ROAD COMMISSION FOR OAKLAND COUNTY

SPECIAL PROVISION
FOR
GPS PRIORITY CONTROL SYSTEM

a. Description

The required priority control system will employ data-encoded radio communications to identify the presence of designated priority vehicles. A record of system users by agency identification number, vehicle classification and vehicle identification number will be created. In priority vehicle mode, the data-encoded communication will request the traffic signal controller to advance to and/or hold a desired traffic signal display selected from phases normally available.

This work consists of installing the GPS Priority Control System according to the plans and sections 818, 820, 918, and 921 of the Standard Specification for Construction except as herein provided.

b. Materials

All materials must meet the requirements of this specification or engineer approved equal.

1. General
   A. Furnish new materials.
   B. All materials shall be compatible with existing RCOC materials.
   C. Compatible with TS1 and TS2 traffic signal cabinet.
   D. Provide proposed material properties to match the existing material properties in place at other intersections within Oakland County, and in accordance with the requirements of this special provision.

      If the materials selected by the contractor do not match all the existing material properties in place, alternate models shall require extensive testing by RCOC (RCOC Traffic Operations Center, RCOC Maintenance Department, and RCOC Traffic Safety Director), the supplier, and the contractor at the RCOC TOC building in Pontiac. The materials will require field testing. RCOC may consider information from the MDOT New Traffic Signal Device Product Review Guidelines. The testing should be expected to take several months. This testing will not be paid extra and any requests to use an alternate material/model will not be justification for an extension of time, delay to the project, and/or additional cost to the project. The RCOC Engineer will provide the final determination, and the outcome cannot be appealed.

2. The system consists of the following matched components.

3. The required priority control system will be comprised of matched components:

   A. Intersection radio/GPS antenna

   B. Radio/GPS cable

   C. Multi-mode Phase selector

   D. Auxiliary interface panel

   E. Card rack (if required)

   F. Base station (if required)

4. To ensure system integrity, operation and compatibility, all components will be from the same manufacturer and will be compatible with NEMA type controllers and cabinets.

   A. Intersection Radio/GPS Module.
   The intersection radio/GPS module will transmit a beacon every second and receive the data transmitted by the vehicle equipment and relay this information to the phase selector as well as other system-equipped intersections. It will also obtain position information from the GPS satellites. A GPS receiver and antenna will obtain the intersection position from the GPS satellite system operated by the DoD. The time information from the GPS satellites will be used to synchronize the frequency hopping of the 2.4 GHz radio and to time stamp the activity log. The GPS receiver and the GPS antenna will reside inside the radio/GPS module.

   Radio/GPS Cable. The radio/GPS cable will carry the data received from the intersection radio/GPS unit to the phase selector. It will also carry the power for the radio and GPS components provided by the phase selector. The same cable will be used to carry the data between the vehicle radio/GPS unit and the vehicle control unit. The cable used to connect the radio/GPS unit to the phase selector shall be a shielded 10 conductor #20AWG data cable; the use of coax cable is not permitted. The cable shall be suitable for direct burial, conduit, or exposed overhead.

   B. Phase Selector.
   The phase selector will process the data in order to validate that all parameters required for granting a priority request are met. It will be located within the controller cabinet at the intersection. It will request the controller to provide priority to a valid priority vehicle by connecting its outputs to the traffic controller’s preemption inputs. The phase selector will be a plug-in, four channel, multiple-priority device intended to be installed directly into a card rack located within the controller cabinet. A unique intersection name, which will be broadcast, shall be settable for

each phase selector. Up to 25 different radio channels will be available to be assigned to the phase selector.

The Opticom 764 Phase Selector (or latest model/version as approved by Engineer) should be used.

C. Card Rack.
The card rack will provide simplified installation of a phase selector into controller cabinets that do not already have a suitable card rack. The card rack will provide the +24 VDC required to operate the phase selector.

The Opticom 760 card rack (or latest model/version as approved by Engineer) should be used.

D. Auxiliary Interface Panel/Harness.
The auxiliary panel will provide additional preemption outputs if needed. It will also provide a connection point for the phase selector to monitor the status of the intersection's green lights (green sense). Additional communication ports may also be accessed via this panel. If additional outputs are not required, an auxiliary harness will be used to monitor the status of the intersection's green lights.

The Opticom 768 Auxiliary Interface Panel (or latest model/version as approved by Engineer) should be used.

E. Base Station.
The Base station module is used at fire stations that are located very close to intersections. When the base station is activated, all nearby equipped intersection/s or only to those intersections in the planned direction of travel will immediately begin requesting preemption from the traffic controller. Base station will wirelessly communicate to intersections near the station that can be activated from the base station controller and/or passing vehicles that are equipped with Opticom GPS vehicle equipment.

F. Cables.
Provide all cables, wires, connectors, and grounding/bonding necessary to provide a fully functional system. Materials must meet or exceed the manufacturer's requirements, be approved by the engineer, and be rated for their intended use.

G. Span Wire or Mast Arm Clamps.
Provide all connectors.

5. Reliability.
   All equipment supplied as part of the radio/GPS priority control system intended for use in the controller cabinet will meet NEMA Standards Publication TS2 2003, Part 2: v02.06.

6. Qualifications

Upon request of the Road Commission for Oakland County, the manufacturer of the Traffic Signal Preemption Control System will verify a proven, safe and successful operation of the proposed solution through current examples of 15 installed GPS Based Traffic Signal Preemption Control Systems using the same products that consist of a minimum of 10 intersections and 10 emergency vehicles each having been in operation a minimum of 1 year. The examples must be from Oakland County, Michigan.

7. Warranty and Guarantee

The protection plan will warrant that component parts of a matched component system that are not subject to coverage limitations and prove to be defective in workmanship and/or material for a minimum two (2) years from the date of shipment or project acceptance (whichever is greater) from manufacturer will be repaired at no charge, and that extended coverage will be available for an additional three (3) years. If requested by the Engineer, supply manufacturer's warranty and guarantee documents.

8. Acceptance

   A. Provide General Certification per the MDOT's *Materials Quality Assurance Procedures Manual* to the Engineer that the materials meet the requirements specified herein.

   B. TOC Operations Engineer can view the preemption events from the TOC Office.

   C. Field Verification

      Engineer, contractor, and supplier representative shall field test the GPS Priority Control System.

      The supplier representative shall supply the equipment to perform the test and verify the pay items are functioning in the controller. This includes a vehicle driving the intersection to verify the equipment is functioning.

The contractor may be required to have the fire department and police department present at the field verification.

The supplier representative shall provide written certification that the field test and verification that the pay items were functional in the controller.

c. Construction

Complete this work in accordance with sections 818 and 820 of the Standard Specifications for Construction. Install the priority detection system per the manufacturer's recommendations and as directed by the engineer.

Remove, store, and dispose of material in accordance with section 204 of the Standard Specifications for Construction.

1. Submittals / Working Drawings
   Submit a detailed dimensional drawing of all equipment, material specification list which shows the materials to be used, equipment to be furnished, and assembly/installation method.

2. Delivery
   A. Deliver the equipment to the RCOC Signal shop for setup and installation in the controller cabinet (if a proposed cabinet is required).

3. Installation
   Ensure that a supplier representative or other certified manufacturer's representative is in attendance during the installation.

   Place 25 to 30 feet above pavement surface.

d. Measurement and Payment

The completed work, as described, will be measured and paid for at the contract unit price using the following pay item(s).

Pay Item	**Pay Unit**
GPS Priority Control System, RCOC	Each
GPS Priority Control System, Salv, RCOC	Each
Priority Control System, Rem, RCOC	Each

GPS Priority Control System, RCOC (Ea) includes all labor, materials and equipment required to provide a complete and operational priority control system, including all necessary equipment, hardware, delivery, conduit risers, cable, wiring, and grounding as and such other material as may be required to provide a complete and operating job as specified herein and as shown on the plans.

GPS Priority Control System, Salv, RCOC (Ea) includes all labor, materials and equipment required to provide a complete and operational (salvaged) priority control system, including all necessary equipment, hardware, delivery, conduit risers, cable, wiring, and grounding and such other material as may be required to provide a complete and operating job as specified herein and as shown on the plans. If material is not present in existing cabinet, the material shall be provided in proposed cabinet for a complete and operating job.

Priority Control System, Rem, RCOC (Ea) includes all labor, materials and equipment required to remove the priority control system, including sensors, detectors, mounting brackets and all associated equipment, hardware, conduit risers, cable, wiring, and grounding as specified herein and as shown on the plans.