

SECTION 17750

VISUAL MESSAGE SIGN

PART 1 – GENERAL

1.01 DESCRIPTION

- A. Section includes requirements for a Visual Message Sign (VMS) for passenger stations as a subsystem of Caltrain station communications.

1.02 REFERENCE STANDARDS

- A. National Fire Protection Agency (NFPA):
 - 1. 70 National Electrical Code (NEC)
- B. Telecommunications Industry Association/Electronics Industries Alliance (TIA/EIA):
 - 1. 568-B Commercial Building Telecommunications Cabling Standard (including B.1, B.2, and B.3)
 - 2. 606-A Administration Standard for the Telecommunications Infrastructure
- C. Americans with Disabilities Act (ADA):
 - 1. Federal Transit Administration 49 CFR Part 37 Appendix A
- D. Department Of Defense Design Criteria Standard:
 - 1. MIL-STD-1472 Military Standards
- E. Underwriters Laboratories (UL):
 - 1. UL-969 Standard for Marking and Labeling Systems

1.03 SYSTEM REQUIREMENTS

- A. The Visual Message Sign shall provide a visual display of dynamic messages, including timetable, listing of arrival and departure times for trains; commuter rail delays, status, or travel updates; alternate service plan advisories; general safety and security advisories; construction activities and interruptions; marketing messages; and local events, emergency and security announcements.
- B. Visual Message Sign equipment shall include matrix display signs with attached sunshades, cabling, and all other equipment defined in this Section and as shown on the Contract Drawings.
- C. Each VMS shall be individually addressable from the Central Control Facility (CCF).

- D. The VMS shall be capable of displaying both text or graphic images.
- E. The VMS shall be readable under all lighting conditions, including direct low-angle sunlight. The intensity and brightness of the displays shall be automatically controlled by a compensation circuit that senses ambient light conditions.

1.04 SUBMITTALS

- A. Refer to Section 17000, Basic Communications Technical Requirements, for related and additional submittal requirements.
- B. Submit detailed catalog cut sheet including dimensions of the VMS.
- C. Submit structural design, including drawings and calculations for tube steel support members and concrete footings with seismic zone 4 designs, signed and sealed by a Structural Engineer licensed in the state of California.
- D. Submit installation drawings no later than 14 days prior to installation of the VMS. Proceed with the installation only after the Engineer approval of installation drawings.
- E. Testing: Submit test plan and procedures at least two weeks prior to commence of testing the VMS. Submit, within 15 days after conclusion of system testing, a report of final Test Procedures and the Results obtained from these tests.
- F. As-Built Documentation: Submit complete As-Built documentation and drawings, as specified in Section 17000, Basic Communications Technical Requirements, for VMS equipment.
- G. Operation and Maintenance Data: Provide documentation containing complete details of the delivered VMS equipment including operating and maintenance procedures and manuals.

1.05 SOURCE QUALITY CONTROL

- A. The functional tests shall fully exercise the system and determine functional compliance as follows:
 - 1. Test each electronic component of the VMS prior to shipment to the project site. Test results shall be submitted for Engineer approval.

PART 2 – PRODUCTS

2.01 VISUAL MESSAGE SIGNS (VMS)

- A. Each VMS shall be individually addressable from the assigned CCF for sending information, configuring memory, and for investigating the contents of memory.
- B. The VMS at the station shall be operable either from the assigned CCF or a local input device connected directly to the VMS.

- C. Locally generated visual messages shall take priority over the assigned CCF generated messages.
- D. The VMS shall be capable of displaying both text or graphic images on a large bright screen of high intensity light emitting diodes (LED). The display shall have the following characteristics:
 - 1. Visual character heights
 - 2. Automatic intensity control
 - 3. 30 degrees from center axis
 - 4. Multiple fonts
 - 5. Multiple display effects; flash, scroll, roll, graphics
 - 6. One to multi-line text
- F. Each VMS shall be capable of storing 32 preprogrammed messages.
- G. The VMS shall automatically lower its peak intensity in concert with ambient light conditions. Adjustment shall range from 25 percent level to 100 percent level.
- H. The VMS shall be equipped with manufacturer's standard sun shade.
- I. VMS systems shall be supplied in single or double sided configuration as required by the Station design. Single sided VMS shall have the same display characteristics as the double sided described in this Section.
- J. Supply double-sided visual message as shown on the Contract Drawings. The double-sided message boards shall be Daktronics Model Galaxy AF-6300 Part No. AF-6300-32X192-8-A-DF or Engineer approved equal. Each VMS shall conform to the following:
 - 1. Display Characteristics:
 - a. Luminance: amber – 4,000 cd/m² (Nits) brightness
 - b. Effects: flash, scroll, travel, roll, split, graphics
 - c. Character height: variable
 - d. Messages: multi and single line, minimum requirements of 2-lines of text, each line a minimum of 4" high and legible from 200 feet to meet ADA Standards for Transit Facilities.
 - e. Viewing angle: 30 degrees to either side of perpendicular
 - 2. Physical Characteristics:
 - a. Enclosure: NEMA 4X

- b. Enclosure length: 62.5 inches maximum
 - c. Display window: shatter-proof, vandal resistant, ultra-violet resistant, condensation prevention
 - d. Metal components: corrosion resistant
 - e. Maintenance access: access doors on each side of double-sided sign
3. A computer cable port shall be included to allow local messages to be generated via a laptop computer.
- J. Cables: Cables shall conform to the requirements of Sections 16100, Wiring Methods, and 17120, Communications Wires and Cables.
- K. Network Connectivity: The VMS shall come equipped with a factory installed 10/100 Mbps Ethernet to serial converter with a standard RJ-45 port or fiber optic interface port for connection to the Station LAN equipment.
- L. The VMS system shall be compatible with Daktronics Model Venus 1500 display control system software.
- M. Extend Caltrain's current Venus 1500 VMS software license from Daktronics with the Enterprise license extension for each new VMS display provided.
- M. The VMS displays shall be powered by Uninterruptable Power Supplies to prevent loss of emergency passenger communications for 90 minutes.
- N. Mounting: Provide the VMS mounting as shown on the Contract Drawings, including all foundation work, stanchions, mounting brackets, and bracing.
- N. Stanchions used for VMS mounting shall have an installed full-length divider to separate communication wiring from power wiring, or internal flex raceway for communication wiring.

2.02 EQUIPMENT RELIABILITY

- A. All VMS equipment shall have a Mean Time Between Failures (MTBF) of at least 100,000 hours.
- B. Maximum time to repair or restore the VMS provided shall not exceed one hour (from arrival of a maintenance technician at the site of the fault or failure) in the event of fault or failure of any subsystem or physical unit excluding cabling which runs in conduit. Equipment availability shall be such that only one side of one VMS sign is inoperative at any given time.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. All materials and installation necessary to complete the VMS System work shall conform to the requirements of the applicable standards and in accordance with the manufacturer's recommendations.
- B. Provide complete electrical and mechanical design for the installation of the VMS equipment.
- C. Provide necessary conduit and wiring, both power and data, to complete the VMS installation. Where two or more VMS are connected to the dual Ethernet switches at the same DC (Distribution Cabinet), for redundancy, connect odd number VMS to first Ethernet Switch and even number VMS to the second Ethernet switch.
- D. Verify that all equipment is the appropriate model, properly installed and connected in accordance with the Contract Drawings. The quality of the installation shall be demonstrated by tests for continuity, visual inspection and any other tests required by this Section.
- E. Install VMS stanchions, including pole, support arms, and foundation, as shown on the Contract drawings and as specified in the Contract Specifications.
- F. Mount VMS on stanchions. Verify that all mechanical connections are made and secure.
- G. Apply all IP addresses to the VMSs as required by Owner's network standards and recorded in the network Domain Name Server. All IP addresses shall be issued by the Caltrain IT network administrator. If required by the Caltrain administrator, implement VMS VLAN.
- H. Perform startup of the VMS.

3.02 VMS INSTALLATION FOR STATIONS

- A. Mount enclosures on tube steel support members. Locations are shown on the Contract Drawings. Mounting hardware and mounting arrangement shall be in accordance with Contract Drawings and manufacturer's recommendations. The VMS shall be secured and plumbed, and clearly viewable by the passengers.
- B. VMS support columns shall be securely attached to concrete footing.
- C. Mount VMS to provide a minimum 8 foot 2 inch vertical clearance and a maximum 9 foot from the platform floor to the bottom of the VMS.
- D. The end of the VMS sign shall not extend beyond the horizontal arm of the support pole in the direction of the tracks.
- E. The VMS shall be mounted to the support pole to meet seismic zone 4 code.
- F. Repair any damage done to existing equipment (e.g. supports, wires, or similar items) to the satisfaction of the Engineer.

3.03 CABLE INSTALLATION AND TERMINATIONS

- A. Cables in Conduits:
 - 1. Verify that communications conduits have been inspected and cleaned prior to cable installation. Conduits shall have a clean, smooth concentric interior surface.
 - 2. Crossover of cables shall be avoided when cables are pulled into conduits. Care shall be taken not to have the conductors pulled tight or twisted in conduit fittings or boxes. All cables to be installed in a single conduit shall be pulled simultaneously.
- B. Verify that all cables are properly routed, supported, terminated and labeled.
- C. Wires and cables shall be continuous without splices between junction boxes, terminals, pull boxes, manholes and hand holes.
- D. Terminate the cables installed between the VMS and the communications cabinets. The termination shall allow quick disconnection of the VMS.

3.04 FIELD TESTING

- A. Perform tests in accordance to the Engineer approved test plan and procedures.
- B. Field tests shall include functional and operational tests of equipment for all message features from the CCF as well as at the station.
- C. The functional tests shall fully exercise the system and determine functional compliance as follows:
 - 1. Perform end-to-end tests for every control and indication point.
 - 2. Verify that all equipment is installed in its proper location in accordance with the approved design. Verify that all mechanical and electrical connections are made and secure.
- D. Perform the following Operational tests:
 - 1. Verify full functional communication between the CCF and each of the existing stations.
 - 2. Verify all features are available at each of the Control Consoles at the CCF and they work as specified with the station.
 - 3. Verify on each VMS the display of the CCF generated messages at the station.
 - 4. Verify on each VMS the display of messages generated on a locally connected laptop computer at the station.

- E. Perform integrated system testing to ensure full functionality with all existing systems of which the VMS is a part.

END OF SECTION