**SPECIAL PROVISION**

**SECTION 643**

**TRAFFIC SIGNALS**

**(Rectangular Rapid Flashing Beacon)**

This section is amended by addition of the following:

Description

The Contractor shall furnish and install rectangular rapid flashing beacons including signage assemblies at pedestrian crossings where shown on the plans. Their installation shall be as described in this special provision.

Materials

Each rectangular rapid flashing beacon (RRFB) assembly shall consist of two rectangular-shaped yellow indications, each with an LED-array based light source. Each RRFB indication shall be a minimum of approximately 5 inches wide by approximately 2 inches high.

Each RRFB signage assembly shall be mounted on a 14-foot-long 4-inch I.D. non-tapered Schedule 40 galvanized steel pole with pole cap. Poles shall have a 0.75” minimum thickness galvanized ASTM A36 steel base plate circumferentially welded to the pole shaft. Anchor bolts for attachment of base plates to foundations shall be 0.75” x 17” (minimum) x 3” threaded. Four anchor bolts shall be provided for each support pole.

Where designated on the plans, poles for RRFB signage assemblies shall be installed with breakaway bases. Breakaway devices shall conform to the latest edition of “AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals” and NCHRP 350. Breakaway devices shall be designed such that anchor bolts will not bend upon vehicle impact. A frangible coupling such as Transpo “Pole-Safe” series, Manitoba safety base with reaction plate, or other approved equal meeting requirements of Section 721 shall be used. Electrical conductors at the pole base shall have a fusible breakaway device that will disconnect all ungrounded conductors simultaneously.

Each support pole shall be installed with a square aluminum pedestal base with grounding lug.

Signs for RRFB signage assemblies shall be sheet aluminum and meet requirements of Section 645 for Type II regulatory, warning and route marker assembly signage. The signage assemblies shall include a W11-2 pedestrian crossing sign, W16-7p diagonal arrow plaque, and R10-25 pedestrian pushbutton signs.

Pedestrian pushbutton assemblies for activating RRFB indications shall be installed on each RRFB support pole, mounted at 42 inches above sidewalk grade and within 10 inches of the edge of sidewalk. Pushbuttons shall meet Americans with Disabilities Act vibrotactile technical requirements for accessible pedestrian signals (APS). The pushbutton assembly shall include a raised directional arrow indicating the direction of crossing. Audible locator and percussive crossing tones are required.

Construction and Operation

The two RRFB indications in an assembly shall be aligned horizontally, with the longer dimension horizontal and with a minimum space between the two indications of approximately seven inches (7”), measured from inside edge of one indication to inside edge of the other indication.

The outside edges of the RRFB indications, including any housing, shall not project beyond the outside edges of the W11-2 sign in the beacon signage assembly.

As a specific exception to 2009 MUTCD Section 4L.01 guidance, the RRFB indications shall be located between the bottom of the W11-2 crossing warning sign and the top of the supplemental W16-7p downward diagonal arrow plaque, rather than 12 inches above or below the sign assembly.

When activated, the two yellow indications in each RRFB shall flash in a rapidly alternating "wig-wag" flashing sequence (left light on, then right light on). The flash rate of each individual yellow indication, as applied over the full on-off sequence of a flashing period of the indication, shall not be between 5 and 30 flashes per second, to avoid frequencies that might cause seizures.

The light intensity of the yellow indications shall meet the minimum specifications of Society of Automotive Engineers (SAE) standard J595 (Directional Flashing Optical Warning Devices for Authorized Emergency, Maintenance, and Service Vehicles) dated March 2014.

The RRFBs, normally dark, shall initiate operation only upon pedestrian pushbutton actuation, and shall cease operation at a predetermined time after the pedestrian actuation. For this project, the duration of operation of the RRFBs following each actuation shall be 12 seconds. All RRFBs associated with a given crosswalk shall, when activated, simultaneously commence operation of their alternating rapid flashing indications and shall cease operation simultaneously. Communication between the devices may be either by spread spectrum wireless or hardwired.

MUTCD R10-25 pedestrian instruction signage with the legend PUSH BUTTON TO TURN ON WARNING LIGHTS shall be mounted adjacent to or integral with each pedestrian pushbutton.

Method of Measurement

All rectangular rapid flashing beacon and sign assemblies associated with a single crosswalk shall constitute a single installation. Each installation will be measured for payment by the lump sum in place.

Basis of Payment

Rectangular Rapid Flashing Beacon will be paid for at the contract lump sum price, which payment will be full compensation for furnishing and installing all materials including, but not limited to, the RRFB LED arrays, flasher, timer, lockable controller cabinet, steel poles with base plate, anchor bolts and pedestal base, breakaway devices, wiring and power service, pole risers, pedestrian push button assemblies, crosswalk signage, radio communication devices and all appurtenances and incidentals required for a complete and functioning installation. Foundations and conduit will be paid under applicable Section 626 pay items.

Payment will be made under:

Pay Item Description Pay Unit

643.60 Rectangular Rapid Flashing Beacon Lump Sum