



GENERAL SUMMARY

| | |
|--|---------------------------|
| DESIGN AGENCY <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>MOTT MACDONALD</p> </div> <div style="text-align: center;">  <p>MOTT MACDONALD</p> </div> </div> <p>20445 EMERALD PKWY SUITE 100 CLEVELAND, OH 44135</p> | |
| DESIGNER <p style="text-align: center;">SMS</p> | |
| REVIEWER <p>SJP 01/03/25</p> | |
| PROJECT ID <p style="text-align: center;">114831</p> | |
| SHEET <p>P.35</p> | TOTAL <p>90</p> |

CABINET POWER

CABINET POWER SHALL FOLLOW THE WIRING DIAGRAM ON P. 75 & 79.

- TWO RUNS OF POWER SHALL BE SUPPLIED:
1. MAIN POWER: FROM DISCONNECT THROUGH CABINET THROUGH UPS TO TERMINATE IN CABINET.
 2. SPARE: DISCONNECT TO CABINET.

ITEM 633 - CONTROLLER WORK PAD, AS PER PLAN

THIS ITEM SHALL INCLUDE THE EXCAVATION AND CONCRETE NECESSARY TO INSTALL CONTROLLER CABINET WORK PAD FOR THE COMBINATION CONTROLLER AND UNIT UNINTERRUPTIBLE POWER SUPPLY (UPS) CABINET.

IN ADDITION TO THE REQUIREMENTS OF CMS 633 & SCD TC-83.20.

THE CONTROLLER SHALL CONSTRUCT THE WORK PAD AS FOLLOWS:

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

PAYMENT FOR ITEM 633 CONTROLLER WORK PAD, AS PER PLAN SHALL INCLUDE ALL EQUIPMENT, LABOR, AND MATERIALS NECESSARY TO INSTALL A NEW CONCRETE WORK PAD.

ITEM 632 - SIGNALIZATION, MISC: TRAFFIC SIGNAL COORDINATION

THIS ITEM SHALL PROVIDE FOR THE RE-TIMING OF THE COORDINATED TRAFFIC SIGNALS AT THE FOLLOWING INTERSECTIONS OUTSIDE OF THE PROJECT WORK LIMITS:

1. FULTON DRIVE (SR-687) & SOUTH/EAST BOULEVARD
2. FULTON DRIVE (SR-687) & BELDEN GREEN ROAD

COORDINATION TIMING TO BE IMPLEMENTED AS SHOWN IN THE PLANS.

PAYMENT FOR ITEM 632 SIGNALIZATION, MISC.: TRAFFIC SIGNAL COORDINATION FOR BOTH SIGNALS TO BE INCLUDED IN THE LUMP SUM AMOUNT AND CONSIDERED COMPLETE UPON APPROVAL OF ENTIRE COORDIOR BY THE ENGINEER.

ITEM 632 - SIGNALIZATION, MISC.: TRAFFIC SIGNAL LS
COORDINATION

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.

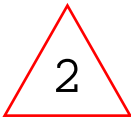
THE CONTROLLER SHALL BE AN ECONOLITE COBALT AND COMPATIBLE WITH THE CABINET TYPE BEING INSTALLED.

ITEM 809 STOP-LINE RADAR DETECTION, AS PER PLAN ,
RE-USE & INSTALLATION OF EXISTING EQUIPMENT
ITEM 809 ADVANCE RADAR DETECTION, AS PER PLAN,
RE-USE & INSTALLATION OF EXISTING EQUIPMENT

THIS ITEM OF WORK SHALL CONSIST OF REUSE AND REINSTALLATION OF THE EXISTING WAVETRONIX SMARTSENSOR MATRIX DETECTION UNIT. OR ADVANCE RADAR DETECTION. UNIT SHALL INCLUDE THE FOLLOWING:

1. UNIT 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
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, WHERE APPLICABLE.
9. THE INSTALLATION SHALL INCLUDE ALL CONTROLLER PROGRAMMING FOR COMPLETE INSTALLATION, WHICH INCLUDES MODIFICATIONS FOR REMOVAL OF EXISTING DETECTION.
10. THE CONTRACTOR SHALL CONTACT THE DISTRICT OFFICE (330-786-2267) THREE WORKING DAYS PRIOR TO INSTALLING THE DETECTION TO REMOVED THE CABINET LOCKS.

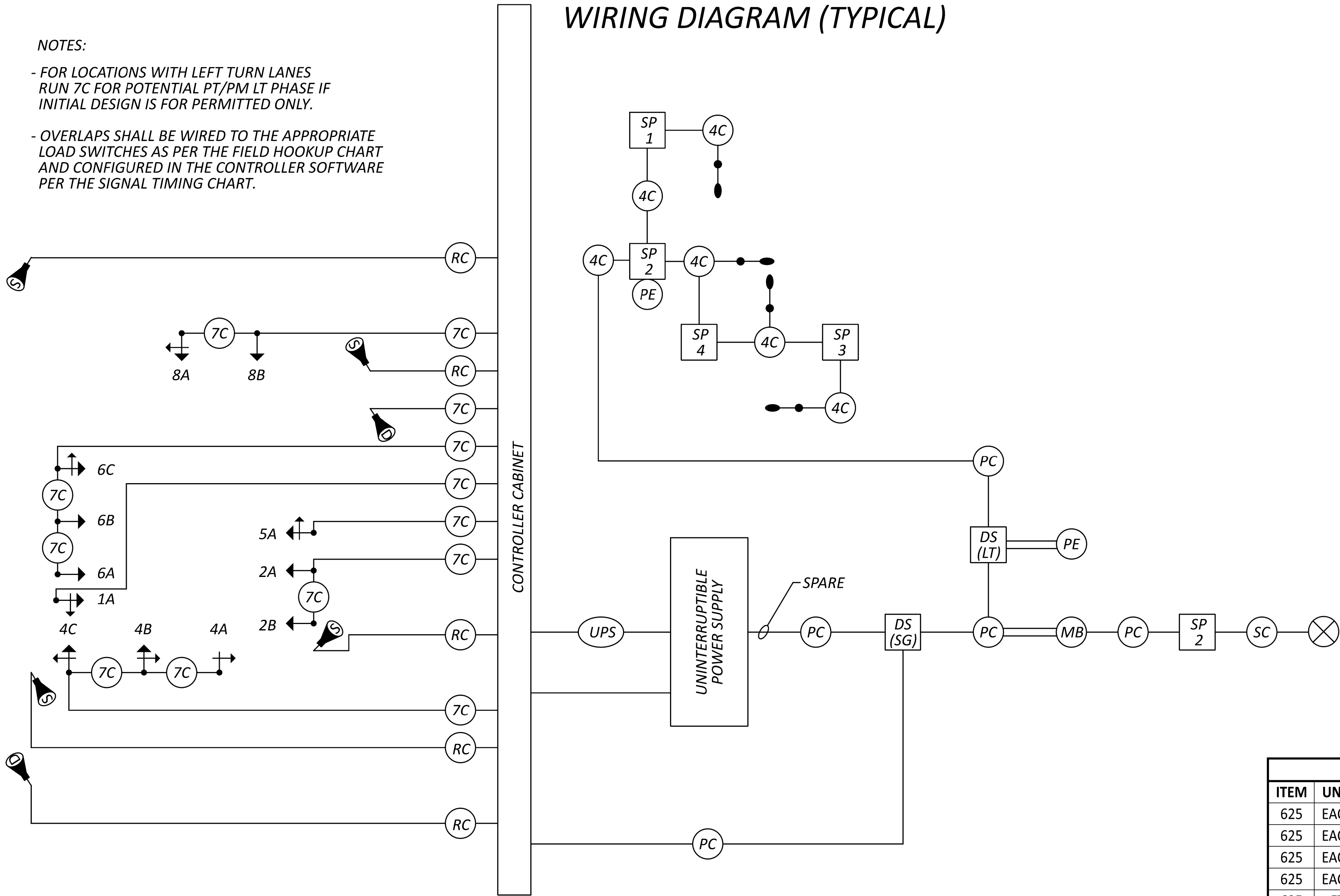
PAYMENT FOR EACH DETECTION UNIT SHALL BE MADE AT THE CONTRACT UNIT PRICE FOR EACH UNIT, COMPLETE AND IN PLACE INCLUDING ALL REMOVAL AND REINSTALLATION OF DETECTION UNITS, REQUIRED CABINET HARDWARE, MOUNTING BRACKETS, RUNNING NEW CABLES OR CONDUIT, AND CONNECTIONS TESTED AND ACCEPTED, AND ANY OTHER NECESSARY HARDWARE TO ESTABLISH A FULLY FUNCTIONAL DETECTION SYSTEM.



NOTES:

- FOR LOCATIONS WITH LEFT TURN LANES
RUN 7C FOR POTENTIAL PT/PM LT PHASE IF
INITIAL DESIGN IS FOR PERMITTED ONLY.

- OVERLAPS SHALL BE WIRED TO THE APPROPRIATE
LOAD SWITCHES AS PER THE FIELD HOOKUP CHART
AND CONFIGURED IN THE CONTROLLER SOFTWARE
PER THE SIGNAL TIMING CHART.



LEGEND

- TRAFFIC SIGNAL, 4 OR 5 UNIT HEAD, 12"
- TRAFFIC SIGNAL, 2 UNIT, 3 UNIT, OR PHB HEAD 12"
- TRAFFIC SIGNAL, 3 UNIT HEAD, 12" WITH ARROWS
- DILEMMA ZONE RADAR DETECTION UNIT
- STOP LINE RADAR DETECTION UNIT
- LUMINAIRE, CONVENTIONAL
- SIGNAL CABLE, 7 CONDUCTOR, NO. 14 AWG
- RADAR DETECTION CABLE
- INTERCONNECT CABLE
- PHOTOELECTRIC CELL
- POWER SOURCE
- SERVICE CABLE, 3 CONDUCTOR, NO. 8 AWG
- POWER CABLE, 2 CONDUCTOR, NO. 8 AWG
- SIGNAL SUPPORT POLE NO. __
- METER BASE
- SIGNAL CABLE, 4 CONDUCTOR, NO. 14 AWG
- LIGHTING DISCONNECT SWITCH
- SIGNAL DISCONNECT SWITCH
- UNINTERRUPTIBLE POWER SUPPLY CABLE
- HAND/ OFF/ AUTO SWITCH

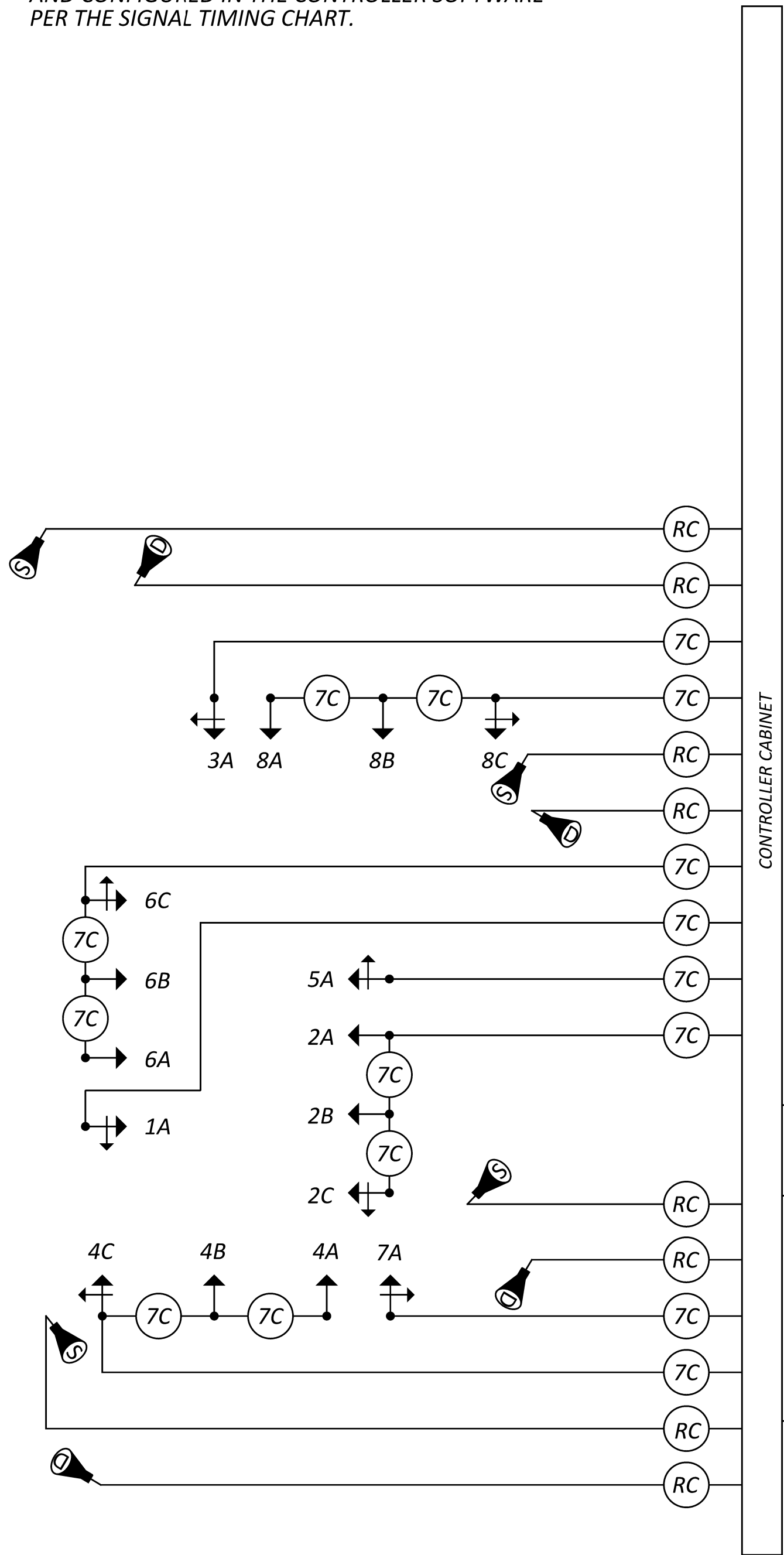
FIELD WIRING HOOKUP CHART (TEM FORM 496-16)

| SIGNAL HEAD | INDICATION | FIELD TERMINAL | FLASH | SIGNAL HEAD | INDICATION | FIELD TERMINAL | FLASH |
|--------------------|------------|----------------|-------|--------------------|----------------|----------------|-------|
| 1A (WB LT) | R | Φ6 R | R | 6A, 6B (WB) | R | Φ6 R | R |
| | Y | Φ6 Y | | | Y | Φ6 Y | |
| | G | Φ6 G | | | G | Φ6 G | |
| | ←Y→ | Φ1 Y | | 6C (WB RT) | R | Φ6 R | R |
| | ←G→ | Φ1 G | | | Y | Φ6 Y | |
| | | G | Φ6 G | | | | |
| 2A, 2B (EB) | R | Φ2 R | R | →Y→ | Φ4 Y / LS 10 Y | Φ4 G / LS 10 G | |
| | Y | Φ2 Y | | | | | |
| | G | Φ2 G | | | | | |
| 4A (SB LT) | R | Φ4 R | R | 8A (NB LT) | R | Φ8 R | R |
| | Y | Φ4 Y | | | Y | Φ8 Y | |
| | G | Φ4 G | | | G | Φ8 G | |
| 4B (SB) | R | Φ4 R | R | | ←G→ | Φ8 G | |
| | Y | Φ4 Y | | | | | |
| | G | Φ4 G | | | | | |
| | ←G→ | Φ4 G | | | | | |
| 4C (SB RT) | R | Φ4 R | R | | | | |
| | Y | Φ4 Y | | | | | |
| | G | Φ4 G | | | | | |
| | →Y→ | Φ5 Y / LS 9 Y | | | | | |
| | →G→ | Φ5 G / LS 9 G | | | | | |
| 5A (EB LT) | R | Φ2 R | R | OVERLAPS | | | |
| | Y | Φ2 Y | | | | | |
| | G | Φ2 G | | | | | |
| | ←Y→ | Φ5 Y | | | | | |
| | ←G→ | Φ5 G | | | | | |
| | | | | OLA | →Y→ | Φ5 Y / LS 9 Y | OUT |
| | | | | | →G→ | Φ5 G / LS 9 G | |
| | | | | OLB | →Y→ | Φ4 Y / LS 10 Y | OUT |
| LS = LOAD SWITCH | | | | | →G→ | Φ4 G / LS 10 G | |

| TRAFFIC SIGNAL QUANTITIES | | | |
|---------------------------|------|--|----------|
| ITEM | UNIT | DESCRIPTION | QUANTITY |
| 625 | EACH | BRACKET ARM, 6' | 4 |
| 625 | EACH | LUMINAIRE, CONVENTIONAL, SOLID STATE (LED), (TYPE III, 8,500-11,000 LUMENS, 240V/120V) | 4 |
| 625 | EACH | PULL BOX, 725.08, 24" | 1 |
| 625 | EACH | PULL BOX, 725.08, 18" | 4 |
| 625 | FT | CONDUIT, 2", 725.04 | 4 |
| 625 | FT | CONDUIT, 3", 725.04 | 24 |
| 625 | FT | CONDUIT, 4", 725.04 | 40 |
| 625 | FT | CONDUIT, JACKED OR DRILLED, 725.04, (4") | 201 |
| 625 | FT | TRENCH | 68 |
| 625 | EACH | ARC FLASH CALCULATIONS AND LABEL (FRANK AVENUE) | 1 |
| 625 | EACH | GROUND ROD | 5 |
| 625 | EACH | LUMINAIRE REMOVED | 4 |
| 625 | EACH | LUMINAIRE SUPPORT REMOVED | 4 |
| 625 | FT | UNDERGROUND WARNING / MARKING TAPE, AS PER PLAN | 269 |
| 632 | EACH | VEHICULAR SIGNAL HEAD, (LED), 3-SECTION, 12" LENS, 1-WAY, POLYCARBONATE, BLACK | 6 |
| 632 | EACH | VEHICULAR SIGNAL HEAD, (LED), 4-SECTION, 12" LENS, 1-WAY, POLYCARBONATE, BLACK | 2 |
| 632 | EACH | VEHICULAR SIGNAL HEAD, (LED), 5-SECTION, 12" LENS, 1-WAY, POLYCARBONATE, BLACK | 4 |
| 632 | EACH | STRAIN POLE FOUNDATION | 4 |
| 632 | EACH | COMBINATION STRAIN POLE, TYPE TC-81.11, DESIGN 10 | 4 |
| 632 | FT | MESSENGER WIRE, 7 STRAND, 3/8 inch DIA., with Accessories | 328 |
| 632 | FT | SIGNAL CABLE, 7 CONDUCTOR, NO. 14 AWG | 721 |
| 632 | FT | SIGNAL CABLE, 4 CONDUCTOR, NO. 14 AWG | 545 |
| 632 | FT | POWER CABLE, 2 CONDUCTOR, NO. 4 AWG | 106 |
| 632 | EACH | POWER SERVICE, AS PER PLAN | 1 |
| 632 | EACH | COVERING OF VEHICULAR SIGNAL HEAD | 12 |
| 632 | EACH | REMOVAL OF TRAFFIC SIGNAL INSTALLATION, AS PER PLAN | 1 |
| 632 | EACH | TETHER WIRE, WITH ACCESSORIES | 328 |
| 633 | EACH | CABINET, TYPE TS2, AS PER PLAN | 1 |
| 633 | EACH | CABINET FOUNDATION, AS PER PLAN | 1 |
| 633 | EACH | CONTROLLER WORK PAD, AS PER PLAN | 1 |
| 633 | EACH | UNINTERRUPTIBLE POWER SUPPLY, 1000 WATT, AS PER PLAN | 1 |
| 809 | EACH | ATC CONTROLLER, AS PER PLAN | 1 |
| 809 | EACH | ADVANCE RADAR DETECTION, AS PER PLAN, RE-USE & INSTALLATION OF EXISTING EQUIPMENT | 2 |
| 809 | EACH | STOP LINE RADAR DETECTION, AS PER PLAN, RE-USE & INSTALLATION OF EXISTING EQUIPMENT | 4 |

NOTES:

- FOR LOCATIONS WITH LEFT TURN LANES RUN 7C FOR POTENTIAL PT/PM LT PHASE IF INITIAL DESIGN IS FOR PERMITTED ONLY.
- OVERLAPS SHALL BE WIRED TO THE APPROPRIATE LOAD SWITCHES AS PER THE FIELD HOOKUP CHART AND CONFIGURED IN THE CONTROLLER SOFTWARE PER THE SIGNAL TIMING CHART.



WIRING DIAGRAM (TYPICAL)

LEGEND

- TRAFFIC SIGNAL, 4 OR 5 UNIT HEAD, 12"
- TRAFFIC SIGNAL, 2 UNIT, 3 UNIT, OR PHB HEAD 12"
- TRAFFIC SIGNAL, 3 UNIT HEAD, 12" WITH ARROWS
- DILEMMA ZONE RADAR DETECTION UNIT
- STOP LINE RADAR DETECTION UNIT
- LUMINAIRE, CONVENTIONAL

- SIGNAL CABLE, 7 CONDUCTOR, NO. 14 AWG
- RADAR DETECTION CABLE
- INTERCONNECT CABLE
- PHOTOELECTRIC CELL
- POWER SOURCE
- SERVICE CABLE, 3 CONDUCTOR, NO. 8 AWG
- POWER CABLE, 2 CONDUCTOR, NO. 8 AWG
- SIGNAL SUPPORT POLE NO. __
- METER BASE
- SIGNAL CABLE, 4 CONDUCTOR, NO. 14 AWG
- LIGHTING DISCONNECT SWITCH
- SIGNAL DISCONNECT SWITCH
- UNINTERRUPTIBLE POWER SUPPLY CABLE
- HAND/ OFF/ AUTO SWITCH

FIELD WIRING HOOKUP CHART (TEM FORM 496-16)

| SIGNAL HEAD | INDICATION | FIELD TERMINAL | FLASH | SIGNAL HEAD | INDICATION | FIELD TERMINAL | FLASH |
|------------------|------------|----------------|-------|----------------|------------|----------------|----------------|
| 1A (WB LT) | R | Φ6 R | R | 6A, 6B (WB) | R | Φ6 R | R |
| | Y | Φ6 Y | | | Y | Φ6 Y | |
| | G | Φ6 G | | | G | Φ6 G | |
| | ←Y | Φ1 Y | | 6C (WB RT) | R | Φ6 R | R |
| | ←G | Φ1 G | | | Y | Φ6 Y | |
| 2A, 2B (EB) | R | Φ2 R | R | G | Φ6 G | R | |
| | Y | Φ2 Y | | | →Y→ | | |
| | G | Φ2 G | | | →G→ | | Φ7 G / LS 12 G |
| 2C (EB RT) | R | Φ2 R | R | 7A (SB LT) | R | Φ4 R | R |
| | Y | Φ2 Y | | | Y | Φ4 Y | |
| | G | Φ2 G | | | G | Φ4 G | |
| | →Y→ | Φ3 Y / LS 10 Y | | | ←Y | Φ7 Y | |
| | →G→ | Φ3 G / LS 10 G | | | ←G | Φ7 G | |
| 3A (NB LT) | R | Φ8 R | R | 8A, 8B (NB) | R | Φ8 R | R |
| | Y | Φ8 Y | | | Y | Φ8 Y | |
| | G | Φ8 G | | | G | Φ8 G | |
| | ←Y | Φ3 Y | | 8C (NB RT) | R | Φ8 R | R |
| | ←G | Φ3 G | | | Y | Φ8 Y | |
| 4A, 4B (SB) | R | Φ4 R | R | G | Φ8 G | R | |
| | Y | Φ4 Y | | | →Y→ | | |
| | G | Φ4 G | | | →G→ | | Φ1 G / LS 9 G |
| 4C (SB RT) | R | Φ4 R | R | | | | |
| | Y | Φ4 Y | | | | | |
| | G | Φ4 G | | | | | |
| | →Y→ | Φ5 Y / LS 11 Y | | OLA | →Y→ | Φ1 Y / LS 9 Y | OUT |
| | →G→ | Φ5 G / LS 11 G | | | →G→ | Φ1 G / LS 9 G | |
| 5A (EB LT) | R | Φ2 R | R | OLB | →Y→ | Φ3 Y / LS 10 Y | OUT |
| | Y | Φ2 Y | | | →G→ | Φ3 G / LS 10 G | |
| | G | Φ2 G | | OLC | →Y→ | Φ5 Y / LS 11 Y | OUT |
| | ←Y | Φ5 Y | | | →G→ | Φ5 G / LS 11 G | |
| | ←G | Φ5 G | | OLD | →Y→ | Φ7 Y / LS 12 Y | OUT |
| LS = LOAD SWITCH | | | | | →G→ | Φ7 G / LS 12 G | |
| OVERLAPS | | | | | | | |

| TRAFFIC SIGNAL QUANTITIES | | | |
|---------------------------|------|--|----------|
| ITEM | UNIT | DESCRIPTION | QUANTITY |
| 625 | EACH | BRACKET ARM, 6' | 4 |
| 625 | EACH | LUMINAIRE, CONVENTIONAL, SOLID STATE (LED), (TYPE III, 8,500-11,000 LUMENS, 240V/120V) | 4 |
| 625 | EACH | PULL BOX, 725.08, 24" | 1 |
| 625 | EACH | PULL BOX, 725.08, 18" | 4 |
| 625 | FT | CONDUIT, 2", 725.04 | 5 |
| 625 | FT | CONDUIT, 3", 725.04 | 18 |
| 625 | FT | CONDUIT, 4", 725.04 | 40 |
| 625 | FT | CONDUIT, JACKED OR DRILLED, 725.04, (4") | 274 |
| 625 | FT | TRENCH | 63 |
| 625 | EACH | ARC FLASH CALCULATIONS AND LABEL (EVERHARD ROAD) | 1 |
| 625 | EACH | GROUND ROD | 5 |
| 625 | EACH | LUMINAIRE REMOVED | 4 |
| 625 | EACH | LUMINAIRE SUPPORT REMOVED | 4 |
| 625 | FT | UNDERGROUND WARNING / MARKING TAPE, AS PER PLAN | 337 |
| 632 | EACH | VEHICULAR SIGNAL HEAD, (LED), 3-SECTION, 12" LENS, 1-WAY, POLYCARBONATE, BLACK | 8 |
| 632 | EACH | VEHICULAR SIGNAL HEAD, (LED), 5-SECTION, 12" LENS, 1-WAY, POLYCARBONATE, BLACK | 8 |
| 632 | EACH | STRAIN POLE FOUNDATION | 4 |
| 632 | EACH | COMBINATION STRAIN POLE, TYPE TC-81.11, DESIGN 12 | 4 |
| 632 | FT | MESSENGER WIRE, 7 STRAND, 3/8 inch DIA., with Accessories | 441 |
| 632 | FT | SIGNAL CABLE, 7 CONDUCTOR, NO. 14 AWG | 1389 |
| 632 | FT | SIGNAL CABLE, 4 CONDUCTOR, NO. 14 AWG | 669 |
| 632 | FT | POWER CABLE, 2 CONDUCTOR, NO. 4 AWG | 328 |
| 632 | EACH | POWER SERVICE, AS PER PLAN | 1 |
| 632 | EACH | COVERING OF VEHICULAR SIGNAL HEAD | 16 |
| 632 | EACH | REMOVAL OF TRAFFIC SIGNAL INSTALLATION, AS PER PLAN | 1 |
| 632 | EACH | TETHER WIRE, WITH ACCESSORIES | 441 |
| 633 | EACH | CABINET, TYPE TS2, AS PER PLAN | 1 |
| 633 | EACH | CABINET FOUNDATION, AS PER PLAN | 1 |
| 633 | EACH | CONTROLLER WORK PAD, AS PER PLAN | 1 |
| 633 | EACH | UNINTERRUPTIBLE POWER SUPPLY, 1000 WATT, AS PER PLAN | 1 |
| 809 | EACH | ATC CONTROLLER, AS PER PLAN | 1 |
| 809 | EACH | ADVANCE RADAR DETECTION, AS PER PLAN, RE-USE & INSTALLATION OF EXISTING EQUIPMENT | 4 |
| 809 | EACH | STOP LINE RADAR DETECTION, AS PER PLAN, RE-USE & INSTALLATION OF EXISTING EQUIPMENT | 4 |