



STATE OF MAINE
DEPARTMENT OF TRANSPORTATION
16 STATE HOUSE STATION
AUGUSTA, MAINE 04333-0016

Janet T. Mills
GOVERNOR

Bruce A. Van Note
COMMISSIONER

March 15, 2023
Subject: over height Vehicle Detection
System on Route 1
State WIN: 025319.00
Location: **Brunswick**
Amendment No. 3

Dear Sir/Ms.:

Please make the following changes to the bid documents:

Remove pages fifty-one to fifty-seven titled SPECIAL PROVISION SECTION 643 TRAFFIC SIGNALS OVERHEIGHT VEHICLE DETECTION SYSTEM dated December 15, 2022, totaling seven pages, and

Replace with the attached SPECIAL PROVISION SECTION 643 TRAFFIC SIGNALS OVERHEIGHT VEHICLE DETECTION SYSTEM dated March 13, 2023, totaling six pages.

Remove pages sixty-five to seventy-three titled SPECIAL PROVISION SECTION 643 INTELLIGENT TRANSPORTATION SYSTEMS CLOSED CIRCUIT TELEVISION SYSTEM dated November 22, 2022, totaling nine pages, and

Replace with the attached SPECIAL PROVISION SECTION 643 INTELLIGENT TRANSPORTATION SYSTEMS CLOSED CIRCUIT TELEVISION SYSTEM dated March 13, 2023, totaling nine pages.

Consider these changes and information prior to submitting your bid on **March 22, 2023**.

Sincerely,

A handwritten signature in blue ink that reads "George Macdougall".

George M. A. Macdougall P.E.
Contracts & Specifications Engineer

SPECIAL PROVISION
SECTION 643
TRAFFIC SIGNALS
(Overheight Vehicle Detection System)

643.833 Overheight Vehicle Detection System:

643.01 Description: This work shall consist of furnishing, installing, integrating, and testing an Overheight Vehicle Detection System (OHVDS).

Work shall include removal and salvage of existing end of life equipment and furnishing and installing a series of overheight detection sensors with associated equipment onto existing steel poles. The system shall be located at locations specified in the Contract Documents or as ordered by the Resident.

643.02 General: The following specifications detail an OHVDS as currently deployed in the State of Maine. If any of the following hardware-specific requirements listed in the following sections cannot be met by a willing Bidder, but the Contractor believes that strict conformance to the given requirement is unnecessary or may be accomplished differently, the Contractor shall provide a list of the requirements that cannot be strictly met along with a justification for how the Contractor's proposed OHVDS may be considered functionally equivalent in accordance with Special Provision 103.

643.021 Materials: All equipment supplied under the contract shall be new. Used, refurbished, and rebuilt equipment will not be permitted.

643.25 Overheight Detection System (OHVDS) Equipment

1. Overheight Vehicle Detectors shall meet the following requirements:
 - a. The Detectors shall create a horizontal elevated plane at 14 feet above the roadway surface.
 - b. The Detectors shall only detect objects moving in one travel direction.
 - c. The Detectors shall use infrared or red source technology.
 - d. The Detectors shall have a reaction speed range of up to 70 miles per hour (mph) for a 2.5 inch diameter object 1 inch above the height of detection.
 - e. The Detectors shall have a detection range of 200 feet.
 - f. The Detectors shall not be affected by ambient light.
 - g. The Detectors shall have internal environmental control that reduces operational failure from condensation.
 - h. The Detectors shall be IP66- or NEMA-equivalent rated.
2. The OHVDS Equipment shall include a controller that shall satisfy the following requirements:
 - a. The controller shall have a modern processor, manufactured within the previous 12 months.

- b. The controller shall continuously monitor detector for inputs for a positive overheight detection reading.
 - c. The controller shall activate warning components in the event the overheight detectors sense an overheight vehicle.
 - d. The controller shall be compatible with the proposed closed circuit television (CCTV) camera system.
 - e. The controller shall operate in the temperature range of -29°F to +150°F.
 - f. The controller shall operate in the relative humidity from 0% to 100%.
3. All software and data interfaces shall be designed to reflect the latest NTCIP and Traffic Management Data Dictionary Standards. Specifically, the system shall support NTCIP 1204 v03.08 protocol.
 4. The OHVDS shall include a Power Supply that shall satisfy the following basic requirements:
 - a. Where public utility power is provided, the Power Supply shall withstand an alternating current (AC) range of 90VAC to 135VAC
 - b. Power shall have in-built surge protection against transients.
 - c. Power shall be at least 240W to ensure sensor heating under all conditions.
 - d. Power supply shall have stable output of ± 1 percent.
 - e. Power supply shall allow parallel connection when additional power is required.
 5. The controller shall be housed in a cabinet enclosure that shall satisfy the following requirements:
 - a. The controller enclosure shall not have external connectors for sensors and other equipment, which may cause excessive amount of corrosion and malfunctions.
 - b. All entries to the controller enclosure shall be completely encased in conduit with appropriate bushings to prevent insect and moisture entry. The sensor cable inlets shall be vandal-proof.
 - c. The controller enclosure material shall be made of bare aluminum or stainless steel.
 - d. The controller enclosure shall be equal to IP66- or NEMA-equivalent rating.
 - e. The controller enclosure door shall have wind lock mechanism to maintain the door in an open position during maintenance.
 6. All software and data interfaces shall be designed to reflect the latest NTCIP and Traffic Management Data Dictionary Standards. Specifically, the system shall support NTCIP1204 v03.08.
 7. The OHVDS shall operate with flashing beacon warning signs meeting the following requirements:
 - a. The OHVDS controller shall integrate the static signs with flashing beacon assemblies as shown on the plans.
 - b. The flashing beacon assemblies shall consist of two flashing beacons for each sign.
 - c. The flashing beacons shall be triggered to operate when the detectors are triggered.

643.065 OHVDS Construction Requirements: The Contractor shall install the OHVDS equipment in accordance with the Plans. The Contractor shall be responsible for all other

work to provide a fully functional, operational, and integrated OHVDS at the locations identified in the Plans.

1. Power Requirements
 - a. Each OHVDS location shall be supplied with adequate power to meet the site and sensor design loads. The existing power is AC.
2. Grounding System Requirements
 - a. All OHVDS sites shall be grounded to a minimum of 25 ohms to ground. If other national, state, local, or manufacturer grounding requirements are more stringent than those of the manufacturer, the applicable national, state, or local code shall apply.
 - b. The Contractor shall install solid copper or copper clad ground rod (minimum ¾-inch x 10-foot) along with #4 AWG ground wire and fittings at the base of the OHVDS equipment pole. The Contractor shall install additional ground rods required to meet the minimum grounding requirement.
 - c. The ground wire shall be exothermically welded to each ground rod installed with all ground rods attached to every other ground rod via the ground wire.
 - d. The OHVDS grounding system shall be bonded to the controller enclosure bus-bar and the steel support structure in accordance with National Electric Code (NEC) requirements.
3. Communication Requirements
 - a. The Contractor shall provide all necessary equipment, cables, hardware, and ancillary equipment to operate the OHVDS and transmit a signal to the CCTV system and the flashing beacons.
 - b. If the OHVDS includes manufacturer-recommended software, the Contractor shall ensure that the software communicates (two-way) with the Transportation Management Center (TMC) in Augusta, Maine.
4. Software and Integration Requirements
 - a. The Contractor shall furnish a license for any manufacturer-recommended OHVDS software to MaineDOT. The software license shall be an enterprise license (or equivalent) assigned to MaineDOT.
 - b. The OHVDS shall have the capability of generating alerts, watches, or warning. The OHVDS shall send an alert to the MaineDOT TMC every time the OHVDS is triggered.
 - c. The OHVDS is not expected to be integrated with New England Compass.
5. System Testing
 - a. All OHVDS sensors and equipment installed under this project shall be tested prior to final acceptance. There are three stages of tests required: Stand-Alone Testing, Subsystem Testing, and Operational Testing.
 - b. The Contractor shall develop test plans and procedures for each test stage for review and approval by the Department. Test plan procedures shall exercise the full functionality of each sensor and system component. Test plans shall be submitted to the Department a minimum of 21 calendar days prior to initiation of the first test.
 - c. Test plans shall include the following:
 - i. Date and Time of the test

- ii. Names of all witnesses to the test, identifying the individual executing the test plan
- iii. Detailed, step-by-step execution plan that tests the functional requirements of all the equipment, including alarms and action plans.
- iv. Tabular document for each test step to include:
 - (1) Description of the test step procedure;
 - (2) Expected result of the test step;
 - (3) Place to input the actual result of the test step;
 - (4) Check box indicating pass or fail; and
 - (5) Comments area for witness comments.
 - (6) Location for the Resident, MaineDOT TMC representative, and test executor to sign and date the form. Signatures on the test forms only acknowledge that the test was performed in the presence of the correct witnesses. Signatures and witnesses do not signify the pass or fail of any given test.
- d. Stand-Alone testing and Subsystem testing shall be completed for all sites prior to the start of the Operational testing.
- e. Upon completion of each test stage, the Contractor shall submit the final test results to the Resident within 14 calendar days.
- f. Stand-Alone Test Requirements - This test shall be performed on site at each OHVDS location. The purpose of the Stand-Alone tests is to exercise all stand-alone (non-network) functional operations of the sensors and equipment installed and demonstrate compliance with the requirements for the equipment defined in the Contract Documents. If a sensor or unit fails to pass the stand-alone test, the Contractor shall correct the problem or replace the sensor or unit and retest until satisfactory results are achieved.
- g. Subsystem Test Requirements – This test shall be performed at the Route 24 OHVDS cabinet. This test shall verify that all the OHVDS equipment is transmitting detection to the CCTV system and the flashing beacons in accordance with the Contract Documents.
- h. Operational Testing –The purpose of the Operational Testing is to operate the OHVDS equipment live through the software to determine if there are any faults or bugs that must be resolved. This test shall commence at the conclusion of the successful Central Control testing and continue for a period of 90 consecutive calendar days or ten system actuations, whichever occurs first, but shall continue for no less than 30 calendar days. The OHVDS must demonstrate successful transmission of data and be fully integrated with the CCTV system and flashing beacons. In the event that there is a single failure associated with any sensor, the test shall be suspended while the Contractor resolves the failure (either by fixing the sensor or replacing the sensor). Upon successful repair/replacement, the test shall continue to the end of the 90 days/ten actuations, or a minimum of 14 days/three actuations, whichever is longer. Upon the failure of any second sensor or equipment, the Operational Test period shall be restarted for the full 90 days/ten actuations upon repair/replacement. The completion of the Operational Test period and the submission of all test reports shall be documented as the date

- of Final System Acceptance, provided all other work has been completed to the satisfaction of the Resident.
- i. MaineDOT reserves the right to examine and test/retest any and all test steps for the project as Quality Assurance. If MaineDOT determines that any test procedure does not show the result indicated by the final test results, the Contractor shall update and/or repair the defect at no additional cost to the Department.
 - j. As part of the final testing, the Contractor shall provide to MaineDOT a complete set of maintenance and user manuals along with all the wiring and assembly schematics/diagrams, including any material safety data sheets (MSDS), prepared by the manufacturer and any toxic substances (coatings, liquids, or other) used.
6. Training
- a. The Contractor shall provide a training program consisting of the furnishing of educational training in the operation of the OHVDS. This training is expected to run concurrent with the CCTV system training.
 - b. The training shall be scheduled after Stand-Alone Testing but prior to the end of the Operational Testing period.
 - c. The Contractor shall provide qualified instructors familiar with the operation of the OHVDS to conduct the training. Training shall consist of hands-on demonstrations as feasible.
 - d. The Contractor shall develop and supply all necessary manuals, displays, class notes, visual aids, and other instructional materials as required to conduct the training program. The Contractor shall supply sufficient materials for up to 10 participants, plus one spare copy of all materials.
 - e. Training will be conducted at the MaineDOT Main Office in Augusta, Maine. The Contractor shall coordinate a specific classroom facility with the Resident at least three weeks prior to the training date.
 - f. The training session shall be up to four (4) hours and shall accommodate up to 10 people. Typical training topic areas include:
 - i. An overview of the hardware and its operation.
 - ii. System component interaction with the CCTV system and flashing beacons.
 - iii. System configuration, troubleshooting and fine tuning.

643.066 Warranty and Guaranty Requirements:

1. The Contractor shall maintain and unconditionally guaranty all OHVDS equipment, including all equipment, hardware, and software for a period of not less than one year from the date of Final System Acceptance. The guaranty shall cover all labor, materials, equipment, tools, transportation, supplies, parts, and incidentals required to facilitate responsive maintenance as necessary to repair and replace any defective sensors or equipment of the completed OHVDS within the one-year time period.
2. The Contractor shall guarantee availability of compatible replacement equipment (to the field replaceable unit level) for a ten-year time period from the date of final system acceptance. Acceptance of any system or sensors during the contract, or

- any modifications to the system design proposed by the Contractor and approved by the Resident shall not relieve the Contractor of the requirements of this guaranty.
3. The Contractor shall provide a warranty on all hardware furnished and installed for a period of not less than one year from the date of Final System Acceptance.
 4. The warranty shall include technical support available via telephone and email 24 hours per day, 7 days per week, 365 days per year for the warranty period.
 5. The warranty shall cover all parts, labor, transportation, shipping, tools, equipment, mobilization and incidentals necessary to repair or replace any system equipment, component, or sensor that fails to perform as required by the Contract Documents.
 6. The Contractor shall provide warranty service within 48 hours of notification by MaineDOT of a fault or failure.
 7. In the event that a component cannot be repaired within seven (7) days of notification, the Contractor shall provide a temporary replacement unit until the original can be repaired. Alternatively, the Contractor may provide a permanent replacement unit and salvage the failed component.
 8. If the same component requires repair more than twice during the warranty period, the Contractor shall replace the component rather than provide a third repair at no additional cost to the Department.
 9. The Contractor shall provide a log of all response maintenance and repair activities performed during the guaranty period. The log shall contain the time and date of the defect notification, the technician's report of the defect and any corrective actions taken.

643.08 Method of Measurement: Overheight Detection System (OHVDS) will be measured for payment by the lump sum complete in place, satisfactorily installed, tested, operational, and accepted.

643.09 Basis of Payment: Overheight Vehicle Detection System (OHVDS) equipment will be paid for at the contract lump sum price. Such price will be full compensation for furnishing and installing all materials, including but not limited to the sensors; mounting hardware; controller with all accessory hardware; cabinet cleaning; communication equipment; cables; grounding; integration and software modifications; system testing; training; warranties and guaranties; and all appurtenances and incidentals required for a complete and functional installation and for furnishing all assembly hardware, tools, labor, and testing necessary for completing the installation.

Payment will be made under the following:

<u>Pay Item</u>	<u>Pay Unit</u>
643.833 Overheight Detection System	Lump Sum

SPECIAL PROVISION
SECTION 654
INTELLIGENT TRANSPORTATION SYSTEMS
(Closed Circuit Television (CCTV) System)

654.211 Closed Circuit Television (CCTV) System

This work shall consist of furnishing, installing, integrating, and testing Closed Circuit Television (CCTV) Systems and equipment in support of an Overheight Vehicle Detection System (OHVDS). The work shall include furnishing and installing all camera equipment and accessories as defined in this specification onto existing support structures. The work shall include integration of the CCTV systems with the OHVDS and testing of all hardware and software functionality necessary for the OHVDS.

The OHVDS CCTV system consists of five CCTV locations with a total of ten interconnected CCTV cameras. The CCTV cameras shall be connected via an existing fiber optic network to a digital video recorder (DVR). Each CCTV location consists of two CCTV cameras. One camera is intended to view and capture the license plate of a vehicle when an overheight vehicle is detected. The second camera is intended to view and record several seconds of video to identify the overheight vehicle in motion. The overall CCTV system shall be integrated into MaineDOT's Axis Camera Station software.

654.02 General:

If any of the following hardware-specific requirements listed in the following sections cannot be met by a willing Bidder, but the Contractor believes that strict conformance to the given requirement is unnecessary or may be accomplished differently, the Contractor shall provide a list of the requirements that cannot be strictly met along with a justification for how the Contractor's proposed CCTV System Equipment may be considered functionally equivalent in accordance with Special Provision 103.

654.021 Materials: All equipment supplied under the contract shall be new. Used, refurbished, and rebuilt equipment will not be permitted.

654.025 Closed Circuit Television (CCTV) System Equipment – General

1. All proposed CCTV cameras shall include an Axis Camera Station device license for one year from the date of system approval.
2. The CCTV cameras and associated equipment shall provide video coverage that meets the requirements of the OHVDS.
3. The CCTV cameras shall be Underwriter's Laboratory (UL) approved. UL certification shall be provided with the catalog cuts in the Technical Submittal.
4. Each CCTV camera shall weigh no more than 10 pounds.
5. The CCTV cameras shall be digital, IP addressable and Ethernet ready.
6. The CCTV interfaces shall be an RJ45 type connector for 10BASE-T/100BASE-TX and shall include an IP66-rated RJ45 connector kit.
7. The CCTV cameras shall be compatible with existing CCTV software at the MaineDOT Transportation Management Center (TMC).

8. The CCTV shall have the capability to be viewed, controlled, and tested locally at the camera site utilizing a laptop computer with OEM software. This shall include the capability to locally retrieve operational status and fault data for the CCTV.
9. The CCTV installation shall include one (1) in-line transient voltage surge suppression (TVSS) to protect against transients and surges carried by the associated Ethernet cable.
10. The CCTV shall be powered by an industrial grade Power Over Ethernet Injector (POEI).
 - a. The POEI shall provide operating power and Ethernet data to the CCTV. The POEI power consumption shall not exceed 40 watts (sum of two camera system).
 - b. The POEI shall include integral TVSS to protect against transients and surges on the incoming power and data (Ethernet) connections to the POEI, as well as to protect against transients and surges on the outgoing data (Ethernet) connection to the camera. The TVSS shall be a product approved by the CCTV manufacturer for use with the camera.
11. The CCTV shall be housed in an environmentally hardened aluminum enclosure suitable for continuous outdoor use and shall feature an internal temperature regulation system. The CCTV shall be IP66-, NEMA 4X- and IK09-rated and shall have an operating temperature range of -40°F to +130°F, minimum.

654.026 Closed Circuit Television (CCTV) System – License Plate Camera

1. The License Plate Camera (LPC) shall provide clear and sharp view of the license plates for vehicles traveling at up to 70 miles per hour. The LPC shall provide an image of the license plate that is sufficient to allow the license plate capture system to read and accurately identify the license plate number.
2. The LPC shall include a license plate capture system.
3. The LPC detection range shall be a minimum of 300 feet in day and night conditions.
4. The LPC shall provide a camera imaging system that automatically shifts from daytime mode to nighttime mode
5. The LPC shall have automated video capture that optimizes video settings.
6. The LPC shall have a horizontal field of view of 16 degrees to 2.5 degrees.
7. The LPC shall have a vertical field of view of 9.5 degrees to 1.5 degrees.
8. The LPC shall have the following image setting functionalities: Wide dynamic range (WDR), compression, contrast, brightness, sharpness, white balance, exposure zones, mirroring of images, text and image overlay, privacy masks, electronic image stabilization and automatic defog.
9. The LPC shall have a minimum illumination of: Color: 0.16 lux at 50 IRE; B/W: 0.03 lux at 50 IRE. The LPC shall include an integrated infrared illumination that allows for illumination at 0 lux.
10. The LPC shall have minimum resolution range of: HDTV 320x180 up to 1920x1080, 1080p.
11. The LPC shall provide H.264 (MPEG-4 Part 10/AVC) and Motion JPEG video compression formats.
12. The LPC shall have a frame rate up to 25/30 frames per second (fps) (50/60 Hz) in all resolutions.

13. The LPC shall be capable of multi-streaming in H.264 and Motion JPEG formats.
14. The LPC shall have the following security features: password protection, IP address filtering, HTTPS encryption, IEEE 802.1X network access control, digest authentication, user access log.
15. The LPC shall support the following protocols: IPv4/v6, HTTP, HTTPS, QoS Layer 3 DiffServ, FTP, CIFS/SMB, SMTP, Bonjour, UPnP, SNMPv1/v2c/v3 (MIB-II), DNS, NTP, RTSP, RTP, TCP, UDP, IGMP, RTCP, ICMP, DHCP, ARP, and NTCIP.
16. The LPC shall conform to the ONVIF Profile S standard and have an open Application Programming Interface for software integration.
17. The LPC shall be able to process, at a minimum, the following alarm events:
 - a. File upload: FTP, HTTP, and network share and email.
 - b. Notification: email, HTTP, TCP, and SNMP trap.
18. The LPC shall be capable of clearly identifying all characters on a license plate for any US state or Canadian province, mounted to any Federal Highway classification vehicle and any towed trailer.

654.027 Closed Circuit Television (CCTV) System – Overview Camera

1. The Overview Camera (OC) shall provide high resolution video images to identify a vehicle that triggers the OHVDS for vehicles traveling at up to 70 miles per hour.
2. The OC shall include built-in analytics for actuated and proactive surveillance.
3. The OC shall provide a camera imaging system that automatically shifts from daytime mode to nighttime mode
4. The OC shall have a horizontal field of view of 60 degrees to 2.5 degrees.
5. The OC shall have a vertical field of view of 35 degrees to 1.5 degrees.
6. The OC shall have the following image setting functionalities: Wide dynamic range (WDR), compression, contrast, brightness, sharpness, white balance, exposure zones, mirroring of images, text and image overlay, privacy masks, electronic image stabilization and automatic defog.
7. The OC shall have a minimum illumination of: Color: 0.2 lux at 50 IRE; B/W: 0.04 lux at 50 IRE. The LPC shall include an integrated infrared illumination that allows for illumination at 0 lux.
8. The OC shall have minimum resolution range of: HDTV 320x180 up to 2560x1440, 1440p.
9. The OC shall provide H.264 and Motion JPEG video compression formats.
10. The OC shall have a frame rate up to 50/60 frames per second (fps) (50/60 Hz) in all resolutions.
11. The OC shall be capable of multi-streaming in H.264 and Motion JPEG formats.
12. The OC shall have the following security features: password protection, IP address filtering, HTTPS encryption, IEEE 802.1X network access control, digest authentication, user access log.
13. The OC shall support the following protocols: IPv4/v6, HTTP, HTTPS, QoS Layer 3 DiffServ, FTP, CIFS/SMB, SMTP, Bonjour, UPnP, SNMPv1/v2c/v3 (MIB-II), DNS, NTP, RTSP, RTP, TCP, UDP, IGMP, RTCP, ICMP, DHCP, ARP, and NTCIP.
14. The OC shall conform to the ONVIF Profile S standard and have an open Application Programming Interface for software integration.
15. The OC shall be able to process, at a minimum, the following alarm events:

- a. File upload: FTP, HTTP, and network share and email.
 - b. Notification: email, HTTP, TCP, and SNMP trap.
16. The OC shall provide short video clips of a vehicle in motion that can be used to identify the vehicle as well as the material that actuated the OHVDS.

654.028 Closed Circuit Television (CCTV) Cables

1. All equipment shall be supplied with the Manufacturer's recommended cables.
2. All Ethernet cable shall be shielded, weatherproof Category 6.
3. Any Ethernet cable not installed within a cabinet, conduit, or other enclosed space shall be UV protected and weatherproof.
4. All free-hanging Ethernet cable shall be plenum type.
5. When specifically called for in the Contract plans, Ethernet cable shall be armored, ruggedized, or gel filled as required for rodent control or underground burial.
6. The existing CCTV communication system uses a fiber optic network for communications back to the NVR.

654.029 Closed Circuit Television (CCTV) Network Video Recorder

1. Each CCTV camera will be connected to a new Network Video Recorder (NVR) that meets the following requirements:
 - a. The NVR shall be shelf mounted and installed in the Route 24 OHVDS equipment cabinet.
 - b. The NVR shall include at least one RJ45 port for connection to a 10BASE-T/100BASE-TX port on the fiber Ethernet switch.
 - c. The NVR shall be capable of taking three independent inputs to trigger concurrent recordings.
 - d. The NVR shall include a minimum of 12 POE ports at 10/100 Mbps.
 - e. The NVR shall provide a minimum of 2 terabytes (2TB) storage.
 - f. The NVR shall have an operating temperature range of 0°F to +100°F, minimum.
 - g. The NVR shall have a recording rate of at least 100 Mbps.
 - h. The NVR shall be configured to provide for remote alarm notification via email and SMS (text) messages.
 - i. The NVR shall be IP-addressable for remote access. The remote access is intended to allow MaineDOT to download stored video files. Remote access shall be available through the Ethernet switch connected to the OHVDS backhaul communication system.

654.065 Closed Circuit Television (CCTV) System Construction Requirements

The Contractor shall install the CCTV system equipment in accordance with the Plans. The Contractor shall be responsible for all other work to provide a fully functional, operational, and integrated CCTV system at the locations identified in the Plans.

The Contractor shall install, configure, integrate, and test the CCTV image and video data into the Axis Camera Station software.

1. Power Requirements
 - a. Each CCTV location shall be supplied with adequate power supply(ies) to meet the site and sensor design loads.
 - b. The CCTV system shall be actuated by the OHVDS.
2. Grounding, Bonding and Transient Voltage Surge Suppression System Requirements
 - a. All CCTV sites shall be grounded to a minimum of 25 ohms to ground. If other national, state, or local grounding requirements are more stringent than those of the manufacturer, the applicable national, state, or local code shall apply.
 - b. The Contractor shall install solid copper or copper clad ground rod (minimum $\frac{3}{4}$ -inch x 10-foot) along with #4 AWG ground wire and fittings at the base of the CCTV equipment pole. The Contractor shall install additional ground rods required to meet the minimum grounding requirement.
 - c. The ground wire shall be exothermically welded to each ground rod installed with all ground rods attached to every other ground rod via the ground wire.
 - d. The CCTV grounding system shall be bonded to the controller enclosure bus-bar and the steel support structure in accordance with National Electric Code (NEC) requirements.
 - e. The Contractor shall furnish and install Transient Voltage Surge Suppressor (TVSS) devices for all power and communications conductors installed.
 - f. The Contractor shall provide and install a TVSS between the AC power mains and all installed equipment.
3. Communications Requirements
 - a. The CCTV system shall transmit still image and video data to MaineDOT's Axis Camera Station software currently in operation at the TMC in Augusta.
 - b. The CCTV system shall be connected to the proposed cable modem provided by Comcast.
 - c. The Contractor shall provide a communications drop with Comcast as shown in the plans. The minimum service to be provided is 50 megabits per second (Mbps) download and 25 Mbps upload.
 - d. The Contractor shall provide a static IP for the CCTV system.
 - e. The Contractor shall provide all necessary equipment, cables, hardware, and ancillary equipment to capture the CCTV image and video data and transmit the data to the Axis Camera Station software at the MaineDOT TMC.
 - f. The communication system shall allow for configuration control and troubleshooting of the CCTV equipment through both a local onsite connection and through a remote connection to the controller.
4. Software and Integration Requirements
 - a. The CCTV System shall be fully compatible with the current MaineDOT Axis Camera Station software.
 - b. If the Contractor proposes to supply equipment that is not fully compatible with the current Axis Camera Station software, the Contractor shall be required to fully integrate the non-compatible equipment into the Axis Camera Station software. Axis Camera Station Software licensing fees will be paid by MaineDOT.
 - c. The Contractor shall ensure that the Axis Camera Station software reporting functions include and incorporate the new CCTV sites installed on this project.

- d. The CCTV System shall be integrated into New England Compass ATMS. Once the camera is integrated and has active communication with the MaineDOT Transportation Management Center (TMC) through New England Compass ATMS, the Contractor's responsibility for integration is complete.
5. ITS Cables
- a. All equipment shall be installed using the Manufacturer's recommended cables.
 - b. The Contractor shall furnish, install, connectorize, and test all Category 6 (Cat. 6) cables, of the types required for the application, at locations shown in the plans or as required to construct a complete, functional system.
 - c. The Cat. 6 cables shall not exceed 325 feet in length unless the Contractor is granted written permission from the Engineer.
 - d. All cables shall be installed in a continuous run. Splicing will not be allowed.
6. System Testing
- a. All CCTV equipment installed under this project shall be tested prior to final acceptance. There are three stages of tests required: Stand-Alone Testing, Subsystem Testing, and Operational Testing.
 - b. The Contractor shall develop test plans and procedures for each test stage for review and approval by MaineDOT. Test plan procedures shall exercise the full functionality of each system component. Test plans shall be submitted to the Resident a minimum of 21 calendar days prior to initiation of the first test.
 - c. Test plans shall include the following:
 - i. Date and Time of the test
 - ii. Names of all witnesses to the test, identifying the individual executing the test plan
 - iii. Detailed, step-by-step execution plan that tests the functional requirements of all the equipment, including alarms and action plans.
 - iv. Tabular document for each test step to include:
 1. Description of the test step procedure;
 2. Expected result of the test step;
 3. Place to input the actual result of the test step;
 4. Check box indicating pass or fail; and
 5. Comments area for witness comments.
 - v. Location for the Resident, MaineDOT TMC representative, and test executor to sign and date the form. Signatures on the test forms only acknowledge that the test was performed in the presence of the correct witnesses. Signatures and witnesses do not signify the pass or fail of any given test.
 - d. Stand-Alone testing and Subsystem testing shall be completed for all sites prior to the start of the Operational testing.
 - e. Upon completion of each test stage, the Contractor shall submit the final test results to the Resident within 14 calendar days.
 - f. Stand-Alone Test Requirements - This test shall be performed on site at the CCTV location. The purpose of the Stand-Alone tests is to exercise all stand-alone (non-network) functional operations of the equipment installed and demonstrate compliance with the requirements for the equipment defined in the

Contract Documents. If a unit fails to pass the stand-alone test, the Contractor shall correct the problem or replace the sensor or unit and retest until satisfactory results are achieved.

- g. Subsystem Test Requirements – This test shall be performed at the OHVDS cabinet along Route 24. This test shall verify that the OHVDS and CCTV equipment operate in accordance with the OHVDS manufacturer’s requirements and in accordance with the Contract Documents.
- h. Operational Testing –The purpose of the Operational Testing is to operate the CCTV equipment live through the software to determine if there are any faults or bugs that must be resolved. This test shall continue for a period of 90 consecutive calendar days or ten actuations of the OHVDS system, whichever occurs first, but shall continue for no less than 30 calendar days. The CCTV system must demonstrate successful transmission of data and be fully integrated with the TMC operations. In the event that there is a single failure associated with any CCTV component or data transmission, the test shall be suspended while the Contractor resolves the failure (either by fixing the sensor or replacing the sensor). Upon successful repair/replacement, the test shall continue to the end of the 90 days/ten actuations, or a minimum of 14 days/3 actuations, whichever is longer. Upon the failure of any second sensor or equipment, the Operational Test period shall be restarted for the full 90 days/ten actuations upon repair/replacement. The completion of the Operational Test period and the submission of all test reports shall be documented as the date of Final System Acceptance, provided all other work has been completed to the satisfaction of the Resident.
- i. The Contractor shall ensure the CCTV is connected to the Axis Camera Station software at the MaineDOT TMC and shall ensure that the CCTV can be viewed and controlled via the software.
- j. SwRI will perform an acceptance test of the CCTV using the Compass software after configuration to ensure the cameras are operating normally. Acceptance testing will be witnessed by MaineDOT. Beyond acceptance testing, the Contractor and SwRI are not responsible for any other testing of the CCTV integration.
- k. MaineDOT reserves the right to examine and test/retest any and all test steps for the project as Quality Assurance. If MaineDOT determines that any test procedure does not show the result indicated by the final test results, the Contractor shall update and/or repair the defect at no additional cost to the Department.
- l. As part of the final testing, the Contractor shall provide to MaineDOT a complete set of maintenance and user manuals along with all the wiring and assembly schematics/diagrams, including any material safety data sheets (MSDS), prepared by the manufacturer and any toxic substances (coatings, liquids, or other) used.

654.066 Warranty and Guaranty Requirements:

- 1. The Contractor shall maintain and unconditionally guaranty all CCTV system equipment, including all equipment, hardware, and software for a period of not less than

- one year from the date of Final System Acceptance. The guaranty shall cover all labor, materials, equipment, tools, transportation, supplies, parts, and incidentals required to facilitate responsive maintenance as necessary to repair and replace any defective equipment of the completed CCTV systems within the one-year time period.
2. The Contractor shall guarantee availability of compatible replacement equipment (to the field replaceable unit level) for a ten-year time period from the date of final system acceptance. Acceptance of any system or sensors during the contract, or any modifications to the system design proposed by the Contractor and approved by the Resident shall not relieve the Contractor of the requirements of this guaranty.
 3. The Contractor shall provide a warranty on all hardware furnished and installed for a period of not less than one year from the date of Final System Acceptance.
 4. The warranty shall include technical support available via telephone and email 24 hours per day, 7 days per week, 365 days per year for the warranty period.
 5. The warranty shall cover all parts, labor, transportation, shipping, tools, equipment, mobilization and incidentals necessary to repair or replace any system equipment, component, or sensor that fails to perform as required by the Contract Documents.
 6. The Contractor shall provide warranty service within 48 hours of notification by MaineDOT of a fault or failure.
 7. In the event that a component cannot be repaired within seven (7) days of notification, the Contractor shall provide a temporary replacement unit until the original can be repaired. Alternatively, the Contractor may provide a permanent replacement unit and salvage the failed component.
 8. If the same component requires repair more than twice during the warranty period, the Contractor shall replace the component rather than provide a third repair at no additional cost to the Department.
 9. The Contractor shall provide a log of all response maintenance and repair activities performed during the guaranty period. The log shall contain the time and date of the defect notification, the technician's report of the defect and any corrective actions taken.
 10. The Contractor shall secure from SwRI on behalf of MaineDOT a written acknowledgment that the new CCTV devices will be covered under their existing New England Compass ATMS Contract 2022-097-ATMS-NE Compass. Coverage under the warranty begins after successful acceptance testing in Compass. Thereafter, the warranty requirements of this section shall not apply to the integration of the CCTV into the New England Compass ATMS.

METHOD OF MEASUREMENT: Closed Circuit Television (CCTV) System will be measured for payment by the lump sum for the full camera system satisfactorily installed, tested, operational, and accepted.

BASIS OF PAYMENT: Closed Circuit Television (CCTV) System will be paid for at the contract lump sum price. Such price will be full compensation for furnishing and installing all materials, including but not limited to the CCTV cameras; controller and enclosure cabinets with all internal hardware; Network Video Recorder; communications drop, connection, and equipment; grounding; all cables and connectors; integration and software modifications; SwRI integration into New England Compass ATMS; system testing; training; warranties and guaranties; and all appurtenances and incidentals required for a complete and functional

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installation and for furnishing all assembly hardware, tools, labor, and testing necessary for completing the installation.

Payment will be made under:

<u>Pay Item</u>		<u>Pay Unit</u>
654.211	Closed Circuit Television (CCTV) System	Lump Sum