MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
TEMPORARY PORTABLE TRAFFIC SIGNALS

Delete the first seven paragraphs of subsection 812.03.D.16, beginning on page 8-96 of the Standard Specifications for Construction and replace with the following:

16. **Temporary Portable Traffic Signal (PTS).** Provide the temporary portable traffic signal (PTS) as shown on the plans. Each PTS consists of one trailer-mounted, solar-powered PTS with battery backup.

    Provide, install, program, and activate the signal at the initial location. Provide hardwire or radio communication. Operate, inspect, maintain, clean, relocate, reactivate, reprogram, and remove the PTS from the project.

    Check the PTS for required operation at 12-hour intervals when in use on the project. If a PTS failure occurs, provide traffic regulators to control traffic until the PTS is operational. If the PTS fails a second time within 30 calendar days of the first failure, remove the PTS from the project and provide traffic regulators in accordance with section 812 of the Standard Specifications for Construction until the replacement PTS is installed, activated, and operating as required.

    The Contractor is responsible for repairing or replacing the PTS.

    PTS trailers must be located on the shoulder, outside the travel lane. After positioning the trailer, rest the tires on the ground with wheel chocks or elevate the trailer, with the bottom of the tires above the ground. Delineate the trailer using three plastic drums or 42-inch channelizing devices.

    When work operations are suspended and traffic lanes are to be opened for less than 72 hours, the temporary signal may remain in place in yellow-flash mode. Remove the temporary signal from the roadway if the temporary signal will be non-functional for longer than 72 hours.

    If existing guardrail prevents a trailer from sitting completely on the shoulder, place the PTS trailer in accordance with the following:

Delete the following pay items from the list in subsection 812.04, on page 8-111 of the Standard Specifications for Construction.

PTS System, Temp, Furn .....Each
PTS System, Temp, Oper.....Each

Add the following pay items to the list in subsection 812.04, on page 8-111 of the Standard

Specifications for Construction.

PTS, Temp, Furn.....Each
PTS, Temp, Oper .....Each

Delete subsection 812.04.R, on page 8-122 of the Standard Specifications for Construction, in its entirety and replace with the following:

R. **Portable Traffic Signal (PTS)**. The Department will not make additional payments for traffic regulating, signing, arrow boards, or lighting systems for traffic regulator stations operated at night due to a temporary PTS failure.

1. **Furnish PTS**. The unit price for **PTS, Temp, Furn** includes the cost of the following:

a. Providing, installing, programming, and activating a temporary PTS in the initial required location;

b. One trailer-mounted, solar-powered PTS with battery backup;

c. Radio-linked communications with hardwire capabilities and conflict monitoring; and

2. **Operate PTS**. The unit price for **PTS, Temp, Oper** includes the cost of the following:

a. Operating;

b. Inspecting and maintaining;

c. Delineating with conspicuity tape;

d. Relocating, reactivating, and reprogramming;

e. Removing the PTS from the project;

The Department will pay separately for the cost of any guardrail work required to place and delineate each PTS trailer, if needed.

Delete section 922.10, beginning on pages 9-222 of the Standard Specifications for Construction, in its entirety and replace it with the following:

922.10. Temporary Portable Traffic Signal

Material for a temporary portable traffic signal (PTS) must meet the requirements of section 918 and section 921, the ITE *LED Circular Signal Supplement*, and the MMUTCD.

A. **Trailer.** PTS trailer must be self-contained and meet the following requirements:

1. Consist of a vertical upright and horizontal mast arm to accommodate two 12-inch overhead traffic signal heads, mounted at the same height, and capable of providing at least 16 feet of clearance;

2. Allow at least one signal head on the horizontal mast to be placed over the traffic lane;

3. Conform to the wind load requirements specified by AASHTO's *Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals* with all equipment mounted without the need for additional ballast;

4. Allow for transporting two signal trailers with one vehicle;

5. Have adequate structural integrity to allow for lifting and placing the PTS trailer, as required.

6. Conform to the Michigan Vehicle Code;

7. Be equipped with four stabilizing and leveling jacks, one on each corner of the trailer; and

8. Be delineated with a 2- by 36-inch strip, or an equivalent area, of reflectorized red and white conspicuity tape, installed on each of the four sides of the trailer. Locate the strips at each corner of the trailer.

B. **Traffic Signal Heads/Display Requirements**. The PTS must meet the following requirements:

1. Conform to the physical display and operational requirements of conventional traffic signals, as specified in Part IV of the MMUTCD, ITE *LED Circular Signal Supplement*, and NEMA TS-5 standards;

2. Be equipped with two overhead, 12-inch, LED traffic signal heads with visors that extend beyond the signal head at least 10 inches;

3. Be equipped with traffic signal heads that can accommodate back plates and that rotate horizontally 180 degrees; and

4. Provide traffic signal head clearance height of at least 16 feet, measured from the bottom of the green signal housing or signal back plate, whichever is lower, to the road surface.

C. **Power Requirements.** Each PTS trailer must be equipped with batteries capable of operating the traffic signal system for at least 21 days at 72°F without charging. Provide a charging system that includes at least 450 watts of solar collection capability, an onboard battery charger for use with a 110-volt power source, and an onboard monitoring system capable of regulating and providing a visual display of the battery voltage and solar input.

The PTS must be fully operable if connected to a 110-volt power source.

D. **PTS Operational Requirements.** The PTS must have an operating system that includes a conflict monitoring system that conforms to NEMA TS-5 standards and is capable of operating in a fixed-time, traffic-actuated, or manual control mode. The fixed-time mode operation option must be capable of providing at least five automatic traffic signal timing changes in a 24-hour period. The traffic-actuation mode option must allow minimum and maximum green time programming to extend the green times in predetermined programmable segments.

In addition, the PTS must be able to communicate with other PTSs and meet the following requirements:

1. Control at least seven traffic phases and include programmable green times from 3 seconds to 250 seconds and red times from 1 second to 250 seconds in 1-second increments;

2. Facilitate standby modes of red, red flash, and yellow flash;

3. Capable of interfacing with a remote monitoring system that reports signal location, battery voltage, and system default. Ensure that the monitoring system in accordance with section 922 is not limited to cellular phone coverage areas and remains operational regardless of location;

4. Can accommodate a pre-emption system with optical activation that provides a priority green phase in the direction of equipped approaching emergency vehicles;

5. Allows for connect and control of the PTS by a standard NEMA-type controller;

6. Be equipped with diagnostic capabilities in the event of a system failure and can identify the failure to expedite return to full operational mode; and

7. Has an integrated mechanism capable of recording system malfunctions and providing a printout of this record that must be kept with the PTS, including the following:

    a. Date and time of system failure;

    b. Service and maintenance performed;

    c. Description of the equipment serviced and why the service was performed;

    d. Repairs made to the unit; and

    e. Past operational history of the unit.

E. **Actuation Requirements.** PTS must have traffic-actuation capabilities that include microwave motion sensors, video detection, and in-pavement loops. The PTS must be capable of operating with a motion and true-presence actuation system.

F. **Communication Requirements.** Equip the PTS to communicate via hardwire connection or wireless radio link communication. If using the hardwire communication,

do not obstruct vehicular and pedestrian traffic or intrude into the work area while deploying the communication cable. If using the radio link communication option, ensure that the radio system conforms to FCC requirements and applicable state and local requirements.

G. **Default Requirements.** Program the PTS to revert to a red, red flash, or yellow flash mode upon system failure. Set the default setting to red flash or a preprogrammed operating mode to ensure safety in the work zone. Upon failure, ensure that the PTS can notify Contractor personnel via the remote monitoring system.