

CONNECTED "SMART" ARROW BOARD RETROFIT KIT

I. GENERAL SPECIFICATIONS: Smart Arrow Board Retrofit Kit (44 units)

A. INTENT STATEMENT:

The purpose of these specifications is to describe a retrofit kit for existing department force arrow boards upgrading these units to a connected "smart" board. The connected retrofit kits (44 units) shall consist of components including but not limited to: Field Controller, Wiring Assemblies, Digital Wireless Cellular Communications, and a Cloud Based User Interface. The connected retrofit kits shall be able to be monitored remotely and controlled locally. The connected retrofit kits shall be able to be added to any existing arrow board and shall connect to the cloud and provide a real-time push in the US DOT's WZDx latest format and capable of other common formats (i.e. Waze) as agreed to by PennDOT.

Pennsylvania Department of General Services, PCID No. 1075, "*General Requirements for Bidding PENNDOT Vehicles/Equipment*", most current version effective at the time and date of bid opening, is included as a part of this specification. PCID No. 1075 may be reviewed and downloaded from the Department of General Services website, <http://www.dgs.state.pa.us>.

Delivery as required per Department of General Service PCID NO. 1075 Section "G". All units must be delivered within 120 days after receipt of the purchase order by the successful bidder.

Warranty per PCID 1075, Section E 1, Construction Equipment – (2 years).

It is understood that the components specified are minimum and if the unit manufacturer's Engineering Department recommends or deems necessary additional components or design the burden of responsibility is hereby placed upon the Manufacturer's Engineering Department to supply a unit that is totally engineered.

The requested operations, plus operational stresses, must be reviewed to ensure the Commonwealth of a properly designed/engineered unit.

This specification and all specified components must be reviewed and approved by the successful manufacturer. The installation of the specified components must be approved by the successful manufacturer's Engineering Department.

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MATERIALS:

The connected retrofit kit shall consist of the following components: Field Controller, Wiring Assemblies, Digital wireless cellular communications (via 4G/LTE digital modem with GPS). The Connected retrofit kits shall be weatherproof and not require any new actions for deployment personnel, once the retrofit kits have been installed. In addition the kits shall allow for remote monitoring and communications to provide the current status (power, communication health), GPS location, active display pattern/operation mode, physical deployment status (up or down) and all related device history (at a minimum) via the manufacturer’s cloud based system. The cloud based system shall provide a GeoJSON/API data feed conforming to the latest adopted version of the [USDOT’s Work Zone data Exchange \(WZDx\)](#) and its associated [Field Device Feed](#) formats, as well as make the feed publicly available to any Agency-approved third parties. for connected arrow boards.

The connected arrow board feed shall include the WZDx required **Core Details** for the Field Device feed. In addition the feed should provide as many as possible **Optional** Device Type parameters as possible. The data feed shall be made active and be pre-approved before the corresponding Field Devices are fully deployed and operational. The feeds shall always contain the most current information and include any changes within 60 seconds of the change being made in the field.

A Waze compatible data push should also be provided, to allow the connected arrow board to be auto-located as an ON_ROAD_CONSTRUCTION (hardhat icon) alert with one of the following associated descriptions:

DEVICE	STATUS	WAZE Report icon	INCIDENT TYPE	INCIDENT SUB-TYPE	DESCRIPTION/OPTIONAL MESSAGE (40 character max)
Smart AB	4 Corners		CONSTRUCTION	ON_ROAD_CONSTRUCTION	CAUTION - ROAD WORK AHEAD
	Bar/Line		CONSTRUCTION	ON_ROAD_CONSTRUCTION	CAUTION - ROAD WORK AHEAD
	Left Arrow(s)		CONSTRUCTION	ON_ROAD_CONSTRUCTION	PREPARE TO MERGE LEFT
	Right Arrow(s)		CONSTRUCTION	ON_ROAD_CONSTRUCTION	PREPARE TO MERGE RIGHT
	Double Arrow		CONSTRUCTION	ON_ROAD_CONSTRUCTION	CAUTION - LANES SPLIT AHEAD

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MATERIALS: (continued)

The Waze location feeds shall include only active devices on public roadways with active actionable displays. The event shall be removed from the feed when the Display Mode is Blank or arrow board is physically down. Waze events shall be visible on Waze web map. Smartphones shall generate a driver alert for an approaching motorist actively using the Waze app with notifications activated.

All connected retrofit kits provided shall be previously approved by the Agency. New devices, not previously approved, shall not be used until they are reviewed, tested for conformance and approved by PennDOT.

CONSTRUCTION:

The connected retrofit kit shall not require any additional training for routine use, once installed. Display changes shall be sent to the cloud and recorded in near real-time and within 60 seconds of the actual modification. The cloud-based system shall be capable of providing weekly reports to the designated personnel indicating the location (GPS coordinates) and display mode of each arrow board, including a log of all power and communication status changes. All changes in location, display mode shall be recorded and included as part of system logs and any reports.

System users shall be able to see the current status of each device and be able to quickly view the display and location history for any custom defined time period. The logged data shall be able to be quickly viewed and exported in a common graphic and spreadsheet format for the time period defined by each user.

Real-Time Automated eAlerts: Each connected arrow board shall provide the following eAlerts via text (SMS) and/or email to any agency provided contacts:

- Device Name/ID
- Display Mode (Previous and New),

CONSTRUCTION: (Continued)

- Location (GPS or map link)
- Power Alerts (for solar powered displays) Notify when battery voltage is less than variable amount (11.7 VDC by default) and when power status is "Okay" again
- Communication
- Alerts (in Alarm and once Okay)

eAlerts shall be able to be sent in real-time to any personnel, even if not a cloud-based system user.

Non-Connected arrow boards shall not be allowed on any Agency-financed projects, unless approved.

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III. MANUALS

The successful vendor shall furnish all applicable manuals per unit:

- 1 Operator's
- 1 Parts
- 1 Service
- 1 Complete set of manuals for any additional items/equipment added to a piece of equipment.

The manuals listed shall be official O.E.M. publications supplemented with technical manuals for all components as published by sub-vendors/manufacturers.

Parts Manual presented must be a relative to "all" items utilized to build these units, with appropriate part numbers.

Delivery of these manuals shall be completed with the delivery of each unit(s).

Manuals shall be supplied on thumb drives (in PDF format) along with paper manuals.

IV. TRAINING

Operator:

The successful vendor shall provide services of qualified factory trained technicians for not more than 1 training sessions of not more than 2 hours at 1 PennDOT locations to train personnel in the proper operation, safety and servicing of the equipment.

TRAINING: (Continued)

The successful vendor shall submit a training plan to the Temporary Traffic Control unit for approval within 45 days after receipt of the Purchase Order. The training plan shall consist of course outline and class schedule.

All training must be completed within 60 days after the dates established in the approved training plan unless an extension is mutually agreed to in writing by the Chief of the Fleet Management Division.

All training shall be coordinated with Brian Crosley, Manager, Temporary Traffic Control Unit, 717-265-7562 bcrossley@pa.gov

V. WARRANTY: Per PCID No. 1075