1. DESCRIPTION

Furnish, operate, maintain, and install a system of high-end Closed-Circuit Television (CCTV) cameras capable of providing real-time video streaming and snapshots to the public and District Operations staff via both programmatic and System Vendor software access mechanisms.

A CCTV system is the complete camera package including cameras, hardware, software, required communications, mount assemblies, mounting brackets, connectors, drivers, power supplies, various components, and hardware constituting a complete operational camera unit.

2. MATERIALS

For the installation of all camera assemblies, use new materials that meet the following specifications. Provide all new materials that comply with the details shown on the plans and the requirements of this Item.

2.1. Camera Specifications:

- IP66/NEMA weather resistant aluminum enclosure with a polycarbonate clear dome.
- Live video stream in H.264 format.
- 4K broadcast quality video clip capability.
- H.264, MPEG-4 Part 10/AVC, Motion JPEG video compression.
- 50/60fps at 1080p, 25/30fps at 4K resolution.
- 8.3 Megapixel images (3840 x 2160 pixels).
- Up to 500 Megapixels auto-generated 360° panoramas.
- Zoom: 12X Optical, 12X Digital.
- Pan/Tilt: Pan Range 360° Continuous Pan, Tilt: +20° to -90°.
- Minimum visible distance at zoom of ½ mile away from camera placement.
- Capable of maintaining multiple preset compositions.
- Auto focus.
- Day/Night automatic iris adjustment.
- Communications: RJ-45 10BASE-T/100BASE-TX PoE.
- 4G cellular modem.
- On-Board Data Back-Up to provide a minimum of thirty days of on-board image retention.
- Power over Ethernet IEEE 802.3af/802.3at Type 1 Class 3.
- 120VAC, 220-230VAC or 12VDC power.

2.2. Weather Station:

The Contractor will provide a minimum of one (1) weather station co-installed with one of the camera locations, with the following minimum requirements:

- Real-time temperature,
- Barometer pressure,
- Wind speed and direction, and,
- Wind gust and severity.

Weather Station will be considered subsidiary to this item.

2.3. System Interface:
The camera system must be operated via an internet based Software as a Service (SaaS) solution. This online interface will be managed and supported by the System Vendor. The service will be available for the term of the project and allow the viewing of live video and High Definition digital still images captured and stored of the project on both mobile and desktop platforms. The system solution must include the following minimum features.

- Cross-platform access on desktop and mobile devices.
- Display project name and logo on all images and video from all cameras.
- Project Dashboard for viewing and accessing multiple cameras.
- Current date/real-time clock visible on the dashboard.
- Real-time live video viewing.
- User-controllable Pan, Tilt and Zoom.
- User-controllable settings for creating and editing multiple preset compositions.
- The system will capture and upload images every 5 min., 24 hr. per day.
- Archive all images.
- Automatically generated daily panoramas.
- Monthly and on demand ultra HD panoramas.
- Picture in picture capability for viewing live video and High Definition Megapixel images simultaneously.
- Digital Pan, Tilt and Zoom capability within a High Definition image.
- Instant live snapshot capability in addition to preset schedule.
- Programmatic access to snapshot URL for remote use, outside of system dashboard.
- Programmatic access to video via embed code.
- Timeline navigation system for selecting specific images and times from archive.
- Time-lapse feature with optional time date overlay for instant time-lapse viewing, downloading and embedding.
- Full Screen Mode for displaying video and complete image without any graphical frame.
- Photo Filters and Graphical Markup Tools for detailing and creating notes with graphical overlays on images, including project title, logo and time date stamp.
- Image Comparison capabilities for comparing two images taken at different times, overlaid on top of each other.
- Image sharing tools for posting and sharing camera images with notes.
- Social media integration Tools sharing project images and notes on Facebook and Twitter.
- Programmatic access to social media tools for remote display.
- Automatically generated daily/weekly project progress update email with camera image and weather.
- Graphical weather applet displaying local weather data with satellite and updating radar imaging.
- Integration of maps, aerial and satellite imagery.
- Graphical data management tools showing archived and current system status of solar amperage, battery power remaining, wireless radio connectivity, and device location. (solar power and battery power remaining only applicable when camera is powered by solar energy).

2.4. **System Security:**
The camera system must have the following, minimum, security provisions:

- Access to account and project dashboard to include four levels of account access and rights (managed via password protection),
- IP address block/permission,
- SSL protection of user login password.

2.5. **System Management:**
The contractor will ensure that the camera system will have the following system management provisions:
• The Texas Department of Transportation (TxDOT) and their designees will have full access to the camera system, camera software, camera dashboard, and all system capabilities, including programmatic remote access.
• Images will be maintained on the System Vendor’s servers for reference available at all times during the life of the project and for at least 60 days after completion.
• All images will be protected on servers owned and operated by the System Vendor and located in a secure area at the System Vendor’s location.

2.6. System Maintenance:
The Contractor must provide, either through contracted use of the System Vendor, or via Contractor’s personnel, all system service and maintenance including:

• Cleaning of the camera system throughout the life of the project.
• Ensuring all system components remain in operation.
• A maximum 48-hour acknowledgement window upon notification of system issues by the Texas Department of Transportation (TxDOT) and/or its designees.
• A minimum 1-week notice for any system components that need to be moved to reduce interference with construction operations.
• A maximum 2-week return to service window from the time of moving the system component.
• All costs associated with operation of the system, system component equipment, and supporting equipment including communications and power, for the lifetime of the project, including all costs associated with equipment relocation as necessary to reduce interference with construction operations.
• The System Vendor must provide a minimum of one (1) time-lapse movie(s) at the end of the project from a camera source selected by the Texas Department of Transportation or its designee. Time-lapses will be professionally edited by a video editor using image stabilization software. The movie will start with a graphic, incorporating project title, date and logo. Periods of bad weather or inactivity should be removed to produce a compelling and consistent movie. A machine edited movie will not be acceptable.

3. CONSTRUCTION
The Contractor must provide a minimum of five (5) CCTV locations throughout the project limits starting at approximately ½ mile from the southernmost limit with spacings of approximately 1 mile. Camera placements may be located:

• With permission and written agreement, on businesses adjoining the construction project right of way, provided a clear line of sight is available for the minimum ½ mile viewing distance, in either direction, required along Interstate 35,

Or,

• With permission from the Texas Department of Transportation (TxDOT), on permanent infrastructure that will not be moved or impacted by construction, provided a clear line of sight is available for the minimum ½ mile viewing distance, in either direction, required along Interstate 35,

Or,

• By placement of the camera and supporting power and communications infrastructure on a temporary pole meeting TxDOT minimum requirements of:
  a. The fixed pole must be (40 ft. / 12 m height recommended) and 3 in. / 8 mm minimum diameter.
b. The Contractor will supply all equipment required for safe and secure access to the camera location for technicians performing installation and maintenance services, including building access, bucket truck and/or lift.

c. Provided a clear line of sight is available for the minimum ½ mi. viewing distance, in either direction, required along Interstate 35

Or,

- By placement of the camera and supporting power and communication infrastructure on a mobile platform within the project right of way capable of providing a clear line of sight for the minimum ½ mile viewing distance, in either direction, required along Interstate 35.

a. The Contractor will supply all equipment required for safe and secure access to the camera location for technicians performing installation and maintenance services, including bucket truck and/or lift.

Consult with the proper utility company before beginning work. Coordinate mounting design with the respective entity before placement. Replace damaged components.

Furnish and install each camera assembly. The Department may shift an assembly's location, if necessary to secure a more desirable location or to avoid conflicts.

Install cables and equipment necessary for fixture connection in a manner that minimizes visibility from pedestrian and roadway traffic.

Support and align assemblies with necessary hangers, supporting members, and mounts for proper installation as approved by the Engineer.

Follow NEC and local utility company requirements when installing the camera assemblies. All camera assemblies must be properly wired and connected to branch circuits, tested, and left ready for operation. Coordinate the utility companies' work for providing service.

4. MEASUREMENT

Streaming CCTV Project Monitoring System will be measured by the month.

5. PAYMENT

The work performed and materials furnished in accordance with this Item and measured as provided under “Measurement” will be paid for at the unit price bid for “CCTV Monitoring System,”. This price is full compensation for furnishing; installing; aiming; cameras; software; power supplies; mounting brackets; conductors and connections; conduit; power cable and connectors; system performance testing & adjustments; equipment; labor; tools; maintenance; and incidentals.