

**STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION**

**ADDENDUM NO. 1
FOR
KAHULUI BEACH ROAD INTERSECTION IMPROVEMENTS
AT KANALOA AVENUE
DISTRICT OF PUALI KOMOHANA
ISLAND OF MAUI
PROJECT NO. 3400A-01-20R**

JULY 8, 2026

This addendum shall make the following amendment to the Solicitation:

A. TABLE OF CONTENTS

1. Delete **TABLE OF CONTENTS** dated 08/18/22 in its entirety and replace with the attached **TABLE OF CONTENTS** dated r07/08/26.

B. SPECIAL PROVISIONS

1. Delete **SECTION 770 - TRAFFIC SIGNAL MATERIALS** dated 04/16/19 in its entirety and replace with the attached **SECTION 770 - TRAFFIC SIGNAL MATERIALS** dated r07/08/26.

The following is provided for information:

C. PRE-BID MEETING MINUTES AND ATTENDANCE SHEET

1. The attached **PRE-BID MEETING MINUTES AND ATTENDANCE SHEET** are provided for information.

D. REQUEST FOR INFORMATION (RFI) AND RESPONSES

1. The attached **RESPONSES TO REQUEST FOR INFORMATION** are provided for information.

Please acknowledge receipt of this **ADDENDUM NO. 1** by recording the date of its receipt in the space provided on **PAGE P-4** of the PROPOSAL.



ANNETTE D.H. MATSUDA
District Engineer, Maui

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1 **SECTION 770 – TRAFFIC SIGNAL MATERIALS**

2
3 Make the following amendments to said Section:

4
5 **(I)** Amend **Subsection 770.01(A)(5) – Finish** by revising the last paragraph
6 from line 41 to 43 to read:

7
8 **“(5) Finish.** Complete standard and other ferrous material after
9 fabrication shall be hot-dipped and zinc-coated, internally and externally in
10 accordance with AASHTO M 232 and AASHTO M 111. In addition, apply
11 Valmont product F-540 or approved equal according to product
12 specifications to reduce corrosion impacts to the Traffic Signal Standards.”

13
14 **(II)** Amend **Subsection 770.01(B)(7) – Zinc Coating** by revising the last
15 paragraph from line 124 to 126 to read:

16
17 **“(7) Zinc-coating.** Steel and iron parts of base, shaft and mast arm
18 shall be zinc-coated in accordance with AASHTO 232. Washers and nuts
19 may be hot-dip zinc-coated or electro-zinc-coated. In addition, apply
20 Valmont product F-540 or approved equal according to product
21 specifications to reduce corrosion impacts to the base, shaft and mast
22 arm.”

23
24 **(III)** Amend **Subsection 770.02(A)(1) – Optical Units** by revising the first
25 paragraph from line 211 to 216 to read:

26
27 **“(b)** To ensure quality and performance, LED head shall have prior
28 history of testing and use by CALTRANS and shall exceed ITE standards.
29 Failure on one LED shall not affect other LED's. LED head shall have
30 fully-encapsulated electronic circuitry and configuration for 12-inch ball.”

31
32 **(IV)** Amend **Subsection 770.02(A) – Standard Traffic Signal Heads** from
33 line 285 to 290 to read:

34
35 **“(4) Back Plates.** Louvered back plates shall be furnished and installed
36 on mast arm mounted signal heads. Back plates shall be constructed of
37 aluminum alloy 3003-H14 sheet having minimum thickness of 0.058 inch
38 and minimum dimensions equal to signal head size plus five-inch border,
39 with a one-inch retro-reflective border around the outside edge of the front
40 surface. Back plates shall be dull black in color.”

41
42 **(V)** Amend **Subsection 770.04 – Pedestrian Signal** from line 447 to 600 to
43 read:

44 **“(A) Purpose.**

45 The purpose of this specification is to provide the minimum
46 requirements for the LED “walking person” and “hand” icon

pedestrian signal modules with countdown. This specification is only for the nominal overall message-bearing surface of 16 x 18 in. This specification is not intended to impose restrictions upon specific designs and materials that conform to the purpose and the intent of this specification. This specification refers to definitions and practices described in "Pedestrian Traffic Control Signal Indications" published in the *Equipment and Materials Standards of the Institute of Transportation Engineers*, (referred to in this document as "PTCSI") and in the Applicable Sections of Manual on Uniform Traffic Control Devices (MUTCD) 2009 Section 4E.

(B) Physical and Mechanical Requirements.

The modules shall fit into existing pedestrian signal housings built for the PTCSI sizes stated in Section 1 of the "walking person" and "hand" icon pedestrian signal indication Standard without modification to the housing and shall not require special tools for installation.

Installation of a retrofit replacement module into existing pedestrian signal housing shall only require the removal of the existing optical unit components, shall be weather tight and fit securely in the housing; and shall connect directly to existing electrical wiring. The LED module shall have a visual appearance similar to that of an incandescent lamp (ie: Smooth and non-pixelated). Screwed on lenses are not allowed. Only modules with internal mask shall be utilized. No external silk-screen shall be permitted.

When not illuminated, the WALKING PERSON, UPRAISED HAND, and COUNTDOWN DIGITS shall not be readily visible. The countdown digits of the pedestrian signal module shall be located to the right of the associated UPRAISED HAND. The display of the number of remaining seconds shall begin only at the beginning of the pedestrian change interval. After the countdown displays zero, the display shall remain dark until the beginning of the next countdown. The walking person, hand icons and countdown digits shall be incandescent looking.

The units shall not have any external attachments, dip switches, toggle switches or options that will allow the mode to be changed from counting the clearance cycle, to the full walk/don't walk cycle or any other modification to the icons or digits.

For each nominal module, use the corresponding minimum H (height) and W (width) measurements:

Module Size	Icon Height	Icon Width	Countdown Height	Countdown Width	Countdown Segment Width
(16 x 18 in)	11 in	7 in	9 in	7 in	0.7 in

All exposed components of a module shall be suitable for prolonged exposure to the environment. As a minimum, the module shall be rated for use in the ambient operating temperature range, measured at the exposed rear of the module, of -40°C to +74°C (-40°F to +165°F).

The module shall be a single, self-contained device, not requiring on-site assembly for installation into an existing pedestrian signal housing. The power supply shall be located inside the pedestrian signal module. The assembly and manufacturing process for the module shall be designed to assure all internal LED and electronic components are adequately supported to withstand mechanical shock and vibration from high winds and other sources.

The front window shall be a transparent polycarbonate material with internal masking to prevent the icons and digits from being visible when not in operation. External masking or silk-screen technology shall not be permitted.

Each module shall be identified on the backside with the manufacturer's name, model, serial number and operating characteristics. The operating characteristics shall include the nominal operating voltage and stabilized power consumption, in watts and/or Volt-Amperes.

(C) Photometric Requirements

For a minimum period of 60 months, the maintained minimum luminance values for the modules under operating conditions, when measured normal to the plane of the icon surface, shall not be less than:

- Walking person: 2,200 cd/m²;
- Hand: 1,400 cd/m².
- Countdown digits: 1,400 cd/m²;

The luminance of the emitting surface, measured at angles from the normal of the surface, may decrease linearly to a value of 50% of the values listed above at an angle of 15 degrees. The LED module shall have a visual appearance similar to that of an incandescent lamp (ie: Smooth and non-pixelated).

Maximum permissible luminance: When operated within the temperature range, the actual luminance for a module shall not exceed three times the required peak value of the minimum maintained luminance. Luminance uniformity: The uniformity of the signal output across the emitting section of the module lens (i.e. the hand, person or countdown icon) shall not exceed a ratio of 5 to 1 between the maximum and minimum luminance values (cd/m²).

The standard colors for the LED Pedestrian Signal Module shall be White for the walking person and Portland Orange for the hand icon and the countdown digits.

(D) Electrical Requirements

All wiring and terminal blocks shall meet the requirements of Section 13.02 of the VTCSH Standard. Maximum of three secured, color coded, 1 meter (39 in) long 600 V, 16 AWG minimum, jacketed wires, conforming to the National Electrical Code, rated for service at +105°C, are to be provided for electrical connection. The conductors shall be color coded with orange for the hand, blue for the walking person and white as the common lead.

LED modules shall operate from a 60 ± 3 Hertz ac line power over a voltage range from 80 to 135 VAC RMS. Nominal operating voltage for all measurements shall be 120 ± 3 VAC RMS. Fluctuations in line voltage over the range of 80 to 135 VAC RMS shall not affect luminous intensity by more than ± 10 %. To prevent the appearance of flicker, the module circuitry shall drive the LEDs at frequencies greater than 100 Hz when modulated, or at DC, over the voltage range specified.

Low Voltage Turn Off: There should be no illumination of the module when the applied voltage is less than 35 VAC RMS. To test for this condition, each icon must first be fully illuminated at the nominal operating voltage. The applied voltage shall then be reduced to the point where there is no illumination. This point must be greater than 35 VAC RMS.

Turn-ON and Turn-OFF Time: A module shall reach 90% of full illumination (turn-ON) within 75 msec of the application of the nominal operating voltage. The signal shall cease emitting visible illumination (turn-OFF) within 75 msec of the removal of the nominal operating voltage.

Default Condition: For abnormal conditions when nominal voltage is applied to the unit across the two-phase wires (rather than being applied to the phase wire and the neutral wire) the pedestrian

signal unit shall default to the hand symbol. The on-board circuitry of a module shall include voltage surge protection:

- To withstand high-repetition noise transients and low-repetition high-energy transients as specified in NEMA Standard TS-2 2003; Section 2.1.8
- Section 8.2 IEC 1000-4-5 & Section 6.1.2 ANSI/IEEE C62.41.2-2002, 3kV, 2 ohm
- Section 8.0 IEC 1000-4-12 & Section 6.1.1 ANSI/IEEE C62.41.2-2002, 6kV, 30 ohm

The LED signal and associated on-board circuitry shall meet the requirements of the Federal Communications Commission (FCC) Title 47, Subpart B, Section 15 regulations concerning the emission of electronic noise by Class A digital devices. The modules shall provide a power factor of 0.90 or greater when operated at nominal operating voltage, and 25°C (77°F). Total harmonic distortion induced into an AC power line by the module, operated at nominal operating voltage, and at 25°C (77°F) shall not exceed 20%.

The current draw shall be sufficient to ensure compatibility and proper triggering and operation of load current switches and conflict monitors in signal controller units. Off State Voltage Decay: When the module is switched from the On state to the Off state the terminal voltage shall decay to a value less than 10 VAC RMS in less than 100 milliseconds when driven by a maximum allowed load switch leakage current of 10 milliamps peak (7.1 milliamps AC).

(E) Module Functions

The module shall operate in one mode: *Clearance Cycle Countdown Mode Only*. The module shall start counting when the flashing don't walk turns on and will countdown to "0" and turn off when the steady "Don't Walk" signal turns on. The module shall not have user accessible switches or controls for the purpose of modifying the cycle, icons or digits. At power on, the module enters a single automatic learning cycle. During the automatic learning cycle, the countdown display shall remain dark. The unit shall re-program itself if it detects any increase or decrease of Pedestrian Timing. The digits shall go blank once a change is detected and then take one complete pedestrian cycle (with no counter during this cycle) to adjust its buffer timer.

The module shall allow for consecutive cycles without displaying the steady Hand icon ("Don't Walk"). The module shall recognize preemption events and temporarily modify the crossing cycle accordingly. If the controller preempts during the walking man, the

countdown shall follow the controller's directions and shall adjust from walking man to flashing hand. It shall start to count down during the flashing hand. If the controller preempts during the flashing hand, the countdown shall continue to count down without interruption. The next cycle, following the preemption event, shall use the correct, initially programmed values. This specification is worded such that the flashing don't walk time is not modified.

If the controller output displays Don't Walk steady condition or if both the hand /person go dark and the unit has not arrived to zero, the unit suspends any timing and the digits shall go dark.

(F) Warranty

Manufacturers will provide the following warranty provisions. Replacement or repair of an LED signal module that fails to function as intended due to workmanship or material defects within the first 5 years (60 months) from the date of delivery."

(VI) Amend **Subsection 770.05(A)- Controller Assembly**, from line 603 to 643 to read:

“(A) Controller Assembly.

Controller assembly shall include Model FLeX controller (or approved equal by HDOT), cabinet, Uninterruptible Power Supply (UPS) or backup battery system (BBS), and auxiliary equipment. Unless otherwise indicated in the contract documents, only manufacturers and products listed for Model FLeX Controller Unit on State of California Department of Transportation (CALTRANS) “Qualified Products List (QPL) for Controller Assemblies for the Model FLeX Traffic Controller” shall be acceptable. Copy of QPL is available from HDOT, phone (808) 873-3535.

Testing and quality control requirements shall be as specified in Subsection 623.03(G)(2)(a).

Controller assemblies are described and shall be supplied as follows:

(1) SWARCO McCain ATC FLeX controller (or approved equal) and Eagle 352S ATC cabinet (or approved equal). Refer to the latest ATC cabinet requirements (CALTRANS TEES, Chapter 7).

(2) FLeX controller Omni eX software (or approved equal) shall be compatible with the controller provided and the HDOT-Maui District Advanced Traffic Management System (ATMS).

(3) Each controller assembly listed in Table 770.05-1 – Controller Assembly Requirements contains sufficient equipment for a minimum full 8-vehicle, 4-pedestrian, and 4-preemption phase intersection, even though the contract documents may not require it.

TABLE 770.05-1 – CONTROLLER ASSEMBLY REQUIREMENTS	
<u>Item</u>	<u>Quantity</u>
SWARCO McCain ATC FLeX Controller with Omni eX software (or approved equal)	1
ALPHA FXM HP 1100 UPS (or approved equal)	1
Model 412C Prom Module	1
Model 400 Modem	1
Eagle-352S ATC Cabinet (or approved equal)	1
Model 200 Load Switches	12
Model 204 Flasher	All
Model 242 Isolators	3
Model FS/ST Isolator	All
Flash Transfer Relays	All
Software	1
Model 262C Detector Amplifiers (Rotary Sw Type)	8
Model 2010ECL Conflict Monitor (Non-QPL)	1
Model M762 Preempt. Car (Non-QPL) with M768 Auxiliary Input Panel	2
Model GPS Time Source (Non-QPL)	1
Cellular Access Point (Non-QPL)	1

(B) Model FLeX Controller with Omni Software or approved equal.
Model FLeX controller or approved equal shall meet the following additional requirements:

- (1) Meet the ATC Model 2070 Controller Standard.
- (2) Have the capability to interface with existing Model 170 Controllers.”

(C) ALPHA FXM HP 1100 UPS or approved equal. Model ALPHA FXM HP 1100 UPS or approved equal shall meet the following additional requirements:

(1) The UPS shall include all components required for a fully functional UPS (inverter, charger, switching transformer and transfer switch, automatic/manual bypass switch, batteries, and wiring), compatible with the controller and controller cabinet.

(VII) Amend **Subsection 770.05(B) - Model 170E Controller** by deleting line 643.

(VIII) Amend **Subsection 770.05(C)(5)** from line 660 to 665 to read:

“(5) Not Used.”

(IX) Amend **Subsection 770.05(D) – Auxiliary Equipment** from line 697 to 741 to read:

“(1) Model 2010ECL Conflict Monitor.

An Eberle Design Inc. (EDI) model 2010ECL Signal Monitor, or approved equal. Conflict monitor shall meets all requirements of the CalTrans “TSCE Specifications 1/89”.

(2) Model M762 Optical Preemption Module with M768 Auxiliary Input Panel.

M762 shall be card-type and shall interface with Model 170 cabinet preemption slots of input file. Each M762 Module shall have two channels of preemption. M762 shall include firmware to discriminate between two valid priority signals, to prioritize valid same priority signals on a first come, first served basis, and to override low priority signal if high priority is received. M762 Module shall receive input signals (9.639 and 14.035 Hz) to permit priority preemption operation within 170 local intersection program. M762 shall optically isolate output signals and shall trigger active low signal to controller for high priority and pulsed active low signal for low priority. M768 Auxiliary Input Panel shall be used to interconnect M762 with the terminals inside the traffic cabinet. The State’s preemption systems employ the 3M/Global Traffic Technologies Opticom System. New preemption equipment shall be 3M/Global Traffic Technologies Opticom or accepted equal that is fully compatible with 3M/Global Traffic Technologies Opticom.

(3) **Security Tumbler for Signal Cabinet.** The signal control cabinet door locks (2 locks for each cabinet) are keyed to take Best Lock Series tumblers. The contractor shall furnish and install 2 lock cylinders that will fit in the current locks on the signal cabinet. The lock cylinders keys shall be one of a kind, licensed to the County of Maui, and each cylinder shall have 1 set of keys with "do not duplicate" stamped on each key.

(4) **GPS Time Source.** The GPS time source unit shall be a precision Time Standard for use on 170 Traffic Signal Controllers. It utilizes time signals broadcast from the GPS satellite network and is traceable to the National Institute of Standards (NIST). The unit incorporates a precision GPS receiver and a microprocessor to decode the time signals and interface to the traffic control equipment.

The standard features of the GSP unit shall include, but not limited to, Time and date information includes Year, Month, Day, Hour, Minute, and Second, All functions are automatic, no jumpers or switches to set, Time zone, baud rate, and Daylight savings operation set with dumb terminal, User set parameters stored in non-volatile EEPROM, 24 hour backup for time keeping, Standard 3 wire RS232 interface, Automatic daylight savings and leap second time corrections, LED status indicator, operates on controller +5 Volts from communications port, antenna mounts to top of cabinet, and no external wires to run."

(5) **Celluar Access Point.** The Cellular Router shall be a Digi WR 44-L500_CEI-RF or approved equal, include all hardware, antennae, and other components necessary to ensure communication between the controller and HDOT's Advanced Traffic Management System (ATMS), and include service to Verizon Wireless until the end of the warranty period."

(X) Amend **Subsection 770.06(G) – Type 7 Preemption Detector (Opticom) Cables** from line 788 to 798 to read:

“(G) Type 7 – Preemption Detector (Opticom) Cables.

Preemption detector (Opticom) cables are specific cables that run continuously from optical detectors mounted on traffic signal standards to terminal blocks for M762 phase module located in controller cabinet. Each detector shall be furnished with its own cable running back to controller cabinet. 3M/Global Traffic Technologies' M138 Optical Detector Cable shall be furnished for detector cable because its is compatible and consistent with requirements for Opticom Preemption System. M138

cable shall be furnished that is BerkTek Type B, shield jacketed, three-insulated conductor cable, 20 AWG, one – 20 AWG bare stranded grounds, 600 volts, orange-blue-yellow color coded and 5/16 inch diameter.”

- (XI) Amend **Subsection 770.11(A) – Description** from line 997 to 1009 to read:

“(A) Description.

Preemption Detectors shall be located on traffic signal standards to convert optical signals emitted from an emergency vehicle to electrical pulses for emergency preemption of traffic signals. Electrical signals from optical detector shall be transmitted by 4-conductor cable to preemption module M762 located in input slot of controller cabinet. M762 preemption module shall direct and hold controller in preemption mode until signal disappears. Preprogrammed selection of phases and signal displays shall be controlled by Local Intersection Program. The State’s preemption system employ 3M/Global Traffic Technologies Opticom System. New preemption equipment shall be by 3M/Global Traffic Technologies Opticom or equal accepted by the Engineer, that is fully compatible with 3M/Global Traffic Technologies Opticom. Astro-mini brackets or similar device for attaching preemption detector to poles shall be included.”

- (XII) Amend **Subsection 770.11(B)(1) – Type 7 Cable** from line 1012 to 1021 to read:

“(1) Type 7 Cable.

Type 7 preemption detector (Opticom) cables shall be specific cables that run continuously from optical detectors mounted on traffic signal standards to terminal blocks for M762 phase module in controller cabinet. Type 7 preemption detector cable shall be compatible with 3M/Global Traffic Technologies’ M138 Optical Detector cable and shall be consistent with requirements for Opticom Preemption System. M138 cable shall be BerkTek Type B, shield jacket, 3-insulated conductor, 20AWG stranded copper, 1-20AWG bare stranded ground, 600 volts, orange-blue-yellow color coded, and 5/16 inch diameter.”

- (XIII) Add the following after line 1030:

“770.12 – Pedestrian Signal Push Button With Integral Sign.

(A) Description.

The pedestrian push button unit shall consist of an assembly that can be secured to traffic poles with standard screws, be tamper proof, weatherproof, and constructed so that electrical shocks are impossible to receive.

421
422 **(B) Materials.**
423

424 **(1)** The housing for the push button assembly shall be of cast
425 and/or machined aluminum. The push button assembly shall be
426 weatherproof with a water diverting groove set in the outside
427 diameter of the actuator button receptor. The housing shall be
428 designed to reduce vandalism and shall mount on the side or top of
429 a pole with a minimum 2-inch diameter button. The push button
430 housing shall be capable of mounting in an 'up button' or 'down
431 button' configuration. All wire connections shall be accessible from
432 the back of the assembly.
433

434 **(2)** An ADA acceptable raised directional sign shall be installed
435 with stainless steel fasteners to the housing. The sign shall consist
436 of a raised walking person and a raised arrow indication. Paint the
437 unit black and paint the raised walking person and arrow white.
438 The sign shall be capable of mounting in an 'up button' or 'down
439 button' configuration. The raised walking person and arrows shall
440 be directional and match the indication as shown in the plans.
441

442 **(3)** The pushbutton shall extend from the sign faceplate
443 approximately three inches. The pushbutton actuator shall be
444 convex in design having a flat area on the face for uses of a stylus,
445 ADA acceptable, two inches in diameter, and have a tension of less
446 than five pounds when pressed. The button shall be manufactured
447 in a way that it cannot be stuck in a closed (constant call) position.
448

449 **(4)** The pedestrian push button shall be a piezo electric type and
450 be UL listed. The button shall have a stainless steel actuator and
451 shall be mounted within the housing with stainless steel, non-
452 corrosive, tamper proof fasteners. The unit shall operate between
453 12-24V DC or AC, 3 inch round mounts with 4 mounting bolts. The
454 pedestrian button shall give an audio and visual signal each time
455 the pedestrian button is activated."
456

457 **(XIV) Add Subsection 770.13 – Video Detection to read:**
458

459 **“ 770.13 – Video Detection**
460

461 **(A) System Description.**
462

463 The work must consist of furnishing, installing, integrating, and
464 testing of environmentally hardened, purpose-built devices and
465 service coordinating with the Agency to provide video detection,
466 counts, intersection monitoring, and communication system for

existing traffic signal controller and all other materials, labor and equipment necessary to provide a complete and operating detection system as specified herein.

These devices provide connectivity from the intelligent transportation systems (ITS) field device(s) to the Traffic Management Center (TMC), as well as providing an application to remotely monitor and manage the traffic signal operation and associated traffic signal devices. The device provides the capability to detect road users and actuate traffic signals. The system should support additional applications such as video streaming, cabinet monitoring and mobility and traffic engineering metrics. This is an environmentally hardened, purpose-built device that when packaged with the related software enables service coordination with the Agency to provide end-to-end traffic data acquisition, transmission, alerts, and data analytics system for existing and new traffic signal controllers.

(B) ITS Intersection Hardware.

(1) Core DCM: All below must be contained with One Device.

(a) Device Dimensions and Orientation

- Must not exceed 10.5" (height), 3" (width), 10" (depth)
- Must support vertical and horizontal orientation for installation

(b) Operating Temperature

- Must meet NEMA operating temperature specification -34 °C to 74 °C (-29 °F to 165 °F)

(c) Power Supply

- Must support being powered through NEMA 15-5 receptacle OR direct wire to cabinet
- Must offer super capacitor-based power reserve sufficient to continue robust operation during brownouts/intermittent power loss for 1000ms. The system must be able to safely shut down in the event of power loss.

(d) Modem/Communications

- Must be SATA III compliant Must support 4G LTE cellular connectivity with diversity, and UMTS/HSPA+ with peak downlink of 150Mbps and peak uplink of 50Mbps
- Must support 802.11 a/b/g/n with Diversity antennas with security of at least 64/128 bits WEP, WPA, WPA2
- Must support GPS and GLONASS
- Must support communication of Telemetry Data, Video Data, and Alert Data to the server via the Communication Service
- Must support direct communication between the server and the devices connected to Controller Interface Hardware
- Must provide data buffering of all Telemetry Data (controller state, detector actuations, pre-emption events) and Alert Data during periods of loss of cellular connection for at least 12 minutes
- Must provide data buffering of all Telemetry Data and Alert Data during periods of loss of power for at least 1000ms

(e) Antenna

- Must provide an externally mounted antenna for supporting functionality of Communications Interface
- Must contain the following fully-enclosed antenna elements and quantities in a single enclosure:
 - 4G/LTE Diversity (quantity: 2)
 - 2.4GHz/5GHz WIFI MIMO (quantity: 2)
 - GPS/GLONASS (quantity: 1)

- Must have labeled antenna terminations for easy installation
- Must not exceed 35mm in height
- Must be colored Pantone 427 U to blend with traffic cabinet construction
- Must be IP67 rated and mounted on the cabinet with a water-tight seal made of a closed cell rubber type foam and medium-firm acrylic adhesive with bonding features including a high initial adhesion and excellent high/low temperature holding power with excellent peel strength

(f) Embedded Hard Drive

- Must support temperature-rated storage comprising of a solid-state drive of at least 240GB: Optional 960GB
 - Must be SATA III compliant
 - Must provide support for SMART command set
 - Must meet minimum shock resistance of 1500 G/0.5ms
 - Must meet minimum vibration resistance 5~800 Hz at 5G peak

(g) Interfaces

- Must support 1 x USB 2.0 device ports
- Must support 1 x 10/100/1000 Ethernet WAN port
- Must support 2 x 10/100/1000 Ethernet LAN ports
- Must support 3 x 10/100/1000 Ethernet LAN ports with PoE (support for 802.3af PoE and 802.3at PoE+ to a maximum of 50W across all three ports)

- Must support configuration as an integrated layer 2 ethernet switch to support cabinet device interconnectivity
- All ethernet ports must feature in-line, auto-resetting surge protection compliant to IEC 61000-4-5 Class 4
- Must support 2 x EIA RS-232 over RJ45 interface (cable included)
- Must provide 4 x General Purpose I/Os pins (200mA sinking each), digital input, 0~30V,
- Must provide galvanic isolation between earth ground and logic ground

(h) Detection Interfaces

- Discrete Detection
 - Must support 16 “Fail High” Detector GPIO connections
 - Must Support 1 Logic Ground
 - Must Support 4 “Fail Low” GPIO connections
- Must support one SDLC port that meets the following criteria:
 - Must provide all necessary cabling to connect to a cabinet’s existing Port 1/SDLC bus
 - Must provide the capability to act as one or more SDLC detector racks
 - Must support generating actuation on up to 64 channels over SDLC
 - Must support reading terminal and facility input & outputs at a frequency of at least 10 times per second
 - Must support reading channel state at a frequency of at least 10 times per second

- Must support acquisition of MMU fault status including conflict, red failure and clearance failure
- Must support reading information from all detectors wired into the cabinet supporting up to 100 ms resolution between detection events
- Must detect failure of a detector in either always high, or always low, mode.
- Must support capturing and reporting Controller Faults based on MMU status bits of 'in conflict', 'red failure', 'diagnostic failure', 'in failure state', and 'local flash'
- Must Support ATC port connections
 - Must provide all necessary cabling to connect to a cabinet's existing Port 1/SIU bus
 - Must provide the capability to act as one or more SIU detector racks

(i) Controller Interface (NTCIP)

- Must communicate with an NTCIP compliant controller over ethernet providing auto-negotiation to 10/100 Mbps, half or full duplex
- Must provide an ethernet cable for interfacing with NEMA TS2 type A1N, A2N, P1N, or P2N controllers.
- The ethernet cable must meet NEMA operating temperature specification -34 °C to 74 °C (-29 °F to 165 °F)
- The ethernet cable must be shielded with stranded conductor and jacket meeting UL requirements
- Must communicate to the controller over TCP/IP
- Must support communication over SNMP v1, v2c, and v3 protocols

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- Must support communication over NTCIP protocols reading all objects defined in NTCIP 1201 and 1202 supported by the controller
- Must acquire and record phase, channel, detector, pedestrian detector, pre-emption, alarm, and overlap statuses at a frequency of no less than 10 times per second including whether a phase is next or has a call for service on it
- Must read and distinguish between detector, pedestrian detection, and preemption device information from all detectors, pedestrian detectors and pre-emption devices wired into the cabinet
- Must detect failure of a detector, pedestrian detector or pre-emption device in either always high, or always low mode based on user configuration.
- Must detect the free mode status of the controller
- Where provided by the controller must read coordination information including cycle, as well as current and future coordination plan parameters
- Must support distinguishing between minimum green, extension, maximum, green rest, yellow change, red clearance and red rest intervals of a phase.
- Must identify flash status, stop time, external start, power restart, low battery, a serviceable call that exists and has not been serviced for two cycles, or SDLC response fault.
- Must support measurement of the existing sequence selected
- Must support reading of the phase table, sequence table, channel table and overlap table
- Must support controller clock re-syncing

- Must support placing a call on a phase if a detector is in fault
- Must support running the traffic controller in free mode through force, hold and omit directions
- Must support setting of coordination plan parameters including but not limited to splits, offsets, and cycle length
- Must support setting of phase table parameters
- Must support capturing and reporting Controller Faults based on controller reported flash status

(j) Device-Level (Local) API Data Access

- Must support the access of data by third-party devices via TCP/IP
- Must provide live data access over a MQTT (publisher/subscriber) interface for edge device integrations and connected vehicle applications
- Must support the selection of MQTT Quality-of-Service 0,1, and 2 for robust data deliverability
- Must provide topics for device-level subscribers that include the following data:
 - red, green, or yellow light status on each channel in the cabinet when the status of any channel changes
 - status on each detector channel in the cabinet when any detector status changes
 - preempt status on every preempt channel in the cabinet when any preempt status changes
 - when connected to NTCIP controllers, the active timing plan (actionPlan, pattern, dayPlan, and localFree) when the active timing plan changes.

- when connected to the Video Detection and Analytics System, must provide object presence, movement data for vehicles, pedestrians and bicycles
- Must support the output of data topics at 1/10th of second (100ms) resolution
- Must provide device endpoint to activate high and low priority preemption mechanisms of any connected controller from third-party cellular-based vehicle priority and preemption systems

(k) In-Cabinet Computation and Actuation

- In-cabinet device must support the addition of an optional module for detection and counting computation.
- Computation Module must not increase external physical footprint of cabinet device
- Computation Modules must derive power from existing in-cabinet device.
- Must support up to two 360 Intersection Cameras for coverage of larger or irregular intersections
- Must support up to four Approach Specific cameras in addition to two At-Intersection Cameras with the use of vendor recommended POE Switch
- Must have an integrated TFT color display which provides diagnostic information such as the status of all phases and detectors, as well as diagnostics on the camera IP and operational status.
- Must display status of detection channel on a front panel display
- Must display Transmit/Receive status of SDLC bus
- Must include onboard processing capabilities to perform video-based vehicle detection and generation of traffic analytics

- Module must be able to use Interface's existing SDLC port for actuation
 - Must provide the capability to act as one or more BUI detector racks
 - Must support generating actuations on up to 64 channels over SDLC
- Must be able to use interface's existing ATC SIU port for actuation
- Typical system power consumption of the full system should be less than 130W.

(I) Physical Indicators and U/I

- Must provide light-emitting diode (LED) indicators for heartbeat, server connectivity, ethernet link/activity, power and device state
- Must have an integrated TFT color display which provides diagnostic information such as the status of all phases and detectors, as well as diagnostics on the camera IP and operational status.
- Must display status of detection channel on a front panel display
- Must display Transmit/Receive status of SDLC bus
- Must provide Installation troubleshooting from front panel

(2) 360 Camera.

- (a)** Must provide 360 degrees of visibility from the point of installation
- (b)** Must be fully NEMA compliant
- (c)** Must be powered via Power over Ethernet (PoE) and be IEEE802.3af compliant
- (d)** Must support configuration in both spherical "fisheye"

- 873 configuration, and rectangular “quad view”
874
875 (e) Must support at least 9 megapixels (MP) capture
876
877 (f) Must support the ability to capture 4K video at
878 2992x2992 resolution
879
880 (g) Must be able to configure video resolution between
881 320x320 and 2992x2992 resolution
882
883 (h) Must be able to provide video at 30 frames per second
884 (FPS)
885
886 (i) Must provide H.264 and MJPEG image compression.
887
888 (j) Must support H.265
889
890 (k) Must support RTSP streaming
891
892 (l) Must support third-party integration of RTSP video
893 streams into Video Management System (VMS)
894 platforms
895
896 (m) Must support maximum aperture ratio of 1:1.9
897
898 (n) Must support focal length of 1.4mm
899
900 (o) Must include a clear polycarbonate resin-based dome
901
902 (p) Must be rated to IP66 (NEMA 4X compliant)
903
904 (q) Must include an electronic de-humidification device for
905 use in various weather conditions
906
907 (r) Must support the ability for users to zoom in and out,
908 rotate and pan the video feed
909
910 (s) Must allow direct connection of Cat 5e cable from
911 camera to traffic cabinet to limit number of connections
912
913 (t) Must include lens defrost functionality with total
914 camera power operation not exceeding standard PoE
915
916 (u) Must utilize a NEMA temperature rated shielded PoE
917 cable with drain wire
918

- 919 (v) Must support in-line Ethernet repeaters for long
920 distance cable runs
921
922 (w) Must be able to operate in a temperature range of -
923 29°F to 165°F (-34°C to +74°C) in a 0% - 95% non-
924 condensing humidity
925
926 (x) Must be able to be shock resistant with compliance
927 with 50 J (IEC 60068-2-75 / IK10 (IEC 62262), NEMA
928 2.2.9 Compliant (10g pulse)
929
930 (y) External power supplies must be UL (UL60950-1), and
931 c-UL (CAN/CSA C22.2 No.60950-1) CE, IEC60950-1
932 compliant
933
934 (z) Must be able to have electromagnetic compatibility
935 FCC (Part15 ClassA), ICES003 ClassA, EN55022
936 ClassB, EN55024, ECE-R10, EN50498 compliant,
937 EN50121
938
939 (aa) Must be able to thermostatically control a camera
940 heater to reduce snow and frost coverage and operate
941 with standard PoE
942
943 **(3) 360 Mounting Hardware.**
944
945 (a) Must include all mounting hardware with device for
946 vertical and horizontal mounting
947
948 (b) Mounting fixture must be constructed of weatherproof
949 painted aluminum or stainless steel
950
951 (c) Mounting hardware must support 6ft' vertical pole
952 installation, horizontal pole installation, or attachment
953 via a 1.5" threaded fitting
954
955 (d) Mounting fixture (including camera, 40ft cable) must
956 not exceed 540mm x 460mm x 205mm in size, and
957 6kg in weight (not including 6 ft extension)
958
959 **(4) Approach Camera (Optional).**
960
961 (a) Must be NEMA compliant
962
963 (b) Must be powered via Power over Ethernet (PoE) and
964 be IEEE802.3af compliant

- 965
- 966 (c) Must support optical zoom of 2.3x
- 967
- 968 (d) Must support automatic focus
- 969
- 970 (e) Must support aperture ratio of 1:1.7 - 1.3.0
- 971
- 972 (f) Must support a field of view of 11° - 36°
- 973
- 974 (g) Must include internal de-humidification features for
- 975 various weather conditions
- 976
- 977 (h) Must provide H.264 and MJPEG image compression.
- 978
- 979 (i) Must support H.265
- 980
- 981 (j) Must be mountable on vertical or horizontal traffic
- 982 poles
- 983
- 984 (k) External power supplies must be UL (UL62368-1), and
- 985 c-UL (CSA C22.2 No.62368- 1), CE, IEC62368-1
- 986 compliant
- 987
- 988 (l) Must be able to have electromagnetic compatibility
- 989 FCC (Part15 ClassA), ICES003 ClassA, EN55032
- 990 ClassB, EN55035
- 991
- 992 (m) Must be able to operate in a temperature range of -
- 993 29°F to 165°F (-34°C to +74°C) in a 0% - 95% non-
- 994 condensing humidity
- 995

996 **(5) Power-Over-Ethernet Switch/Expansion (Optional).**

997

- 998 (a) System must be able to support 1 360 camera and 2
- 999 Approach-specific cameras, or 2 360 cameras and 1
- 1000 Approach-specific camera without use of PoE Switch
- 1001
- 1002 (b) Must support up to 4 advance detection cameras in
- 1003 addition to two 360 at-intersection cameras with use of
- 1004 the recommended PoE switch.
- 1005

1006 **(6) Certification and Testing.**

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- 1008 (a) Must be fully NEMA TS-2-2016 tested and compliant,
- 1009 including shock, vibration, voltage, and thermal articles
- 1010 2.2.7-2.2.11

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- (b) Must support NEMA operating temperature specification -34 °C to 74 °C (-29 °F to 165 °F)
- (c) Must support NEMA storage temperature specification -34 °C to 74 °C (-29 °F to 165 °F)
- (d) Must support humidity operating requirements of 0% - 95% RH non-condensing
- (e) External power supplies must be UL (UL60950-1), and c-UL (CAN/CSA C22.2 No.60950-1) CE, IEC60950-1 compliant
- (f) Must be FCC (Part15 ClassA) tested and compliant
- (g) Must be ROHS compliant

(C) Online Platform.

(1) Platform Server / Data Storage

- (a) Must be hosted at a professional cloud hosting facility with redundancy of at least two instances, with automatic load balancing and must scale to support simultaneous number of connections
- (b) Must support permanent storage of all Telemetry Data, Alert Data, and Vehicle Identification Data in perpetuity.
- (c) Must use AWS IOT structure

(2) Security Architecture

- (a) Vendor must demonstrate commitment to security through compliance with recognized security certifications like ISO27001, AWS Smart City and AWS Qualified Software

(3) Security Tools

- (a) MFA
- (b) SSO

- 1057 (c) Miovision/Distributor Access
1058
1059 (d) Audit Logs
1060
1061 (e) Data consumption Management
1062
1063 (f) Inventory and Asset Management
1064
1065 • Must support the creation of geographical
1066 placeholders for any intersection, including those
1067 without a device installed
1068
1069 • Must support the ability to record and store cabinet
1070 equipment inventory information associated with
1071 each intersection
1072
1073 • Must support the ability to upload and store an
1074 unlimited number of arbitrary files including, image
1075 and video files, with each node in the network up to
1076 a size of 1 GB per file
1077
1078 • Must support the ability to view all inventory and
1079 asset information, including uploaded files
1080
1081 (4) Location Sharing
1082
1083 (a) Must be able to share with any number of agencies
1084 and reflect the location within their solution instance.
1085
1086 (b) Must be user configurable to share:
1087
1088 • Signal telemetry
1089
1090 • Live video Stream
1091
1092 • Recall Video
1093
1094 • Continuous Count Data
1095
1096 • Performance Data
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1098 (5) Network Settings and Configurations
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1100 (a) Must allow the user to manage network settings locally
1101 on the CoreDCM as well as through the Platform
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- Local Access Network Settings
- Platform Network Settings

(6) Open Data Support Via Cloud API

- (a)** Must support the access of data via a modern REST application programmable interface (API) in JSON or XML
- (b)** Must provide access to raw decoded event-based data in the standard Indiana Traffic Signal Hi Resolution Data Logger Enumerations format
- (c)** Must provide access to by-movement turning movement count data generated by the Vehicle Detection system in a minimum of 15-minute bins
- (d)** Must provide access to bi-directional pedestrian counts on crosswalks in a minimum of 15-minute bins
- (e)** Must provide point to point travel time data for 24hrs in bins of 15 mins or less
- (f)** Must provide POST endpoint to ingest signal and detector data in the Indiana Traffic Signal Hi Resolution Data Logger Enumerations format
- (g)** Must provide currently active infrastructure alert data
- (h)** Must provide intersection detail data include location (lat/long) data for all intersections on the device network
- (i)** Must support administrator control of level of data API access, including what function calls may be made publicly and what function calls are accessible only through authentication
- (j)** Must support API documentation with examples and testing environment
- (k)** Must support the ingestion of third-party data sources such as (but not limited to) traffic alert and incident data from the Waze Connected Citizen Program (CCP)

(D) Applications.

(1) Basic Signal Metrics

(a) Available Locally On the Device

- Must support collection of a rolling 365 day buffer of Occupancy Ratios
- Must support collection of a rolling 365 day buffer of Arrivals on Red, and Arrivals on Green
- Must support collection of a rolling 365 day buffer of Phase Interval

(b) Available via Platform

- Must Support Approach Volume
- Must Support Approach Delay
- Must Support Arrivals on Red
- Must Support Occupancy Ratio
- Must Support Pedestrian Delay
- Must Support Phase Interval
- Must Support Purdue Coordination Diagram
- Must Support Split Failures
- Must Support Split Trends

(2) Intersection Monitoring

(a) User Interface

- Must provide a secure web-based Graphical User Interface (GUI) using SSL
- Must support an unlimited number of concurrent logins by authenticated users

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- Must be fully accessible via desktop and tablet on Chrome, Microsoft Edge and Safari
 - Must provide all the functionality of Signal Monitoring, Alerts Management, Inventory & Asset Management and Traffic Data Analysis from a single software application requiring a single login
 - Must support user login via OAuth Login
 - Must provide a secure means of verifying account registration via email
 - Must provide a secure means of password reset
 - Must support the addition and management of user accounts for users that are both inside and outside of the organization at no additional cost
 - Must support access to all Telemetry Data and Alert Data
- (b)** Signal Monitoring
- Must support live display of all Telemetry Data with latency not to exceed 1 seconds when LTE connection is active
 - Must support historical display of all Telemetry Data on-demand with load latency not to exceed 1 second
 - Must support a viewing mode in which all Telemetry Data is displayed overlaid onto a diagram of the intersection
 - Must support a viewing mode in which all Telemetry Data is displayed in a timing diagram format in which interval length is displayed in seconds for each signal phase
 - Must support display of environmental weather conditions, including precipitation and temperature, as part of live and historical viewing of Telemetry Data

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- Must provide reporting on signal telemetry, detector and alert data

(c) Remote Video Monitoring

- Must support live video streaming from the Camera to desktop browsers without any third party plugins
- Must support live video streaming from the Camera on tablet browsers
- Must support live video streaming of any third-party camera connected over ethernet to the Peripheral Interface Hardware that supports non-proprietary codecs and RTSP streaming
- Must support live video streaming with an initial load time of no more than 10 seconds
- Must support live video streaming with a latency of no more than 10 seconds at a frame rate of at least 15 fps
- Must support at least 10 concurrent video streams from a single camera to be viewed in multiple browsers
- Must support at least 400 concurrent video streams from all cameras active in the system, to be viewed in multiple browsers
- Must support the ability for users to virtually zoom in and out, rotate and pan the video feed
- Must include Video Detection Overlay
- Must include directional Labels

(d) Alerts Management

- Must detect the following alert conditions and transmit them to the Server via the Communications Service

- 1284 ○ Cabinet power outages
- 1285
- 1286 ○ Traffic signals in flash
- 1287
- 1288 ○ Any digital I/O signal which has been wired to
- 1289 third-party devices through the four hardware
- 1290 I/Os such as:
- 1291
- 1292 ○ Cabinet door open
- 1293
- 1294 ○ UPS battery backup system in use
- 1295
- 1296 ○ UPS battery backup system falls below a
- 1297 configurable charge level
- 1298
- 1299 ○ Detector failure (stuck high)
- 1300
- 1301 ○ Preemption System failure (stuck high)
- 1302
- 1303 ○ Controller failures reported by the Controller
- 1304 Interface Hardware
- 1305
- 1306 ● Must display log of all historical alerts including
- 1307 time of alert and resolution time
- 1308
- 1309 ● Must support SMS and Email alerts for all Alert
- 1310 events (listed in the Alert Data Acquisition
- 1311 specification)
- 1312
- 1313 ● Must support configuration of distribution of SMS
- 1314 and Email alerts based to different user groups
- 1315 based on Alert type
- 1316
- 1317 ● Must support reports indicating alert volume by
- 1318 intersection over time
- 1319

1320 (3) Detection

1321 (a) Functionality

- 1322
- 1323
- 1324 ● Must support real-time detection of vehicles,
- 1325 cyclists and pedestrians in configurable detection
- 1326 zones
- 1327
- 1328 ● Must support the configuration of 100✓ zones
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- Must provide flexible detection zone placements using a graphical interface to configure both rectangular and irregular polygon-shaped zones
 - Must ensure the detection system meets or exceeds the FDOT TERL 98% vehicle occupancy detection accuracy requirement in good setup and lighting conditions
 - Must support directional detection zones to reduce false detections from objects traveling opposite or perpendicular to the intended direction of travel
 - Must automatically adapt to poor conditions which inhibit accurate detection
 - Must support stop bar detection for both vehicles & bicycles
 - Must be able to distinguish between vehicles and bicycles, and configure stop bar
 - detection zones which can only be activated by one class of object and not the other
 - Must be able to configure detection zones as either pulse, presence zones or stop bar
 - Must be able to detect & classify pedestrians and apply filtering to vehicle and bicycle zones such that they are not activated by pedestrians.
 - Must support multiple pulse or presence zones for each approach
 - Must support individual lane pulse, presence zones and stop bar
 - Must support combined lane pulse, presence zones and stop bar
 - Must support the configuration of departure zones for road users exiting the intersection

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- Must utilize configurable directional filtering for detection zones
- Must support delay and extend functionality per detection zone
- Must support multiple detection zones mapping to one detection channel output
- Must support virtual actuation channels that do not actuate controller channels but can be used to populate signal performance measures
- Must support the output of a constant call on all detection channels within 1 second in the event that a loss of video signal occurs
- Must support automatically switching individual detection zones into alternate detection mode when high glare conditions are detected
- Must support manually overriding detection information to force actuated channels into constant call, both from the roadside device and the software portal
- Must support an MQTT API with detection events for advanced analytics or adaptive signal control systems.
- Must support crosswalk detection and counting
- Must support omnidirectional presence detection in crosswalks
- Must support pedestrian corner detection
- Must support live stream with detection, phasing and telemetry overlay
- Must support video recall with detection, phasing and telemetry overlay
- Must support the ability for users to zoom in and out, rotate and pan the video feed

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- The Detection zone shall change color in real-time on the video feed to verify the proper operation of the detection system

(b) Configuration

- Must support secure configuration of system remotely without requiring any additional connectivity costs
- Must provide full configuration history for changes made in remote platform
- Must support roadside configuration of detection zones

(c) Detection Model and bug improvements

- Must support Over-The-Air software and algorithm updates without requiring manual updating

(d) Camera Support

- Must support roadside configuration of detection zones Must support up to two 360 Intersection Cameras for coverage of larger or irregular intersections,
- Must support up to four Approach Specific cameras in addition to two At-Intersection Cameras with the use of vendor recommended POE Switch

(e) Detection U/I

- Must have an integrated TFT color display which provides diagnostic information such as the status of all phases and detectors, as well as diagnostics on the camera IP and operational status.
- Must display status of detection channel on a front panel display
- Must display Transmit/Receive status of SDLC bus

1464 **(4) Continuous Counts**

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1466 **(a) General**

- 1467
- 1468 • Must classify road users: Bicycles, Pedestrians,
- 1469 Light Vehicles (Car, Motorcycle and Van), Single
- 1470 Unit Trucks, Articulated Trucks, Buses, and Other
- 1471 Motorized Vehicles.
- 1472
- 1473 • Must be able to distinguish between lanes for any
- 1474 given vehicle movement. (E.g. NB Thru lane 1, NB
- 1475 Thru lane 2).
- 1476
- 1477 • Must be capable of counting large groups of
- 1478 pedestrians
- 1479
- 1480 • System must be able to generate bi-directional
- 1481 pedestrian counts for each crosswalk, including for
- 1482 groups of pedestrians.
- 1483
- 1484 • System must be able to count bicycles both on the
- 1485 road and on the crosswalk. These counts should be
- 1486 able to be measured separately.
- 1487

1488 **(b) Data Reporting Via Platform**

- 1489
- 1490 • Must provide access to a secure (authentication
- 1491 required) dashboard for counts data
- 1492
- 1493 • Must provide summaries of total Light Vehicles,
- 1494 Pedestrians, Bicycles, Buses, Single Unit Trucks,
- 1495 Articulated Trucks, and Other Motorized Vehicles.
- 1496
- 1497 • Must provide the total percentage of Trucks
- 1498 (combines Single-Unit and Articulated Trucks).
- 1499
- 1500 • Must make it possible to retrieve data from all dates
- 1501 the system was installed for using a date selector.
- 1502
- 1503 • Must show raw (15 min binned) data for ranges of a
- 1504 day or less
- 1505
- 1506 • For ranges of a day or more, it must be possible to
- 1507 show average, median, 5th, 85th, and 95th
- 1508 percentiles of data for the date range.

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- It must be possible to export the typified data when a percentile aggregation is selected.
- Must have at least 15 minute bin resolution
- Single-Day Volumes (TMC) Report must enable filtering by class, day of the week, date range, start & end time, approach and movement.
- Must provide a view of the counts data that shows the historical trend of daily volumes.
- Must provide Vehicle Clearance data
- Must provide Pedestrian Clearance data
- Must provide Pedestrian Compliance data
- Must provide Red Light Running Data

(c) Accuracy

- Vehicle Turning Movement Count accuracy must be a minimum of 90% during normal weather and operating conditions for correct camera set ups.
- Pedestrian counting accuracy must be a minimum of 85%, including for large groups of pedestrians, during normal weather and operating conditions for correct camera setups
- Bicycle counting accuracy must be a minimum of 80% during normal weather and operating conditions for correctly set up cameras

(d) Data Access Available on Roadside Device

- Must support collection of a rolling 365 day buffer of Turning Movement Counts
- Count data must be available via a real time local device API

- 1554 • Count data must be available via a local CSV
1555 download
- 1556
- 1557 • Count data must be available via a real time local
1558 device API
- 1559
- 1560 • Count data must be available via a local CSV
1561 download
- 1562

1563 **(5) Performance Measures (Optional)**

1564 **(a) General System Functionality**

- 1567 • ATSPM must collect data of up to 3000 signals
- 1568
- 1569 • Vendor must connect to, and poll, the traffic signal
1570 controllers in the field
- 1571
- 1572 • The system must allow for an unlimited number of
1573 user accounts
- 1574
- 1575 • The system must support multiple simultaneous
1576 logins at one time
- 1577
- 1578 • The system must provide cloud-based data storage
1579 for a system size of up to 3000 signal controllers
- 1580
- 1581 • The system must be cloud based
- 1582
- 1583 • The system shall be capable of up time of
1584 99%
- 1585
- 1586 • The ATSPM system cannot prevent monitoring and
1587 manual override control from the existing Central
1588 management/ traffic control software portion.
- 1589

1590 **(b) Data Collection / Communication / Controller**
1591 **Integration**

- 1593 • The system must be capable of logging controllers
1594 with the following communication types:
- 1595
 - 1596 ○ Fiber
 - 1597
 - 1598 ○ Wireless Point to Point

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- Cellular Modem
- Controller must support High Resolution Data logging

(c) Data Reporting

- The system must provide reports. The agency recognizes that performance report generation is dependent on the level of existing detector channel maps per intersection
- The ability to show simplified view of each chart
- The ability to customize view (chart options)
- Zoom in/out functionality
- The ATSPM must export its systems log in the following formats: MS Excel, Text, CVS
- The system must provide searchable signal event functionality containing all hi-resolution signal event information by intersection

(d) Performance Reports

- Purdue Phase Termination
- Split Monitor
- Pedestrian Delay
- Preemption Details
- Turning Movement Counts
- Purdue Coordination Diagram
- Approach Volume
- Approach Delay
- Arrivals on Red

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- Approach Speed
- Red Light Runners
- Purdue Split Failures
- Queue Length
- Detector Counts
- Detector Durations
- Purdue Link Pivot: Adjustment Optimization
- Purdue Link Pivot: Predicted Purdue coordination Diagrams

(e) Advanced Insights

- The system must provide self-monitoring to automatically provide signal maintenance insights
- The system must provide self-monitoring to automatically provide signal data insights
- The system must provide self-monitoring to automatically provide signal configuration insights
- The system must provide self-monitoring to automatically provide signal operational insights
- The system must provide self-monitoring to automatically provide signal performance insights
- The system must provide rating on the quality of the data ingested into the software
- The system must show all insights described above on a map layer
- The system must provide filtering functionality for all insights provided

- The system must provide qualitative signal state information to assist with the prioritization of issues identified
- The system must provide acknowledgement functionality of the issues identified
- The system must provide functionality to acknowledge, ignore, comment or assign action items reflecting the current status.
- The reports must be query-able by time of day and day of week within a selected time and data range for a signal.
- The system must retain records for a minimum of 5 years.
- All the data must be fully accessible by the system for reporting purposes The System must be configurable to provide email alerts for each Insight type and issue

(f) Performance Trend Analysis

- The ATSPM shall be capable of generating reports of the following performance measures for signal groups in increments of 1 month, 3 months and yearly with trend analysis of:
 - Throughput (vehicles per hour)
 - Arrivals on green
 - Split failures
 - Traffic volume (vehicles per day)

(g) Executive Dashboard

- The system must be able to provide information on delay per vehicle, approach volume, arrivals on green, split failures and platoon ratios on a corridor level dashboard

- 1733 • The system must be able to provide information on
1734 intersection level of service, total cost, CO2 waste,
1735 volume trends and delay information on a
1736 dedicated dashboard
- 1737
- 1738 • The system must provide signal performance
1739 dashboard summarizing information on approach
1740 volumes, delay, arrivals on green, split failures,
1741 platoon ratio, ped actuations, ped delay, queue
1742 length and queue spillback
- 1743
- 1744 • The system must provide automated insights
1745 dashboard per Insight type and problem
- 1746
- 1747 • The system must log travel times gathered by
1748 Waze through the Connected Citizen Program and
1749 display them on a historical travel time trends
1750 dashboard that includes Travel Time Index,
1751 Planning Time Index, Travel Time, and Congested
1752 Time
- 1753
- 1754 • Corridor Metrics
- 1755

1756 **(E) Support and Training.**

1757 **(1) Technical Support**

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- 1760 **(a)** Vendor must provide technical support via email and
1761 toll-free telephone for all included hardware and
1762 software between the hours of 9:00 and 17:00
1763 EST/EDT, Monday to Friday.
- 1764
- 1765 **(b)** Local Distributor shall be available to support the
1766 system.
- 1767
- 1768 **(c)** Vendor must provide guidance on camera placement
1769 for optimal performance.
- 1770

1771 **(2) Training**

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- 1773 **(a)** Vendor must provide free training videos and
1774 webinars for device installation of cabinet devices,
1775 camera locations, configuration of zones and counts,
1776 operation, and troubleshooting.
- 1777

1778 **(F) Hardware Warranty.**

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(1) ITS Hardware

- (a) Must provide devices with a standard manufacturer's warranty, transferable to the Customer. The device must carry a warranty for 3 years from the date of installation. Device Firmware and Software are updated for the life of the product. Software and Web application updates, and security patches, shall be provided by the vendor over the term of the contract."

END OF SECTION 770

KAHULUI BEACH ROAD INTERSECTION IMPROVEMENTS

AT KANALOA AVENUE

PROJECT NO. 3400A-01-20R

**PRE-BID MEETING MINUTES
(VIA TELECONFERENCE)**

JUNE 18, 2026, 2:00 P.M. (HST)

The following minutes are from the Hawaii Department of Transportation (HDOT) pre-bid conference with prospective bidders for the Kahului Beach Road (Route 3400) Intersection Improvements at Kanaloa Avenue.

The conference was conducted virtually on Microsoft Teams.

The pre-bid conference attendees included representatives from HDOT Maui District and the design consultant team Austin, Tsutsumi & Associates, Inc. No prospective bidders attended the pre-bid conference.

Meeting was adjourned at 2:15 P.M.

KAHULUI BEACH ROAD INTERSECTION IMPROVEMENTS

AT KANALOA AVENUE

PROJECT NO. 3400A-01-20R

PRE-BID CONFERENCE ATTENDANCE SHEET

JUNE 18, 2026, 2:00 P.M. (HST)

No.	Name	Company	Phone No.	Email Address
1	Larry D. Hail	HDOT HWY-MD	(808) 873-3535	larry.d.hail@hawaii.gov
2	Kynan D. Ledee	HDOT HWY-MD	(808) 873-3535	kynan.d.leddee@hawaii.gov
3	Chad K. Kadokawa	Austin, Tsutsumi & Associates, Inc	(808) 533-3646	ckadokawa@atahawaii.com
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**Request for Information and Responses for Solicitation:
HlePRO (B26003355)**

**3400A-01-20R, Kahului Beach Road Intersection Improvements
at Kanaloa Avenue
(July 7, 2026)**

1. Are you requiring union labor for this project, or can both union and non-union contractors participate?

Answer: Both union and non-union contractors can participate. It is recommended that prospective bidders follow and comply with all applicable labor laws and regulations.

2. Is there a pre-bid meeting attendees list available?

Answer: The Pre-Bid meeting minutes and attendance sheet are included with Addendum No. 1.

3. Is Builder's Risk required for this project?

Answer: Yes, Builder's Risk insurance is required (refer to Section 107.01.B.4 in the Special Provisions).

4. It is our understanding that a Battery Backup System (BBS) is typically included as part of the traffic signal equipment. Please confirm whether a Battery Backup System is required for this project. If required, please provide the applicable specifications.

Answer: Yes, an Uninterruptible Power Supply or Battery Backup System (BBS) is required and the requirements have been added to the revised SECTION 770 - TRAFFIC SIGNAL MATERIALS of the SPECIAL PROVISIONS, included with Addendum No. 1.