SHEET NUM.						PART.	ITEM	ITEM	GRAND	UNIT	DESCRIPTION	SEE SHEET NO.
2	3	5	6	8	12	01/SAE/ OT		EXT	TOTAL			
											TRAFFIC CONTROL	
			1.9			1.9	630	80100	1.9	SF	SIGN, FLAT SHEET, R10-4A-9, 9"x15"	
											TRAFFIC SIGNALS	
		1				1	625	76000	1	EACH	ARC FLASH CALCULATIONS AND LABELJACKSON ST. AND WASHINGTON ST.	
		1				1	625	76000	1	EACH	ARC FLASH CALCULATIONS AND LABELJACKSON ST. AND CLAY ST.	
		1				1	625	76000	1	EACH	ARC FLASH CALCULATIONS AND LABELJACKSON ST. AND MONROE ST.	
			2		2	4	632	04000	4	EACH	VEHICULAR SIGNAL HEAD, MISC.: (LED), 3-SECTION, 8" LENS, 1-WAY, POLYCARBONATE	
			8	8	8	24	632	26000	24	EACH	PEDESTRIAN PUSHBUTTON	
			224		229	453	632	40500	453	FT	SIGNAL CABLE, 5 CONDUCTOR, NO. 14 AWG	
			2	3		5	632	80700	5	EACH	SIGNAL SUPPORT, MISC.:MECHANICAL DAMPER FOR TC-81.22 MAST ARM (GREATER THAN 59' IN LENGTH)	5
			8	8	8	24	632	90020	24	EACH	REMOVAL OF MISCELLANEOUS TRAFFIC SIGNAL ITEM, PUSHBUTTON	
			1	1	1	3	632	90212	3	EACH	REUSE OF CONTROLLER	
			1	1	1	3	633	45000	3	EACH	GPS (GLOBAL POSITIONING SYSTEM) CLOCK ASSEMBLY	
				4		4	809	69100	4	EACH	STOP LINE RADAR DETECTION	
											MAINTENANCE OF TRAFFIC	
	30					30	614	11110	30	HOUR	LAW ENFORCEMENT OFFICER WITH PATROL CAR FOR ASSISTANCE	
											INCIDENTALS	
LS						LS	614	11000	LS		MAINTAINING TRAFFIC	
						LS	624	10000	LS		MOBILIZATION	

CALCULATED NEC CHECKED JMH

GENERAL SUMMARY

HOL-62-19.65

SCOPE OF WORK

IT IS THE INTENT OF THESE PLANS AND SPECIFICATIONS THAT THE CONTRACTORS WILL PROVIDE TRAFFIC SIGNALS AS DEFINED HEREIN. THE CONTRACTOR SHALL FURNISH SIGNAL EQUIPMENT, ALONG WITH ALL MATERIALS, EQUIPMENT, TOOLS AND INCIDENTALS NECESSARY TO COMPLETE THE SIGNAL MODIFICATION PER PLAN.

SPECIFICATIONS

EXCEPT AS MODIFIED BY THESE PLANS AND SPECIFICATIONS, ALL MATERIALS AND WORKMANSHIP SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT:

1) OHIO MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (OMUTCD)
2) MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD)
3) NATIONAL ELECTRIC CODE (NEC)
4) NATIONAL ELECTRIC SAFETY CODE (NESC)
5) AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) STANDARDS
6) AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) STANDARDS
7) INTERNATIONAL MUNICIPAL SIGNAL ASSOCIATION (IMSA) STANDARDS
8) APPLICABLE CITY/ODOT CODES AND ORDINANCES. ALL ELECTRICAL EQUIPMENT SHALL ALSO CONFORM TO THE FOLLOWING WHEREVER APPLICABLE:

   A) NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA) STANDARD PUBLICATIONS TS-1-1989 (R-1994, R-2000, R-2005), TS-2-1992, TS-2-2003 (R-2008), TS-2-2016
   B) UL STANDARDS
   C) ELECTRONIC INDUSTRIES ALLIANCE (EIA) STANDARDS.
   D) TRAFFIC SIGNAL WORK SHALL BE GOVERNED BY THE STATE OF OHIO, DEPARTMENT OF TRANSPORTATION, 2019 "CONSTRUCTION AND MATERIAL SPECIFICATIONS" (C&MS), INCLUDING SUPPLEMENTAL SPECIFICATIONS, AND ODOT "STANDARD CONSTRUCTION DRAWINGS".

442-8 WORK INSPECTION

THE CONTRACTOR SHALL PROVIDE THE PROJECT ENGINEER AND VILLAGE OF MILLERSBURG ADMINISTRATOR WITH 72 HOUR NOTICE OF ANY SIGNAL WORK TO BE PERFORMED AT THE INTERSECTION SITE(S) SO THAT INSPECTION SERVICES CAN BE SUPPLIED.

GUARANTEE

THE CONTRACTOR SHALL GUARANTEE THAT THE TRAFFIC CONTROL SYSTEM INSTALLED AS PART OF THIS CONTRACT SHALL OPERATE SATISFACTORILY FOR A PERIOD OF 90 DAYS FOLLOWING COMPLETION OF THE 10-DAY PERFORMANCE TEST. IN THE EVENT OF UNSATISFACTORY OPERATION THE CONTRACTOR SHALL CORRECT THE FAULTY INSTALLATIONS, MAKE REPAIRS AND REPLACE DEFECTIVE PARTS WITH NEW PARTS OF EQUAL OR BETTER QUALITY. EQUIPMENT, MATERIAL, AND LABOR COSTS INCURRED IN CORRECTING AN UNSATISFACTORY OPERATION SHALL BE BORNE BY THE CONTRACTOR.

THE GUARANTEE SHALL COVER THE FOLLOWING ITEMS OF THE TRAFFIC CONTROL SYSTEM AND THEIR SATISFACTORY OPERATION IN BOTH SUMMER AND WINTER MONTHS: CONTROLLERS AND ASSOCIATED EQUIPMENT, PUSHBUTTONS, RADAR DETECTION, LED LAMPS, AND GPS COORDINATION UNITS.

CUSTOMARY MANUFACTURERS GUARANTEES FOR THE FORGOING ITEMS SHALL BE TURNED OVER TO THE MAINTAINING AGENCY FOLLOWING ACCEPTANCE OF THE EQUIPMENT.

THE COST OF GUARANTEEING THE TRAFFIC CONTROL EQUIPMENT WILL BE INCIDENTAL TO AND INCLUDED IN THE CONTRACT UNIT PRICE OF THE VARIOUS ITEMS MAKING UP THE SYSTEM.

ITEM 632 SIGNAL SUPPORT, MISC.: MECHANICAL DAMPER FOR TC-81.22 MAST ARM (GREATER THAN 59' IN LENGTH)

THIS ITEM SHALL CONSIST OF THE CONTRACTOR INSTALLING A TUNED OR MASS-SPRING TYPE DAMPER ON A TC-81.22 MAST ARM SIGNAL SUPPORT TO REDUCE THE POSSIBILITY OF HARMONIC VIBRATIONS CAUSED BY WIND LOADS. A MECHANICAL DAMPER SHALL BE APPLIED TO ALL MAST ARMS OVER 39 FEET IN LENGTH. THE INSTALLED DAMPER SHALL BE CAPABLE OF REDUCING THE LOADED MAXIMUM VERTICAL MOVEMENT AT THE TIP OF THE ARM TO 8 INCHES MEASURED FROM THE HIGHEST TO THE LOWEST POINT OF DEFLECTION AT WIND SPEEDS OF 5-20 MPH. THE DAMPER SHALL INCREASE THE INHERENT DAMPING RATIO OF A TYPICAL UNLEADED MAST ARM SUPPORT (FN = 1-2 HZ) BY 0.01. THIS INCREASE SHALL BE DOCUMENTED BY LABORATORY TESTING AVAILABLE FROM THE MANUFACTURER.

ALL ATTACHMENT HARDWARE CONNECTIONS SHALL BE STAINLESS STEEL. THE DAMPER SHALL BE ATTACHED TO THE ARM WITHIN 8 FEET OF MAST ARM TIP. INSTALLATION SHALL BE PER THE MANUFACTURER'S GUIDELINES. STATIC DAMPERS SUCH AS HORIZONTAL FLAT SIGN MOUNTINGS SHALL NOT BE USED. ACCEPTABLE DEVICES INCLUDE THE FOLLOWING OR APPROVED EQUAL:

1. VALMONT STRUCTURES MITIGATOR - MODEL TR1

PAYMENT FOR ITEM 632 SIGNAL SUPPORT, MISC.: MECHANICAL DAMPER FOR TC-81.22 MAST ARM (GREATER THAN 59' IN LENGTH) SHALL BE MADE AT THE CONTRACT UNIT PRICE PER EACH COMPLETE AND IN PLACE, AND SHALL INCLUDE ALL LABOR, MATERIALS, AND EQUIPMENT NECESSARY TO COMPLETE THE WORK.

ITEM 632 - PEDESTRIAN PUSHBUTTON

IN ADDITION TO THE REQUIREMENTS OF SPECIFICATIONS CMS 632.09 AND 732.06, PROVIDE A PEDESTRIAN PUSHBUTTON THAT ALSO MEETS THE FOLLOWING REQUIREMENTS:

1. PUSHBUTTON HOUSING SHALL BE CAST ALUMINUM POWDER COATED AND BUTTON CAP SHALL BE OF 316 STAINLESS STEEL.

2. PUSHBUTTON SWITCH MUST BE A SOLID STATE ELECTRONIC SWITCH RATED FOR 100 MILLION CYCLES WITH NO MOVING PLUNGER OR MOVING ELECTRICAL CONTACTS.

3. PUSHBUTTON SHALL HAVE BUILT IN SURGE PROTECTION AND SHALL BE ABLE TO HOLD A CALL FOR A MINIMUM OF FIVE (5) SECONDS.

4. PEDESTRIAN SIGNS SHALL BE MOUNTED ON A BLACK MODULAR PEDESTRIAN STATION TO PROVIDE ADDED REINFORCEMENT FOR SIGNS MOUNTED ON SIGNAL AND PEDESTAL POLES. THE MODULAR PEDESTRIAN STATION SHALL BE MODIFIED BY THE REMOVAL OF THE PUSHBUTTON MOUNTING. THE MODULAR PEDESTRIAN STATION SHALL BE CAMPBELL COMPANY MPS912, PELCO PRODUCTS, INC. SE 0290, OR APPROVED EQUAL.

5. PUSHBUTTON SHALL OPERATE IMMEDIATELY AFTER BEING COMPLETELY IMMERSED IN WATER FOR FIVE (5) MINUTES AND SHALL BE DESIGNED TO NOT ALLOW ICE TO FORM SUCH THAT IT WOULD IMPEDE THE FUNCTION OF THE BUTTON OR BUTTON CAP.

6. ALL MOUNTING HARDWARE SHALL BE BLACK.

ITEM 809 STOP-LINE RADAR DETECTION

THIS ITEM OF WORK SHALL CONSIST OF FURNISHING AND INSTALLING A "WAVETRONICS SMARTSENSOR MATRIX". THE DETECTION UNIT SHALL INCLUDE THE FOLLOWING:

1. POWER SHALL BE PROVIDED FROM THE TRAFFIC CABINET.
2. ALL REQUIRED INPUT CARDS SHALL BE INCLUDED IN THE TRAFFIC CABINET AND SHALL BE COMPATIBLE WITH CALTRANS, NEMA TS1, AND NEMA TS2 DETECTOR RACKS. THE CARDS SHALL PROVIDE TRUE PRESENCE DETECTOR CALLS OR CONTACT CLOSURE TO THE TRAFFIC CONTROLLER.
3. THE UNIT SHALL BE MOUNTED DIRECTLY TO A POLE OR MAST ARM, AS RECOMMENDED BY THE MANUFACTURER. CABLE(S) SHALL BE PROVIDED AS REQUIRED AND RECOMMENDED BY THE MANUFACTURER.
4. SURGE PROTECTION DEVICES, AS RECOMMENDED BY THE MANUFACTURER SHALL BE INCLUDED BOTH AT THE POLE WHERE THE UNIT IS LOCATED TO PROTECT THE UNIT AND IN THE TRAFFIC CABINET TO PROTECT THE CABINET ELECTRONICS.
5. MANUFACTURER'S REPRESENTATIVE SHALL BE ON SITE DURING INSTALLATION AND TESTING AND SHALL PROVIDE ON SITE TRAINING ON THE SETUP, OPERATION, AND MAINTENANCE OF THE UNIT.
6. A SERIAL TO ETHERNET COMMUNICATIONS MODULE AND ETHERNET CABLE (MINIMUM 7 FEET).
7. THE POWER SUPPLY AND COMMUNICATION MODULES SHALL BE SECURED TO A SINGLE PANEL THAT CAN BE MOUNTED INTERIOR TO THE TRAFFIC CABINET. THE PANEL SHALL INCLUDE MODULAR-PLUG STYLE CONNECTIONS FOR UP TO FOUR (4) SENSOR CABLES. ADDITIONAL SENSORS MAY BE HARD-WIRED TO THE COMMUNICATION MODULES, AS NECESSARY.

PAYMENT FOR ITEM 809 STOP-LINE RADAR DETECTION SHALL BE MADE AT THE CONTRACT UNIT PRICE FOR EACH UNIT, COMPLETE AND IN PLACE INCLUDING ALL REQUIRED CABINET HARDWARE, MOUNTING BRACKETS, CABLES, CONDUIT, AND CONNECTIONS TESTED AND ACCEPTED.

DETECTION MAINTENANCE

IF VEHICLE DETECTION BECOMES UNEXPECTEDLY DISABLED, REQUIRES MODIFICATION, OR IS SCHEDULED TO BE TEMPORARILY REMOVED DURING THE CONSTRUCTION PROJECT, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE PROJECT ENGINEER AND DISTRICT TRAFFIC ENGINEER.

IF THE LOSS OF VEHICLE DETECTION IS KNOWN PRIOR TO THE START OF CONSTRUCTION, IT SHALL BE DISCUSSED AT THE PRECONSTRUCTION MEETING. AT SUCH TIME, THE DISTRICT TRAFFIC ENGINEER SHALL ADVISE THE PROJECT ENGINEER AND CONTRACTOR ON THE APPROPRIATE ACTION TO RECTIFY ANY LOSS OF VEHICLE DETECTION. THIS MAY INCLUDE PLACING THE TRAFFIC SIGNAL ON MINIMUM OR MAXIMUM RECALL, MODIFYING THE MINIMUM GREEN TIMES, AND REMOVING THE MALFUNCTIONING DETECTION FROM SERVICE. WHERE NONINTRUSIVE DETECTION (I.E. VIDEO, RADAR) ALREADY EXISTS, THE CONTRACTOR SHALL INSURE THAT DETECTION IS OPERATING AND MAINTAINED BY RECONFIGURING THE DETECTION UNITS ACCORDINGLY DURING ALL CONSTRUCTION PHASES. THIS IS TO AVOID THE SIGNAL FROM MAXING OUT THE EFFECTED SIGNAL PHASE AND CREATING UNNECESSARY DELAYS.

LOCATIONS WHERE NON-INTRUSIVE DETECTION IS PROPOSED AND THE EXISTING VEHICLE DETECTION IS TO BE ABANDON, THE NON-INTRUSIVE VEHICLE DETECTION SHALL BE INSTALLED, CONFIGURED AND MADE FULLY FUNCTIONAL PRIOR TO THE EXISTING DETECTION BEING DISABLED. THE CONTRACTOR SHALL CONTINUE TO MAINTAIN AND MODIFY THE DETECTION UNTIL FINAL ACCEPTANCE OF THE TRAFFIC SIGNAL. THIS IS TO ENSURE VEHICLE DETECTION REMAINS FULLY FUNCTIONAL THROUGHOUT CONSTRUCTION.

625 ARC FLASH CALCULATION AND LABEL

THIS ITEM OF WORK SHALL CONSIST OF PERFORMING ARC FLASH CALCULATIONS AND APPLYING AN EXTERNAL LABEL AS DESCRIBED IN SUPPLEMENTAL SPECIFICATION 825. THIS WORK SHALL BE PERFORMED FOR EACH DISCONNECT SWITCH, SIGNAL CABINET, AND UPS ENCLOSURE. THE LABEL USED SHALL BE ODOT VERSION A (PREFERRED). THE FOLLOWING INTERSECTIONS SHALL HAVE THE CALCULATIONS PERFORMED AND LABELS APPLIED:

JACKSON ST & WASHINGTON ST

JACKSON ST & CLAY ST

JACKSON ST & MONROE ST

PAYMENT FOR ITEM 625 ARC FLASH CALCULATIONS AND LABEL, SHALL BE MADE FOR EACH LOCATION AND SHALL BE FULL COMPENSATION FOR ALL LABOR, EQUIPMENT, MATERIALS, AND INCIDENTALS REQUIRED TO COMPLETE THE WORK.

THE FOLLOWING ESTIMATED QUANTITIES ARE CARRIED TO THE GENERAL SUMMARY FOR THIS PURPOSE:

ITEM 625 - ARC FLASH CALCULATIONS AND LABEL, (JACKSON ST & WASHINGTON ST) 1 EACH

ITEM 625 - ARC FLASH CALCULATIONS AND LABEL, (JACKSON ST & CLAY ST) 1 EACH

ITEM 625 - ARC FLASH CALCULATIONS AND LABEL, (JACKSON ST & MONROE ST) 1 EACH

CALCULATED NEC CHECKED JMH

TRAFFIC SIGNAL GENERAL NOTES

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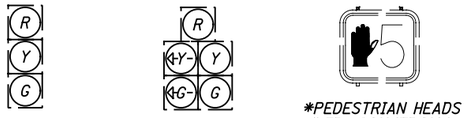
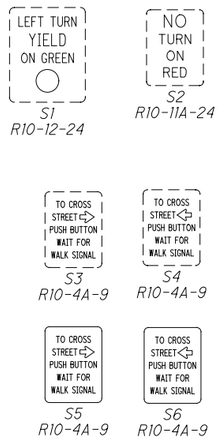
SIGNAL HEADS

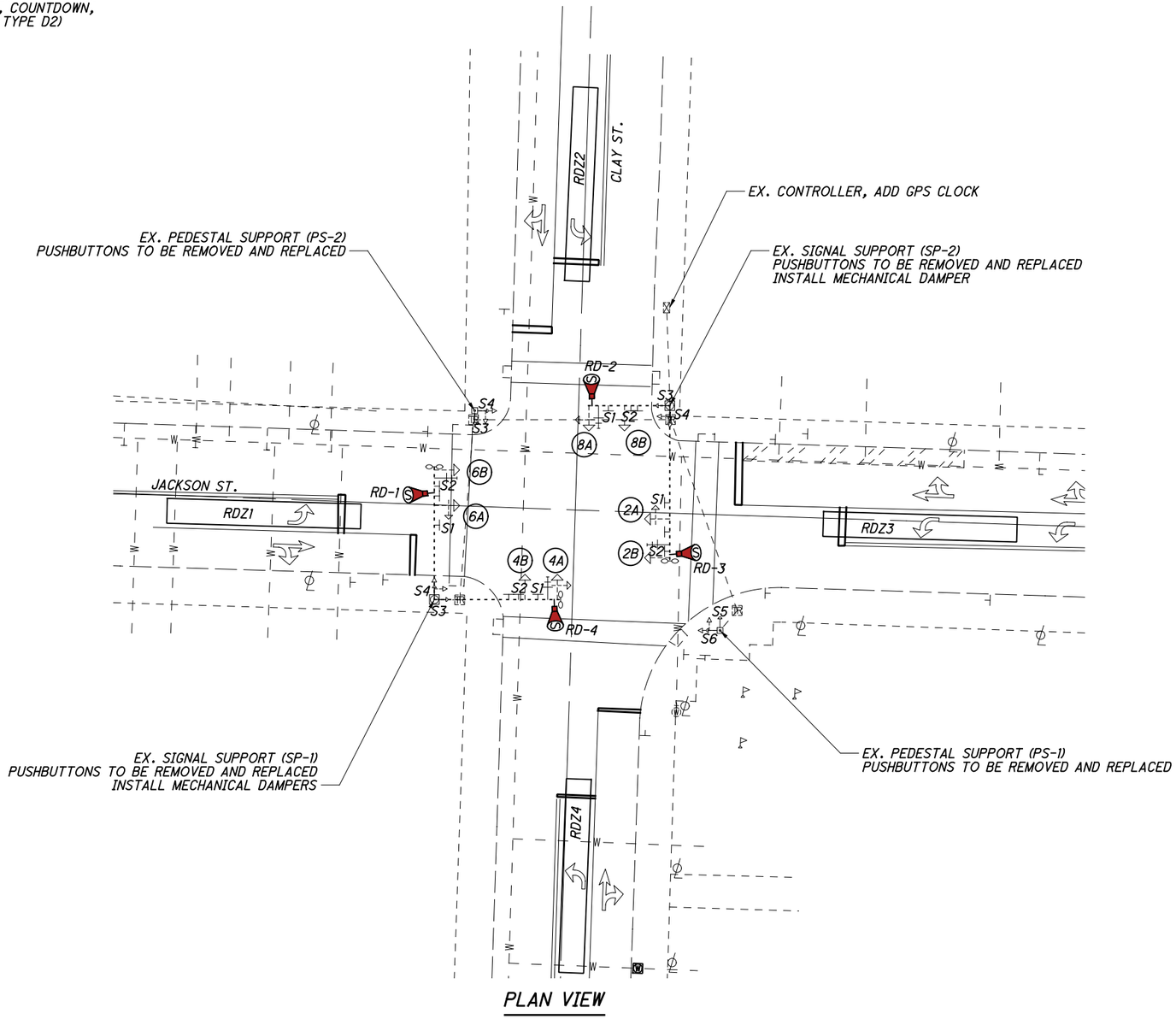


*-2B, 4B, 6B, 8B *-2A, 4A, 6A, 8A *PEDESTRIAN HEADS (LED, COUNTDOWN, TYPE D2)

*EX. SIGNAL HEADS TO REMAIN IN PLACE

SIGNS





PLAN VIEW

LEGEND

	PROP	EXIST
TRAFFIC SIGNAL, 3 UNIT HEAD, 12"		
TRAFFIC SIGNAL, 4 OR 5 UNIT HEAD, 12"		
SIGNAL SUPPORT POLE		
PEDESTRIAN HEAD		
PEDESTRIAN PUSH BUTTON		
PEDESTAL SUPPORT		
CONTROLLER CABINET		
TRAFFIC PULL BOX		
STOP-LINE RADAR DETECTION UNIT		
PREEMPT DETECTOR		
PREEMPT CONFIRMATION LIGHT		
DETECTION ZONE		
SIGN		
MECHANICAL DAMPER		

NOTE: PLANS NOT BASED ON SURVEYED INFORMATION

HORIZONTAL SCALE IN FEET
0 10 20 40

CALCULATED NEC
CHECKED JMH

TRAFFIC SIGNAL PLAN
JACKSON ST. & CLAY ST.

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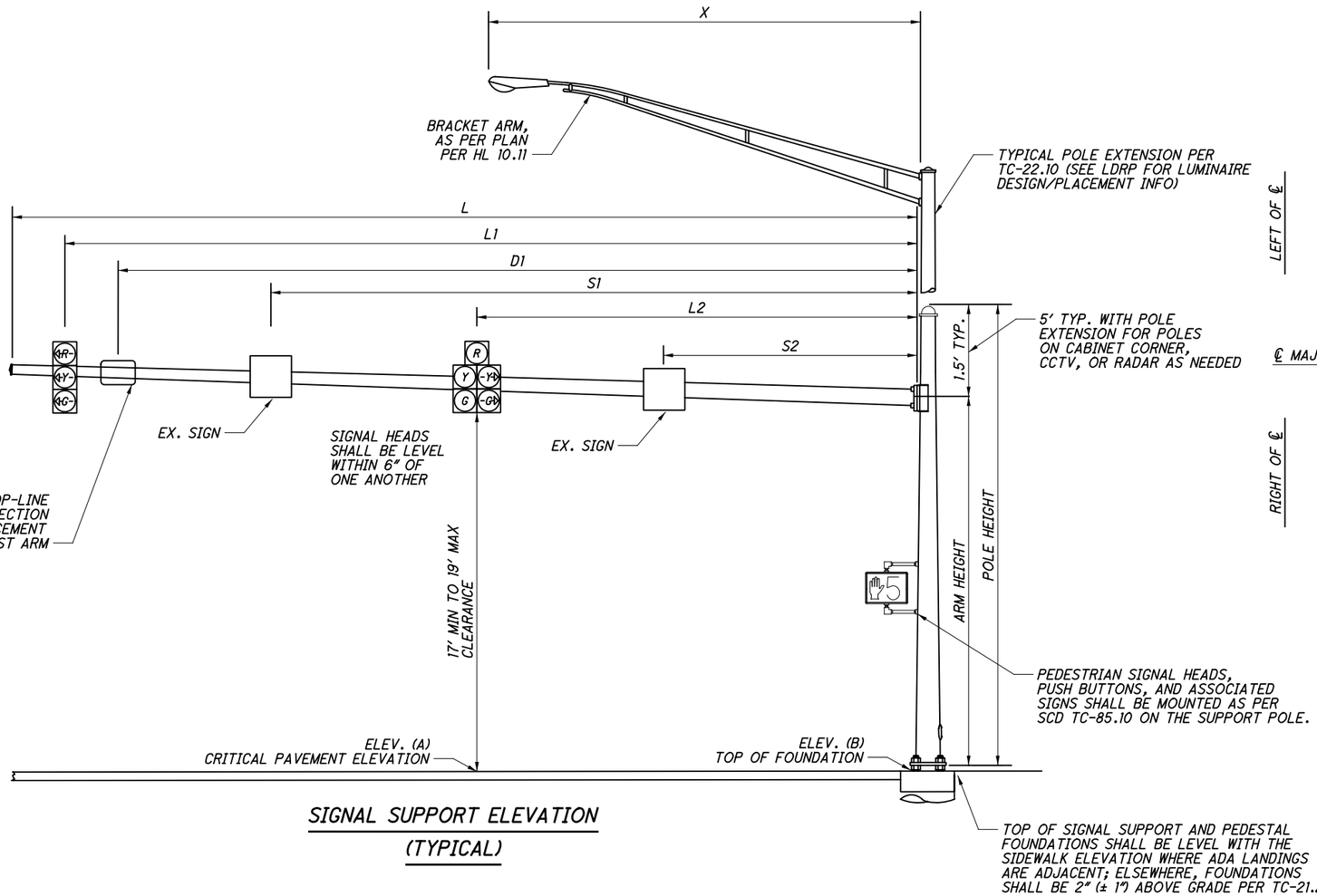
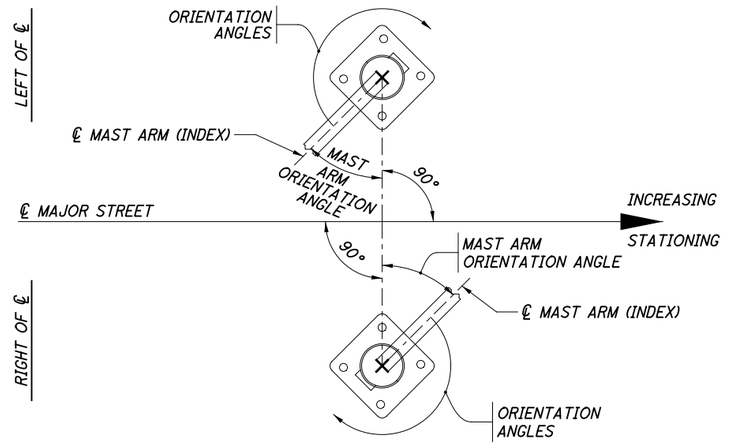


SIGNAL SUPPORT ELEVATION (TYPICAL)



POLE ORIENTATION

MAST ARM TABLE (TEM FIGURE 498-37 & 38)

SUPPORT NO.	STATION	OFFSET	ELEVATION		SIGNAL SUPPORT DETAILS											ORIENTATION ANGLES FROM MAST ARM A								
			A (PAVEMENT ELEVATION)	B (TOP OF FOUNDATION)	DESIGN TYPE	DESIGN NO.	POLE HEIGHT	ARM HEIGHT	L	L1	L2	S1	S2	D1	PREEMPT DETECTOR	MAST ARM A ANGLE	MAST ARM B ANGLE	PEDESTRIAN SIGNAL	PEDESTRIAN PUSH BUTTON	POWER SERVICE	SIGNAL CABINET	BRACKET ARM	HANDHOLE	CABLE ENTRANCE 12" FROM TOP
							FT	FT	FT	FT	FT	FT	FT	FT	FT	DEG	DEG	DEG	DEG	DEG	DEG	DEG	DEG	DEG
SP-1	-	-	-	-	-	-	-	-	41	40	29	23	35	33	37.5	180°	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	39	38	28	32	26	37	35	-	270°	-	-	-	-	-	-	-
SP-2	-	-	-	-	-	-	-	-	48	47	35	30	45	46	43	0°	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	26	25	14	19	12	24	22	-	90°	-	-	-	-	-	-	-

NOTE: EXISTING POLES TO REMAIN IN PLACE

CALCULATED NEC CHECKED JMH

TRAFFIC SIGNAL PLAN DETAILS
JACKSON ST. CLAY ST.

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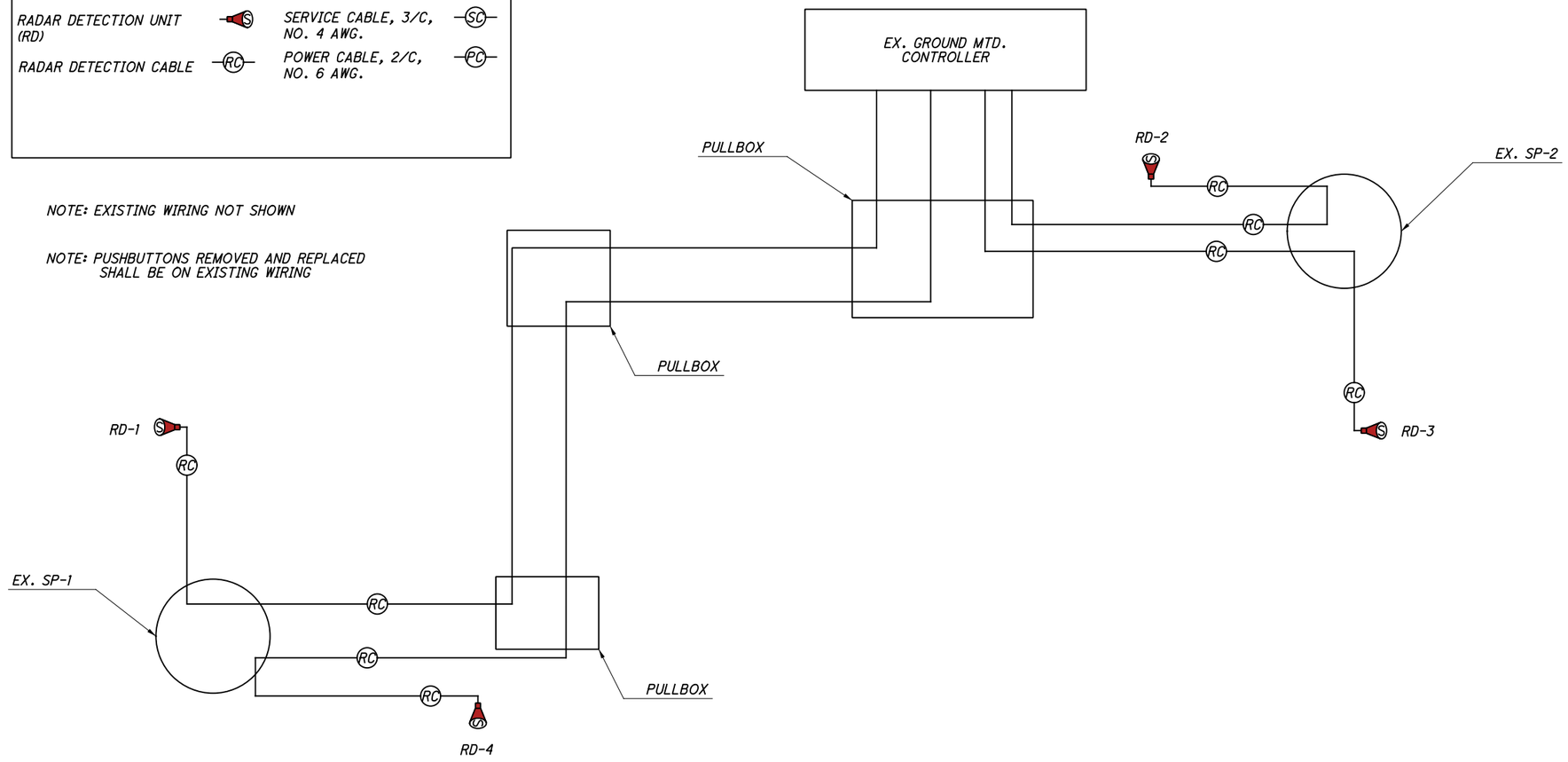
WIRING DIAGRAM

LEGEND			
RADAR DETECTION UNIT (RD)	(S)	SERVICE CABLE, 3/C, NO. 4 AWG.	(SC)
RADAR DETECTION CABLE	(RC)	POWER CABLE, 2/C, NO. 6 AWG.	(PC)

NOTE: EXISTING WIRING NOT SHOWN

NOTE: PUSHBUTTONS REMOVED AND REPLACED SHALL BE ON EXISTING WIRING



CALCULATED NEC
CHECKED JMH

TRAFFIC SIGNAL PLAN DETAILS
JACKSON ST. CLAY ST.

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