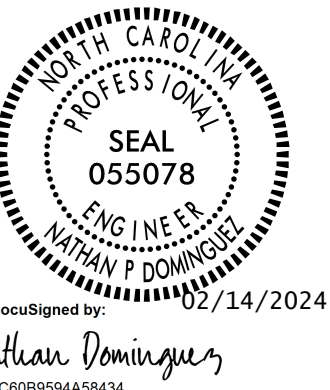


COMPONENT LIST			
#	QTY	DESCRIPTION	SPECIFICATIONS
1	1	NEUTRAL BAR	
2	1	SERVICE CIRCUIT BREAKER	2P, 240V, 150A
3	1	CONTROL CIRCUIT BREAKER	1P, 120V, 15A
4	1	MECHANICALLY HELD CONTACTORS	2P, 240V, 60A W/120V COIL
5	1	CONTROL RELAY W/NC & NO CONTACT	120V, 10A, W/120V COIL
6	3	FEEDER CIRCUIT BREAKERS	2P, 240V, 50A
7	1	TYPE 1 SURGE PROTECTION DEVICE	20,000A RATED
8	1	SELECTOR SWITCH (ON-OFF-AUTO)	240V, 10A
9	2	POWER DISTRIBUTION LUGS OR BLOCKS	
		MOUNTING BRACKETS OR SCREW STUDS	

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Rev.	Date	Description	Approved
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION ROADWAY DESIGN LIGHTING/ELECTRICAL SECTION CONTROL PANEL DETAILS SHEET 1 OF 3 PANEL SCHEMATIC HAYWOOD COUNTY			
Drawn By:	RGH	Approved By:	Dwg No.:

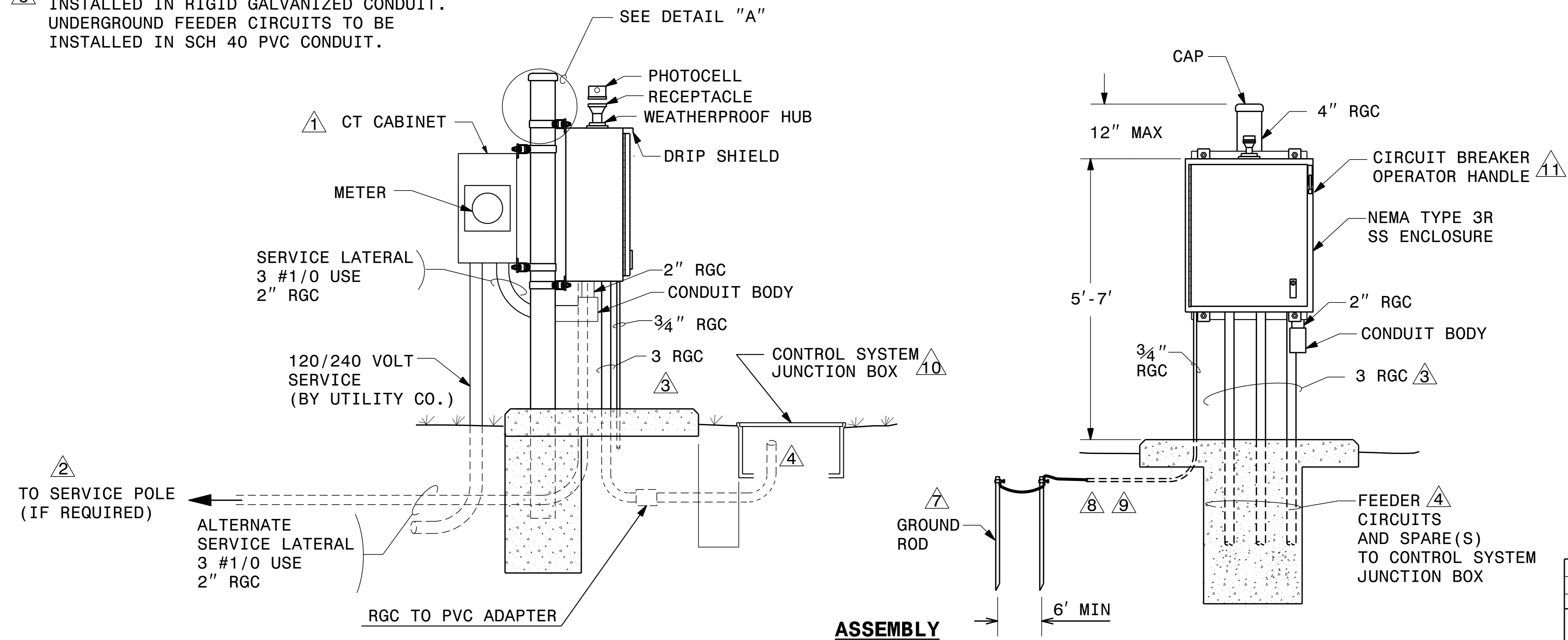
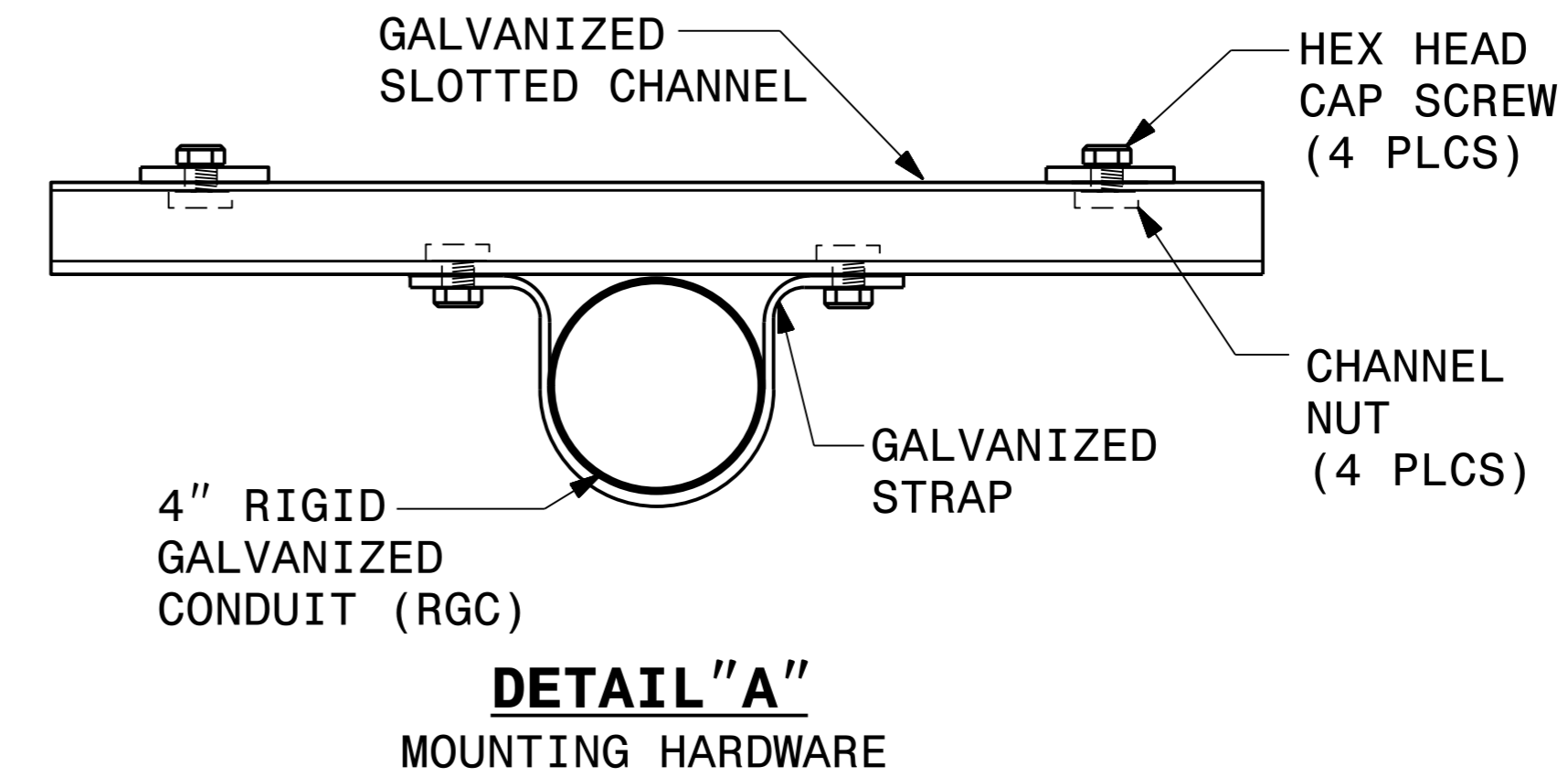
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NOTES

- 1 CURRENT TRANSFORMER (CT) CABINET AND METER MAY BE MOUNTED ON SERVICE POLE OR BACK OF CONTROL ENCLOSURE.
- 2 SEE SECTION 1407 OF THE STANDARD SPECIFICATIONS FOR SERVICE POLE AND SERVICE LATERAL.
- 3 SEE PLANS FOR SIZE OF CONDUITS AND/OR ELECTRICAL DUCT.
- 4 STUB FEEDER CIRCUIT CONDUITS INTO JUNCTION BOX. CAP UNUSED CONDUITS. FEEDER CIRCUITS MUST BE MINIMUM 30" BELOW GRADE
- 5 SEE SECTION 1411 OF THE STANDARD SPECIFICATIONS FOR JUNCTION BOX INSTALLATION.
- 6 ALL ABOVE GROUND CIRCUITRY TO BE INSTALLED IN RIGID GALVANIZED CONDUIT. UNDERGROUND FEEDER CIRCUITS TO BE INSTALLED IN SCH 40 PVC CONDUIT.
- 7 TOP OF GROUND ROD(S) SHALL BE NO MORE THAN FOUR INCHES BELOW GRADE TO ALLOW FOR EASE OF INSPECTION BY DEPARTMENT OF INSURANCE, OFFICE OF STATE FIRE MARSHAL PERSONNEL.
- 8 INSTALL A CONDUIT GROUND CHOKE AND BOND THE EQUIPMENT GROUNDING CONDUCTOR TO THE END OF THE 3/4" CONDUIT UNDERGROUND PER NEC ARTICLE 250.64E.
- 9 GROUNDING ELECTRODE CONDUCTOR 3/4" CONDUIT SHALL NOT TERMINATE BELOW THE CONCRETE FOUNDATION PAD.
- 10 SEE STANDARD DRAWING 1411.01 FOR CONTROL SYSTEM JUNCTION BOX REQUIREMENTS.
- 11 TOP OF OPERATOR HANDLE SHALL BE NO HIGHER THAN 6'-7" FROM TOP OF FOUNDATION.



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Rev.	Date	Description	Approved
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION ROADWAY DESIGN LIGHTING/ELECTRICAL SECTION CONTROL PANEL DETAILS SHEET 2 OF 3 ASSEMBLY HAYWOOD COUNTY			
Drawn By:	RGH	Approved By:	Dwg No.:

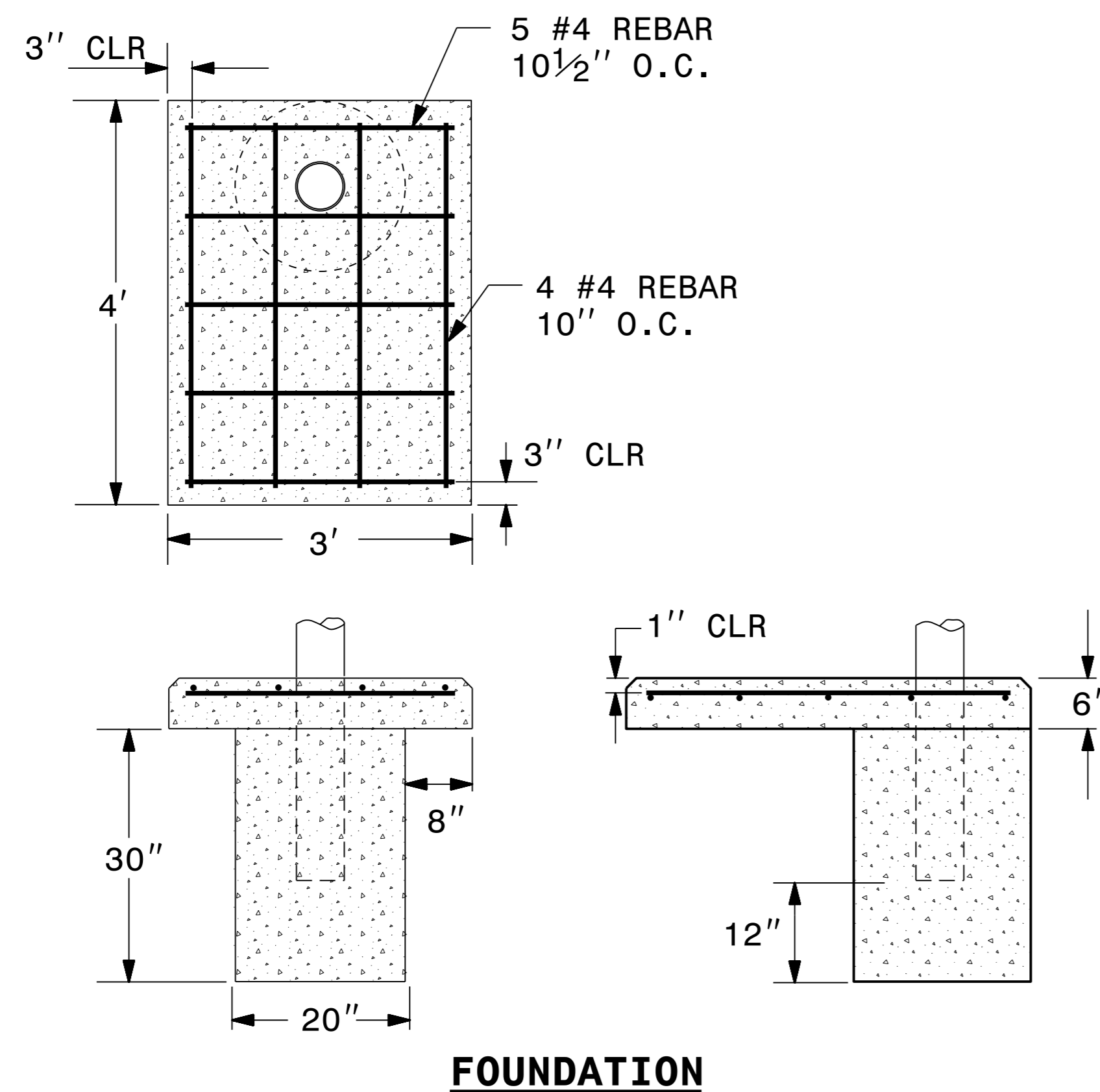


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Nathan Dominguez
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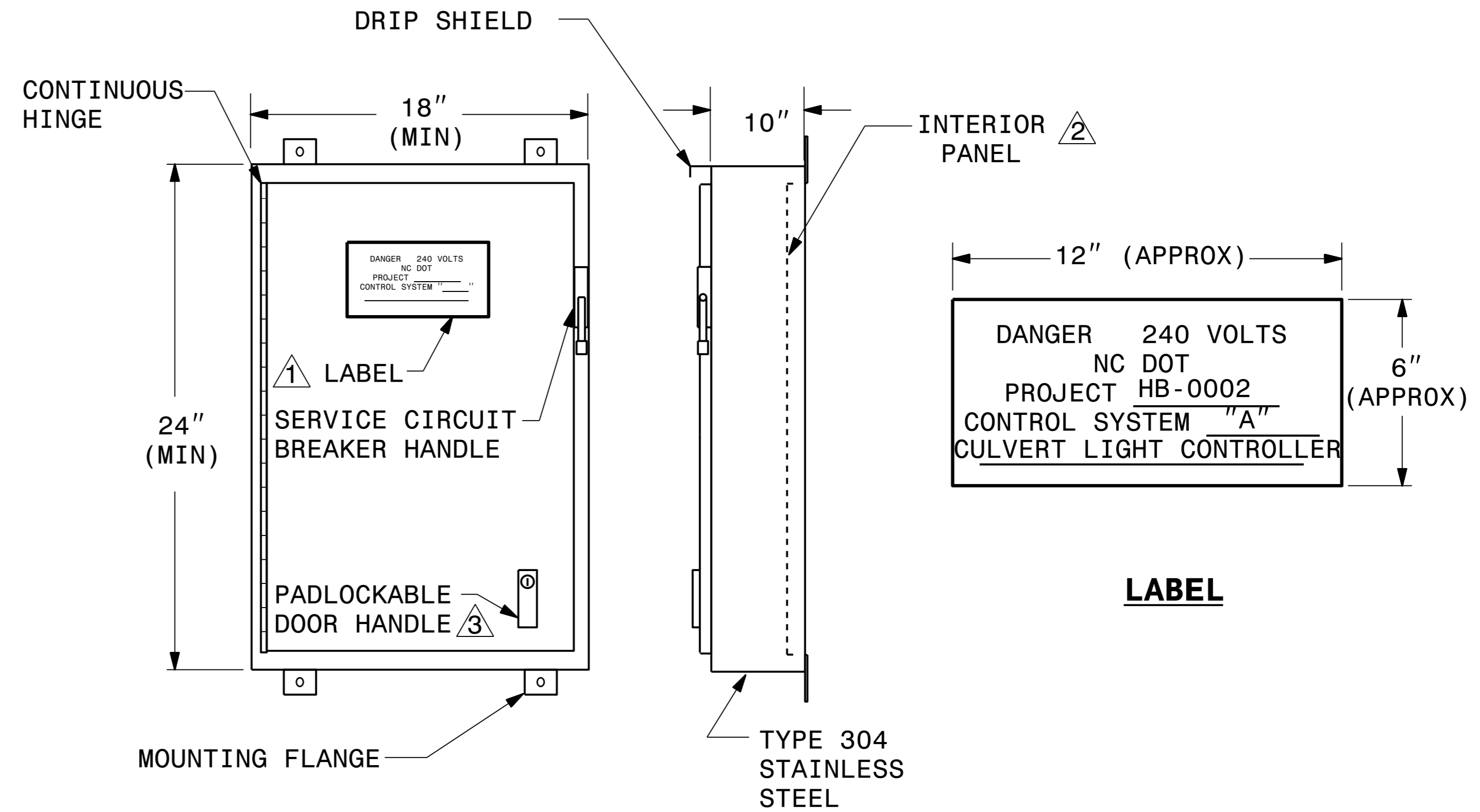
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△ NOTES

- 1 PERMANENTLY ATTACH A LABEL TO THE ENCLOSURE DOOR SHOWING THE WORK ORDER NUMBER, CONTROL SYSTEM LETTER DESIGNATION AND LOCATION DESCRIPTION SHOWN IN THE LOAD SCHEDULE AT EACH CONTROL SYSTEM IN THE PLANS.
- 2 SEE SHEET E-4 FOR INTERIOR PANEL AND COMPONENT LAYOUT.
- 3 PROVIDE DOOR CLOSING MECHANISM INTERLOCKED WITH SERVICE CIRCUIT BREAKER HANDLE. SEE STANDARD SPECIFICATIONS FOR DETAILS.
- 4 PHOTOCELL NOT SHOWN.
- 5 INCLUDE ARC FLASH AND SHOCK HAZARD WARNING LABEL IN ACCORANCE WITH NEC ARTICLE 110.16.



FOUNDATION



NEMA TYPE 3R STAINLESS STEEL ENCLOSURE △ △

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Rev.	Date	Description	Approved
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION ROADWAY DESIGN LIGHTING/ELECTRICAL SECTION CONTROL PANEL DETAILS SHEET 3 OF 3 FOUNDATION AND ENCLOSURE HAYWOOD COUNTY			
Drawn By:	RGH	Approved By:	Dwg No.:

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