

APPENDIX A
Description of Materials, Supplies, Equipment and Bid Price

Contractor _____

SCHEDULE OF ITEMS

- The Bid must be Delivered to the precise location and by the precise time set forth in the Notice to Contractors or any applicable Bid Amendment.
- Required unit prices, lump sum prices and/or bid amounts must be provided and legible.
- Do not make handwritten changes to the bid documents.

Item Number	Item Description	Estimated Quantities & Units	Unit Price \$/Per Each
643.60	Rectangular Rapid Flashing Beacon on a two way street	37 Each	\$
643.62	Rectangular Rapid Flashing Beacon on a two way street w/DSRC for Connected Vehicle Communications	2 Each	\$
TOTAL BID			\$

- Paper bids must be signed in pen and ink. Signatures shall be original. Stamped and copied signatures will not be accepted.

Signature

Date

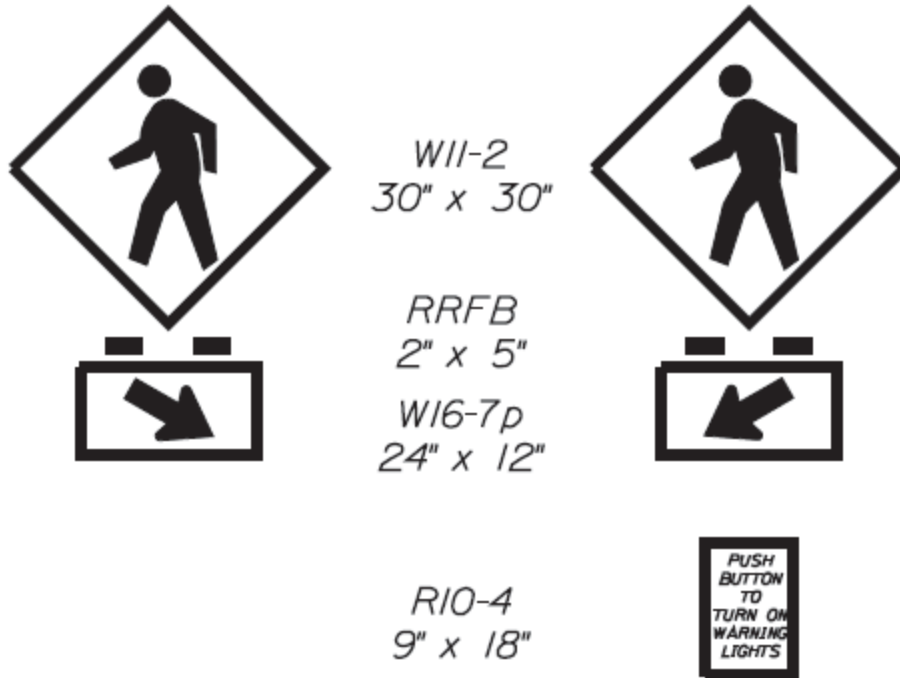
(Print Bidder's Name and Title)

Bids are not accepted by email or FAX. If a paper Bid is to be sent express, please take note that overnight services do not always arrive in time. Packages using express services should be sent to Maine Department of Transportation, 24 Child Street, Augusta, Maine.

See bid instructions on page three of the bid book.

Description

The Rectangular Rapid Flashing Beacon shall meet the specifications.



Delivery The Contractor shall deliver the materials to the MaineDOT Sign Shop at 66 Industrial Drive in Augusta. The Contractor shall notify MaineDOT, Stephen Landry, 207-557-0347 a minimum of one week prior to delivery for delivery coordination. Alternative contact is: Robert Rooney, 287-2846. The Contractor shall deliver the materials only during the following times: Monday through Friday, 7:00 AM through 3:30 PM except for deliveries may not be made on holidays, or government closure days. The Department will not off-load the materials at the delivery site.

Contract Administrator The contract administrator for this contract will be:

Name: Stephen Landry
 Title: State Traffic Engineer
 Address: Maine Department of Transportation
16 State House Station, Augusta, ME 04333-0016
 Phone: 207-557-0347

Invoices and Payments The Contractor shall submit an itemized bill to the Department for materials following delivery for approval and payment. Invoices shall include the following minimum information:

Contractor name, address & Contract Number
 Invoice Date & Number
 Dates of Delivery

The Department will pay based upon prices bid and the invoices provided and accepted.

No such payment will be made if, in the judgment of the Department, the Materials are not in accordance with the provisions of the Contract.

The Acceptance by the Contractor of the final payment, as evidenced by cashing of the final payment check, constitutes a release to the Department from all claims and liability under the Contract. Upon Final Acceptance, the Contractor is released from further obligation, except for warranty obligations provided for in this Contract.

Payments to the Contractor shall be full compensation for furnishing all labor, equipment, materials, services, and incidentals used to supply the materials under the Contract in a complete and acceptable manner, and for all risk, loss, damage, or expense of any kind arising from the nature or prosecution of the Work.

No payments due the Contractor will be adjusted for inflation. No interest shall be due and payable on any payment due the Contractor.

Dispute Resolution If, in the performance of this Agreement, there arises a dispute between the Contractor and MaineDOT that cannot be resolved by the parties to the Contract, the parties may agree to submit the dispute to non-binding Alternate Dispute Resolution. All disputes shall be governed by Maine law, and all actions shall be filed in the Kennebec Superior Court, in Augusta Maine.

Conformity with Standards Unless otherwise provided in the contract, all materials shall conform to the following standards, as applicable.

- A. MDOT
- B. AASHTO
- C. ASTM
- D. AREMA
- E. Standard conditions and special conditions contained in any permit
- F. Manual on Uniform Traffic Control Devices (MUTCD)
- G. American with Disabilities Act (ADA)

Material Quality Materials and manufactured products shall be new unless otherwise specified, free from defect, and in conformity with the contract. If there is no applicable standard set forth in this Contract for a particular item, then the item shall be in accordance with industry standards prevailing at the time of bid. The Department has the authority to inspect all Materials and every detail of the Work.

When material is fabricated or treated with another material or where any combination of materials is assembled to form a finished product, any or all of which are covered by specifications, the Department may reject the finished product if any of the components do not comply with the specifications. The Department may reject materials not conforming to the Specifications at any time.

Material Specifications The Contractor shall provide and deliver rectangular rapid flashing beacons for each pedestrian crossing warning signs shown on the quantity sheet.

1. Beacon Dimensions and Placement in Sign Assembly:

- a. Each rectangular rapid flashing beacon (RRFB) 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.
- b. The two RRFB indications shall be aligned horizontally, with the longer dimension horizontal and with a minimum space between the two indications of approximately seven inches (7 in), measured from inside edge of one indication to inside edge of the other indication.
- c. The outside edges of the RRFB indications, including any housings, shall not project beyond the outside edges of the W11-2.
- d. As a specific exception to 2003 MUTCD Section 4K.01 guidance, the RRFB shall be located between the bottom of the crossing warning sign and the top of the supplemental downward diagonal arrow plaque, rather than 12 inches above or below the sign assembly.

2. Beacon Flashing Requirements:

- a. 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).
- b. As a specific exception to 2003 MUTCD Section 4K.01 requirements for the flash rate of beacons, RRFBs shall use a much faster flash rate. Each of the two yellow indications of an RRFB shall have 70 to 80 periods of flashing per minute and shall have alternating but approximately equal periods of rapid pulsing light emissions and dark operation. During each of its 70 to 80 flashing periods per minute, one of the yellow indications shall emit two rapid pulses of light and the other yellow indication shall emit three rapid pulses of light.
- c. 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.
- d. 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 January 2005.

3. Beacon Operation (Rectangular Rapid Flashing Beacon On a Two-Way street)

- a. The RRFB, normally dark, shall initiate operation only upon pedestrian actuation, and shall cease operation at a predetermined time after the pedestrian actuation. **Pedestrian activation shall have an LED Visual Confirmation Voice Message Push Button Station.**
- b. All RRFBs associated with a given crosswalk shall, when activated, simultaneously commence operation of their alternating rapid flashing indications and shall cease operation simultaneously.

- c. A pedestrian instruction sign with the legend PUSH BUTTON TO TURN ON WARNING LIGHTS should be mounted adjacent to or integral with each pedestrian pushbutton.
 - d. The duration of a predetermined period of operation of the RRFBs following each actuation shall be 20 seconds.
 - e. Each pole will be outfitted with a 45 watt solar panel, a NEMA 4X aluminum pole mount cabinet and a 35 Ahr battery .
 - f. Communication between the devices shall be spread spectrum wireless.
4. **Beacon Operation (Rectangular Rapid Flashing Beacon on a Two-way street w/DSRC for Connected Vehicle Communications)**
- a. The RRFB, normally dark, shall initiate operation only upon pedestrian actuation, and shall cease operation at a predetermined time after the pedestrian actuation. **Pedestrian activation shall have an LED Visual Confirmation Voice Message Push Button Station.**
 - b. All RRFBs associated with a given crosswalk shall, when activated, simultaneously commence operation of their alternating rapid flashing indications and shall cease operation simultaneously.
 - c. A pedestrian instruction sign with the legend PUSH BUTTON TO TURN ON WARNING LIGHTS should be mounted adjacent to or integral with each pedestrian pushbutton.
 - d. The duration of a predetermined period of operation of the RRFBs following each actuation shall be 20 seconds.
 - e. Each pole will be outfitted with a 45 watt solar panel, a NEMA 4X aluminum pole mount cabinet and a 35 Ahr battery .
 - f. Communication between the devices shall be spread spectrum wireless.
 - g. The RRFB with DSRC shall be AC powered.
 - h. A Connected Vehicle Interface (CVI) or other proprietary product shall be provided to communicate with the DSRC and send out messages to any vehicles on-board unit.
 - i. The CVI cabinet can be mounted on one of the two RRFB crosswalk poles, or on a separate pole/structure
 - j. The CVI or approved equal will connect wirelessly to the RRFB system via TAPCO 900 MHz radio
 - k. The CVI cabinet will house a Power Over Ethernet (POE) injector to connect with and power an RSU
 - l. The CVI will have an RJ-45 jack for Ethernet connectivity to connect to a Road Side Unit (RSU)
 - m. The CVI will communicate system activation status over its Ethernet interface
 - n. The RSU will be mounted on the same structure as the CVI cabinet
 - o. The RSU will be connected to the CVI via hardwire Ethernet link
 - p. The RSU will be powered by the POE injector inside the CVI cabinet, or by separate AC main power
 - q. The RSU will receive system status via NTCIP 1202 v03 standard UDP SPAT packet from the CVI

- r. The RSU will communicate information to connected vehicles via SAE J2735 messages sent out via Dedicated Short-Range Communication (DSRC) radios or Cellular-V2X devices

If the controller boxes operate as a **master/slave or primary/secondary, those must be clearly marked on the controller boxes.**

643.18 Method of Measurement

All rectangular rapid flashing beacons installed on signs associated with a single crosswalk shall constitute a single installation. For a one-way street, the signage and RRFB's only need to be seen from one direction. For two-way traffic installations, two sets of signs and lights are needed on each pole. Each full crossing installation will be measured for payment by the each supplied and delivered.

643.19 Basis of Payment

The rectangular rapid flashing beacon on a tow way street will be paid for by each, which payment will be full compensation for furnishing all materials including, but not limited to the RRFB LED-arrays, flasher, timer, controller cabinet, pole risers, wiring, APS pedestrian push buttons and system, 4 inch I.D Steel Pole, 20 foot in length, signs, solar panels, wireless spread spectrum, cabinets, batteries, 2 padlocks with 4 number tumbler resettable locks and all appurtenances and incidentals required for a complete and functioning sign package.

The rectangular rapid flashing beacon on a two way street with DSRC will be paid for by each, which payment will be full compensation for furnishing all materials including, but not limited to the RRFB LED-arrays, flasher, timer, controller cabinet, pole risers, wiring, APS pedestrian push buttons and system, 4 inch I.D Steel Pole, 20 foot in length, signs, wireless spread spectrum, cabinets, Dedicated Short Range Communication (DSRC) road-side unit (RSU), 2 padlocks with 4 number tumbler resettable locks and all appurtenances and incidentals required for a complete and functioning sign package.

Payment will be made under:

<i>Pay Item</i>	<i>Description</i>	<i>Pay Unit</i>
643.60	Rectangular Rapid Flashing Beacon On a Two-Way street	Each
643.62	Rectangular Rapid Flashing Beacon on a Two-way street w/DSRC for Connected Vehicle Communications	Each