ITEM 683.97910001 – MAINLINE ELECTRONIC SCREENING

DESCRIPTION.
Under this item the Contractor shall furnish and install equipment associated with a Mainline Electronic Screening (E-screening) System for commercial vehicle compliance operations in designated locations as specified in the contract documents and as directed by the Engineer. The purpose of the E-screening System is to screen commercial vehicles while traveling on the roadway at normal highway speeds. The system will provide enforcement personnel with more information to help focus safety inspection and weight compliance operations on commercial vehicles that may have a greater probability of non-compliance with federal and state regulations. The mainline e-screening system shall include various components or subsystems located at different locations along the roadway that interact together. At a minimum, it will have hardware and software interfaces to control at a minimum WIM scales or sensors, Automated Vehicle Identification (AVI) using Dedicated Short Range Communications (DSRC), License Plate Recognition (LPR) camera system, and an overview camera.

MATERIALS.
All E-screening hardware shall be field hardened to perform in the Northeast climate. The mainline e-screening equipment (hardware and software) shall include but not limited to the following:
- Weigh-In-Motion (WIM) sensors or scales
- Inductance loop detectors
- Automated Vehicle Identification (AVI) equipment such as transponder tag reader and antenna
- License Plate Recognition Camera
- Overview Camera
- Software/Hardware needed for traffic monitoring and commercial vehicle enforcement
- Roadside cabinet

FUNCTIONAL REQUIREMENTS.
The equipment under this item will be integrated to form a complete mainline e-screening system. The system will essentially be divided in four locations; Advance location, Notification location, Inspection location, and Compliance location. The system will utilize dedicated short range communications (DSRC) in order to relay information using in-cab transponder tags, transponder readers and antennas. If there is no transponder read, the LPR will be used as a substitute for this equipment. The system shall be developed as a network based solution where data is uploaded/downloaded from an existing central server to the roadside system.

Advance Location
The advance location will be equipped with at a minimum WIM, AVI, LPR, overview camera and the roadside system. The screening process will begin when the commercial vehicle reaches this location. The AVI will be comprised of an in-vehicle transponder tag used to transmit unique information about the commercial vehicle to an antenna fixed above the roadway using 915 MHz and/or 5.9 GHz communications where it is then sent to the roadside system. The weight of the vehicle along with an image of the license plate and an overview image of the
commercial vehicle are captured. The system will merge data from the different components into one unified record. At the same time, the system will inquire with federal and state databases to check against credential and permit status. This information will be sent back to the roadside system where a decision will be made based on selected screening criteria to have the commercial vehicle pull in or bypass the inspection location. When no transponder tag is read, the LPR will be used as a substitute for the AVI equipment and identification will be based on the license plate read. The commercial vehicle will report to the inspection location for further instruction based on output from the system. Other equipment may be integrated based on application and location to give more information.

Notification Location
The Notification location will be equipped with a transponder reader and antenna (915 MHz and/or 5.9GHz) to relay the screening decision back to the commercial vehicle. Once a decision is made at the ROC, a message is sent to the Notification location where it will be relayed through the transponder reader and antenna to the in-cab notification. If the LPR will be used, notification will not happen and the commercial vehicle will need to report to the inspection location.

Inspection Location
The inspection location will be considered the end user location. Personnel will use laptops in order to gain access to the e-screening system. Enforcement personnel will have the ability to log in to the system and screen commercial vehicles based on sorting criteria that was set for that day’s screening operations. At the same time, personnel will have the ability access other databases to conduct further inspection.

Compliance Location
The compliance location will be used to ensure that any commercial vehicle that did not report to the site, received an in-cab notification to bypass the inspection location because screening criteria was met.

All field equipment installed shall be operational in all weather conditions, 24 hours a day/ 7 days a week. Data collected shall conform to NYSDOT Traffic Monitoring Standards (EI 01-001). Data stored must be able to be accessed and downloaded remotely via TCP/IP Internet connection. The system shall be compatible with all Windows based operating systems and comply with the National Transportation Communications for ITS Protocol (NTCIP).

SPECIFIC REQUIREMENTS.

WEIGH IN MOTION (WIM)
WIM sensors or scales used shall conform to the associated specification as noted in the contract documents.

LOOP DETECTORS
Loop detectors used shall conform to the associated specification as noted in the contract documents.

**AUTOMATED VEHICLE IDENTIFICATION (AVI)**
Transponder readers and antennas used shall conform to the associated specification as noted in the contract documents.

**LICENSE PLATE RECOGNITION (LPR)**
LPR system shall conform to the associated specification as noted in the contract documents.

**OVERVIEW VIDEO CAMERA**
The overview camera system shall conform to the associated specification as noted in the contract documents.

**E-SCREENING ELECTRONICS/SOFTWARE**
The e-screening electronics and software shall be used to capture, identify, and screen commercial vehicles. It shall contain the interface and signal conditioning for the WIM, AVI, and LPR and overview cameras. Data shall be integrated from the various subsystems (WIM, AVI, LPR, Overview camera, etc.) with data contained in the New York Commercial Vehicle Information Exchange Window (CVIEW). It will be compiled and formatted to create individual records on commercial vehicles for enforcement purposes. All sensor modules must be field hardened, field replaceable and have built-in signal conditioning, self testing, and built-in fault diagnosis. Operation of electronics equipment must function in extreme environments found in New York State. Documentation shall be provided that shows equipment can meet these specifications. At a minimum, it shall have the following characteristics:

- Collect data on a 24/7 basis
- Ability to operate as a data collection site that complies with FHWA & NYSDOT traffic data collection guidelines including New York State’s class compliance table.
- Roadside system shall connect to existing central server located in NYSDOT Main Office
- Ability to synchronize State and Federal data directly from NY Commercial Vehicle Information Exchange Window (CVIEW) or from an exported XML or comma delimited file
- Must be compliant with Federal programs such as Commercial Vehicle Information Systems and Networks (CVISN) and Performance and Registration Information Systems Management (PRISM)
- Support for five or more user assigned fields for screening, with the ability to display a label for each in the interface so the system user can clearly see why a vehicle has received a pull in decision.
• Support multilane screening conditions
• Microsoft Windows XP™ SP2 or later compatible

The data collected at a site shall be used in a real-time manner or used for historical analysis. The operator interface shall be capable of real-time operations for on-site commercial vehicle screening and off-site monitoring. It shall have the ability to provide historical records for a minimum of one month through the use of a search function using time & date or record number for queries when accessing the roadside server and up to a minimum of one year when accessing the central server.

USER INTERFACE
Data from the mainline screening system shall be viewable in two applications: mainline electronic screening which includes commercial vehicle report and bypass and the virtual weigh station web browser. The first application allows the data to be viewed in a real-time, active screening application. It will process data obtained from the WIM and from federal and state databases. This information obtained from the vehicle and carrier records will be used to determine whether or not the screened commercial vehicle will report for further inspection or bypass the inspection location. The system will have the ability to create lists of vehicles and carriers that must report to the to the inspection location that overrides any compliance and credential bypass. The operator will be notified with an indicator on the display of any warnings or violations. The reason for the indication will be prominently displayed for the commercial vehicle in question. This information will be stored for viewing by personnel. All information shall be viewed by all users. Screening criteria, list overrides and any system settings will be adjusted depending on user access privileges.

The second application will be to use a web browser to view the VWS. The VWS provides high level information based on what is provided by the mainline e-screening application such as a weight and credential output. Using this application, all commercial vehicles will report to the inspection location for further instruction.

At a minimum the user interface for the mainline e-screening program shall have the ability to be run in an environment where the operators utilize individual laptops and be viewed in a web browser. Multiple users shall have the ability to access the application at one time. The VWS application shall be viewed in a web browser which will allow for users to utilize individual laptops or from a desktop PC.

At a minimum, the user interface for the mainline e-screening application shall have the following information displayed about the screened vehicle:

○ Vehicle images (overview image)
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- Record number
- Date & time
- Lane (If applicable)
- Class
- Speed
- Recorded GVW
- Max GVW
- Length
- Axle Information
  - Number
  - Distance
  - Weight
  - Allowable weight
- Diagram to show characteristics of the screened vehicle including length, axle weight and position, and highlighted axles when weight violations occur.
- Warning notification of potential state and federal credential/permit violations noted in text along with a visual indicator
- Ability to create hotlists based on carrier and vehicle
- Support for five or more user assigned fields for screening, with the ability to display a label for each in the interface so the system user can clearly see why a vehicle has received a pull in decision
- The ability to randomly pull in vehicles with a user adjustable value
- Ability to assign different levels of access
- Support multiple lanes of operation

At a minimum, the user interface for the VWS shall have the following information displayed
about the screened vehicle contained on a single web page:

- Vehicle images (plate and overview image)
- Record number
- Date & time
- Lane (If applicable)
- Class
- Speed
- Recorded GVW
- Max GVW
- 18,000K ESAL
- Length
- Axle Information
  - Number
  - Distance
  - Weight
  - Allowable weight
- Vehicle diagram to show characteristics of the screened vehicle including length, axle weight and position, and highlighted axles when weight violations occur.
- Warning notification of potential state and federal credential/permit violations noted in text along with a visual indicator

The vendor shall provide software documentation, support, upgrades, and reasonable modifications to keep software consistent with the “New York State Traffic Monitoring Standards for Contractual Agreements” and the NYSDOT Traffic Monitoring Telemetry System Specification for a period of ten years at no additional cost to the State.

Programs (software and firmware) which perform the equipment configuration, interrogation,
data collection, site management, processing, and export functions shall be warranted for a period of ten years. During this warranty period, the vendor agrees to provide support, modification, enhancements, and updates necessary to maintain the continued usefulness of the equipment and programs (software and firmware) in the functions for which they were originally purchased at no additional cost to the Purchaser.

CONSTRUCTION DETAILS.
The Contractor shall furnish and install the specified Mainline Electronic Screening equipment at the locations shown on the plans and as ordered by the Engineer. All associated in-road equipment (WIM & loops), roadside equipment (cameras, antennas, electronics) shall be installed as noted in the contract documents. Specifications shall be followed for equipment listed. The Contractor shall provide for the presence of a vendor or manufacturer representative with sufficient knowledge and experience to be on site to direct and assist with the proper installation of the in-road equipment and related equipment such as WIM, antennas, overview camera and LPR as well as the integration of the entire system. All necessary equipment that needs to be installed in a roadside cabinet shall follow the cabinet specification contained in the contract documents or as directed by the engineer. A site survey shall be performed if RF communications is considered for the local area network communications. All incidental parts which are necessary to complete the installation, but are not specified herein or on the plans, shall be supplied as necessary to provide a complete and properly operating e-screening system. Installation shall include civil and electrical work as well as the coordination of work zone traffic control. Integration shall include testing and commissioning of the e-screening system.

ACCEPTANCE
Acceptance of each upgraded or newly installed site will be based on compliance with the specifications and special provisions contained in this specification, contract documents, and the NYSDOT Standard Specifications for Construction and Materials.

A NYSDOT representative will inspect each site, both while work is being performed and after all work has been completed, to ensure that compliance with specifications is met.

All sites must be in complete working order for at least one 30 day period and satisfy the requirements set forth in this specification and requirements of the Traffic Monitoring Telemetry System Specification prior to acceptance by the NYSDOT.

The Contractor shall submit three copies of test procedures and data forms for each of the tests to be conducted for written approval by the Engineer. The test procedures shall indicate the use of test fixtures, instruments, and/or system equipment that is required to perform specific test. All test procedures shall be submitted ten days prior to the start of the respective test. Testing shall demonstrate all functional capabilities of the system as described herein.

The Contractor shall supply the NYSDOT with a minimum of five hard copies and an electronic
copy of the operation manual. Training shall be offered to a minimum of 10 people which will include hands-on guidance and all materials needed for the training. Additional training shall also be provided upon request when needed to serve as a refresher course. If needed, the NYSDOT will provide space for any training.

**WARRANTY**
The two year warranty period will not begin for an accepted site until the first day of the quarter following acceptance (January 1, April 1, July 1, and October 1). The Contractor will be responsible for all normal warranty actions (equipment failure, required repairs, etc.), at the Contractors expense, between the acceptance date and the beginning of the official two year warranty period. The bidder should determine the actual costs for warranty requirements and include the costs in the bid proposal.

**METHOD OF MEASUREMENT.**
The work will be measured as a per unit basis that is satisfactorily installed.

**BASIS OF PAYMENT.**
The unit price bid for the Mainline Electronic Screening system include the cost of all labor, materials, equipment, necessary to satisfactorily perform the work. Installation shall include procurement, placement and installation of all electronics and related equipment, except that installation of in-road sensors or scale, installation of LPR, installation of overview camera, transponder reader and antenna, and installation of cabinet conduit excavation and backfill, conduit, pullboxes, standard mounting poles and work zone traffic control will be paid for separately. The system shall be tested and operating including the replacement of any software or hardware that fails during the performance period. During the performance period, the Contractor will be required to perform any and all remedial or replacement work necessary to maintain satisfactory performance of the system.