MARYLAND DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION

Justification of Patented & Proprietary Product

By signature of this document, the State official is justifying that in accordance with the requirements of Maryland Department of Transportation State Highway Administration this patented or proprietary item is:

- ☑ Synchronization: The compatibility of equipment, accessories, or replacement parts is the paramount consideration
- ☑ Single Source: Only one source exists which meets the requirements
- ☐ Experimental Product: A sole vendor's item is needed for trial use or testing for research or experimental purposes
- ☐ Other

Project Specific Information

Contract Name:	Location:
Safe Routes to School-Mill Hill Road Sidewalk	Mill Hill Road, Waldorf, Charles County, MD

FA Project #:	SRTS-3(338)E	State Project #:	AX933B52

Stewardship: ☐ Full Oversight ☐ State Administered ☑ LPA

Manufacturer Name and Address:
Star Precision Fabricating, Ltd., 5410 Brystone Drive, Houston, TX 77041

Description of Item(s)/Work:

Purchase and install two activated, solar-powered, double-sided (flash on front and back) R920-F devices (Pedestrian Crosswalk Flasher - Rectangular Rapid Flashing Beacons (RRFB's)) and pushbuttons manufactured by Star Precision Fabricating Ltd. and distributed by Carmanah Technologies Corporation as specified in the Invitation to Bid (Part III, Section 3.1). The RRFB's and pushbuttons shall be installed with signs "B" at the Mill Hill Road and Davis Road intersection in accordance with the approved construction drawings (Sheet No. C4.3).

Estimated Costs:

The estimated cost for purchase and installation of two R920-F Rectangular Rapid Flashing Beacons as described above is $25,000.00.

Justification:

Charles County Government has specified and installed thirty-one (31) of the R920 Rectangular Rapid Flashing Beacons to date at several mid-block pedestrian crossings on various County-owned and maintained roadways throughout the County. For consistency with Charles County's existing inventory of RRFB's, Capital Services requests proprietary product approval on the basis of synchronization for compatibility of equipment, accessories and replacement parts. Additionally, Charles County is only aware of Star Precision Fabricating Ltd as the single source manufacturer of R920 devices or ones similar that meet or exceed the product and performance specifications described in Appendix 1 of the project's Invitation to Bid.

Supporting/Reference Documentation (drawing sheet numbers, specifications, correspondence, etc.):

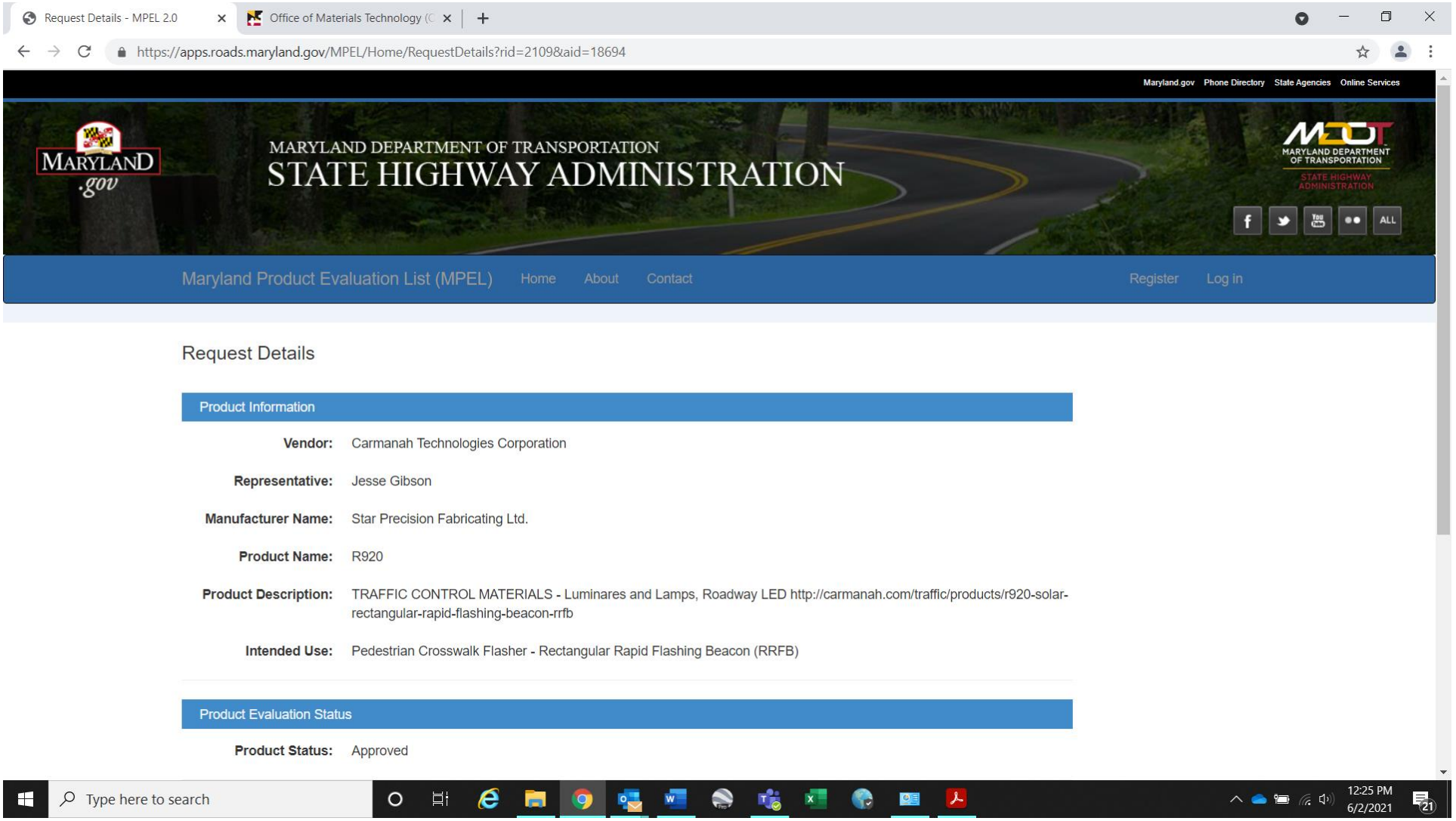
As noted above, please refer to the general call-out for the RRFB's in the plan view and Signage Schedule included on construction drawing Sheet No. C4.3. Also, refer to the proprietary R920-F RRFB product specified in Section 3.1 of the Invitation to Bid and the related product and performance specifications described in Appendix 1. Additionally, find attached a screenshot copy of the Maryland Product Evaluation List taken on June 2, 2021, indicating MDOT SHA's approval status of the R920, and a copy of the R920-F Product Sheet.

Requester's Name:	**Contact Information:**		**Date of Request:**
Charles County Government Mr. John H. Stevens, Chief of Capital Services	**Email:** **Phone:**	StevensJ@charlescountymd.gov 301-396-5847	June 2, 2021 Revised September 8, 2021

This signature certifies that, in accordance with the requirements of the Maryland Department of Transportation State Highway Administration, the use of this patented or proprietary item is necessary because: a) The compatibility of equipment, accessories, or replacement parts is the paramount consideration; b) only one source exists which meets the requirements; c) a sole vendor's item is needed for trial use or testing for research or experimental purposes; or d) product does not fit the criteria or (a),(b),or (c).

State DOT Official (DC or above signature):	**Name and Title:**	**Date:**
[signature]	Deputy Director	9/21/2021

Note: A copy of this signed Justification must be sent to the OMT New Products and Research Team


Request Details - MPEL 2.0
Office of Materials Technology
https://apps.roads.maryland.gov/MPEL/Home/RequestDetails?rid=2109&aid=18694
Maryland.gov Phone Directory State Agencies Online Services
MARYLAND DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
Maryland Product Evaluation List (MPEL)
Home
About
Contact
Register
Log in
Request Details
Product Information
Vendor: Carmanah Technologies Corporation
Representative: Jesse Gibson
Manufacturer Name: Star Precision Fabricating Ltd.
Product Name: R920
Product Description: TRAFFIC CONTROL MATERIALS - Luminares and Lamps, Roadway LED http://carmanah.com/traffic/products/r920-solar-rectangular-rapid-flashing-beacon-rrfb
Intended Use: Pedestrian Crosswalk Flasher - Rectangular Rapid Flashing Beacon (RRFB)
Product Evaluation Status
Product Status: Approved
Type here to search
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6/2/2021

R920-F

Solar-Powered Rectangular Rapid Flashing Beacon

carmanah®

Rectangular rapid flashing beacons (RRFBs) improve pedestrian safety by increasing yield rates to 72-96% at crosswalks.*

- The benchmark for RRFBs, the R920-F meets MUTCD requirements, including IA-21, and is Buy America compliant
- Compact and lightweight solar engine
- Audible pushbutton or passive pedestrian activation
- Energy Balance Report™ (EBR) prepared for every location to ensure battery longevity

Superior Design and Technology

The R920-F utilizes a self-contained solar engine integrating the Energy Management System (EMS) with an on-board user interface, housed in a compact enclosure together with the batteries and solar panel. A larger solar engine enables the R920-F to work with audible pushbutton stations, passive activation sensors, and remote monitoring, as well as operate at higher intensities and increased activations in challenging environments.

Easy Installation

With its highly efficient and compact design, installation is quick and uncomplicated, dramatically reducing installation costs. Retrofitting can be done where existing sign bases are used to enhance existing marked crosswalks in minutes, and new installations can be completed without the cost of larger poles, new bases, and trenching.

Advanced User Interface

The R920-F comes with an on-board user interface for quick configuration and status monitoring. It allows for simple in-the-field adjustment of flash pattern, duration, intensity, ambient auto adjust, night dimming, and many more. Settings are automatically sent wirelessly to all units in the system.

Reliable

Designed with Carmanah's industry-leading solar modeling tools to provide dependable year-after-year operation. We prepare an Energy Balance Report (EBR) for every location.

Trusted for 20+ Years

With thousands of installations, Carmanah's systems are the benchmark in traffic applications and other transportation applications worldwide.

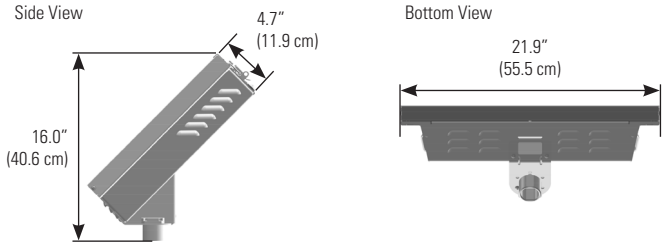
* U.S. Department of Transportation Federal Highways Administration, Publication No. FHWA-HRT-10-043 - "Effects of Yellow Rectangular Rapid-Flashing Beacons on Yielding at Multilane Uncontrolled Crosswalks"

R920-F

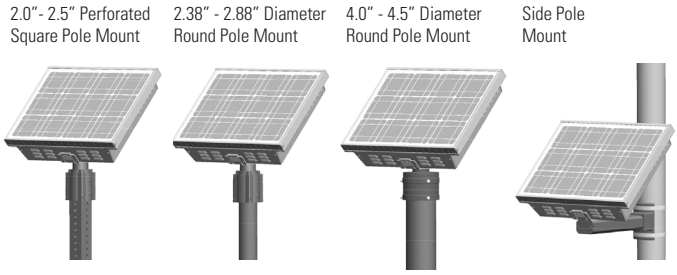
Solar-Powered Rectangular Rapid Flashing Beacon

1.844.412.8395 | traffic@carmanah.com | carmanah.com

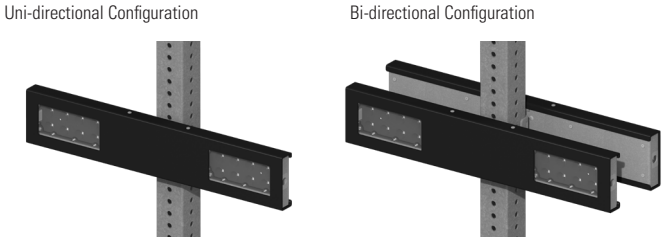
SOLAR ENGINE DIMENSIONS



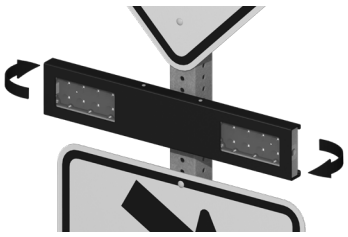
SOLAR ENGINE MOUNTING



LIGHT BAR CONFIGURATION



IN-THE-FIELD AIMING



Rotate the light bar towards the incoming vehicle lane, independent of the wire hole location.

BEACON SPECIFICATIONS

Optical	MUTCD interim approval IA-21 and MUTCDC compliant
	Purpose-built light bar optics = maximum efficiency and no stray light Exceeds SAE J595 class 1 intensity by 2.5 to 3x when used as recommended Meets SAE J578 chromaticity
	3 in (76 mm) x 7 in (178 mm) clear, UV-rated polycarbonate lens with yellow LEDs
	High-power LEDs: +90% lumen maintenance (L90) based on IES LM-80
	Side-emitting pedestrian confirmation LEDs
	Independent, stainless steel mounting brackets make back-to-back installation simple and enable in-field aiming for maximum effectiveness
	Yellow, black, or green powder coated light bar covers

SYSTEM SPECIFICATIONS

On-Board User Interface (OBUI)	Adjustable system settings with auto-scrolling LED display on our latest EMS
	System test, status, and fault detection: battery, solar, button, beacon, radio, day/night
	Flash patterns: RFB (WW+S), RFB1 (WW+S legacy), RFB2 (WSDOT), 0.5 sec. alternating (MUTCD), 0.5 sec. unison (MUTCD), 0.5 sec. x3 alternating (MUTCD), 0.1 sec. unison, 0.25 sec. unison, 0.1 sec. x3 quick flashes unison, 0.1 sec. x3 quick flashes alternating, steady on
	Input: momentary for pushbutton activation, normally open switch, normally closed switch
	Flash duration: 5 sec. to 1 hr.
	Intensity setting: 20 to 1400 mA for multiple RRFBs, circular beacons, or LED enhanced signs
	Nighttime dimming: 10 to 100% of daytime intensity
	Ambient Auto Adjust: increases intensity during bright daytime
	Automatic Light Control: reduces intensity if the battery is extremely low
	Temperature correction: yellow beacons
	Calendar: internal time clock function
	Radio settings: enable/disable, selectable channel from 1 to 14
	Output: enabled when beacons flashing daytime and nighttime, or nighttime only E.g., for relay control of overhead lighting
	Activation counts and data reporting via OBUI or optional USB connection
Beacon Communication	Encrypted, wireless radio with 2.4 GHz mesh technology
	Wireless update of settings from any unit to all systems on the same radio channel
	User-selectable multiple channels to group different beacons and ensure a robust wireless signal
	Communicates with all other Gen III radio-enabled systems including our R820-E, -F, and -G circular beacons
	Instantaneous wireless activation: <150 ms
	Wireless range: 1000 ft (305 m)
	Integrated, vandal-resistant antenna
Energy Collection	30 W high-efficiency photovoltaic solar panel
	45 deg tilt for optimal energy collection
	Maximum Power Point Tracking with Temperature Compensation (MPPT-TC) battery charger for optimal energy collection in all solar and battery conditions
Energy Storage	12 V 34 Ahr. battery system
	Replaceable, recyclable, sealed, maintenance-free, best-in-class AGM batteries offer the widest temperature range and longest life
	Battery design life: +5 yrs.
	Tool-less battery change with quick connect terminals and strapping for easy installation
Solar Engine Construction	Weatherproof, gasketed enclosure with vents for ambient air transfer (NEMA 3R)
	Lockable, hinged lid for access to on-board user interface and batteries
	Corrosion-resistant aluminum with stainless steel hardware
	Raw aluminum finish or yellow, black, or green powder coated
	Prewired to minimize installation time
	High-efficiency optics and EMS = the most compact, lightweight system
	39 lb (17.7 kg) including batteries, excluding beacons and pushbutton
Environmental	-35 to 165° F (-37 to 74° C) system operating temperature
	-40 to 140° F (-40 to 60° C) battery operating temperature
	150 mph (241 kph) wind speed as per AASHTO LTS-6
Activation	Pushbutton: ADA-compliant, piezo-driven with visual LED and two-tone audible confirmation
	Audible pushbutton station: ADA-compliant, piezo-driven with visual LED and customizable voice message confirmation
	Passive activation: microwave-based sensor detects pedestrian
Warranty	**5-year limited warranty, excluding batteries**

MUTCD IA-21

Specifications subject to local environmental conditions, and may be subject to change.

Document: SPEC_TRA_R920-F_RevB