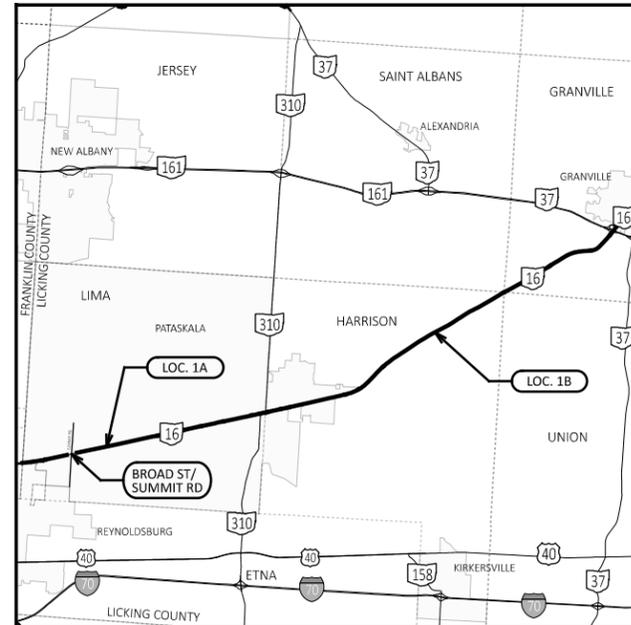


STATE OF OHIO  
DEPARTMENT OF TRANSPORTATION

LIC-16-0.00

CITY OF PATASKALA  
LIMA, HARRISON, AND GRANVILLE TOWNSHIPS  
LICKING COUNTY



LOCATION MAP

LATITUDE: N 40° 00' 38" LONGITUDE: W 82° 38' 04"

PORTION TO BE IMPROVED \_\_\_\_\_

DESIGN DESIGNATION	LIC-16	LIC-161	SUMMIT RD.
FUNCTIONAL CLASSIFICATION	PA	MC	MC
OPENING YEAR ADT (2024)	14,500	12,000	2,600
DESIGN YEAR ADT (2036)	15,000	12,500	3,500
DESIGN HOURLY VOLUME (2036)	1,700	1,300	450
DIRECTIONAL DISTRIBUTION	62%	63%	70%
TRUCKS (24 HOUR B&C)	4%	5%	1%
DESIGN SPEED	35-55 MPH	45 MPH	35 MPH
LEGAL SPEED	35-55 MPH	45 MPH	35 MPH
NHS PROJECT	YES	NO	NO

PA = PRINCIPAL ARTERIAL MC = MAJOR COLLECTOR

DESIGN EXCEPTIONS  
NONE REQUIRED

ADA DESIGN WAIVER  
NONE REQUIRED



PLAN PREPARED BY:  
OHIO DEPARTMENT OF TRANSPORTATION  
DISTRICT 5 ENGINEERING



INDEX OF SHEETS

TITLE SHEET	1	TRAFFIC SIGNAL (BROAD ST. & SUMMIT RD.)	
GENERAL NOTES	2-5	SIGNAL NOTES	55-61
MAINTENANCE OF TRAFFIC NOTES	6-7	SIGNAL SUB-SUMMARIES	62-64
PAVEMENT DATA	8-11	SIGNAL PLAN SHEETS	65-66
SHOULDER DATA	12	SIGNAL DETAILS	67-71
EXTRA AREA DATA	13-14	SIGNAL GENERAL SUMMARY	72
BRIDGE TREATMENT DATA	15		
CURB RAMP DATA	16		
PAVEMENT MARKING DATA	17-19		
PLAN SHEETS	20-47		
RAISED PAVEMENT MARKER DATA	48		
LOCATION SUB-SUMMARIES	49-52		
GENERAL SUMMARY	53-54		

LOC	PLAN SPLIT	CTY	ROUTE	BEGIN SLM	END SLM	LENGTH MILES	CITY/VILLAGE
1A	1	LIC	16	0.00	7.55	*7.34	PATASKALA
1B	2	LIC	16	7.55	14.10	6.55	
			161	0.00	0.19	0.19	

\* SUSPEND RESURFACING FROM SLM 0.99 TO SLM 1.20

2023 SPECIFICATIONS

THE STANDARD SPECIFICATIONS OF THE STATE OF OHIO, DEPARTMENT OF TRANSPORTATION, INCLUDING CHANGES AND SUPPLEMENTAL SPECIFICATIONS LISTED IN THE PROPOSAL SHALL GOVERN THIS IMPROVEMENT.

I HEREBY APPROVE THESE PLANS AND DECLARE THAT THE MAKING OF THIS IMPROVEMENT WILL NOT REQUIRE THE CLOSING TO TRAFFIC OF THE HIGHWAY AND THAT PROVISIONS FOR THE MAINTENANCE AND SAFETY OF TRAFFIC WILL BE AS SET FORTH ON THE PLANS AND ESTIMATES.

ENGINEER'S SEAL	STANDARD CONSTRUCTION DRAWINGS						SUPPLEMENTAL SPECIFICATIONS	
	BP-3.1	1/21/22	TC-16.22	7/21/23	TC-83.20	7/15/22	800	10/20/23
	BP-4.1	7/19/13	TC-21.21	1/20/23	TC-85.10	10/21/22	805	7/16/10
	BP-5.1	7/15/22	TC-22.20	1/17/14	TC-85.20	4/21/23	809	10/20/23
	BP-7.1	7/21/23	TC-41.20	10/18/13			813	7/21/23
			TC-41.40	10/18/13	HL-10.31	7/15/22	825	4/21/23
	MT-95.30	7/19/19	TC-41.41	7/19/19	HL-30.11	7/21/23	832	7/21/23
	MT-95.60	4/19/19	TC-42.20	10/18/13	HL-30.22	1/15/21	903	7/20/12
	MT-97.10	4/19/19	TC-52.10	10/18/13	HL-40.20	7/21/23	909	10/20/23
	MT-97.12	1/20/17	TC-52.20	1/15/21	HL-60.11	7/21/17	913	4/16/21
	MT-99.20	4/19/19	TC-65.10	1/17/14			916	7/21/23
	MT-101.90	7/17/20	TC-65.11	7/15/22			961	4/17/20
	MT-105.10	1/17/20	TC-71.10	7/15/22				
			TC-74.10	7/16/21				
			TC-81.22	7/21/23				
			TC-82.10	7/19/19				

DISTRICT DEPUTY DIRECTOR

*Jason L. Sturgeon*  
Jason L. Sturgeon, P.E.  
05

DIRECTOR, DEPARTMENT OF TRANSPORTATION

*John Mahan*

DESIGN AGENCY



DESIGNER  
LME

REVIEWER  
JSL 12/01/23

PROJECT ID  
97996

SHEET TOTAL  
1 72

TITLE SHEET

LIC-16-0.00

MODEL: Sheet PAPER: 17x11 (in.) DATE: 3/15/2024 TIME: 4:12:34 PM USER: jltz1 pwc:\ohio\dot-pw-bentley.com\shahid\pww-02\Documents\01 Active Projects\District 05\Licking\97996\400-Engineering\Roadway\Sheets\97996\_GT001.dgn

**ITEM 632 POWER SERVICE, AS PER PLAN**

THE POWER SUPPLY AGENCY FOR THIS PROJECT IS:

**AMERICAN ELECTRIC POWER  
740-348-5322**

POWER CABLE SHALL BE PROVIDED AS PER **C&MS 632.23** BETWEEN THE CONTROL CABINET AND THE TAP-IN LOCATION NOTED IN THE PLAN. WHEN THE POWER CABLE IS IN PLACE AND TWO WEEKS PRIOR TO THE TIME THAT ELECTRICAL POWER WILL BE REQUIRED, THE CONTRACTOR SHALL CONTACT AMERICAN ELECTRIC POWER COMPANY TO ESTABLISH POWER. AEP WILL MAKE THE FINAL ELECTRICAL SERVICE CONNECTION.

UNDER NO CIRCUMSTANCES SHALL THE CONTRACTOR CONNECT POWER CABLE INTO THE POWER COMPANY'S CIRCUIT. A COMMON PHOTO ELECTRIC RELAY AND CONTRACTOR WITH HAND/OFF/AUTO SWITCH SHALL CONTROL ALL LUMINAIRES. PHOTO ELECTRIC RELAY SHALL BE LOCATED AT THE DESIGNATED SIGNAL POLE WHERE NOTED. THE VOLTAGE SUPPLIED SHALL BE **120/240 VOLTS, 120 VOLTS** PER CIRCUIT WITH ONE CIRCUIT FOR TRAFFIC SIGNALS AND ONE CIRCUIT FOR STREET LIGHTING. POWER CABLE CONDUCTORS SHALL BE COPPER. THE NEUTRAL OF THE POWER CABLE SHALL ONLY BE GROUNDED IN THE MAIN POWER SERVICE DISCONNECT SWITCH UNLESS THERE IS A SWITCHED NEUTRAL FOR A GENERATOR AT CONTROLLER OR UPS CABINET.

PROVIDE AN AVAILABLE FAULT CURRENT SIGN ON THE OUTSIDE OF THE FRONT DOOR OF THE POWER SERVICE DISCONNECT SWITCH AT THE CONTROLLER CABINET IN ACCORDANCE WITH THE **2014 NATIONAL ELECTRICAL CODE PARAGRAPH 110.24**.

POWER SHALL BE METERED. THE CONTRACTOR SHALL SUPPLY THE REQUIRED METER BASE. THE METER SHALL HAVE A LEVERED OPERATED BYPASS. THE DISCONNECT ENCLOSURE SHALL BE FURNISHED AND INSTALLED IN ACCORDANCE WITH ITEM 632 AND SHALL INCLUDE A PADLOCK EQUAL TO MASTER 4BKA OR WILSON BOHANNON 660, WITH A LOCK BODY OF BRASS OR BRONZE, KEYS TO STATE MASTER.

THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL PERMITS AND FEES ASSOCIATED WITH ESTABLISHING THE NEW POWER SERVICE. ADDITIONALLY, THE CONTRACTOR IS RESPONSIBLE FOR POWER USAGE FEES UNTIL THE SIGNAL IS ACCEPTED BY THE ENGINEER.

PAYMENT FOR THE AFOREMENTIONED WORK SHALL BE MADE AT THE UNIT PRICE BID FOR POWER SERVICE, COMPLETE IN PLACE, INCLUDING WEATHER-HEAD, CONDUIT RISER, FITTINGS, CLAMPS, DISCONNECT SWITCH WITH ENCLOSURE, METER BASE, GROUND RODS, MOUNTING HARDWARE, PADLOCK AND KEY, POWER CABLE, PHOTOCELL, AND ALL OTHER INCIDENTALS (UNLESS ITEMIZED SEPARATELY) NECESSARY FOR COMPLETE SERVICE AS SHOWN IN THE PLANS, ALL CONNECTIONS TESTED AND ACCEPTED.

**ITEM 632 PEDESTRIAN PUSHBUTTON, AS PER PLAN**

THE PEDESTRIAN PUSHBUTTONS SHALL ADHERE TO THE REQUIREMENTS OF **CMS 632.09 AND 732.06** AND **BE POLARA BULLDOG MODELL III**, OR APPROVED EQUAL. THE PUSHBUTTONS SHALL FACE THE SIDEWALK AND BE MOUNTED ON THE PEDESTAL NO HIGHER THAN 4' ABOVE SIDEWALK SURFACE. SEE SIGNAL PLANS FOR DETAILS.

PUSHBUTTONS SHALL INCLUDE THE COST TO PROVIDE PEDESTRIAN CROSSING SIGNS PER **CMS 632.29**. PEDESTRIAN CROSSING SIGNS SHALL BE O MUTCD **R10-3E SIGNS** AND HAVE NOMINAL DIMENSIONS OF **9"X15"**. PEDESTRIAN CROSSING SIGNS SHALL BE CAST ALUMINUM AND SHALL BE INTERGRAL TO THE PUSHBUTTON. SIGNS SHALL BE BOLTED 6" ABOVE PUSHBUTTON (WITH STAINLESS STEEL HARDWARE) ON THE POLES, BANDING WILL NOT BE ACCEPTED. THE CONTRACTOR SHALL FIELD DRILL AND TAP INTO PEDESTALS IN TWO PLACES TO ACCOMMODATE THE INSTALLATION OF THE SIGNS.

ALL COSTS INCLUDING TOOLS, MATERIALS, AND LABOR TO PROVIDE AND INSTALL A PEDESTRIAN PUSHBUTTON WITH INTERGRAL SIGN IN ACCORDANCE WITH THIS NOTE AND THE PLAN DETAILS SHALL BE INCLUDED IN THE BID ITEM PRICE.

**ITEM 632 PEDESTRIAN SIGNAL HEAD (LED), (COUNTDOWN), TYPE D2, AS PER PLAN**

IN ADDITION TO THE REQUIREMENTS OF **C&MS 632 AND 732** THE FOLLOWING SHALL APPLY:

1. SIGNAL HEADS AND VISORS SHALL BE CONSTRUCTED OF BLACK POLYCARBONATE PLASTIC AND MEET ITE SPECIFICATIONS.
2. PROPER EXTERIOR COLORS SHALL BE OBTAINED BY USE OF COLORED PLASTIC MATERIAL RATHER THAN PAINTING.
3. PIPE, SPACERS AND FITTINGS CONSTRUCTED OF POLYCARBONATE PLASTIC MAY BE USED IN LIEU OF GALVANIZED STEEL OR ALUMINUM.
4. THE PEDESTRIAN SIGNAL HEAD SHALL BE OF THE LED COUNTDOWN TYPE.
5. NEW ATTACHMENT HARDWARE AND FITTINGS SHALL BE USED.
6. THE LIGHT EMITTING DIODE (LED) MODULES SHALL MEET THE REQUIREMENTS OF **C&MS 732.04**. THE CONTRACTOR SHALL PROVIDE ODOT, IN WRITING, WITH THE LED MANUFACTURER NAME, SERIAL NUMBER, PART NUMBER, DESCRIPTION OF LAMP, AND DATE OF MANUFACTURE FOR ALL LED UNITS THAT ARE TO BE USED IN THE SIGNAL HEAD PRIOR TO INSTALLATION, FOR ACCEPTANCE AND WARRANTY PURPOSES.

PAYMENT FOR ITEM 632 PEDESTRIAN SIGNAL HEAD (LED), (COUNTDOWN), TYPE D2, AS PER PLAN SHALL BE MADE FOR THE NUMBER OF COMPLETE SIGNAL HEAD FURNISHED AND INSTALLED, INCLUDING ALL LABOR, EQUIPMENT, MATERIALS AND NEW ATTACHMENT HARDWARE.

**ITEM 632, PEDESTAL, 10', TRANSFORMER BASE, AS PER PLAN  
ITEM 632, PEDESTAL, 15', TRANSFORMER BASE, AS PER PLAN**

THIS ITEM INCLUDES FURNISHING AND INSTALLING AN ALUMINUM PEDESTAL AND TRANSFORMER BASE PER **CMS 732.15** AND **SCD TC-83.20**. THE ALUMINUM PEDESTAL AND TRANSFORMER BASE SHALL BE PAINTED BLACK TO MATCH SIGNAL SUPPORTS.

PAYMENT SHALL BE MADE AT THE UNIT PRICE BID AND INCLUDE ALL LABOR, EQUIPMENT, MATERIALS, AND INCIDENTALS NECESSARY TO ERECT THE PEDESTAL.

**ITEM 633 CONTROLLER WORK PAD, AS PER PLAN**

THIS ITEM SHALL INCLUDE THE ADDITIONAL EXCAVATION, EMBANKMENT, AND CONCRETE NECESSARY TO EXTEND THE CONTROLLER WORK PAD TO THE DIMENSIONS **9'L X 8'W** AND PROVIDE A LEVEL WORK PAD.

THE CONTRACTOR SHALL CONSTRUCT THE WORK PAD AS FOLLOWS:

- EXCAVATE A MINIMUM OF **9" BELOW GRADE**
- PLACE AND COMPACT **6" OF MATERIAL CONFORMING TO 304.02**
- INSTALL A CAST-IN-PLACE WORK PAD THAT IS A MINIMUM OF 4" THICK

THE CONTROLLER WORK PAD SHALL BE IN ACCORDANCE WITH **CMS 633.11, SCD TC-83.20, AND PIS 208320**.

PAYMENT SHALL BE MADE AT THE UNIT PRICE BID AND INCLUDE ALL LABOR, EQUIPMENT, MATERIAL, AND INCIDENTALS NECESSARY TO CONSTRUCT THE CONCRETE WORK PAD.

**ITEM 633 CABINET FOUNDATION, AS PER PLAN**

THIS ITEM SHALL INCLUDE THE ADDITIONAL EXCAVATION AND CONCRETE NECESSARY TO EXTEND THE CONTROLLER CABINET FOUNDATION TO SUPPORT THE UNINTERRUPTIBLE POWER SUPPLY (UPS) CABINET. IT IS THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE A FOUNDATION LARGE ENOUGH TO ACCOMMODATE THE UPS BEING PROVIDED BY SEPARATE BID ITEMS.

THE CONTROLLER AND UPS CABINET FOUNDATION SHALL BE IN ACCORDANCE WITH **CMS 633.10, SCD TC-83.20, AND PIS 208320**.

PAYMENT SHALL BE MADE AT THE UNIT PRICE BID AND INCLUDE ALL LABOR, EQUIPMENT, MATERIAL AND INCIDENTALS NECESSARY TO CONSTRUCT THE FOUNDATION, INCLUDING CONDUIT ELLS AND ANCHOR BOLTS, RESTORATION OF DISTURBED AREA AND DISPOSAL OF SURPLUS MATERIAL AS PER **CMS 104.04**.

**ITEM 633 CABINET, TYPE TS-2, AS PER PLAN**

THE CABINET SHALL BE FURNISHED AND INSTALLED ACCORDING TO **CMS 633 AND 733** AND BE LISTED ON THE TRAFFIC AUTHORIZED PRODUCTS LIST (TAP).

THE CABINET SHALL BE AN 8 PHASE CABINET WITH ALL ACCESSORIES IN ACCORDANCE WITH THESE PLANS AND THE ABOVE SPECIFICATIONS. THE CABINET SHALL BE EQUIPED WITH ALL INTERNAL COMPONENTS TO PROVIDE FULL COMPATIBILITY WITH BOTH ACTRA AND TACTICS, (MOST CURRENT MODELS), INCLUDING THE INTERNAL MODEM. THE CABINET SHALL BE SIZE "P-44 UPS" WITH INTEGRAL BATTERY BACK-UP COMPARTMENT WITH A SEPARATE DOOR. THE CONTROLLER AND BATTERY BACK-UP CABINET SHALL APPEAR AS ONE CABINET FROM THE OUTSIDE WITH TWO INTERNAL COMPARTMENTS ACCESSED BY SEPARATE DOORS (P-UPS). THE GROUND MOUNTED CONTROL CABINET SHALL BE CONFIGURED FOR EIGHT PHASE OPERATION AND SHALL BE PROVIDED WITH A POWDER COATED FINISH TO MATCH THE SIGNAL SUPPORTS. THE CABINETS SHALL BE PROPERLY INSULATED TO PREVENT SOLID STATE EQUIPMENT FROM OVERHEATING. OPERATING TEMPERATURES SHALL CONFORM TO THAT SPECIFIED IN **C&MS 733.03**. THE CABINET SHALL PROVIDE THE FOLLOWING FEATURES:

- INTERIOR POWDER COATED GLASS WHITE.
- EQUIPED WITH TWO 16-CHANNEL CABINET DETECTOR RACKS (CDR) INCLUDING BUS INTERFACE UNITS (BIU). THE LOOP DETECTOR TERMINATION PANEL FOR THE SECOND DETECTOR RACK SHALL BE OMITTED.
- 16 POSITION LOAD BAY, MODEL TF5016 OR NEWER. LOAD SWITCHES SHALL HAVE LED INDICATORS.
- SLIDE OUT LAPTOP SHELF.
- INTERIOR, UNDERSHELF LED CABINET LIGHTING, INCLUDING A MINIMUM OF 2 PANELS OF 6 HIGH INTENSITY LED'S EACH AND A DOOR ACTIVATED SWITCH. THE LED PANELS SHALL BE MOUNTED IN LOCATIONS TO MAXIMIZE LIGHT ON THE CABINET EQUIPMENT.
- A GOOSENECK/ADJUSTABLE LIGHT FIXTURE WITH AN LED LAMP. THE ADJUSTABLE LIGHT FIXTURE SHALL BE MOUNTED ON THE LOWER RIGHT SIDE OF THE CONTROLLED CABINET.
- A MINIMUM OF TWO GFCI PROTECTED RECEPTACLES.
- A MINIMUM OF SIX SURGE PROTECTED (NON-GFCI) RECEPTACLES.
- CABINET SHALL INCLUDE WIRING FROM UPS TO SIGNAL CABINET TO PROVIDE ALARMS FOR ON BATTERY, TWO HOUR TIMER, LOW BATTERY AND OFF BATTERY IN SIGNAL CABINET.
- PROVIDE A 10 AMP CIRCUIT BREAKER AHEAD OF THE LIGHTING CIRCUIT CONTRACTOR POLE
- PROVIDE AN ARC FLASH HAZARD WARNING SIGN ON THE OUTSIDE OF THE FRONT DOOR OF THE ENCLOSURE IN ACCORDANCE WITH THE 2014 NATIONAL ELECTRIC CODE PARAGRAPH 110.16
- SEE NOTE FOR ITEM 633 UNINTERRUPTIBLE POWER SUPPLY, AS PER PLAN FOR ADDITIONAL REQUIREMENTS.
- ALL CABINET WIRING SHALL BE LABELED FUNCTION, PHASE, DIRECTION, MOVEMENT, AND COLOR AS APPLICABLE.

PAYMENT SHALL BE AT THE CONTRACT UNIT PRICE PER EACH, COMPLETE AND IN PLACE, INCLUDING ALL CONNECTIONS, SPARE COMPARTMENTS, TESTED AND ACCEPTED.

**ITEM 633 UNINTERRUPTIBLE POWER SUPPLY (UPS), 1000 WATT, AS PER PLAN**

IN ADDITION TO THE REQUIREMENTS OF **C&MS 633 AND 733**, POLE ATTACHMENT HARDWARE WILL BE INCLUDED FOR POLE-MOUNTED CABINETS, AND A CABINET RISER (8-INCH MINIMUM) AND ANCHOR BOLTS WILL BE PROVIDED FOR BASE-MOUNTED CABINETS. THE UPS SYSTEM SHALL BE **ALPHA POWER, MODEL FXM1100** OR APPROVED EQUAL. BEFORE PERFORMING THE WORK, THE CONTRACTOR, THE DISTRICT TRAFFIC ENGINEER AND THE PROJECT ENGINEER WILL PERFORM A SITE INSPECTION TO ESTABLISH THE LOCATION OF THE UPS CABINET AND FOUNDATION.

THE UPS CABINET SHALL INCLUDE A GENERATOR POWER PANEL WITH A HEAVY-DUTY POWER RELAY VERSUS THE LINE VOLTAGE GENERATOR SWITCH. THE GENERATOR INLET SHALL BE A RECESSED PANEL WITH A DOOR THAT IS FLUSH WITH THE EXTERNAL SIDE OF THE UPS CABINET. IT SHALL INCLUDE A RECESSED PLUG, AUTOMATIC TRANSFER SWITCH AND A DOOR THAT SECURELY CLOSES OVER THE POWER CORD.

THE CABINET SHALL HAVE A DOOR STOP MECHANISM AND THERMOSTATICALLY CONTROLLED FAN. **ADDITIONALLY, THE CABINET SHALL BE BUILT WITH ALL BATTERIES ALWAYS BELOW THE INVERTER TO AVOID POTENTIAL FURTHER BATTERY LEAKAGE ISSUES.**

THE CABINET SHALL INCLUDE A BATTERY BALANCING DEVICE THAT REGULATES THE BATTERIES AND OPTIMIZES PERFORMANCE.

AFTER FOUR (4) HOURS OF BATTERY RUNTIME, THE SYSTEM SHALL BE PROGRAMMED TO SWITCH THE INTERSECTION FROM FULL OPERATION TO CONTROLLER AUTOMATIC FLASH OPERATION THROUGH THE MONITOR. THE CONTROLLER SHALL BE PROGRAMMED SO THAT FLASH OPERATION SHALL BEGIN ONCE THE INTERSECTION RUNS MINOR STREET GREEN (TYP. PH. 4 & 8), ALL-RED CLEARANCE, AND THEN FLASH OPERATION.

THE UPS OUTPUT NOTIFICATIONS FOR ON BATTERY, BATTERY 2-HOUR TIMER, AND LOW BATTERY SHALL BE WIRED INTO THE TRAFFIC SIGNAL CABINET BACK PANEL OR THROUGH THE CONTROLLER WITH A C11 TO PROVIDE SPECIAL STATUS ALARMS FOR EACH OUTPUT INTO THE SIGNAL CONTROLLER.

THIS ITEM SHALL INCLUDE A RED LED STATUS INDICATOR LAMP TO ALLOW MAINTENANCE PERSONNEL AND LAW ENFORCEMENT TO QUICKLY ASSESS WHETHER A TRAFFIC SIGNAL CABINET IS BEING POWERED BY A UPS. THE LED HOUSING SHALL BE NEMA 4X, IP65 OR IP66, RATED FOR OUTDOOR USE AND BE TAMPER/SHATTER RESISTANT. IT SHALL BE A DOMED ENCLOSURE CONTAINING A RED LENS WITH LED THAT IS VISIBLE FROM 100 FOOT MINIMUM. THE ENCLOSURE AND LED MODULE SHOULD BE PLACED ON THE SIDE OF THE UPS CABINET FACING TOWARDS THE MAINLINE ROADWAY AND SEALED FROM WATER INTRUSION. IT SHOULD BE WIRED USING MINIMUM 20GA STRANDED, INSULATED HOOKUP WIRE TO THE STATUS RELAY OUTPUTS OF THE UPS. THE WIRES SHALL BE TERMINATED BY LUGS AT THE DISPLAY END AND PERMANENTLY LABELED "BACKUP POWER STATUS DISPLAY," WITH WIRE POLARITY INDICATED. THE RED LED SHALL ONLY ILLUMINATE TO INDICATE THE CABINET IS OPERATING UNDER UPS BACKUP POWER (THE "BACKUP" OPERATING CONDITION). THIS ITEM INCLUDES PROGRAMMING THE UPS STATUS RELAY OUTPUTS TO PRODUCE THE LAMP STATUS DISPLAYS. THESE STATUS DISPLAYS WILL BE SOLID 100% DUTY CYCLE (NOT FLASHING) DISPLAYS. THE OPERATING VOLTAGE OF THE LED LAMP SHALL BE 120V AC UNLESS OTHERWISE INDICATED.

DESIGN AGENCY



DESIGNER  
GPM

REVIEWER  
JSL 12/01/23

PROJECT ID  
97966

SHEET TOTAL  
57 72

**ITEM 809 ADVANCE RADAR DETECTION, AS PER PLAN  
ITEM 809, STOP LINE RADAR DETECTION, AS PER PLAN**

THIS ITEM OF WORK SHALL CONSIST OF FURNISHING AND INSTALLING A WAVETRONIX SMARTSENSOR ADVANCE DETECTION UNIT (MODEL SS-200E). THE DETECTION UNIT SHALL INCLUDE THE FOLLOWING:

1. POWER SHALL BE PROVIDED FROM THE TRAFFIC CABINET.
2. ALL REQUIRED INPUTS 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. THE MANUFACTURER'S REPRESENTATIVE SHALL BE ON SITE DURING INSTALLATION AND TESTING AND SHALL PROVIDE ONSITE 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.
8. THE CONTRACTOR SHALL INSTALL THE RADAR DETECTION PRIOR TO MILLING/DISABLING EXISTING LOOPS.
9. THE INSTALLATION SHALL INCLUDE ALL CONTROLLER PROGRAMMING FOR COMPLETE INSTALLATION, WHICH INCLUDES MODIFICATIONS FOR REMOVAL OF EXISTING DETECTION. PAYMENT FOR ITEM 809 ADVANCE RADAR DETECTION, AS PER PLAN SHALL BE MADE AT THE CONTRACT UNIT PRICE FOR EACH UNIT, COMPLETE AND IN PLACE INCLUDING ALL REQUIRED CABINET HARDWARE, MOUNTING BRACKETS, CABLES, CONDUIT, CONNECTIONS TESTED AND ACCEPTED, AND ANY OTHER NECESSARY HARDWARE TO ESTABLISH A FULLY FUNCTIONAL DETECTION SYSTEM.

PAYMENT FOR ITEM 809 ADVANCE RADAR DETECTION, AS PER PLAN SHALL BE MADE AT THE CONTRACT UNIT PRICE FOR EACH UNIT, COMPLETE AND IN PLACE INCLUDING ALL REQUIRED CABINET HARDWARE, MOUNTING BRACKETS, CABLES, CONDUIT, CONNECTIONS TESTED AND ACCEPTED, AND ANY OTHER NECESSARY HARDWARE TO ESTABLISH A FULLY FUNCTIONAL DETECTION SYSTEM.

**ITEM 809 ATC CONTROLLER, AS PER PLAN**

THE CONTROLLER UNIT SHALL BE FURNISHED AND INSTALLED PER **SS 809** AND BE LISTED ON THE TRAFFIC AUTHORIZED PRODUCTS (TAP) LIST.

THE CONTROLLER SHALL BE AN **ECONOLITE COBALT EOS** AND COMPATIBLE WITH THE CABINET TYPE BEING INSTALLED.

**ITEM 809 ATC CONTROLLER, AS PER PLAN (CONTINUED)**

THE CONTROLLER SHALL HAVE 6 MODES OF COMMUNICATION, ADAPTIVE TRAFFIC CONTROL FEATURES, REPORTS, PREEMPTION, DIAGNOSTICS, AND INTERNAL TIME BASED COORDINATION. THE CONTROLLER SHALL INCLUDE A "PORT 3 MODULE" AND AN ETHERNET PORT. IN ADDITION, THE CONTROLLER SHALL PROVIDE THE FOLLOWING FEATURES:

- EXTENDED MONITORING
- MANUAL CONTROL AND PUSHBUTTON
- AUTOMATIC/MANUAL TRANSFER SWITCH
- COORDINATED/FREE SWITCH
- DETECTOR TEST SWITCHES
- 8 FLAHER RELAY POSITIONS
- POLICE PANEL WITH FLASH, MANUAL/AUTOMATIC, AND ON/OFF SWITCHES
- MANUAL PUSHBUTTON SWITCH WITH A MINIMUM CARD LENGTH OF 10 FEET
- 8 PORT SDLC PANEL
- SURGE SUPPRESSOR IN MODULAR PACKAGE UTILIZING A 12 PIN BEAU CONNECTOR WITH LED FAILURE INDICATORS
- AUXILARY POWER SHALL CHARGE BATTERIES

**GROUNDING AND BONDING**

THE REQUIREMENTS OF THE CONSTRUCTION AND MATERIAL SPECIFICATIONS (C&MS) AND THE TC SERIES OF STANDARD CONSTRUCTION DRAWINGS ARE MODIFIED AS FOLLOWS:

1. ALL METALLIC PARTS CONTAINING ELECTRICAL CONDUCTORS SHALL BE PERMANENTLY JOINED TO FORM AN EFFECTIVE GROUND FAULT CURRENT PATH BACK TO THE GROUNDED CONDUCTOR IN THE POWER SERVICE DISCONNECT SWITCH.
  - A. PROVIDE AN EQUIPMENT GROUNDING CONDUCTOR IN METALLIC CONDUITS (**725.04**) IN ADDITION TO THE CONDUCTORS SPECIFIED AND BOND THE CONDUIT TO THIS GROUNDING CONDUCTOR.
  - B. WHEN AN EQUIPMENT GROUNDING CONDUCTOR IS REQUIRED IN PLASTIC CONDUIT (**725.05**), THE INSTALLATION SHALL INCLUDE A SEPARATE EQUIPMENT GROUNDING CONDUCTOR IN ADDITION TO THE CONDUCTORS SPECIFIED.
  - C. METALLIC CONDUIT CARRYING THE LOOP WIRES FROM IN THE PAVEMENT TO THE PULL BOX SPLICE LOCATION WILL ONLY BE BONDED AT THE PULL BOX END, AND WILL NOT CONTAIN AN EQUIPMENT GROUNDING CONDUCTOR.
  - D. IF MULTIPLE CONDUIT RUNS BEGIN AND END AT THE SAME POINTS, ONLY ONE EQUIPMENT GROUNDING CONDUCTOR IS REQUIRED.
  - E. IF AN EQUIPMENT GROUNDING CONDUCTOR IS NEEDED IN CONDUIT BETWEEN SIGNALIZED INTERSECTIONS FOR UNDERGROUND INTERCONNECT CABLE, THE GROUNDING SYSTEM FOR EACH SIGNALIZED INTERSECTION WILL BE SEPARATED ABOUT MIDWAY BETWEEN THE INTERSECTIONS.
  - F. THE MESSENGER WIRE AT SIGNALIZED INTERSECTIONS WILL BE USED AS THE CONDUCTIVE PATH FROM CORNER TO CORNER IF CONDUIT IS NOT PROVIDED UNDER THE ROADWAY. WHEN CONDUIT CONNECTS THE CORNERS OF AN INTERSECTION, AN EQUIPMENT GROUNDING CONDUCTOR SHALL BE USED IN THE CONDUIT.
2. CONDUITS.
  - A. THE **725.04** CONDUIT SHALL HAVE GROUNDING BUSHINGS INSTALLED AT ALL TERMINATION POINTS. THE BUSHING MATERIAL SHALL BE COMPATIBLE WITH GALVANIZED STEEL CONDUIT AND THE GROUNDING LUG MATERIAL SHALL BE COMPATIBLE FOR USE WITH COPPER WIRE. THREADED OR COMPRESSION TYPE BUSHINGS MAY BE USED.
  - B. THE **725.05** CONDUIT SHALL HAVE THE INSIDE AND OUTSIDE DIAMETERS OF THE CONDUIT DEBURRED AT ALL TERMINATION POINTS.
  - C. BOTH ENDS OF METALLIC CONDUIT SHALL BE BONDED TO THE EQUIPMENT GROUNDING CONDUCTOR.
  - D. METALLIC CONDUIT MAY BE BONDED TO METALLIC BOXES THROUGH THE USE OF CONDUIT FITTINGS UL APPROVED FOR THIS TYPE OF CONNECTION, WITH THE BOX BONDED TO THE EQUIPMENT GROUNDING CONDUCTOR.

**GROUNDING AND BONDING (CONTINUED)**

3. WIRE FOR GROUNDING AND BONDING.
  - A. USE INSULATED, COPPER WIRE FOR THE EQUIPMENT GROUNDING CONDUCTOR. BONDING JUMPERS IN BOXES AND ENCLOSURES MAY BE BARE OR INSULATED COPPER WIRE. WIRE SIZE SHALL BE AS FOLLOWS:
    - I. USE 4 AWG BETWEEN THE POWER SERVICE AND SUPPORTS, POLES, PEDESTALS, CONTROLLER OR FLASHER CABINETS.
    - II. USE A MINIMUM 8 AWG BETWEEN LOOP DETECTOR PULL BOXES AND THE FIRST CONDUIT THAT REQUIRES A LARGER SIZE AS SPECIFIED IN 3.A.I ABOVE.
    - III. USE A MINIMUM 8 AWG BETWEEN THE "PREPARE TO STOP WHEN FLASHING" INSTALLATION (INCLUDING SUPPORT) AND THE FIRST CONDUIT THAT REQUIRES A LARGER SIZE AS SPECIFIED IN 3.A.I ABOVE.
    - IV. THE INSULATION SHALL BE GREEN OR GREEN WITH YELLOW STRIPE(S). FOR 4 AWG OR LARGER, INSULATION MAY ALSO BE BLACK WITH GREEN TAPE/LABELS INSTALLED AT ALL ACCESS POINTS.
  - B. IN A HIGHWAY LIGHTING SYSTEM, THE EQUIPMENT GROUNDING CONDUCTOR SHALL BE THE SAME WIRE SIZE AS THE DUCT CABLE OR DISTRIBUTION CABLE CIRCUIT CONDUCTORS, WITH THE MINIMUM CONDUCTOR SIZE OF 4 AWG. BONDING JUMPERS WILL BE MINIMUM SIZE 4 AWG.
4. GROUND ROD.
  - A. A 3/4-INCH SCHEDULE 40 PVC CONDUIT WILL BE USED IN FOUNDATIONS AND CONCRETE WALLS FOR THE GROUNDING CONDUCTOR (GROUND WIRE) RACEWAY TO THE GROUND ROD. SHOULD METALLIC CONDUIT BE USED, BOTH ENDS OF THE CONDUIT SHALL BE BONDED TO THE GROUNDING CONDUCTOR.
  - B. THE TYPICAL GROUNDING CONDUCTOR (GROUND WIRE) SHALL BE 4 AWG INSULATED, COPPER.
5. THE GREEN CONDUCTOR IN SIGNAL CABLES (CONDUCTOR #4) SHALL NOT BE USED TO SUPPLY POWER TO A SIGNAL INDICATION. IT WILL BE CONNECTED TO THE SIGNAL BODY AS AN EQUIPMENT GROUND IN ALUMINUM HEADS AND IT WILL BE UNUSED IN PLASTIC HEADS. UNUSED CONDUCTORS SHALL BE GROUNDED IN THE CABINET. TYPICAL USE OF CONDUCTORS IS AS FOLLOWS:

COND. NO.	COLOR	VEHICLE SIGNAL	PEDESTRIAN SIGNAL
1	BLACK	GREEN BALL	#1 WALK
2	WHITE	AC NEUTRAL	AC NEUTRAL
3	RED	RED BALL	#1 DW/FDW
4	GREEN	EQUIPMENT GROUND	EQUIPMENT GROUND
5	ORANGE	YELLOW BALL	#2 DW/FDW
6	BLUE	GREEN ARROW	#2 WALK
7	WHITE/BLACK	STRIPE YELLOW	ARROW NOT USED

**GROUNDING AND BONDING (CONTINUED)**

6. POWER SERVICE AND DISCONNECT SWITCH.
  - A. AT THE POWER SERVICE LOCATION, THE GROUNDING CONDUCTOR (GROUND WIRE) FROM THE DISCONNECT SWITCH NEUTRAL (AC-) BAR TO THE GROUND ROD SHALL BE A CONTINUOUS, UNSPLICED CONDUCTOR. IF SPLICED, IT SHALL BE AN EXOTHERMIC WELD BUTT SPLICE.
  - B. THE SERVICE NEUTRAL (AC-) SHALL ONLY BE CONNECTED TO GROUND AT THE PRIMARY POWER SERVICE DISCONNECT SWITCH.
    - I. NEMA CONTROLLER CABINETS: IF A POWER SERVICE DISCONNECT SWITCH IS LOCATED BEFORE THE CONTROLLER CABINET, THE NEUTRAL (AC-) AND THE GROUNDING BARS IN THE CONTROLLER CABINET SHALL NOT BE CONNECTED TOGETHER AS SHOWN IN NEMA TS-2, FIGURE 5-4.
    - II. IF SECONDARY DISCONNECT SWITCHES ARE CONNECTED AFTER THE PRIMARY DISCONNECT SWITCH, THE NEUTRAL (AC-) SHALL ONLY BE GROUNDED AT THE PRIMARY SWITCH. EQUIPMENT GROUNDING CONDUCTORS SHALL BE BROUGHT TO THE PRIMARY SWITCH, BUT SHALL BE GROUNDED AT BOTH SECONDARY AND PRIMARY SWITCHES.
7. PAYMENT - ALL MATERIALS AND WORK REQUIRED TO COMPLETE THE EFFECTIVE GROUND FAULT CURRENT PATH SYSTEM ARE INCIDENTAL TO THE CONDUCTORS INSTALLED BY CONTRACT.

**SURVEYING PARAMETERS**

USE THE FOLLOWING VERTICAL POSITIONING AND HORIZONTAL POSITIONING PARAMETERS FOR ALL SURVEYING.

**VERTICAL POSITIONING**

ORTHOMETRIC HEIGHT DATUM: NAVD88  
GEOID: GEOID12B

**HORIZONTAL POSITIONING**

REFERENCE FRAME: NAD83 (2011)  
ELLIPSOID: GRS80  
MAP PROJECTION: LAMBERT CONFORMAL CONIC  
COORDINATE SYSTEM: OHIO STATE PLANE – SOUTH ZONE  
COMBINED SCALE FACTOR: 1.0000000

UNITS ARE IN U.S. SURVEY FEET.

**CONTROL POINTS**

SEE "97996\_SURVEYMASTER.XLSM" SPREADSHEET (PLACED IN CADD FILES) FOR CONTROL POINT INFORMATION.

DESIGN AGENCY



DESIGNER

GPM

REVIEWER

JSL 12/01/23

PROJECT ID

97966

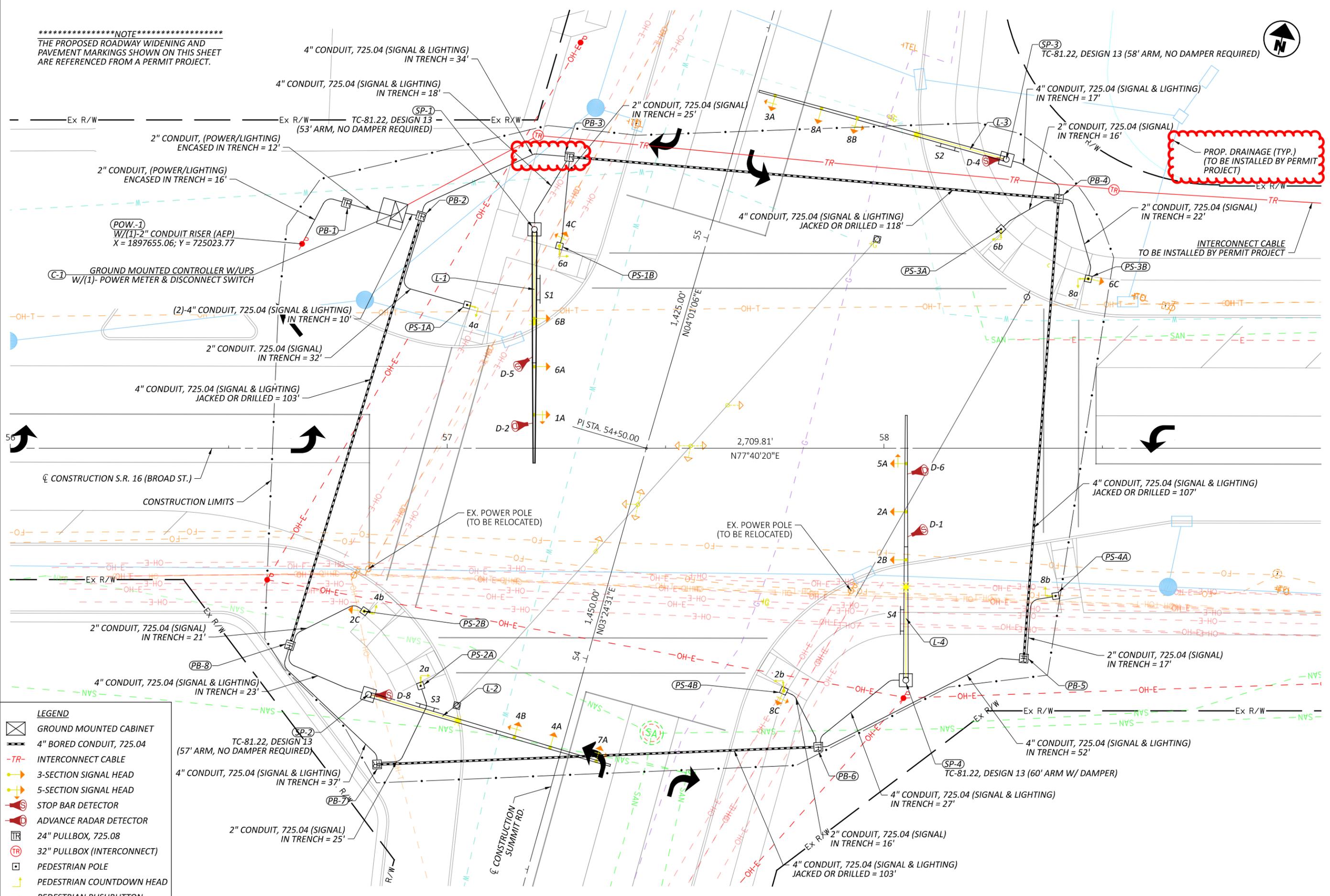
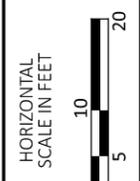
SHEET

58

TOTAL

72

\*\*\*\*\*NOTE\*\*\*\*\*  
 THE PROPOSED ROADWAY WIDENING AND PAVEMENT MARKINGS SHOWN ON THIS SHEET ARE REFERENCED FROM A PERMIT PROJECT.



PROP. DRAINAGE (TYP.)  
 (TO BE INSTALLED BY PERMIT PROJECT)

INTERCONNECT CABLE  
 TO BE INSTALLED BY PERMIT PROJECT

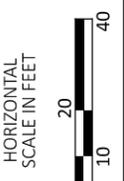
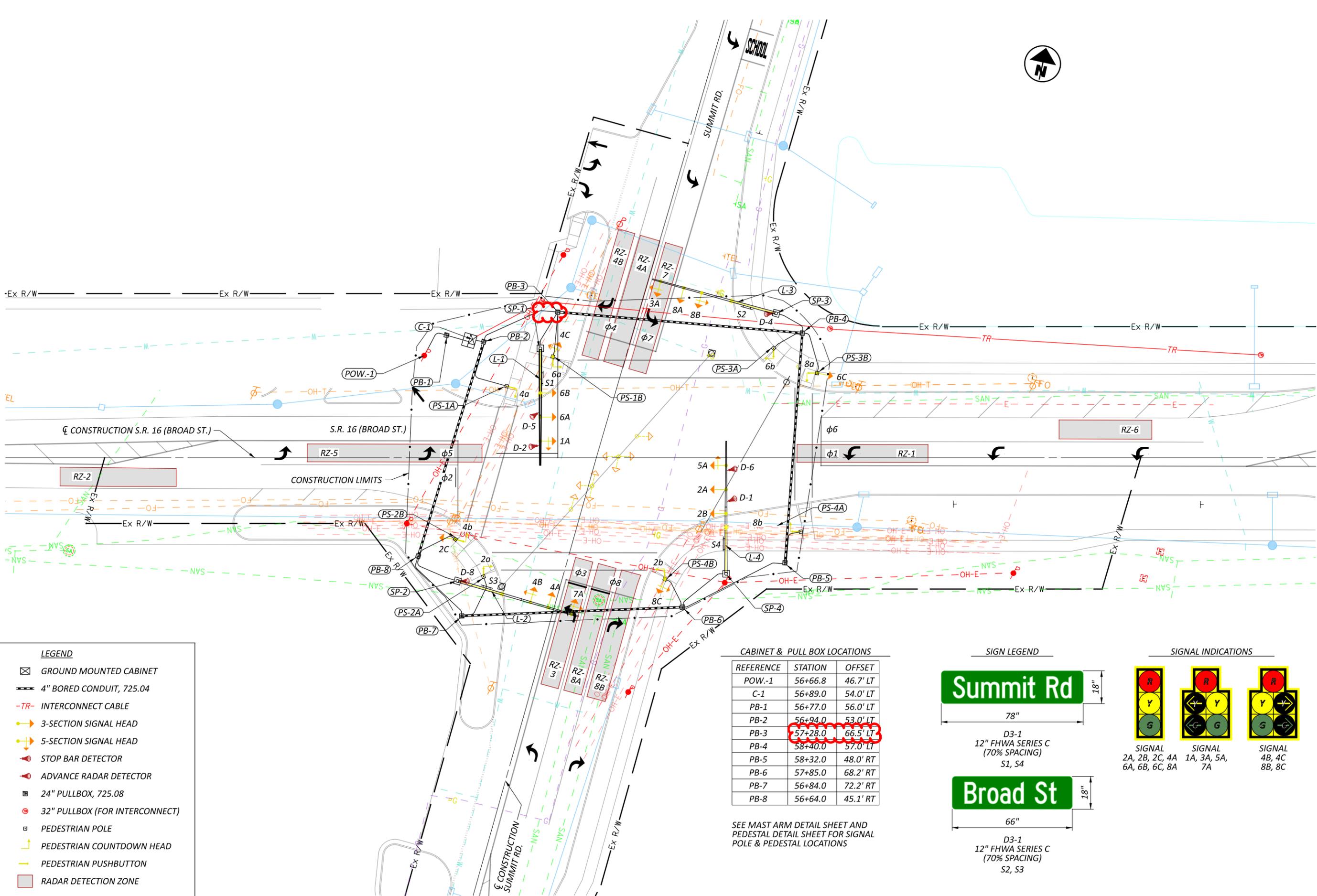
- LEGEND**
- GROUND MOUNTED CABINET
  - 4" BORED CONDUIT, 725.04
  - INTERCONNECT CABLE
  - 3-SECTION SIGNAL HEAD
  - 5-SECTION SIGNAL HEAD
  - STOP BAR DETECTOR
  - ADVANCE RADAR DETECTOR
  - 24" PULLBOX, 725.08
  - 32" PULLBOX (INTERCONNECT)
  - PEDESTRIAN POLE
  - PEDESTRIAN COUNTDOWN HEAD
  - PEDESTRIAN PUSHBUTTON

LIC-16-0.00

MODEL: CLK\_RW\_SR16Broad - Plan 1 [Sheet] PAPER SIZE: 17x11 (in.) DATE: 4/1/2024 TIME: 9:32:08 AM USER: jlutz1  
 pw:\ohiodot-pw-bentley.com\ohiodot-pw-02\Documents\01-Active Projects\District 05\Engineering\Signals\Sheets\97996\_CP001.dgn

TRAFFIC SIGNAL PLAN - 10 SCALE  
 BROAD ST. & SUMMIT RD.

DESIGN AGENCY	
DESIGNER	BRH
REVIEWER	JSL 12/01/23
PROJECT ID	97996
SHEET	TOTAL
65	72

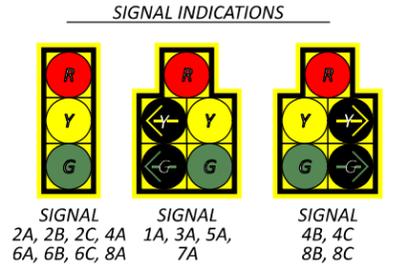
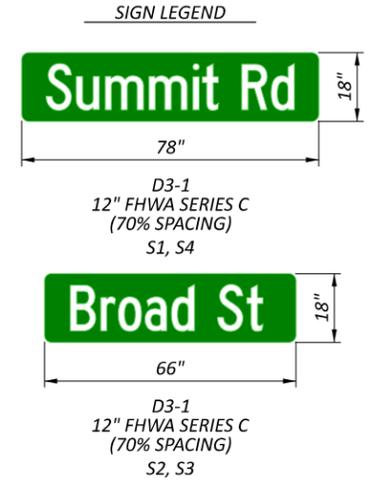


- LEGEND**
- GROUND MOUNTED CABINET
  - 4" BORED CONDUIT, 725.04
  - TR- INTERCONNECT CABLE
  - 3-SECTION SIGNAL HEAD
  - 5-SECTION SIGNAL HEAD
  - STOP BAR DETECTOR
  - ADVANCE RADAR DETECTOR
  - 24" PULLBOX, 725.08
  - 32" PULLBOX (FOR INTERCONNECT)
  - PEDESTRIAN POLE
  - PEDESTRIAN COUNTDOWN HEAD
  - PEDESTRIAN PUSHBUTTON
  - RADAR DETECTION ZONE

**CABINET & PULL BOX LOCATIONS**

REFERENCE	STATION	OFFSET
POW-1	56+66.8	46.7' LT
C-1	56+89.0	54.0' LT
PB-1	56+77.0	56.0' LT
PB-2	56+94.0	53.0' LT
PB-3	57+28.0	66.5' LT
PB-4	58+40.0	57.0' LT
PB-5	58+32.0	48.0' RT
PB-6	57+85.0	68.2' RT
PB-7	56+84.0	72.2' RT
PB-8	56+64.0	45.1' RT

SEE MAST ARM DETAIL SHEET AND PEDESTAL DETAIL SHEET FOR SIGNAL POLE & PEDESTAL LOCATIONS



TRAFFIC SIGNAL PLAN - 20 SCALE  
 BROAD ST. & SUMMIT RD.

DESIGN AGENCY



DESIGNER: BRH  
 REVIEWER: JSL  
 PROJECT ID: 97996  
 SHEET: 66 TOTAL: 72