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

Janet T. Mills
GOVERNOR

Bruce A. Van Note
COMMISSIONER

July 24, 2024
Subject: Road Weather Information System
State WIN: 024185.00
Location: Statewide
Amendment No. 2

Dear Sir/Ms.:

Please make the following changes to the Bid Documents:

In the Bid Book:

Change on page 15 "NOTICE TO CONTRACTORS", the bid opening date in the first paragraph which reads "July 31, 2024" per Amendment No. 1 to now read "**August 7, 2024**". Make this change in pen and ink.

Remove pages eighty-nine to ninety-seven titled SPECIAL PROVISION SECTION 645 HIGHWAY SIGNING (Mini Dynamic Message Sign (DMS) System) dated May 17, 2024, totaling nine pages, and **Replace** with the attached SPECIAL PROVISION SECTION 645 HIGHWAY SIGNING (Mini Dynamic Message Sign (DMS) System) dated July 18, 2024, totaling seven pages.

Remove pages one hundred six to one hundred eleven titled SPECIAL PROVISION SECTION 654 INTELLIGENT TRANSPORTATION SYSTEMS dated May 17, 2024, totaling six pages, and **Replace** with the attached INTELLIGENT TRANSPORTATION SYSTEMS (ITS Base Specification) dated July 18, 2024, totaling nine pages.

Remove pages one hundred fifteen to one hundred twenty-seven titled INTELLIGENT TRANSPORTATION SYSTEMS (Road Weather Information Station (RWIS) System Equipment) dated May 17, 2024, totaling thirteen pages, and **Replace** with the attached INTELLIGENT TRANSPORTATION SYSTEMS (Road Weather Information Station (RWIS) System Equipment) dated July 18, 2024, totaling eleven pages.

Insert with the attached pages titled SPECIAL PROVISION SECTION 654 INTELLIGENT TRANSPORTATION SYSTEMS dated July 18, 2024, totaling 3 pages.

In the Plan Set:

Remove Sheet Number 7 of 17 titled DETAILS and **Replace** with the attached, revised Sheet Number 7 of 17 titled DETAILS.

Remove Sheet Number 16 of 17 titled BOS 1 - FORT FAIRFIELD SITE PLAN and **Replace** with the attached, revised Sheet Number 16 of 17 titled BOS 1 - FORT FAIRFIELD SITE PLAN.

Remove Sheet Number 17 of 17 titled BOS 2 - EASTON SITE PLAN and **Replace** with the attached, revised Sheet Number 17 of 17 titled BOS 2 - EASTON SITE PLAN.

The following questions have been received:

Question: Section 654.029 RWIS Support Structure and Foundation: Paragraph 4 mentions a "Steel Support Pole". Page 6 of 17 of the Plan Set depicts a "Steel Truss Structure". Will the use of either a "Steel Support pole" or a "Steel Truss Structure" be acceptable? If not, then which type of support structure would be acceptable?

Response: A steel support is required for the RWIS equipment. The Vendor may propose either a single pole or a truss support. Note that there is a requirement that the support should not exceed 30 feet above the foundation as per Section 654.029.

Question: The following excerpt is from Special Provisions Section 654, more specifically, 654.53 Road Weather Information Station: paragraph 4 "Integration into MaineDOT's Road and Weather software shall be the responsibility of the Contractor and can be done separately of the Compass integration. MaineDOT has an existing contract for the Road and Weather software and will pay any associated licensing fees after the initial six months." Please specify the current Road and Weather software manufacturer, supplier and software version.

Response: The current Road and Weather software is Decisionvue by WSP. MaineDOT has revised the requirements related to integration. See the revised Special Provisions 654 for the Base ITS Specification, for RWIS Equipment, and for the Mini DMS that has been included with this Addendum.

Question: With the short bid timeframe, we would like to ask for an additional 2 weeks to submit our bid. Can the Bid Date be moved to 8/7/24?

Response: Please see the change on the first page of this bid amendment.

Question: In the RWIS section 654, 4th paragraph, the document states that for integration to Compass, "This integration effort shall include the development of a live, supported dataflow using an open vendor API from the RWIS System Equipment to Compass ATMS and MaineDOT." Will Compass poll the fixed stations with NTCIP protocol? Or will there be a data feed from a new or

existing software source? In the Proposal of Scheduled Items, there is no Integration line item. How will this system integration item be paid?

Response: Compass can poll the fixed RWIS stations or receive data from a vendor API, as appropriate. For currently integrated system types, Compass polls Campbell Scientific sites directly and receives data from WxHorizon/Navigator for Vaisala sites. Integration costs are considered to be incidental to the hardware items.

Question: In RWIS section 654.026 under (7.) regarding the Ethernet switch – "The controller enclosure shall include a fiber optic Ethernet switch matching the requirements of Item 654.311 Ethernet Switch with Fiber Optic Interfaces except that the switch may be shelf or wall-mounted." The document does NOT have a section Item 654.311 – Can this spec please be provided?

Response: A new Special Provision for Item 654.311, as incidental to Item 654.53, is included in this Addendum.

Question: Section 718 TRAFFIC SIGNALS MATERIAL is unclear. Does the RWIS cabinet need to have LED light panels? Does it need a generator transfer switch? Do you have the latest version of Section 718?

Response: Reference to Section 718 in the proposal book reflects a Supplemental Specification, or a permanent modification to the MaineDOT 2020 Standard Specifications. Section 718.08 is intended for use with traffic signal cabinets. The RWIS cabinet will not require LED light panels or a generator transfer switch. The most current version of Section 718 is contained in the 2020 Standard Specifications and the modifications shown in Section 718 in the Supplemental Specification dated February 16, 2024.

Question: Spec for Field Monitoring Unit is listed in section 718.13 Field Monitoring Unit (FMU) in the but not on the plans nor pay schedule. Is the FMU required?

Response: The reference to Section 718.13 for Field Monitoring Unit (FMU) is part of the Supplemental Specification and generally refers to traffic signal cabinets. FMUs are not required for any RWIS site; however, this technology may be provided by the Vendor to meet requirements of the RWIS or DMS. In situations where an FMU is provided, the FMU may take the place of a Cellular Modem and shall either include 5 years of Cellular Service or be compatible with MaineDOT's existing US Cellular APN so that MaineDOT can provide a SIM. Any FMU provided shall be a version that is included on MaineDOT's approved products list. It shall be the Contractor's responsibility to integrate new FMUs into MaineDOT's Glance software provided by Applied Information (AI).

Question: . RWIS Data Logger Specification. "The controller shall have remote access capability for local maintenance purposes (WLAN, WiFi, Bluetooth or equivalent)." Can this connectivity be supplied via a secondary piece of hardware in order support the Logger/Controller wirelessly

Response: While MaineDOT would prefer no additional hardware in the cabinets, MaineDOT is willing to consider any supplemental hardware that is necessary for the Vendor's solution to provide the remote access capability that may be considered functionally equivalent to a WLAN, WiFi or Bluetooth connection.

Question: Can the construction end date be extended past May 2025? Lead times are a concern

Response: The construction must be completed and integrated by May 2025 due to MaineDOT's scheduled downtime of the Road and Weather Software. If the Vendor is unable to complete the RWIS deployment and operational testing by May 1, 2025, the Contractor shall be required to pay an additional six months of Road and Weather Software licensing.

Question: In the specification for the DMS for WIN(s): 024185.00 it currently states 34mm is the minimum pitch size for the signs. Will you accept a 20mm pitch. This does not give any competitive advantage bidding this size.

Response: The Special Provision 654 for Mini DMS has been modified to establish 20 mm as the maximum pixel pitch.

Question: There is no mention of battery backup requirements under the DMS line item spec. The power draw required to operate a DMS is rather large. Does this project's "mini DMS" require battery backup as well or just the RWIS system components?

Response: There is no requirement for battery backup for the Mini DMS on this project.

Question: If so; for how long of a period of time should that be calculated at and at what percent of sign operation; assuming some type of sign usage reduction during a power loss situation?

Response: There is no requirement for battery backup for the Mini DMS on this project.

Question: How many preset messages are intended for the Blank out sign/DMS. What will the messages be.

Response: The Special Provision for Item 645.1552 Mini Dynamic Message Sign (DMS) requires that the Mini DMS controller be capable of pre-programmed messages. MaineDOT has not defined the pre-programmed messages at this time. The pre-programmed messages are expected to be warnings related to weather conditions present along US Route 1A. The mini DMS shall meet the display specifications, including but not limited to the ability to display custom graphics and MUTCD graphics, a maximum pixel pitch of 20 mm, and a full matrix/full color display.

Consider these changes and information prior to submitting your bid on **August 7, 2024**.

Sincerely,

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

SPECIAL PROVISION
SECTION 645
HIGHWAY SIGNING
(Mini Dynamic Message Sign (DMS) System)

645.1552 Mini Dynamic Message Sign (DMS): This work shall consist of the furnishing, installing, integrating and testing of new mini full-matrix dynamic message sign (DMS) and controller. The Mini DMS will be installed on breakaway steel H-Beams on concrete foundations. The breakaway devices, steel H-beams, and concrete foundations are included in separate pay items.

This specification also includes the work necessary to integrate the messaging data obtained into the Maine Department of Transportation (MaineDOT) Advanced Transportation Management System (ATMS) called New England Compass (Compass). Compass was developed by the Southwest Research Institute (SwRI) and is used by Maine, New Hampshire and Vermont for their respective Transportation Management Centers. The Mini DMS shall be controlled by Data Vision Software (DVS).

The location of the Mini DMS and other incidental work will be shown on the plans. Plans are diagrammatic. All equipment locations shall be field verified by the Resident before installation.

The Mini DMS will be connected to and coordinated with the Road Weather Information Station (RWIS). The System shall have logic programmed to determine if any of the pre-configured weather conditions are present and subsequently activate or deactivate a pre-programmed message related to weather conditions along US Route 1A. The RWIS with its data logger will be paid for under 654.53: Road Weather Information Station (See Special Provision 654: Road Weather Information System for additional information).

645.025 General The following specifications detail a Mini DMS system. 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 (e.g. alternative mini-DMS dimensions), the Contractor shall provide a list of the requirements that cannot be strictly met along with justification for how the Contractor's proposed Mini DMS System Equipment may be considered functionally equivalent in accordance with Special Provision 103.

645.026 Mini DMS System Equipment – General

1. 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.
2. The Mini DMS shall be Underwriter's Laboratory (UL) approved. UL certification shall be provided with the catalog cuts in the Technical Submittal.
3. All parts of the Mini DMS System will work normally in sustained ambient temperatures from -20 degrees F to +120 degrees F.
4. The Mini DMS shall operate within the humidity rang of 10 to 95 percent relative humidity, non-condensing.

5. The Mini DMS System shall include a communications system that shall satisfy the following requirements:
   a. The Mini DMS System shall be digital, IP addressable, and Ethernet ready.
   b. The Mini DMS System shall have the capability of being controlled and tested locally at the Mini DMS Control Cabinet utilizing a laptop computer with OEM software.
   c. The Mini DMS shall have the capability for RS422 or Ethernet (wired or fiber) communication.
   d. The Mini DMS controller shall be native Ethernet, allowing Ethernet communications via cellular modem.
   e. The controller cellular communications shall support modern networks: 4G/LTE/5G.
   f. The controller cellular communications shall support dual SIM usage for data transmission purposes.
   g. The controller shall support an RJ-45 port.
   h. Where the controller includes a WLAN for local remote access, the controller shall have user definable time-out for WLAN broadcasting to prevent unintentional use of WLAN.
   i. The controller WLAN shall have the ability to be used as a hotspot.
   j. The controller WLAN shall have the ability to be used as a client.
   k. The controller shall have two Ethernet networks: one for internal communications and second for external communications.
   l. The controller's internal network shall be Ethernet based.
6. The Contractor shall provide all necessary cables and connectors to connect a cellular modem to the Mini DMS controller.
7. The Contractor shall furnish and install TVSS device(s) for all power and communications conductors leaving the equipment cabinets, including ITS equipment, including but not limited to power service, and power and communications for all devices that are external to the cabinet.
8. All external wiring shall be inaccessible to vandals. All external wiring shall be in liquid tight flexible conduit, or flexible non-metallic tubing. All wiring and connections shall be sufficient size to support all maximum currents continuously, with a maximum of five percent (5%) voltage drop, including an 'all pixels ON' display, for at least three hours. All wiring installation shall meet or exceed National Electrical Code (NEC) Articles 300 and 310 methods and requirements.
9. The Mini DMS 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 89VAC 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.
   f. The Power Supply shall include a main disconnect circuit breaker for maintenance purposes.

654.027 Mini DMS System Display Requirements

1. The display shall be a matrix of LED pixels to form a display of not more than 72 inches high and 144 inches wide. Center to center pixel spacing shall be the same horizontally and vertically.
2. The maximum pixel pitch for the LED matrix shall be 20 mm.
3. The pixels shall be arranged as a "full matrix" display capable of multiple fonts and justifications, with equal horizontal and vertical spacing.
4. The LEDs shall provide a full color display and have a viewing angle of 30 degrees in the horizontal plane. The brightness at 15 degrees off axis shall be at least 50 percent of the on-axis brightness.
5. When all pixels are illuminated at maximum brightness, the display shall have an on-axis luminance intensity of at least 3,720 candelas per square meter. The sign shall have an automatic intensity control feature in order to keep the LED lamp matrix intensity constant with a reduction in voltage and adjust the brightness for the ambient light level.
6. The display shall be capable of displaying full-color MUTCD graphics on a diamond sign graphic at a nominal size of 48 inches x 48 inches.
7. The display shall be capable of displaying alpha-numeric characters with a normal font style in 18-inch and 12-inch characters.
8. The Mini DMS shall include a photocell for automated dimming.
9. The Mini DMS controller shall be able to have pre-programmed messages.
10. The Mini DMS shall display a single dot in the middle of the display when no message condition is present to confirm power and communication connection.

654.028 Mini DMS System Cabinet Requirements: The Mini DMS System Controller shall include a cabinet enclosure that satisfies the following requirements:

1. The cabinet shall be 46"H x 24"W x 20"D. The cabinet shall have two locking doors.
2. Each cabinet shall contain a full-height standard EIA 19-inch rack. The rack shall be secured within the cabinet by mounts at the top and bottom.
3. Concrete work pad for cabinets shall meet the requirements of Section 626 – Foundations, Conduit, and Junction Boxes for Highway Lighting, Traffic Signals, and Highway Lighting.
4. The cabinets shall protect all equipment against sustained winds of 90 miles per hour (MPH), with 120 MPH wind gusts, blowing sand and dust, roadside pollutants from vehicle exhausts, blowing rain and snow, and heavy ice accumulations.
5. The cabinets shall be weatherproof with the top of the enclosure crowned or slanted to prevent standing water. The field cabinet shall also provide protection against vandalism and theft of equipment. Each cabinet door shall be supplied and installed with Corbin 1548-1 locks for access by #2 keys.
6. The cabinets and doors shall be constructed from sheet aluminum, which has a minimum thickness of 0.125 inches. All welds shall be neatly formatted and free of cracks, blowholes and other irregularities.
7. The cabinets shall be supplied with a captive door restraint bar. The bar shall allow the door to be kept open at a minimum of two different angles, with one at 90 degrees and the other in the fully open position. The door restraint bar shall be supplied and installed such that the door is held in place during a 40 MPH wind without the restraint bar being bent. The door restraint bar shall be provided to prevent door movement when open in windy conditions.

8. Door hinges shall be continuous and bolted to the cabinet and door utilizing steel carriage bolts and nylock nuts. The hinges shall be made of a minimum 0.083-inch thick aluminum and shall have a minimum 0.250-inch diameter stainless steel hinge pin. The hinge pin shall be capped at the top and bottom by a weld to prevent removal.
9. The top and bottom of the latching pushrods shall contain nylon rollers to promote secure door closure.
10. The door handles shall be stainless steel. The latching handles shall have provisions for padlocking in the closed position.
11. The cabinets shall be equipped with a slide out metal drawer, constructed and installed such that it is capable of holding a 15-pound laptop computer, and mounted at a suitable height for a technician to use as a computer workstation.
12. The cabinets shall be supplied with a 120 VAC, 200 watt radiant heater. The radiant heater shall be a self-contained device designed to provide heat for an outdoor metal enclosure. The heater shall have an on/off switch, along with an adjustable thermostat with a minimum turn on range of 10°F to 60°F.
13. The air filters shall have an average rated efficiency of 30% and an arrestance of 90% when tested in accordance with ASHRAE 52.1-1992 Test Standard. The filter shall be listed and rated Class 2 by the Underwriters Laboratories. Filters shall have a metal structure; paper or paper-based filters shall be prohibited.
14. All intake and exhaust vents shall meet NEMA 3R requirements with and without powering the air venting arrangements.
15. All conduits terminating in the cabinet shall be sealed with duct sealant. Use of tape to permanently seal conduits shall be prohibited.
    a. Conduits less than 1 inch diameter shall be sealed with a silicone sealant.
    b. Conduits with diameters greater than one inch shall be filled with stainless steel wool in addition to being sealed with duct sealant.
16. All cabinet electrical wiring and communication cables shall be of diameters and colors as required by the device Manufacturers.
    a. Cabinet wiring shall be secured with appropriate cable ties to maintain a neat appearance.
17. Each cabinet shall contain a power panel containing a primary circuit breaker, which will accept the incoming 120 VAC, single-phase power. This primary circuit breaker shall serve as the electrical disconnect for the cabinet and shall shut off all cabinet power when in the "off" position.
18. The primary circuit breaker shall be a single pole, 30-amp breaker. Two additional single pole, 20-amp circuit breakers shall be supplied, installed and be fed from the primary circuit breaker.
    a. One of the 20-amp circuit breakers shall feed the four 15-amp electrical outlets to be installed in the cabinet.
    b. The other 20-amp circuit breaker shall feed a power distribution buss, providing hard wired electrical feed for the lamps, the cabinet heater, the electric fan, and all other integrated electrical equipment.
19. The power panel shall also contain a single-phase filtering surge protector.
20. The field cabinets shall be provided with a minimum of four utility electric power outlets to support electrical equipment. The utility power outlets shall be installed within the field cabinet and not on the cabinet doors.

21. The current rating of all utility outlets shall be 15 amperes, with at least one being a GFCI outlet.
22. The field cabinets shall include a thermostatically controlled electric cooling fan, capable of maintaining temperatures inside the cabinet to levels recommended by the equipment Manufacturers for outside installations, or as specified in these Special Provisions.
23. Thermostats for controlling electric cooling fans shall have the capability of being field adjusted from 50°F to 120°F.
24. All exposed, high voltage electrical terminals shall be insulated with non-conducting material such as rubber boots or silicone/rubber caulking.
25. The cabinets shall be electrically bonded to all associated metallic ITS Device support structure grounding systems, as described below or shown on the Plans.
26. All air venting arrangements shall contain air filters. All fans shall be located above the air filters at the top of the cabinets. All exhaust vents shall be furnished with a screen to prevent insects from entering the field cabinet.
27. The cabinets shall be supplied and installed with two internal lights located in the top of each cabinet inside each door. These lights shall automatically turn on when the cabinet doors are open and shut off when the doors are closed. The lights shall be hardwire-connected to the cabinet's electrical power distribution buss. The lights shall be LED.
28. Two keys shall be supplied for the generator transfer switch access. Four sets of keys shall be supplied for each of the two cabinet locks.
29. The Contractor shall furnish, in a watertight container, a control cabinet-wiring diagram. Three sets of identical wiring diagrams shall be furnished for each cabinet.
30. If tracer wire equipment connection points are installed inside ITS equipment cabinets, the tracer wire shall enter the cabinet through a conduit or conduit riser specifically installed for that purpose.
31. All equipment shall be installed using the Manufacturer's recommended cables.
32. The Contractor shall furnish, install, connect, and test all Category 6 (Cat6) cables, of the types required for the application, at locations shown in the Plans or as required to construct a complete, functional system.
33. The Cat6 cables shall not exceed 325 feet in length unless the Contractor is granted written permission from the Engineer.
    a. All cables shall be installed in a continuous run. Splicing will not be allowed.

645.031 Mini DMS System Construction Requirements: The Contractor shall install the Mini DMS system equipment in accordance with the Plans. The Contractor shall be responsible for all other work to provide a fully functional, operational, and integrated Mini DMS system at the locations identified in the Plans.

1. Power Requirements:
    a. Each Mini DMS location shall be supplied with adequate power to meet the site design loads. The power should be AC (public utility power) as required by the Plans.
    b. The Contractor shall coordinate the power connections at the meter and disconnect.

2. Grounding Requirements
   a. All Mini DMS 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 ¾-inch x 10-foot) along with #4 AWG ground wire and fittings at the base of the Mini DMS supports.
   c. The Contractor shall install additional ground rods required to meet the minimum grounding requirement. 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 Mini DMS grounding system shall be bonded to the controller enclosure bus-bar and the steel supports in accordance with National Electric Code (NEC) requirements.
3. Mounting System
   a. The DMS shall be mounted to two breakaway steel beams on concrete foundations. The Contractor shall design and submit shop drawings for the steel beams based on field site measurements.
   b. The DMS shall be mounted to the sign supports using a minimum of two Zee bars attached along the top and bottom of the DMS panel. The Zee bars shall be bolted to the steel beams on each side of the beam web.
4. Software and Integration Requirements
   a. Specific Integration Requirements are identified in Special Provision Section 654 (ITS Base Specification), 654.04, Software and Integration Requirements.
   b. Part of integration for these Mini DMS will include coordination with adjacent RWIS to have messages automatically activated based on RWIS measurements. More detailed requirements are included in Special Provision Section 654 (ITS Base Specification), 654.04, Software and Integration Requirements.
5. System Testing Requirements
   a. Mini DMS shall pass Standalone Testing, Subsystem Testing, Central Control Testing, and Operational Testing prior to work being deemed complete.
   b. Specific Testing requirements are outlined in Special Provision Section 654 (ITS Base Specification), 654.05, Testing Requirements.
6. Training
   a. The Contractor shall provide up to 6 hours training on all components of the DMS system. The training shall meet the following requirements:
      i. The Contractor shall provide training on the configuration, operation, and maintenance of the items provided under this contract as described herein. The training shall be on the new items provided under this contract, including the DMS, DMS controller, and DMS control cabinet.
      ii. The Contractor shall develop and supply all necessary manuals, displays, class notes, and visual aids, and other instructional materials furnished by equipment manufacturers.
      iii. Instructional materials shall include all data sheets and manuals from manufacturers for all contract items supplied.

iv. All training shall include hands-on use of all equipment, both field equipment and central equipment.

7. Warranty
   a. The length of warranty shall be one (1) year from the completion date of the Operational Testing Period unless extended in accordance with the Supplemental Warranty requirements. The Contractor shall guarantee the availability of compatible replacement equipment for a five-year period from the same date.
   b. Detailed Warranty Requirements are included in ITS Base 654.06, Guarantees and Warranties.

645.081 Method of Measurement Mini Dynamic Message Sign (DMS) Systems will be measured for payment by the lump sum for each fully operational system complete in place per site, satisfactorily installed, tested, operational, and accepted.

645.11 Basis of Payment The accepted quantity of Mini Dynamic Message Sign (DMS) will be paid for at the contract lump sum price for each location. Such price will be full compensation for furnishing and installing all materials including but not limited to the DMS, controller, equipment cabinet, communications equipment, workman pads, flexible conduit, grounding configuring and automating pre-programmed messages, connection and integration with the MaineDOT Road and Weather software and the TMC, calibration, system testing, training, warranties and guarantees. Payment shall also be for all labor, tools, equipment, hardware, transportation, and incidentals necessary for a fully functioning DMS system.

Steel beam supports and breakaway devices for mounting the DMS will be paid for in accordance with Section 645.

Foundations for the steel beam supports will be paid for in accordance with Section 626.

Pay Item		Pay Unit
645.1552	Mini Dynamic Message Sign (DMS):	Lump Sum

SPECIAL PROVISION
SECTION 654
INTELLIGENT TRANSPORTATION SYSTEMS
(ITS Base Specification)

654.01 Description: This work shall consist of the furnishing, configuring, integration, and testing of intelligent transportation systems (ITS) devices, equipment, and associated materials. This specification includes materials, integration, and warranty requirements for all ITS systems. Each specific ITS system or device will include its own specification that supplements the requirements of this specification.

654.02 General: All ITS equipment shall be new unless otherwise specified. Requests for substitution of any specified material shall be submitted in writing with all documentation (specifications, mill certifications, catalog cuts, shop drawings, etc.) in order to enable the Department to evaluate the equivalency of the substitution. Substitutes shall give equal or better service than the specified material or equipment.

654.025 Materials: The Contractor shall provide a complete Technical Submittal as outlined below for all ITS systems, devices, and equipment. The requirements for the ITS Technical Submittal shall meet the following requirements and additional requirements as indicated by the specific ITS system, device, or equipment specifications:

1. This specification includes the universal requirements for all ITS Technical Submittals; additional requirements for specific ITS systems, devices, and equipment may be found in other specifications.
2. The Contractor shall not proceed with manufacture or fabrication until the Resident has approved the submittals in accordance with Section 105.7.
    a. The Contractor shall provide drawings, manufacturer's specifications, and applicable catalog cuts for all materials and components for this work, submitted in accordance with Section 105.7.
    b. The Technical Submittal shall list all proposed equipment to be provided, including mounting hardware as applicable.
    c. The Contractor shall provide cabinet diagrams for all equipment cabinets showing installed hardware and wiring connections.
    d. The Contractor shall provide electric load calculations required for all power supply equipment to be installed.
        i. Where solar powered systems are required, the Contractor shall provide solar power calculations to indicate the size, quantity, and capacity of the solar panels and batteries to meet the required autonomy standards.
        ii. Where uninterruptable power supply (UPS) is specified, the Contractor shall provide calculations to indicate that the proposed power requirements of the system can be accommodated by the UPS equipment in accordance with the specifications.
    e. All specification documentation shall be clearly marked to identify the exact proposed model and all options to be supplied.

f. MaineDOT will give no guarantee as to the completeness of the Plan details and the Contractor shall be required to furnish, install, and test any other equipment and materials required to provide a complete and operational ITS device system.

3. Support Pole Submittals. The submittal for device support poles shall include the following for approval in accordance with Section 105.7.:
    a. Design computations (AASHTO LRFD) for support structures or poles, for the wind speeds defined in ITS system or device specifications. All calculations shall be signed and stamped by a Professional Engineer licensed in the State of Maine. The submittal for above grade components shall be in accordance with Section 626.034
    b. Complete sets of shop drawings for the pole signed and stamped by a Professional Engineer licensed in Maine.
    c. Manufacturer's specifications and applicable catalog cuts for all materials and components.
    d. If not provided with the Contract Documents, the Contractor shall submit elevation and plan views showing the device support locations, foundations, and the proposed slopes plotted on cross-sections showing no interference with utilities, drainage pipes or structures and showing support of excavation if needed for construction of the foundation.
    e. The submittal shall include the foundation system that is selected for each pole location in accordance with Section 626.034.
    f. When more than one Engineer is responsible for the design of separate components (i.e. pole, attachment information), the Contractor shall make one submittal containing all of the components unless otherwise allowed by MaineDOT.
4. Training Materials. When a training requirement is included in an ITS specification, the Contractor shall furnish and provide a separate Training submittal. This training submittal shall include the following:
    a. Samples of all training materials including student handouts, presentation materials, and training agendas.
    b. The proposed date, time, and location for the training program.
    c. Resumes for the proposed qualified instructors.
5. Ethernet Cable. Where Ethernet cable is specified in the Contract Document, it shall be interpreted to mean shielded, weatherproof Category 6 (Cat6) cable of the length required for the application. The maximum length for a single Cat6 cable shall be 325 feet. Cat6 cable shall not be spliced. If any Cat6 cable will be exposed to the sun, the cable shall be UV protected.

654.03 Construction:

1. ITS Device Documentation Requirements.
    a. A minimum of 15 working days prior to configuration of the IP-addressable equipment, the Contractor shall formally request the assigned IP addresses from the MaineDOT Transportation Management Center (TMC).
    b. All ITS Device documentation shall identify the specific manufacturer and model number as approved in the Technical Submittal.

c. IP addresses and login credentials will be assigned for each device by MaineDOT and returned to the Contractor.
d. The Contractor shall configure all devices with the correct IP addresses and login credentials assigned by MaineDOT.
e. The Contractor shall properly label all ports and outlets within device interfaces with the correct component connected to the port or outlet.

654.04 Software and Integration Requirements:

1. General Software and Integration
    a. All ITS devices furnished and integrated shall be fully compatible with the MaineDOT TMC's Advanced Transportation Management System (ATMS) known as New England Compass (Compass). This software was developed by the Southwest Research Institute and is used by the TMC's in Maine, New Hampshire, and Vermont.
    b. Where applicable, ITS devices and equipment shall also be fully compatible and integrated with specific equipment software (for example, Road and Weather software and Axis Camera Station software).
    c. RWIS System data integration shall be accomplished with minimal interruption to the existing MaineDOT Traffic Management Center (TMC) operations or the existing Road and Weather software in use at the TMC. Any required downtime of the Compass ATMS shall be approved by the Resident at least seven (7) days in advance.
2. New England Compass ATMS Integration
    a. All ITS provided for this project shall be integrated into New England Compass (ATMS). New equipment shall operate in the same manner as existing equipment in the ATMS. Integration shall be completed by Southwest Research Institute, who are the developers of the ATMS.
        i. All ITS includes the 8 new RWIS stations and Cameras and 2 new Mini DMS.
    b. Vaisala and Campbell Scientific RWIS Equipment are currently integrated into Compass. If the Contractor proposes to supply RWIS equipment or sensors that requires additional software development to integrate, the contractor shall be responsible for all coordination and all costs associated with software development.
    c. SwRI integration work will be consistently priced for Bidders providing equipment types that are all currently integrated into Compass. Additional cost will be applied for models that are not currently integrated and supported by SwRI based on the complexity of development. Each Bidder shall get a price quote from SwRI for this integration work. SwRI and the Contractor will not be responsible for any Compass integration work needed beyond the original estimated budget and schedule. Any time required above and beyond that schedule may be negotiated between the Contractor, SwRI, and MaineDOT and will be paid for by MaineDOT if all parties are in agreement.
    d. Compass Integration shall be deemed complete when the following is true in the ATMS production environment: 1) RWIS data is showing in all applicable interfaces and consistent with field measurements 2) Camera images are

showing properly, and 3) Mini DMS can be successfully polled and have messages sent to them.

i. These can be demonstrated in a 30-minute virtual meeting with SwRI and MaineDOT. If there is a failure during that meeting, the meeting can be rescheduled as many times as needed. At acceptance, the integrated devices will fall under the separate ATMS project contract, 2022-097-ATMS-NE Compass.

e. Compass integration is not included in any warranty for this project. No additional ATMS testing will be required after the initial 30-minute virtual meeting, barring a system failure during that meeting. SwRI's role is complete as soon as successful communication is demonstrated. The Contractor is no longer responsible for any ATMS testing once the successful SwRI virtual meeting is conducted.

f. If there are any issues with device performance in the ATMS that are caused by a data feed change or other non-Compass deficiencies as determined by MaineDOT, the Contractor shall be fully responsible for correcting those issues.

3. RWIS-Specific Integration
   a. Road and Weather Software
      i. All RWIS provided for this project shall be integrated into MaineDOT's Road and Weather Software and operate in the program in the same manner as the existing RWIS, including reporting capabilities. MaineDOT uses WSP for Road and Weather Software.
      ii. The Contractor shall be responsible for the first six months of the Road and Weather Software licensing fees. After the initial six month period, the software licensing fees will be paid by MaineDOT.
      iii. If operational testing is not completed on or before May 1, 2025, the Contractor shall be responsible for the first twelve (12) months of the Road and Weather Software licensing fees. After the initial 12-month period, the software licensing fees will be paid by MaineDOT.
4. CCTV-Specific Integration
   a. CCTVs provided for this project shall be compatible with Axis Camera Station.
   b. The Contractor shall supply Axis Camera Station licenses for each CCTV.
   c. The Contractor shall configure each CCTV so that they can be integrated into Axis Camera station by MaineDOT.
5. Mini DMS Specific Integration
   a. Messaging
      i. The Contractor shall provide the ability for each Mini DMS to automatically display pre-programmed messages based on three (3) or more measured values by the adjacent RWIS on Rt 1A. These values shall be fully configurable. This may be completed using Contractor-supplied software or in-the-field hardware and programmable logic. Configuration shall be able to be completed remotely from the MaineDOT TMC. The functionality shall be able to be activated or deactivated remotely from the MaineDOT TMC.
      ii. Hardware-based solutions shall be approved by MaineDOT. It is MaineDOT's preference for hardware-based solutions to include as few

additional pieces of equipment as possible and for logic to be programmed into the RWIS Data Logger. Any additional hardware required shall be environmentally hardened to the same degree as the Data Logger.

654.05 Testing Requirements

1. General Requirement: ITS Device and System Testing
    a. In addition to the requirements of this specification, all installations of ITS devices and equipment, fiber optic cable, and wireless communication equipment will be subjected to testing before the work will be accepted by MaineDOT.
    b. The Contractor shall submit testing plans to MaineDOT for review and acceptance. Successful completion of device testing shall be considered a requirement of the Contract. The Contractor shall provide all equipment, materials and labor required to perform each test, including laptop computers, internet connections, software, and Maintenance of Traffic.
    c. The Contractor shall coordinate with the MaineDOT TMC no less than 7 days prior to scheduling any equipment or systems testing.
    d. MaineDOT reserves the right to examine and test or retest any or all materials furnished by the Contractor for the project to determine if they meet the requirements specified within the Contract Documents.
    e. If MaineDOT decides that any material used in the construction of this project is defective or otherwise unsuitable, the workmanship does not conform to the requirements of the contract, and/or the equipment does not meet the performance specifications required in the Contract Documents, the Contractor shall replace such defective or deficient parts and material at no cost to MaineDOT.
    f. The Contractor shall conduct all tests in the presence of the Resident. Testing shall be scheduled only on weekdays, and subject to approval of MaineDOT.
    g. Completed test results shall be packaged and submitted to MaineDOT within 14 calendar days of test completion. No test phase shall begin until all prior test phases have been completed, and test results have been approved by MaineDOT.
    h. As part of the system and device testing, the Contractor shall provide to MaineDOT a complete set of maintenance and user manuals along with all wiring and assembly schematics and diagrams. This shall including any material safety data sheets (MSDS), prepared by the manufacturer and any toxic substances (coatings, liquids, or other) used. Maintenance information shall include troubleshooting directions, maintenance schedule recommendations, and calibration recommendations/directions. All necessary equipment to complete calibrations shall be included.
    i. The Contractor shall provide any test specific software required to complete the test.
2. Testing Step 1 – Standalone and Subsystem Testing
    a. Standalone testing and Subsystem testing can be completed together for this project.

b. Standalone testing shall be performed on site at the ITS device or system. The purpose of the Standalone tests is to exercise all in-field functional operations of the equipment or device as installed. The Contractor shall demonstrate compliance with the requirements for the equipment defined in the specifications during this testing period. If a unit fails to pass the stand-alone test, the Contractor shall correct the problem or replace the part/device/system and retest until satisfactory results are achieved.
c. Subsystem testing shall be performed for ITS devices and systems that are connected to a communication network other than a cellular modem. The purpose of the Subsystem test is to exercise the ITS device or system over the communication network locally, before making a final connection to the required software. If a unit fails to pass the subsystem test, the Contractor shall correct the problem, troubleshoot the communication system, or replace the part/device/system and retest until satisfactory results are achieved.

3. Testing Step 2 – Central Control Testing
    a. Central Control Testing shall be conducted after Standalone and Subsystem testing are deemed to be complete.
    b. Central Control Testing shall be performed at the TMC in Augusta and on non-Compass software. The purpose of the Central Control Test is to exercise all remote functionality and control of all ITS components at a TMC workstation, simulating normal use.
    c. The Contractor shall have a representative at each device location to provide on-site validation of device functionality during Central Control Testing, as required by the Resident or the MaineDOT TMC.
    d. If a device within the system fails to pass the central control test, the Contractor shall correct the problem or replace the part/device/equipment/system and retest until satisfactory results are achieved.
        i. Upon successful completion of the Central Control Test, the Contractor shall request in writing the initiation of the Operational Acceptance Test Period.
4. Testing Step 3 – Operational Acceptance Test Period
    a. An Operational Acceptance Test Period will be required for all ITS components. This test period shall commence upon successful completion of the Central Control Test. The purpose of the Operational Testing Period is to validate consistent system performance during real-life operations.
    b. During the Operational Testing Period, the ITS shall perform as expected by MaineDOT at all times. Any system errors will suspend the testing period.
    c. The Operational Acceptance Test Period shall be 45 days. In the event that there is a single failure associated with any ITS 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 45 days, or a minimum of ten days, whichever is longer. Upon the failure of any second sensor or equipment, the Operational Test period shall be restarted for an additional 30 days upon each repair/replacement.

   d. It is imperative that the RWIS operational testing be conducted during inclement winter weather. A valid Operational Testing Period shall be defined as occurring between December 1st and April 30th. The Operational Test should include a minimum of 20 days that occur during that time. If the Operational Test cannot be achieved between December 1st and April 30th, the Supplemental Warranty condition shall apply.
5. 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.

654.06 Guarantees and Warranties:

1. The Contractor shall unconditionally guarantee all system and subsystem modules including all cabinets, equipment, hardware, and software installed to be free of defects.
2. It shall be the Contractor's responsibility to secure all guarantees that are customarily issued by the equipment manufacturers for the specific equipment included in the Contract. The form in which such guarantees are delivered to the Contractor shall include the provision that they are subject to transfer to MaineDOT and shall be accompanied by proper validation of such fact. Transfer of guarantees shall coincide with the Guarantee Period specified below.
3. The length of warranty shall be one (1) year from the completion date of the Operational Testing Period unless extended in accordance with the Supplemental Warranty requirements. The Contractor shall guarantee the availability of compatible replacement equipment for a five-year period from the same date.
   a. Supplemental Warranty: In the event the Operational Test cannot be completed in accordance with Section 654.05 above, the customary warranty period shall be extended to include a minimum of two (2) winter maintenance periods following System Acceptance. A winter maintenance period shall be considered November 1st to April 30th. For example, if the Operational Test does not include a minimum of 20 days between December 1st and April 30th with System Acceptance occurring in May 2025, the warranty period shall be extended to April 30, 2027.
4. The warranty shall cover all parts, labor, transportation, shipping, tools, equipment mobilization, maintenance of traffic, and incidentals necessary to repair or replace any system component, device, equipment or sensor that fails to perform as required by the Contract Documents.
5. 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.
6. The terms of any equipment warranties stipulated by the equipment manufacturers shall be provided with product data included in the Technical Submittal, specified in Section 654.025. The terms of any equipment manufacturer's warranties will not relieve the Contractor from any of the guarantee requirements of this contract.
7. The Contractor shall be responsible for repair or replacement during the guaranty/warranty period. Repair is defined as all activities that shall be performed for the system to remain in, or return to, operation as observed at the time of installation (by others). Replacement is defined as providing the same or better model of the

equipment or device under warranty. The work consists of the repair of defective devices that fail during the normal course of operation, and does not include repairs or replacements made necessary due to damage resulting from vandalism, traffic accidents, or acts of God.

8. The Contractor shall provide on-site warranty service of the equipment within 48-hours of notification by MaineDOT. If the Contractor is unable to affect a repair to the equipment within seven (7) calendar days of notification, temporary equipment meeting all the original equipment specifications may be requested by MaineDOT and shall be provided and installed at no cost to MaineDOT. The Contractor shall then either fix or replace the broken device or equipment at their discretion.
9. A log of all guarantee work performed by the Contractor during the Guarantee Period shall be maintained by the Contractor. The log shall include, as a minimum, the following information:
    a. Date and time defect reported
    b. Entity reporting the defect
    c. Description of the reported defect
    d. Technician responding to reported defect
    e. Arrival time at the site of the technician
    f. Technician performing defect repair or replacement
    g. Description of observed defect
    h. Corrective actions taken
    i. Model and serial number of any module repaired or replaced
    j. Date and time defect rectified
10. The Contractor shall maintain records, which show the itemized material and equipment cost incurred to provide response maintenance during the guarantee period. These records shall be provided to the TMC within 15 working days of the warranty work. These records will not be used as a Basis of Payment to the Contractor. The Contractor shall assure that these cost records are as complete and accurate as practicable. MaineDOT may perform an audit to verify the accuracy of the cost records.
11. When a guarantee is available on repaired or replacement components, a written and signed guarantee shall accompany the manufacturer's billing invoice. The TMC representative or inspecting agent will sign and retain the original and provide a copy to the maintaining agency and a copy to the manufacturer.
12. 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.

654.07 Method of Measurement:

The development and submission of ITS Technical Submittals will not be measured, but shall be considered incidental to the ITS system, device or equipment installed.

Guarantees/Warranties will not be measured, but shall be considered incidental to the ITS system, device or equipment provided.

Configuration and integration of ITS equipment and devices will not be measured, but shall be considered incidental to the equipment being provided.

SPECIAL PROVISION
SECTION 654
INTELLIGENT TRANSPORTATION SYSTEMS
(Road Weather Information Station (RWIS) System Equipment)

654.53 Road Weather Information Station: This work shall consist of furnishing, installing, integrating and testing a Road Weather Information Station (RWIS) system. This RWIS system shall include a new steel pole with multiple weather sensors mounted to a reinforced concrete foundation.

This work also includes integrating the data obtained by the RWIS system into the Maine Department of Transportation (MaineDOT) Advanced Transportation Management System (ATMS), New England Compass ATMS (Compass ATMS). Compass was developed by the Southwest Research Institute (SwRI) and is used by Maine, New Hampshire, and Vermont. This integration effort shall include the development of a live, supported dataflow using an open vendor API from the RWIS System Equipment to Compass ATMS and MaineDOT. RWIS data shall also be integrated into MaineDOT's existing Road and Weather software as part of this project. MaineDOT has an existing contract for the Road and Weather software and will pay any associated licensing fees after the initial Contractor-paid period. Specific integration requirements are identified in Special Provision Section 654 (ITS Base Specification), 654.04, Software and Integration Requirements.

MaineDOT currently maintains RWIS systems manufactured by Vaisala and Campbell Scientific. Both vendor's RWIS systems are currently integrated into both Compass and the existing Road and Weather software.

654.021 General: The following specifications detail a typical RWIS system 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 RWIS System Equipment may be considered functionally equivalent in accordance with Special Provision 103.

654.026 RWIS System Equipment – General

1. 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.

2. The RWIS System shall include a controller (controller or Data Logger) that shall satisfy the following requirements:
   a. The controller shall have a modern processor, manufactured within the previous 12 months.
   b. The controller shall have a minimum of 512MB DDR3 and 2GB of NAND flash memory.
   c. The controller shall have internal/integral Ethernet communications and support direct Ethernet connections.
   d. The controller shall provide a means for real-time clock synchronization and location definition at least once daily.
   e. The controller shall have remote access capability for local maintenance purposes (WLAN, WiFi, Bluetooth or equivalent).
   f. The controller shall keep records and show calibration history of the attached sensors.
   g. The controller shall operate in the temperature range of -34°F to +150°F.

3. The RWIS System Equipment shall include a Sensor Interface and Power Management system that shall satisfy the following requirements:
   a. All sensor connectors shall be MIL-SPEC circular connectors rated to IP66/IP68.
   b. The controller shall include Ethernet interfaces for sensor and peripheral connections including at least two spare ports.
   c. Ethernet connections shall support Power over Ethernet (PoE) functionality.
   d. The controller shall have serial interfaces for sensor and peripheral connections without extension modules including at least two spare ports.
   e. The controller shall have centralized bus-bar for sensor grounding. The bus-bar shall be copper.
   f. Sensor cables shall be connected to bus-bar for grounding.
   g. The controller shall have built-in surge arrestors that shall be field replaceable.
   h. Where indicated on the Plans, the controller shall have the capability to operate with solar power technology (direct current).
   i. Where indicated on the Plans, the controller shall have a battery charger.

4. The RWIS System 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 89VAC 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 AC Supply shall satisfy the following requirements:
   a. The controller AC supply shall have surge protection level at least 6kV/3kA. Surge protection units shall be field replaceable.
   b. AC Supply shall include a main disconnect circuit breaker for maintenance purposes.

c. Where AC power systems are employed, the RWIS System shall include a Battery Back-Up that shall satisfy the following requirements:
   i. The battery back-up system shall provide sufficient power for all RWIS system components for a minimum of 24 hours at full function in the absence of AC power.
   ii. At the end of the initial 24 hours without AC power, the battery back-up system shall provide sufficient power for critical sensors (as defined by the manufacturer) for an additional 24 hours. This low power or survival mode may include less frequent polling of the sensor data but not less than once every ten (10) minutes.
   iii. At the end of 48 hours without AC power, the battery back-up system shall not have discharged more than 50 percent of the rated capacity of the battery back-up system.
   iv. Back-up batteries shall be sealed and spill proof and shall be considered maintenance-free.
   v. The battery back-up system shall be Ethernet ready. The Contractor shall furnish and install an Ethernet patch cord to connect the battery-back-up system to the Ethernet switch in the controller cabinet.
   vi. The Contractor shall submit for approval a Technical Submittal calculation for the battery back-up system that demonstrates compliance with the required hold-up time of the back-up system. This calculation shall include the manufacturer's specified loads for each sensor, the controller, and other pieces of equipment to be powered during the full function period and the low power/survival mode period. The battery calculation shall be measured from 0°F. The Technical Submittal shall be submitted in accordance with Special Provision 654.

6. The RWIS System Equipment shall include a communications system that shall satisfy the following requirements.
   a. The controller shall support at least two parallel communication lines out from the station, with one communication line being a cellular modem.
   b. The controller shall be native Ethernet, allowing Ethernet communications via cellular modem.
   c. The controller cellular communication shall support modern networks: 4G/LTE/5G.
   d. The controller cellular communication shall support dual SIM usage for data transmission purposes.
   e. The controller shall support an RJ-45 port.
   f. Where the controller includes a WLAN for local remote access, the controller shall have user definable time-out for WLAN broadcasting to prevent unintentional use of WLAN.
      i. The controller WLAN shall have the ability to be used as a hotspot.
      ii. The controller WLAN shall have the ability to be used as a client.
   g. The controller shall have two Ethernet networks: one for internal communications and second for external communications.
   h. The controller's internal network shall be Ethernet based.

i. The controller shall be connected to the Ethernet switch via Ethernet patch cord furnished and installed by the Contractor.

7. The controller shall include 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.
   f. The controller enclosure shall include a fiber optic Ethernet switch matching the requirements of Item 654.311 Ethernet Switch with Fiber Optic Interfaces except that the switch may be shelf or wall-mounted.

654.027 RWIS System Sensors: The Contractor shall furnish, install, integrate and test environmental and weather sensors that shall measure several environmental characteristics. The following sensor equipment shall be included:

- Wind Speed and Direction Sensor
- Visibility Sensor
- Precipitation and Accumulation Sensor
- Present Weather Detector (may include visibility, precipitation and accumulation sensors if the single combination sensor can meet the functional requirements for each of the individual sensors)
- Air Temperature and Humidity Sensor
- Barometric Pressure Sensor
- Road Surface Sensors (Non-Invasive and Subsurface Probe)
- Closed Circuit Television (CCTV) Camera

1. Wind Speed and Direction Sensor
   a. The sensor shall measure both wind speed and wind direction.
   b. The sensor shall be weather resistant and have an operational temperature of -40°F to +140°F.
   c. The sensor shall fully compensate for the effect of temperature, humidity and pressure.
   d. Measurement Parameters:
      i. The wind speed sensor shall have a measurement range of 0 to 150 miles per hour (mph).
      ii. Wind speed shall be user selectable in units of miles per hour (mph) and meters per second (mps).

iii. Wind speed resolution shall be to the whole integer for the selected unit (i.e. 5 mph or 3 mps) and accuracy shall be within one (1) percent of actual.
iv. Wind direction shall be measured in degrees. Wind direction resolution shall be +/- 3 degrees.
v. Wind speed and direction shall be reported as instantaneous value and rolling average value to a customized average time.
vi. Wind speed and direction minimum and maximum values shall be available over a customized time period (i.e. 10 minutes).
vii. Wind speed shall be available as 3-second gust values.

2. Visibility Sensor (or visibility function of Present Weather Sensor)
    a. The visibility sensor may be integrated into a combination sensor unit that operates as a Present Weather Detector. If they are separate units, the visibility sensor shall meet the requirements of parts b. through g. below.
    b. The sensor shall have a measurement range of up to 10 miles with an accuracy of +/- 10 percent.
    c. The sensor shall utilize back scatter optical technology.
    d. The sensor shall have an operational temperature range of -40°F to +131°F.
    e. The sensor shall have an operating humidity range of 0-100 percent relative humidity.
    f. The sensor shall be IP66 rated.
    g. The sensor shall be capable of detection through the following weather conditions:
        1. Clear visibility
        2. Fog
        3. Mist
        4. Haze (from smoke or other particulates)
        5. Rain
        6. Freezing rain
        7. Snow

3. Precipitation and Accumulation Detector (or precipitation function of Present Weather Sensor)
    a. The precipitation detector should be provided as an independent sensor. The Contractor may propose a combination sensor unit that operates as a Present Weather Detector with precipitation detector, subject to MaineDOT approval.
    b. The precipitation sensor shall meet the requirements of c. below, regardless whether it is part of a Present Weather Sensor or if it is a stand-alone sensor.
    c. Measurement Parameters:
        i. The sensor shall detect the following types of precipitation:
            1. Rain
            2. Freezing Rain

3. Drizzle
4. Freezing Drizzle
5. Mixed Rain/Snow
6. Snow
7. Sleet/Ice Pellets

ii. The sensor shall be capable of measuring rain precipitation accumulation rate to an accuracy of 0.05 inches per hour measured over a 10 minute time period. This accuracy shall be met under Maine field conditions.

iii. The sensor shall be capable of measuring snow accumulation and amount of new snow since previous readings. Snow accumulation sensitivity shall be at least 0.5 inches per hour with an accuracy of +/- 10 percent. This accuracy shall be met under Maine field conditions.

4. Air Temperature and Humidity Sensor
   a. The sensor shall contain a radiation shield to protect the sensor from solar radiation influence and from precipitation. The radiation shield shall contain no moving parts.
   b. The sensor shall combine air temperature detector (AT), relative humidity detector (RH), and dew point detector (DP) into a single unit. Alternatively, dew point may be calculated by the controller or via the Road and Weather software.
   c. The sensor shall have integral surge protection.
   d. The sensor shall be IP66 rated.
   e. The AT detector shall have an operational range of -40°F to +140°F.
   f. The RH detector shall have an operational range of 0-100 percent RH.
   g. Measurement Parameters:
      i. AT detector shall provide instantaneous and rolling one minute average values. The AT detector shall hold the previous five observations.
      ii. AT detector shall have rolling 24-hour minimum and maximum temperature values.
      iii. AT detector shall have an accuracy of 0.5°F over the range of 0°F to +100°F.
      iv. RH detector shall provide rolling one minute average values from the previous six observations.
      v. RH detector shall have an accuracy of two (2) percent and shall be reported to the nearest 0.1 percent (i.e. 90.8%).
      vi. RH detectors shall provide a means (either directly or via software) to measure dew point temperature and frost point temperature.
      vii. RH detector shall provide active measurements that maintain accuracy within 2% in condensing conditions.

5. Barometric Pressure Sensor
    a. The sensor shall be a silicon capacitive absolute pressure sensor designed for barometric pressure measurement.
    b. Measurement Parameters:
        i. The barometric pressure sensor shall conduct readings every 5 seconds and report the instantaneous readings.
        ii. The barometric pressure sensor shall measure in units of inches of mercury (Hg).
        iii. The barometric pressure sensor shall have an operational range of 18.0-31.0 inches Hg with a resolution of 0.03 inches Hg.
        iv. The barometric pressure sensor shall have an accuracy of +/- 0.12 inches Hg over the temperature range of 0°F to +140°F.

6. Non-Invasive Pavement Sensors
    a. There shall be sensors that can measure the pavement surface temperature, ambient air temperature, relative humidity, pavement surface state, and friction coefficient remotely, without penetrating the roadway. The non-invasive sensors shall be Luft NIRS, Viasala DSC/DST, or equivalent.
    b. If a pavement sensor cannot meet the accuracy requirements for all of the measurements in part a., additional supplemental sensors shall be furnished and installed to meet the accuracy requirements.
    c. These non-invasive sensors shall have no moving parts.
    d. Non-invasive sensors shall collect data samples from the road surface in accordance with the performance standards established in this specification.
    e. The data generated by the non-invasive sensors shall be compatible with the current Road and Weather software currently in operation within the MaineDOT license for New England Compass ATMS.
    f. Measurement Parameters:
        i. The pavement surface state sensor shall have an operational range of -40°F to +140°F and 0-100 percent RH.
        ii. The pavement surface state sensor shall be capable of remote readings at the range of 6.5 feet to 48 feet.
        iii. The pavement surface state sensor shall identify the condition of the pavement remotely with the following surface states:
            1. Dry
            2. Moist
            3. Wet
            4. Snow/Frost
            5. Ice
            6. Slush
        iv. The pavement surface state sensor shall measure the depth of precipitation on the pavement surface as shown below, all at a resolution of 0.01 millimeters:
            1. Water/Rain at 0.0 - 2.0 millimeters
            2. Ice at 0.0 – 2.0 millimeters

3. Snow at 0.0 to 10.0 millimeters

v. The pavement surface temperature sensor shall measure the pavement surface temperature every 60 seconds and have a resolution of 0.5°F.

vi. The pavement surface friction sensor shall estimate the friction coefficient (grip factor) at the range 0.01 to 1.00 at a resolution of 0.01 units.

7. Subsurface Probe
   a. The sensor shall be a probe specifically designed for outdoor use.
   b. The sensor shall measure air, soil, and water temperature.
   c. The sensor probe shall be water-tight and weather-resistant.
   d. The sensor probe shall have an operational range of -40°F to +140°F.
   e. Measurement Parameters:
      i. Road surface temperature shall have an accuracy of +/- 1°F with a resolution of 0.5°F.
      ii. Freezing point shall have an accuracy of +//- 1°F.

654.028 Closed Circuit Television (CCTV) Camera System: The Contractor shall furnish, install, integrate and test a digital closed circuit television (CCTV) camera at the RWIS System location that shall provide streaming video adjacent to the RWIS system. The CCTV camera shall be connected to the controller and shall be remotely controlled via the RWIS communication system.

1. The CCTV camera shall be digital, IP addressable and Ethernet ready.
2. The CCTV camera shall be Underwriter's Laboratory (UL) approved. The UL certification shall be provided with the technical submittal.
3. The CCTV shall have the capability to be viewed, controlled and tested locally at the controller utilizing a laptop computer with the manufacturer's software. This shall include the capability to locally retrieve operational status and fault data for the camera.
4. The CCTV shall have a minimum resolution of HDTV 800 x 600.
5. The CCTV shall be capable of streaming video with H.264 and/or Motion JPEG video compression format.
6. The CCTV shall be capable of time triggered FTP.
7. The CCTV shall be powered by an industrial grade Power Over Ethernet Injector (POEI). The POEI shall provide operating power and Ethernet data to the CCTV.
8. The CCTV shall be housed in an environmentally hardened enclosure suitable for continuous outdoor use. The CCTV shall have an operating range of -40°F to +100°F, minimum.
9. The CCTV housing shall be IP66-rated.

654.029 RWIS System Support Structure and Foundation: The Contractor shall furnish and install a galvanized steel support structure on a steel reinforced concrete foundation.

1. The steel support structure shall be designed by the Contractor. Shop drawings and structural calculations shall be submitted to the Engineer for approval prior to beginning fabrication.
2. The steel support structure shall be designed in accordance with Standard Specification 643.023 for Traffic Signal Structures, with Fatigue Category II.
3. The steel support structure shall be installed on a steel reinforced concrete foundation. The foundation should be a drilled shaft foundation in accordance with Standard Specification 626.034 for Concrete Foundations.
4. The Contractor shall prepare shop drawings and structural calculations to support the size of the concrete foundation proposed for the steel support pole. Precast foundations are permitted if the diameter of the foundation is 24 inches or less and if the height of the steel support pole is 30 feet or less. The foundation design shall conform to the requirements of Standard Specification 626.036, regardless whether the installation will be precast or cast-in-place.
5. The RWIS System Support Structure shall not exceed 35-feet in height.

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

1. Power Requirements
    a. Each RWIS location shall be supplied with adequate power to meet the site and sensor design loads.
    b. Where AC power is provided by others, the Contractor shall coordinate the power connections at the meter and disconnect.
2. Grounding System Requirements
    a. All RWIS 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 ¾-inch x 10-foot) along with #4 AWG ground wire and fittings at the base of the RWIS 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 RWIS 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 furnish and install a cellular modem compatible with the RWIS system and with the MaineDOT communications system.
b. The communication system shall support 4G/LTE and shall be configurable to support 5G if available.
c. The modem shall be able to support US Cellular, Verizon, and AT&T service plans. Switching between the three shall be achievable with firmware updates.
d. The RWIS system shall transmit weather sensor data to Compass and MaineDOT's Road and Weather software currently in operation.
e. The Contractor shall provide all necessary equipment, cables, hardware, and ancillary equipment to capture the RWIS sensor data and transmit the data to Compass and to the Road and Weather software at the MaineDOT TMC.
f. The communication system shall allow for configuration control and trouble-shooting of the RWIS equipment through both a local onsite connection and through a remote connection to the controller.

4. Software and Integration Requirements
    a. All RWIS, including CCTVs, shall be fully integrated into New England Compass and MaineDOT's Road and Weather Software.
    b. CCTVs shall be integrated into Axis Camera Station
    c. Specific Integration Requirements are identified in Special Provision Section 654 (ITS base specification), 654.04, Software and Integration Requirements.
5. System Testing
    a. All RWIS shall pass Standalone Testing, Subsystem Testing, Central control Testing, and Operational Testing prior to work being deemed complete.
    b. Specific System Testing Requirements are identified in Special Provision Section 654 (ITS base specification), 654.05, Testing Requirements.
6. Training
    a. If the Contractor elects to provide new or modified Road and Weather software, the Contractor shall provide a training program consisting of the furnishing of educational training in the operation of the new software.
    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 software 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 software and its operation.
ii. New/modified features of the software.
iii. Producing reports using the Road and Weather software.

7. Warranty
   a. The length of warranty shall be one (1) year from the completion date of the Operational Testing Period unless extended in accordance with the Supplemental Warranty requirements. The Contractor shall guarantee the availability of compatible replacement equipment for a five-year period from the same date.
   b. Detailed Warranty Requirements are included in Special Provision Section 654 (ITS base specification), 654.06, Guarantees and Warranties.

654.061 Method of Measurement: Road Weather Information Station (RWIS) equipment will be measured for payment by the lump sum complete in place per site, satisfactorily installed, tested, operational, and accepted.

Connection of the RWIS equipment to a power source will be measured in accordance with Special Provision 654 Electrical Service Connection.

654.07 Basis of Payment: Road Weather Information Station (RWIS) equipment will be paid for at the contract lump sum price for each location. Such price will be full compensation for furnishing and installing all materials, including but not limited to the sensors; CCTV camera; controller and enclosure cabinets with all internal hardware; support poles; communication equipment; 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.

Foundations for the RWIS support poles will be paid for in accordance with Section 626.

Connection to the electrical power service will be paid for in accordance with Special Provision 654 Electrical Service Connection.

Payment will be made under the following:

Pay Item		Pay Unit
654.53	Road Weather Information Station	Lump Sum

SPECIAL PROVISION
SECTION 654
INTELLIGENT TRANSPORTATION SYSTEMS

654.311 Ethernet Switch with Fiber Optic Interfaces This item of work shall conform to this specification. This item shall consist of furnishing and installing a 1 Gigabit per second (Gbps) Ethernet Switch with fiber optic interfaces, as well as all needed accessories required for a full and complete installation, including but not limited to power adapters, Ethernet patch cables, fiber optic patch cords, and small form-factor pluggable (SFP) modules as described herein.

654.026 Ethernet Switch Requirements: The materials for this work shall conform to the following requirements:

1. The work under this item specifies the requirements for the switch with single mode fiber optic interfaces. The switch shall accept both RJ-45 Ethernet connection as well as single mode SC fiber optic connections.

2. The switch shall be installed within the field cabinets as shown on the plans. The switch shall be designed for shelf mounting and rack-mounting in a standard 19-inch rack.

3. The switch specified herein shall be a self-contained unit capable of 24-hour per day unattended operation. The switch shall be supplied, assembled, configured, and tested by the Contractor.

4. The switch shall be of rugged design and suitable for reliable operation when mounted in the configuration as specified in these Specifications and the Plans. The switch shall be configured for minimum maintenance or adjustment after initial set-up.

5. The Contractor shall provide the switch with all required software. The software shall be web-based or the Contractor shall provide licensing for the software to be installed on a minimum of ten (10) computers to be determined by the TMC.

6. The switch shall have the following connections:

    6.1 The Contractor shall determine the number of multi-speed 10/100/1000 Mbps Ethernet ports with RJ45 connectors required for the specific installation. The Contractor shall furnish a switch with the required number of ports plus a minimum of two spare Ethernet ports with RJ45 connectors and two spare SFP ports. These shall meet the following network standards:

        6.1.1 IEEE.802.3 10 Base-T

        6.1.2 IEEE.802.3u 100 Base-T

        6.1.3 IEEE.802.3ab 1000 Base-T

        6.1.4 IEEE.802.1d Spanning Tree

6.1.5 IEEE.802.1w Rapid Spanning Tree

6.1.6 IEEE.802.1q VLAN

6.1.7 IEEE.802.1p Class of service (CoS)

6.2 Fiber optic ports shall support single mode fiber optic cable with type SC connectors.

6.2.1 Optical emitters shall be laser diode type.

6.2.2 Fiber optic ports shall be single mode and shall have an operating wavelength of 1310 nm, and/or 1550 nm.

6.2.3 Fiber optic ports shall each have an optical power budget of 13 dB, minimum.

6.2.4 Optical emitters shall have a transmit power of -15 dB, minimum.

6.2.5 Optical detectors shall have received sensitivity of -28 dBm.

6.2.6 Fiber optic ports may be integral to the switch or may be of the SFP type.

6.2.7 Fiber optic ports shall remain covered at all times, unless connected to fiber optic cables.

6.2.8 All fiber optic ports of switches supplied in this project shall be fully compatible and interoperable with all other switches on this project. All fiber optic ports shall be interoperable with any other existing switch with which they must connect and communicate.

6.3 The Contractor shall supply, install, and test all Ethernet cables required to make all connections as shown in the Plans. Ethernet cables shall be weatherproof Category 6 (Cat6).

6.4 The Contractor shall supply, install, and test all fiber optic patch cords required to make all connections as shown in the Plans. Fiber optic patch cords shall meet the following requirements:

6.4.1 Each patch cord shall contain one single mode fiber strand with a factory terminated SC type connector.

6.4.2 Each patch cord shall be a minimum of 3 feet in length.

6.4.3 The patch cords shall operate without degradation over a temperature range of -34 to 74 degrees Celsius at a relative humidity of 10% to 90% condensing.

6.4.4 All fiber optic strands shall be nonconductive to electricity.

6.4.5 The Fiber Optic Patch Cord shall meet or exceed the following performance characteristics:

6.4.5.1 Fiber Optic Patch Cords shall consist of tight buffered optical fibers of the type used for interconnect cable with a 900 µm secondary buffer.

6.4.5.2 The fiber shall be surrounded by aramid fiber yarn strength members and a UL listed OFNR, UV resistant and fungus resistant yellow outer jacket 3mm in diameter.

6.4.5.3 The optical fibers shall be 100 kpsi proof tested and have an attenuation change no greater than 0.05 dB/km.

6.4.5.4 The attenuation of the Fiber Optic Patch Cord shall not exceed 1.0 dB/km at 1310 nm and 0.75 db/km at 1550 nm.

6.4.5.5 The SC type connector shall meet the following requirements:

6.4.5.5.1 All fiber optic connectors shall be SC type with a PC (physical contact) 2.5 mm ceramic ferrule.

6.4.5.5.2 The connector mean insertion loss shall be 0.3 dB and maximum 0.5 dB.

6.4.5.5.3 The connector mean return loss shall be -59 dB and maximum of -55 dB.

6.4.5.5.4 All SC connectors shall have a durability rate of less than 0.2 dB change over 500 rematings.

6.4.5.5.5 Connectors shall meet ANSI/TIA EIA-604-3A requirements.

7. The switch shall be UL listed.

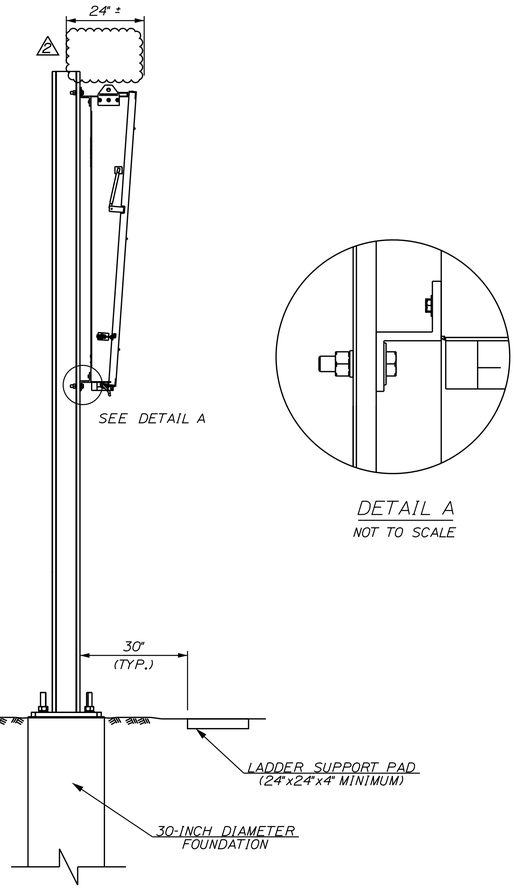
8. The switch shall be a fully managed Ethernet layer 2 device.

9. The switch shall have a switching method of store and forward.

10. The switch shall have an operating temperature range of -34°C to +74° C.

11. The switch shall have a power usage of +12VDC to +24VDC at 1 amp or less. This shall be provided by an included plug-in type AC adapter.

654.061 Method of Measurement: Fiber Ethernet Switch will not be measured but shall be incidental to Item 654.53. The Fiber Ethernet Switch shall include furnishing and installing the Ethernet Switch, any Ethernet cables, fiber optic patch cords, and any configuration and testing necessary to provide a communication network with access to the MaineDOT TMC.



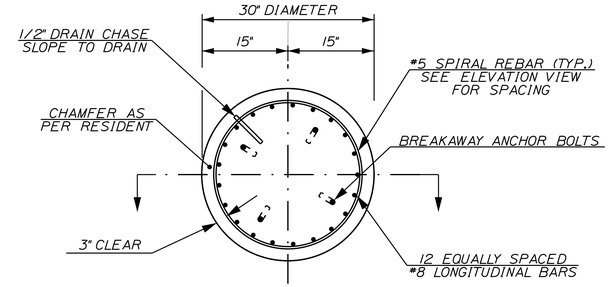
DETAIL A

NOT TO SCALE

GROUND MOUNTED BLANK OUT SIGN (BOS) WITH FLASHING BEACONS

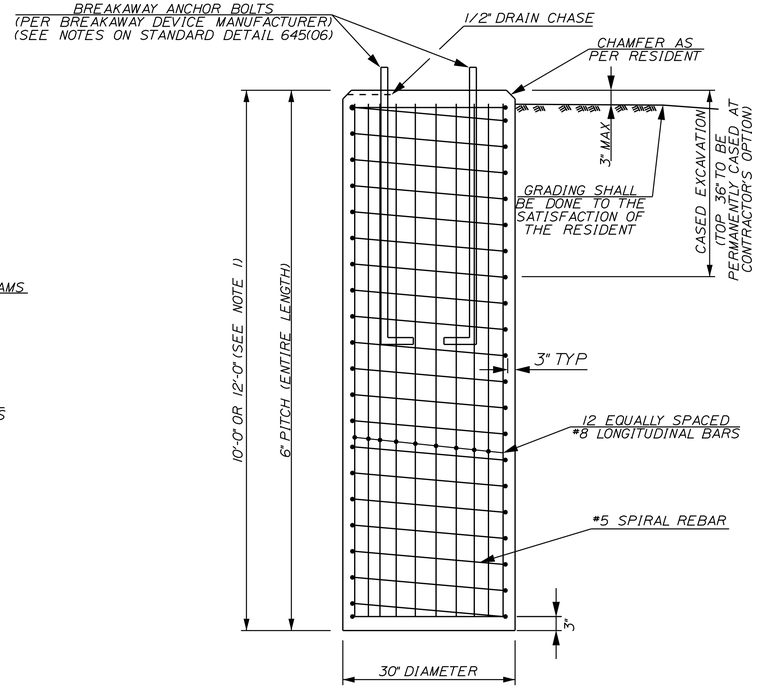
NOT TO SCALE

ALL DIMENSIONS ARE APPROXIMATE
CONTRACTOR SHALL VERIFY



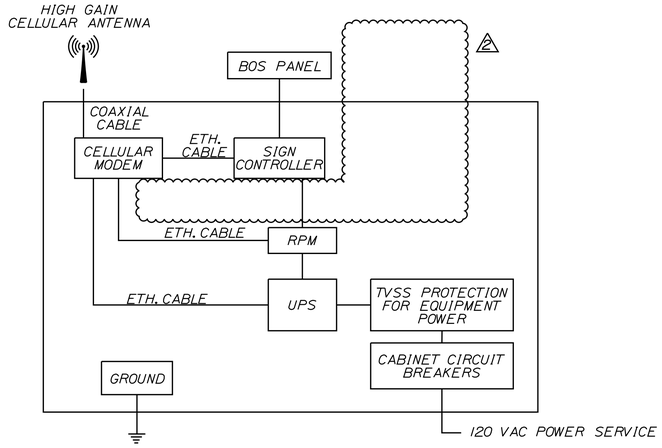
DRILLED SHAFT PLAN VIEW

NOT TO SCALE



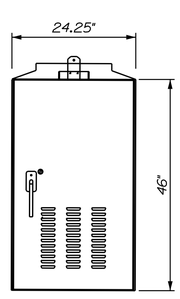
DRILLED SHAFT FOUNDATION ELEVATION VIEW

NOT TO SCALE

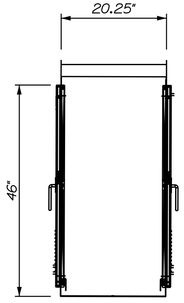


CELLULAR BOS

NOT TO SCALE



FRONT & REAR VIEWS



SECTION

POLE MOUNTED ITS EQUIPMENT CABINET DETAIL

NOT TO SCALE

NOTES:

1. DRILLED SHAFT LENGITH SHALL BE:
   A. 10'-0" FOR COHESIONLESS SOILS (SANDS)
   B. 12'-0" FOR COHESIVE SOILS (CLAYS)
2. ALL REINFORCING STEEL IS TO BE GRADE 60 AND CONFORM TO MAINEDOT STANDARD SPECIFICATION REQUIREMENTS ALONG WITH ANY PROJECT SPECIFIC SUPPLEMENTALS OR SPECIAL PROVISIONS.
3. ALL REBAR SHALL HAVE 3" COVER UNLESS OTHERWISE NOTED.
4. SHOULD THERE BE A DISCREPANCY BETWEEN THESE DETAILS AND ACTUAL OBSERVED FIELD CONDITIONS REPORT IT TO THE RESIDENT IMMEDIATELY.
5. DO NOT PROCEED WITH DEPENDENT WORK UNTIL ANY SUCH DISCREPANCY IS RESOLVED TO THE SATISFACTION OF THE RESIDENT.
6. CONCRETE TO BE CLASS LP WITH F'C = 5,000 PSI.
7. MAXIMUM DMS STRUCTURE HEIGHT IS 20 FEET FROM TOP OF FOUNDATION TO CENTER OF DMS.
8. CONTRACTOR SHALL PROVIDE A STABLE FLAT WORK SURFACE AT THE GROUND ADJACENT TO EACH CABINET DOOR.
9. CABINET DOORS SHALL BE ORIENTED AS SHOWN ON THE PLANS.
10. CABINET SHALL BE SECURED TO ITS MOUNTING POLE USING A MINIMUM OF TWO (2) STAINLESS STEEL BANDS.

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

PROJECT NO. 2418500

WIN
024185.00

ITS PLANS

vhb

	BY	DATE
PROJ. MANAGER	J. DOSTIE	
DESIGN-DETAILED	DJS	10/2023
CHECKED-REVIEWED	DJS	10/2023
DESIGN2-DETAILED2	MDS	
DESIGN3-DETAILED3		
REVISIONS 1	REMOVE FLASHING BEACONS	07/2024
REVISIONS 2		
REVISIONS 3		
REVISIONS 4		
FIELD CHANGES		

STATEWIDE
RWIS INSTALLATIONS

DETAILS

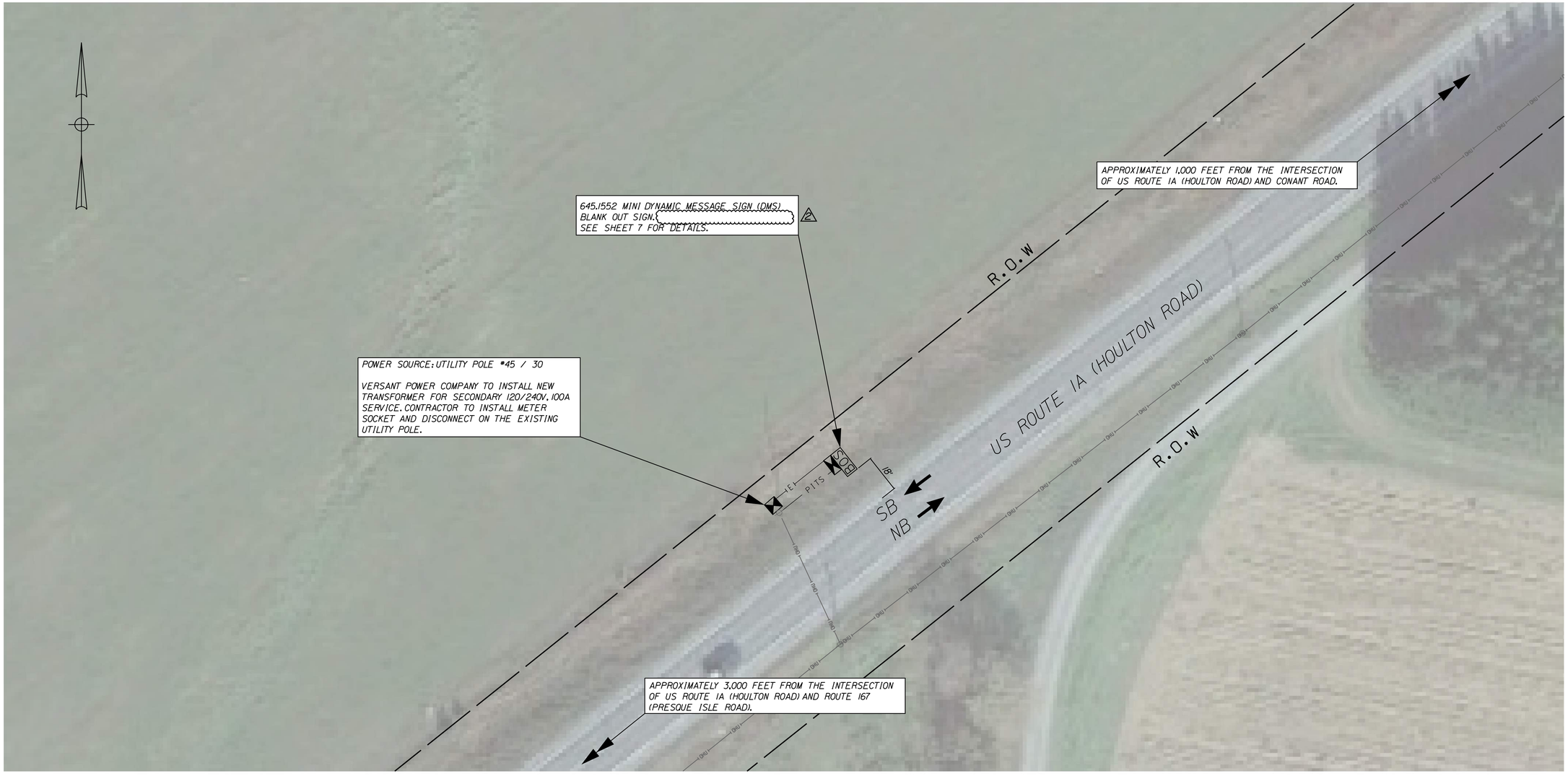
SHEET NUMBER

7

OF 17

Division: $wkgroup$ Username: $user$ Date:10/2023

Filename: $file$



LIST OF MAJOR ITEMS

ITEM NO.	EQUIPMENT AND WORK ITEMS	QUANTITY
626.21	METALLIC CONDUIT (2-INCH)	15 LF
626.21	METALLIC CONDUIT (3-INCH)	15 LF
626.22	NON-METALLIC CONDUIT (2-INCH)	35 LF
626.22	NON-METALLIC CONDUIT (3-INCH)	35 LF
626.43	30 INCH DIAMETER FOUNDATION	20 LF
645.1552	MINI DYNAMIC MESSAGE SIGN (DMS): FORT FAIRFIELD	1 LS
645.162	BREAKAWAY DEVICE MULTI POLE	1 EA
645.289	STEEL H-BEAMS POLES	806 LB
654.51	ELECTRICAL SERVICE CONNECTION: BOS 1	1 LS

2

NOTES

1. THE CONTRACTOR SHALL PROVIDE A METAL CONDUIT RISER ON THE EXISTING GUIDE POLE FOR SECONDARY POWER SERVICE CONNECTION THAT EXTENDS A MINIMUM OF 7' ABOVE GRADE.
2. THE CONTRACTOR SHALL PROVIDE A SECOND METAL CONDUIT RISER ON THE EXISTING GUIDE POLE FOR FUTURE COMMUNICATION CONNECTION.

25 0 25 50
1" = 25'-0"

* - RIGHT-OF-WAY INFORMATION FROM FEDERAL PROJECT F-051-1(4) - JANUARY 1956

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

PROJECT NO. 2418500

WIN
024185.00

ITS PLANS

vhb

PROJ. MANAGER	J. DOSTIE		
DESIGN-DETAILED	DJS	BY	DATE
CHECKED-REVIEWED	DJS	DJS	10/2023
DESIGN2-DETAILED2		MDS	10/2023
DESIGN3-DETAILED3			
REVISIONS 1	REMOVE FLASHING BEACONS		07/2024
REVISIONS 2			
REVISIONS 3			
REVISIONS 4			
FIELD CHANGES			

STATEWIDE
RWIS INSTALLATIONS

BOS 1- FORT FAIRFIELD
SITE PLAN

SHEET NUMBER
16
OF 17

Username: $user$ Date:10/2023
Division: $wkgroup$
Filename: $file$

LIST OF MAJOR ITEMS

ITEM NO.	EQUIPMENT AND WORK ITEMS	QUANTITY
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626.43	30 INCH DIAMETER FOUNDATION	20 LF
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645.162	BREAKAWAY DEVICE MULTI POLE	1 EA
645.289	STEEL H-BEAMS POLES	806 LB
654.51	ELECTRICAL SERVICE CONNECTION: BOS 2	1 LS

2

NOTES

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2. THE CONTRACTOR SHALL PROVIDE A SECOND METAL CONDUIT RISER ON THE EXISTING GUIDE POLE FOR FUTURE COMMUNICATION CONNECTION.

25 0 25 50

1" = 25'-0"

* - RIGHT-OF-WAY INFORMATION FROM FEDERAL PROJECT F-051-1(3) - APRIL 1954

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

PROJECT NO. 2418500

WIN 024185.00

ITS PLANS

vhb

PROJ. MANAGER	J. DOSTIE	BY	DATE
DESIGN-DETAILED	DJS	DJS	10/2023
CHECKED-REVIEWED	DJS	MDS	10/2023
DESIGN2-DETAILED2			
DESIGN3-DETAILED3			
REVISIONS 1	REMOVE FLASHING BEACONS		07/2024
REVISIONS 2			
REVISIONS 3			
REVISIONS 4			
FIELD CHANGES			

STATEWIDE
RWIS INSTALLATIONS

BOS 2- EASTON
SITE PLAN

SHEET NUMBER

17

OF 17

Division: $wkgroup$ Username: $user$ Date:10/2023

Filename: $file$