

CALN TOWNSHIP

CHESTER COUNTY, PENNSYLVANIA

RESOLUTION NO. 2006-19

A RESOLUTION OF THE BOARD OF COMMISSIONERS OF CALN TOWNSHIP, CHESTER COUNTY, PENNSYLVANIA, ADOPTING TECHNICAL SPECIFICATIONS FOR TRAFFIC SIGNALS.

WHEREAS, pursuant to the authority in Chapter 149 of the Caln Code, titled, "Vehicles and Traffic", specifically Section 149-8, the Board of Commissioners may adopt technical specifications for traffic signals that are installed on State and/or Township roads in the Township; and

WHEREAS, pursuant to such authority, the Board desires to adopt the technical specifications which are described herein;

NOW THEREFORE, BE IT RESOLVED, by the undersigned Board of Commissioners of Caln Township, Chester County, that the specifications which are attached hereto as Exhibit "A" entitled "Caln Township Traffic Signal Specifications" are hereby adopted as the specifications which shall be used for the installation of all traffic signals which are hereafter installed or replaced on State and/or Township roads in the Township.

ATTEST:

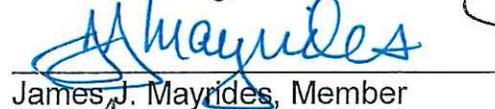
BOARD OF COMMISSIONERS
OF CALN TOWNSHIP


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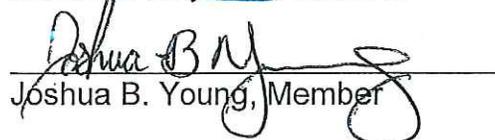

Joshua B. Young, Member

EXHIBIT A
CALN TOWNSHIP
TRAFFIC SIGNAL SPECIFICATIONS

PART 1 - GENERAL

QUALITY ASSURANCE:

Referenced specifications shall be the current Pennsylvania Department of Transportation (PENNDOT) Publication 408, Specifications and its revisions.

Referenced standard drawings shall be the current PENNDOT Traffic Standards - Signals; TC-7800 Series, as supplemented.

Referenced standard drawings shall be the current PENNDOT Publication 111 Traffic Control Signing Standards, TC-8700 Series, August 1997, as supplemented.

Referenced standard drawings shall be the current PENNDOT Traffic Control Standards Pavement Markings, TC-8600 Series, October 2004, as supplemented.

System installer shall be pre-qualified as a traffic signal installer by the Pennsylvania Department of Transportation and furnish the Township with copy of said certificate.

Pole manufacturer shall certify that the mast arms are designed to withstand loads imposed by signs attached to them and they meet or exceed the requirements of the 2002 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals", and as modified by the Pennsylvania Department of Transportation.

DESCRIPTION OF WORK:

As specified in PENNDOT Publication 408, Section 950.1.

Exact locations of equipment shall be determined by the Contractor in consultation with a representative of the Township or the Township Engineer.

Employ traffic control measures in accordance with the requirements of PENNDOT, Title 67, Chapter 213, Work Zone Traffic Control at all times.

SUBMITTALS:

Certificates: CONTRACTOR shall submit four (4) copies of the following to the Township Engineer for review and approval:

Product data information including PENNDOT Approval Numbers (where applicable) and shop drawings on the following:

1. Eight Phase Fully Actuated Controller
2. Base Mounted Cabinet
3. Electrical Disconnect Cabinet(s)

4. Signal Heads and Brackets
5. Loop Detector Amplifiers / Rack
6. Mast Arms and Poles
7. Malfunction Management Unit
8. Pedestrian Pushbuttons
9. Surge Protectors
10. Loadswitches
11. Flasher Unit
12. Master Controller
13. Battery Backup System
14. Spread Spectrum Radio Equipment / Accessories
15. Preemption Equipment
16. Conduit
17. Signal Cable
18. Traffic sign posts and breakaway system
19. Sign brackets and hardware

Pole manufacturer's mast arm certification.

Provide conflict monitor bench test certification.

PART 2 - MATERIALS

TRAFFIC SIGNAL SUPPORTS:

As specified in PENNDOT Publication 408, Section 951.2 and the following:

Mast arm shafts and arms shall be galvanized, round, and tapered. All mast arms without luminaires shall be capable of having an extension to the shaft and a luminaire mounting arm added at a future date.

CONTROLLER ASSEMBLY AND CABINET:

Controller Assembly: Furnish and install controller of the type indicated. Comply with Publication 408, Section 952 and 1104.02 except as follows:

- Controller shall be an Eagle EPAC 3108-M42
- Master Controller shall be an Eagle MARC 390 with required communications module.

Cabinet: Unfinished aluminum, waterproof, NEMA 3R, base-mounted type, EAGLE P-44, or equal. Cabinet enclosure shall contain all terminal and facilities to fully accomplish the PENNDOT traffic signal permit and to house all required components.

1. Cabinet Functions and Equipment:
 - a) The cabinet shall be equipped with a bracket mounted, heavy duty door open/close switch.
 - b) The cabinet shall be wired to provide monitoring of the following police panel functions:
 - a) Auto - Flash switch.
 - b) Signal On - Off switch.
 - c) Auto - Manual switch.

- c) Coiled manual cord with push-button shall be provided and installed in the police compartment of the controller cabinet.
- d) The rear panel shall have a minimum of twelve (12) load switch positions, unless noted otherwise.
- e) Provide 2 12" LED lighting fixture 1 at the top of the cabinet and 1 under the bottom equipment shelf. Both controlled by a switch located on the inside main cabinet door.
- f) Field hook-up wiring schedule shall be laminated and placed inside the main cabinet.
- g) Provide Corbin #2 main cabinet door lock and keys.
- h) Surge protection shall be installed in the Controller Assembly as manufactured by EDCO Incorporated of Florida, SHA1210-IRS, or equal.
- i) Service disconnect enclosure and disconnect assembly shall be NEMA 3R rated and U.L. approved. The service disconnect enclosure and communication cabinet (for future use) shall be an unfinished aluminum Tri-County Enclosure TC141007 with a Corbin police door lock. Watertight fittings shall be used in order to maintain the NEMA 3R rating of the cabinet. The disconnect assembly shall be a Square D Q02-4L70S.
- j) The power sub-panel shall be isolated from the main back panel, completely wired through its own terminal block.
- k) The controller shall contain pedestrian isolation circuitry and surge protection on all controller inputs.
- l) Battery Back-up system shall be Dimensions Unlimited 24J11 or approved equal.

VIDEO DETECTION SYSTEM

1. The video detection system shall be Iteris EDGE 2 video processors, with Iteris RZ4 color video cameras. This will be the standard item unless Loop Detection is spelled out by the Township Engineer.

RACK-MOUNTED DETECTORS AMPLIFIERS

As specified in PENNDOT Publication 408 Section 1104 and as follows:

1. The rack shall have a minimum of eight (8) positions with the first position dedicated for the BIU; all remaining positions shall be wired for 2 channel detector cards with count outputs. There shall be two (2) unused slots left for future use.
2. Provide Detector Systems EDI Oracle or equal.
3. The detectors shall be clearly labeled with loop number, detector input, and phase called.
4. Loop, slot assignments, detector input, and card type shall be approved by the Owner prior to cabinet set-up.
5. Each detector channel shall be connected to only one (1) loop.

LOOP DETECTORS:

Conforming to PENNDOT Publication 408 Section 956 and 1104.07. The loop detector lead-in wire shall be clearly and permanently tagged identifying the individual loop number from the Traffic Signal Permit Plan which shall match the loop number indicated on the rack mounted detector amplifier. Each loop shall have its own unspliced lead-in cable and channel of amplification. Splice

the sensor wires to the lead-in cable as shown on the TC-7806 in the junction boxes. Loops shall be tested in the presence of the Township Engineer and documentation provided in the cabinet.

LOOP WIRE IDENTIFICATION TAGS

Provide a tag for each lead-in cable in the cabinet in accordance with PENNDOT Publication 408 Section 1101.12(e).

ELECTRICAL DISTRIBUTION:

As specified in PENNDOT Publication 408, Section 954.2 and as follows:

Furnish and install Signal Battery Backup System Dimension Unlimited, Inc. Model Number 24J11 or equal.

Furnish and install rack-mounted traffic uninterruptible power supply TechPower Developments, Inc. Model Number M-E 1000, or equal and batteries.

Furnish and install a generator / utility transfer assembly switch and cabinet. Type/manufacturer will be provided by Township Engineer at time of shop drawing submission.

SIGNAL ASSEMBLIES

Conforming to PENNDOT Publication 408 Section 955 and 1104.06, one way, either 8" or 12" adjustable, sectional, L.E.D., polycarbonate, complete with all brackets and rigid mounting attachments.

1. All overhead and sidemount signals to have cut-away visors unless noted differently on the Traffic Signal Permit Plan.
2. All signal wiring must terminate on terminal strips. Splices are only permitted in the traffic signal support handhole and shall be in accordance with PENNDOT Publication 408 Section 954.
3. All signals shall have a drip loop attached with UV stabilized nylon wire ties.
4. All signals and brackets shall be attached with 3/4-inch stainless steel banding.
5. All signals shall be completely and securely covered with burlap-type material until signal is approved by PENNDOT to flash, not plastic bags.
6. Use Kelly Bracket as manufactured by Northeast American or Astro-Brac as manufacturers by Pelco Products, Inc.
7. Backplates shall be black, one-piece, UV stabilized, polypropylene or ABS and non-louvered, if required on the Traffic Signal Permit Plan. All hardware shall be stainless with a permanent black finish. Backplates shall be designed to properly fit the signal manufacturer heads that will be furnished.
8. L.E.D. signals shall be used on all 8", 12", and 16" one-piece pedestrian indications. They shall be as manufactured by G.E., Dialight Corporation, or equal.

CONDUIT:

All conduit for the electrical service and external cabinet fittings and shall be rigid steel conduit; hot-dipped galvanized, inside and outside; and manufactured to conform to the requirements of ANSI Specification C80.1, Federal Specification WW-C-581 and UL-6 Listing. Rigid Polyvinyl Chloride

Conduit for exposed or direct burial shall be Schedule 40; 90C with a UL-651 Listing for rigid nonmetallic conduit; UL-514 Listing for fittings.

JUNCTION BOXES:

Furnish and install stackable, reinforced plastic mortar junction boxes in accordance with PENNDOT Publication 408 Section 1104.05(C) with "TRAFFIC SIGNAL" as the logo on the cover. Junction Boxes containing Fiber Optic cable shall have "FIBER OPTIC" as the logo on the lid.

PEDESTRIAN PUSHBUTTON ASSEMBLIES:

ADA Compliant Pedestrian Push Button Assemblies: Shall be direct push button, contact type, normally open, insulated, with 319 aluminum round cover and housing castings. The control button shall be raised or flush and a minimum of 2-inches at its smallest dimension. Push button shall activate pedestrian signal with no more than 5 lbf required. The pushbutton shall be mounted 42-inches from finished grade to center of pushbutton. External surface shall be painted Federal Yellow #595a-13538. The cover shall be attached to the housing with stainless steel vandal resistant screws.

SPREAD SPECTRUM RADIO COMMUNICATIONS:

Provide a shelf mounted spread spectrum radio (SSR) transceiver, yagi antenna, necessary low loss coaxial cable, LMR-400, 1 conductor and all necessary equipment to establish communication with the master controller at the US Route 30 Ramps and adjacent intersection at Humpton Road. Provide the appropriate coaxial surge/lightening arrestors between the low loss coaxial cable (connected to the antenna) and the SSR transceiver to determine the voltage requirements for the arrestors. The contractor is required to coordinate with the manufacturer of the SSR radio to determine the voltage requirements for the arrestors. Provide connectors that are equipped with sealers that inhibit moisture entry to the connections. Mount yagi antennas at each intersection at highest level possible on pole, including luminaries. Work includes all necessary stand-off brackets, cabling and incidental items. Mount antenna to withstand 80 MPH winds.

EMERGENCY PRE-EMPTION:

The intersection shall have an optical emergency pre-emption system (Opticom – 3M). The contractor shall furnish pre-emption cable, optical detectors, phase detector selector, system chassis, white fail-safe confirmation light kit, and any other equipment necessary to complete the work in accordance with the PENNDOT Permit and the Township.

TRAFFIC CONTROL SIGNS:

Signs: Of size and design shown on the plans and in accordance with PDT Section 1103. Sign blank material shall be aluminum with Type III, IV, or VII retroreflective sheeting material. All signs shall be one sided. Post mounted street signs shall be attached to the post using drive rivets and shall have cherry mate rivets to secure ends of street name signs together.

Posts: Posts for all post-mounted signs shall be square hot dipped galvanized steel with 7/16" diameter die-punched knockouts (left in place) on 1" centers, full length on all four sides. Erect using System "A" as shown in PennDOT Publication 111, as supplemented. Provide post caps. Select number and size of posts in accordance with PennDOT Publication 111, as supplemented.

All overhead mast-arm mounted signs shall be mounted as indicated on the plans utilizing a Kelly sign bracket with a minimum of two (2) z-bar type brackets and mounting pipe that allow adjustment of the signs. All Street Name Signs shall be installed with a minimum of three (3) z-bar type brackets. All overhead signs shall be mounted level to the roadway and perpendicular to the approach.

All banding for structure-mounted signs, except for the pedestrian push-button signs, shall be 3/4-inch stainless steel banding. Pedestrian push-button signs may be 1/2-inch stainless steel banding.

All Overhead Street Name Signs (D3-4 or D3-5) shall have a white legend and border on a green background. Both the legend and sign background shall be fabricated from Type III, IV, or VII retroreflective sheeting material.

PART 3 - CONSTRUCTION

GENERAL:

As specified in PENNDOT Publication 408, Section 950.3.

TRAFFIC SIGNAL SUPPORTS:

As specified in PENNDOT Publication 408, Section 951.3.

Contractor shall not install poles on concrete bases until a minimum of 72 hours after placing concrete and/or the 3,500 psi compressive strength is achieved. Achievement of this compressive strength shall be demonstrated by a certified concrete break test to be supplied by Contractor.

The Contractor shall be responsible for establishing the top of foundation elevations and the "H" dimension of the mast arm shaft in order to meet the specified signal clearance height.

ELECTRICAL DISTRIBUTION:

As specified in PENNDOT Publication 408, Section 954.3 with the following additions.

Add to Section 954.3(c) that the maximum ground resistance shall be 25 ohms. The CONTRACTOR shall provide adequate equipment to verify the ground. The CONTRACTOR shall provide additional grounding, if necessary, to ensure that the maximum resistance is not exceeded.

Add to Section 954.3(e) that the CONTRACTOR shall schedule the connection of electrical power to the system with the appropriate utility company. The CONTRACTOR shall be responsible for any connection fees. The surge protection package shall be installed in the system to accommodate fluctuations in power supply.

All conduit crossings shall be bored or jacked, unless approved by the Township.

All conduit shall be installed at least 36-inches below final grade.

All equipment shall be grounded in accordance with the provisions of the 1996 National Electrical Code and/or required by this specification. All work shall be done in accordance with the 1996 National Electrical Code.

Contractor shall provide a Type C electrical service, unless directed otherwise by the Township.

Contractor shall coordinate the inspection of all electrical components and connections by an approved Third Party Electrical Inspection Agency, and provide said inspection report to Owner. Costs for tests and inspections shall be included in the contract price.

Battery backup and UPS shall be installed as per the manufactures specifications.

SIGNAL HEADS:

As specified in PENNDOT Publication 408, Section 955.3.

LOOP DETECTORS:

As specified in PENNDOT Publication 408, Section 956.3, and as follows:

All 90-degree corners where loop wires turn shall be made as two (2) 135 degree cuts. Saw cuts shall be cleaned, dried and free from dust, grit, oil and moisture before the placement of wire.

TRAFFIC CONTROL SIGNS:

As indicated on permit drawing in accordance with PENNDOT Publication 408 Section 1103 and the Standard Drawings TC-8700.

Any sign removed and not replaced shall be delivered to the Township Public Facility.

EMERGENCY PRE-EMPTION:

Install as per manufacturer's specifications.

PAVEMENT MARKINGS:

As indicated on permit drawing in accordance with PENNDOT Publication 408 Sections 960, 962, 963, 964 and the Standard Drawings TC-8700. The limits of the installing pavement markings shall be as indicated on the permit drawing. All stopbars, arrows, legends, crosshatching, and crosswalks shall be hot thermoplastic and/or epoxy markings.

All surfaces must be clean, dry, and free of surface contaminants such as oil, laitance, and curing compounds. Existing lines must be in good condition, and adhering well to the roadway. Oil, laitance, curing compounds, and loose, chipping, flaking lines should be mechanically removed prior to pavement marking application.

ALL surfaces must be dry and be blown/swept clean just before application. Surface temperature range for application is between 30 -110 degrees F.

PART 4 - FIELD QUALITY CONTROL

Final test and inspection shall be conducted in the presence of Caln Township, the Township Engineer, PENNDOT, and the Contractor. Costs for tests and inspections shall be included in the contract price.

After final inspection and acceptance of system by the Pennsylvania Department of Transportation and the Township Engineer there will be an initial 30-day operation period of the system. All items shall be covered during this time period including bulbs. The Contractor shall provide the Township with the telephone number of the emergency contact person. The Contractor shall respond to any call within 2 hours of receiving the service call.

The Contractor shall guarantee the satisfactory in-service operation of mechanical and electrical equipment, and related components for a period of 1 year after the initial 30 day test period.

The controller manufacturer shall warrant the equipment for five years from date of shipment. The controller manufacturer shall present to the municipality a five year warranty certificate with the controller model number, serial number, and effective date of warranty.

The L.E.D. manufacturer shall warrant the equipment for five years from date of shipment. The L.E.D. manufacturer shall present to the municipality a five year warranty certificate with the signal model number, serial number, and effective date of warranty.

Three (3) sets of record plans shall be provided to the Township upon final inspection and acceptance of the signal. The plans shall indicate the actual locations and sizes of all conduits and junction boxes.

Three (3) copies of the cabinet wiring diagram shall be provided to the Township as per PENNDOT Publication 408 Form 408, Section 954.3.(j).

Contractor shall provide the services of an experienced technician representing both the controller manufacturer and pre-emption equipment manufacturer at the signal turn-on.

Contractor shall test preemption equipment where applicable. Each approach shall be tested using a motor vehicle with a hand held or vehicle mounted emitter. Adjustments to detectors shall be made as necessary. Testing shall be conducted in the presence of the Owner

Contractor shall test all switches and push buttons located within the switch compartment.

Contractor shall test all ground rods as per PENNDOT Publication 408, Section 954.3(l). Copies of the ground rod tests shall be provided.

Install traffic control signs as indicated on permit drawing in accordance with PENNDOT Publication 408 Section 1103 and the Standard Drawings TC-8700.

END OF SECTION