REQUEST FOR PROPOSALS
CITY OF BLAKELY
NEW CAMERA TRUCK

The City of Blakely will accept bids for one (1) New Camera Truck until 10:00 am on November 13, 2020. All proposals will be delivered to M.E. Sack Engineering, 515 North Main Street, Hinesville, Georgia 31313, at the date and time stated.

Associated specifications may be downloaded from M.E. Sack Engineering's website at http://www.mesack.com/category/bidding/. Specifications include compliance checklists and are required as part of the bid. Failure to submit associated specifications will result in an incomplete bid and will be rejected.

Bids should clearly identify the total unit price. Bids must be sealed and clearly marked "**Sealed Bid for Blakely New Camera Truck**" on the outside front of the envelope containing the bid.

Once the bid has been awarded to a vendor and a delivery date has been established, the vendor is expected to deliver the equipment on or before that date. If the equipment is not delivered by the date agreed upon by both parties, the vendor agrees to pay the City of Blakely a $100.00 per day penalty until the equipment is delivered.

The City of Blakely reserves the right to refuse any and all bids.

Detailed Specifications For Blakely, City of (GA)

2WD REGULAR CAB 205"WB 19,500 GVWR

ENGINE
6.7L V8 DIESEL ENGINE

TRANSMISSION
6-SPEED AUTOMATIC TRANSMISSION

AIR CONDITIONING
MANUAL AIR CONDITIONING

STANDARD EQUIPMENT
Mechanical
Rear wheel drive
Dual rear wheels
Power steering
Power 4-wheel disc brakes

Comply Yes_____ No_____

16' CARGO BOX

LED stop/turn/tail and clearance lights
Full width Barn doors with CAM (Pipe) Locks on each door
Two (2) Master Lock
Kemlite on inside of rear doors
Back-Up Alarm

Comply Yes_____ No_____

TWO (2) STEP REAR BUMPER

Comply Yes_____ No_____

KICKPLATE TRANSPORTER STORAGE

Comply Yes_____ No_____

EVO 3.0 HIGH CUBE VAN CONTROL ROOM INTERIOR

EXTERIOR

The vehicle shall include front and rear amber LED warning beacons mounted on the roof. The on/off switch for the beacons shall be located in the cab of the truck to give the operator the ability to turn them on before exiting the vehicle, thus enhancing the safety of the outside environment before they enter it. Beacon switches that are mounted in a location other than the cab of the truck shall be deemed unacceptable due to the inability to turn them on before exiting the vehicle.

Two adjustable 12V LED floodlights (work lights) shall be mounted inside of the vehicle box, at the rear header. The floodlight placement on the inside of the box allows the operator to safely adjust them while standing on the inside of the truck box facing rearward. Floodlights that are mounted on the outside of the vehicle shall be deemed unacceptable due to the awkwardness of

adjustments.

INTERIOR
The van interior shall be divided into two areas - an Operators Control Room and an Equipment/ Storage Room. A full width laminate covered bulkhead wall constructed with cabinet grade plywood with an operator pass through door will divide the two areas. The bulkhead wall will have a 3" aluminum kick plate (minimum 1/8" thick) attached at the base for protection from possible damage caused by impact.

VAN CONTROL ROOM
The Control Room shall be located at the front of the van body. All cabinets and hinged cabinet doors shall be constructed of 7ply cabinet grade plywood for durability. All cabinets will be mounted above the floor surface on 1/4" nylon spacers to minimize any potential water damage from absorption of water during the wash down process. A 3" aluminum kick plate (minimum 1/8" thick) will be installed at the base of all cabinets and walls to provide maximum protection against potential damage caused by impact or moisture. Cabinets not constructed of 7ply cabinet grade plywood shall be deemed unacceptable. All hinged cabinet doors will have a metal flush (recessed) mounted positive latch, eliminating the unwanted opening of doors during transit. Plastic door latches or surface mounted barrel bolt type latches shall be deemed unacceptable on any cabinet doors.

Cabinets installed directly on the floor surface without nylon spacers and cabinets constructed with particle/MDF board shall be deemed unacceptable due to the possibility of water damage. Cabinets installed with no 3" aluminum kick plate at the base shall be deemed unacceptable due to lack of protection from potential long term impact damage.

The Control Room floor shall be constructed of a 3/4" cabinet grade plywood substrate with 1/4" tall water relief channels attached to the bottom of the floor to prevent moisture from gathering under the floor, thus minimizing potential long term water damage. The plywood substrate shall be covered with Lonseal flooring. The Control Room walls and ceiling will be covered with a seamless Kemlite laminate. The Kemlite laminate on the walls and ceiling shall be void of any seams or exposed screws for easy cleaning. Laminate wall and ceiling covering that is not void of seams and screws will be deemed unacceptable due to the difficulty of cleaning.

A plywood control console shall be used for mounting all electronic components. The control console shall be designed to bring all controls within comfortable reach of the operator. The control console shall be positioned so the operator can see the Equipment Room area through a tinted window in the bulkhead wall. The control console shall be equipped with 19" Industrial rack rails for the electronic components. A 1" thick counter top constructed with 7ply cabinet grade plywood shall be provided. The counter top shall be covered with an Industrial grade "standard" Laminate (.062" thick) for durability.

A 12V "high intensity" LED Indirect Light fixture shall be supplied for optimum lighting in the Control Room. Direct Lighting shall be deemed unacceptable due to the glare on the video monitor and track (halogen) lighting shall be deemed unacceptable due to the heat produced from the bulbs.

(2) Duplex interior electrical outlet shall be supplied in the Control Room.

Comply Yes_____ No_____

ROOF MOUNTED AIR CONDITIONER

Comply Yes_____ No_____

BENCH SEAT

Comply Yes_____ No_____

CUSHION FOR BENCH SEAT

Comply Yes_____ No_____

CURBSIDE DOOR

Comply Yes_____ No_____

SIDE DOOR STEPS

Comply Yes_____ No_____

EVO 3.0 HIGH CUBE VAN EQUIPMENT ROOM INTERIOR

EQUIPMENT/ STORAGE ROOM

The Equipment/Storage Room will be located in the rear of the truck body. The side walls, rear doors, and ceiling shall be constructed of 3/8" plywood and covered with a protective washable Kemlite laminate. The Kemlite laminate on the walls and ceiling of the Equipment Room shall be void of any seams or exposed screws for easy cleaning. Laminate wall and ceiling covering that is not void of seams and screws will be deemed unacceptable due to the difficulty of cleaning.

The electrical system shall be designed to fully meet the environmental, safety, and electrical requirements of the vehicle as specified. All electronics will be housed in a climate-controlled cabinet.

A 12V "high intensity" LED Indirect Light fixture shall be supplied for optimum Lighting in the Equipment Room. All Equipment Room electrical boxes, outlets, and wiring conduit will be UL approved for exterior use in a wet environment. One (1) duplex interior electrical outlet will be supplied in the Equipment Room area. No exposed wiring will be acceptable. All electrical wiring shall be in accordance with applicable electrical codes Including NEC. An automatic transfer switch for Shore / Generator Power shall be installed and will be activated upon receipt of power with a minimum 40 second delay to protect all electronic components and assemblies.

Brackets shall be mounted on the passenger side rear door to hold all downhole poles, invert rollers and manhole adapter hooks when required.

Comply Yes_____ No_____

MULTI-OUTLET WORKSTATION WITH LIGHTS AND USB PORTS

Comply Yes_____ No_____

20 GALLON WASHDOWN SYSTEM WITH RETRACTABLE HOSE REEL WITH 25' WATER HOSE AND NOZZLE

A 20 gallon fresh water tank with a water pump to maintain water pressure for wash down of all cameras, transporters, and other related equipment.

Comply Yes_____ No_____

EQUIPMENT ROOM CABINETRY

A lower cabinet shall be supplied in the equipment room. An upper storage cabinet shall be mounted over the lower storage cabinet.

Comply Yes_____ No_____

24" COLOR FLATSCREEN MONITOR

Comply Yes_____ No_____

QUIET DIESEL POWERED ELECTRICAL 7.5 KW GENERATOR

The power source for the system will be a 7,500-watt commercial grade alternating current quiet diesel powered generator consisting of the following (minimum):

Generator

Shall provide optimum power by utilizing a pure sine wave specially designed for use with electronic equipment.

Shall be the product of a firm regularly engaged in the manufacture of diesel powered generators.

Shall be designed for commercial mobile applications capable of handling the load of Intermittent heavy-duty use for sewerline television inspection units.

Shall be capable of continuously producing 7500 watts of power (62.5 amps) at 120 volts AC while rotating at 3600 RPM without undue heating, wear or vibration.

Shall be enclosed in a sound-attenuated housing and furnished with a 3-point vibration Isolation to ensure quiet operation.

Shall have an intake silencer and heavy-duty industrial muffler for reduced noise and ease of Installation.

Shall include self-diagnostic capabilities to simplify troubleshooting.

Shall include digital voltage regulation to ensure voltage stability as loads change. Adjustments will not be required.

Shall include overvoltage, low oil pressure, overtemp, overspeed/underspeed, and overload protections.

Shall meet the 1995 California Emissions Standards.

Weight: 420 lb.

Size: Length-36.3 in; Width-24.2 in; Height- 22.3 in

Sound Level: 67dB(A) at 10 ft, ½ load before installation

Engine

Shall be a 4-cycle, 3 cylinder, liquid-cooled diesel engine.

Shall be designed to operate the generator at 60 cycles + or - 2 cps and shall be governor controlled to maintain these cycles under varying load conditions.

Starting system: remote, 12v
Shall be designed with top-mounted switches, oil and coolant level check/fill for convenience.
Fuel consumption: up to 0.55 gal/hr diesel
Oil capacity: 2.8 quarts
Coolant capacity: 4 quarts

Comply Yes_____ No_____

GENERATOR COMPARTMENT

A 30-amp external shore power receptacle shall be provided.

Shore power to generator switchover shall be accomplish through a UL approved automatic changeover switch with suitable time delay to avoid damaging power surges.

A 25 foot, 30 A shore power extension cable shall be supplied.

Comply Yes_____ No_____

SYSTEM ENGINEERING PANEL

The engineering panel shall provide monitoring of the power supply to the system. The panel circuitry shall be assembled in a rack-mounted chassis for Installation in a built in control console. The faceplate shall be heavy gauge aluminum finished with an Industrial grade surface and shall have permanent labels designating the function of the various switches and controls. Provisions shall be made on the panel for the following Items:

AC Volt Readout
AC Frequency Readout (58-62 Hertz)
Generator Remote Start/Stop
Generator Run Time Readout
Flood Light Switch

Comply Yes_____ No_____

PAN, TILT, and OPTICAL ZOOM LED CAMERA

The Pan, Tilt, and Zoom Camera shall be designed for use in 6" diameter relined pipe and Larger. The unit will be designed to provide close-up views of pipe walls during inspection Including minute defects and voids. The unit will be color, shall operate optimally through a maximum of 1200' multi conductor and shall consist of the following (minimum):

Camera

Chassis construction shall include 100% solid state circuitry designed to withstand shocks and vibration normally sustained while being pulled through a pipe.

The camera module shall be an industrial model only.

REPACKAGED CONSUMER GRADE CAMERAS (I.E. CAMCORDERS) WILL BE DEEMED UNACCEPTABLE FOR USE IN A PIPELINE TELEVISION INSPECTION SYSTEM.

Operating temperature ranges of the camera shall be 0 degrees C to 50 degrees C.

CAMERAS INCORPORATING BUILT IN LIGHTING SYSTEMS THAT GENERATE HEAT EXCEEDING THE OPERATING TEMPERATURE PARAMETERS LISTED BY THE BASE STOCK CAMERA MANUFACTURER WILL NOT BE ACCEPTABLE.

The camera shall develop a true color and transmit a sharp image picture on the video bandwidths only.

PICTURE TRANSMISSION SYSTEMS THAT REQUIRE THE USE OF R.F. SUPPRESSORS AND ARE SUBJECT TO LOCAL TRANSMITTER INTERFERENCE SHALL NOT QUALIFY AS BEING EQUAL.

Full color video bandwidths shall be provided with no sacrifice of low frequency response.

There shall be no visible streaking of the low frequency test bars when viewing a standard EIA Test Chart.

Shall not exceed an overall length of 14.5", a head length of 5.9", and a camera barrel diameter of 2.5".

Camera Optical & Digital Zoom

Optical & digital zoom and zoom & focus speeds shall be selectable from the maintenance terminal.

Remote control of pan, tilt, pan and tilt homing, optical zoom, manual focus, automatic focus, shutter speed, frame integration, manual iris, diagnostics and internal lights shall be provided.

Optical Zoom Range: 10x

Digital Zoom Range: 4x (40x with optical zoom)

Total effective zoom ratio: 40:1

The lens shall be an automatic iris type with a manual override (controlled from the control console) to control the illumination range for an acceptable picture between 3 and 10,000 lux.

Pan and Rotate Speeds

Full Pan (no load): 56 deg/sec, full pan in 7-8 seconds

Full Rotation (no load): 31 deg/sec, full rotation in 10-11 seconds

Camera Housing

The camera mechanics and electronics shall be housed in a high strength, damage resistant, aluminum housing with a stainless steel tube.

The rear portion of the camera shall not exceed 2.5 inches in diameter to allow for operation In skids and self-propelled units that are designed for 2.5-inch diameter cameras.

The front of the camera head housing shall have a view port of optical grade sapphire.

The camera connector shall integrate directly to the transporter, securing with a cam-locking action for positive sealing and retention.

Mounting Fork

The forward portion of the camera shall not exceed 4 inches in diameter and will include the mounting fork, camera head and lighting.

The camera forks must be rounded or chamfered and be the same diameter as the forward portion of the camera to eliminate any sharp corners that can become caught on obstructions.

CAMERA FORKS THAT EXCEED THE DIAMETER OF THE CAMERA HOUSING THAT ARE SUBJECT TO DAMAGE INSIDE THE PIPE ARE NOT ACCEPTABLE.

The mounting fork will rotate 360 degrees with an optical viewing angle of 400 degrees and shall allow the camera head to pan mechanically 285 degrees with a pan viewing angle of 331 degrees.

Camera Lighting

Shall be remotely controlled from the control console.

Shall be integrated into the camera and include four (4) 5W white LED emitters.

Shall provide adequate lighting in pipe sizes from 6"-48" in diameter.

CAMERAS THAT REQUIRE EXTERNAL MOUNTED NON-DIRECTIONAL LIGHTING FOR 12" THROUGH 48" PIPE ARE NOT ACCEPTABLE.

ELECTRICAL SPECIFICATIONS and CAMERA REQUIREMENTS

Video Output

Multi-Conductor Version: 1 V, S/N 46dB or greater

Single-Conductor Version: FM modulated 9.8mHz to 11.3mHz.

Integrated Lights
4 X 5W white LED emitters
LED power consumption, 20W
Field Replaceable
Illumination: 480 Lumens
Color temp: 5500°K
Optional field replaceable 4 X 6W xenon incandescent lamps [24W max 12V power consumption] with 412 Lumens of Illumination and 3000°K color temp
Image Pick-up Device
Interline transfer 1/4 inch CCD color
Picture Elements (pixels)
Solid state ¼" diagonal pixels: 768 (H) x 494 (V) = 379,392 elements (NTSC)
Lens
10x Zoom f=4.2mm to 42mm (F1.8 to F2.9)
Digital Zoom
4x (40x with optical zoom)
Field of View
56° diagonal, 46° (H) wide, 4.6° (H) tele end
Resolution Lines
470 TV lines horizontal
Electronic Shutter
¼ s to 1/10,000 s, 20 steps
Minimum Illumination
1.5 lux @ F/1.8
Input Camera Voltage
Multi-Conductor Version: 20-72V from controller
Head Rotation
Axial Rotation: 360°
Rotation Optical Viewing Angle: 400°
Lateral Pan: 285°
Pan Viewing Angle Range: 331°
Operate in a 6" Relined Pipe
Rotational Diameter: 4"
Internal Diagnostics
Humidity sensor, CCD temperature, camera voltage, light head voltage, serial number Identification, and operating hour meter.
CAMERAS WITHOUT THE AFOREMENTIONED DIAGNOSTICS WILL BE DEEMED UNACCEPTABLE.
Working Pressure
50 PSI (minimum)
Operating Temperature
0° to 50°C
Compatible PCU's
Multi-conductor Version: 1208 Mainline PCU and Inspector General portable PCU
Compatible Cables
Multi-Conductor Version: Up to 1200'
Dimensions
Overall length: 14.5", Head length: 5.9", Body tube diameter: 2.5", Head rotational diameter, 4"
Weight
10 lbs.

Comply Yes_____ No_____

BUILT-IN SONDE FOR MAINLINE CAMERA

SONDE SPECIFICATIONS AND REQUIREMENTS

ELECTRICAL

Drive Circuit

Operating Frequency: 512 Hz.

Frequency Control: Crystal stabilized

Power Supply: 12 volts, shared with internal lights power supply

MECHANICAL

Drive Circuit

Square circuit board to match the inclinometer sensor footprint to ensure that the mounting hardware can be shared.

ransmitter Antenna Coil

Shall be built into a modified connector housing.

Comply Yes_____ No_____

BRASS COMP STEERABLE CAM TRANS, WHEELED - 60V

A self-propelled camera transporter shall be provided for inspecting relined pipe and storm drains/wastewater pipelines measuring 6" and up in diameter. The transporter assembly shall be designed to operate optimally with 1200' multi-conductor cable and shall consist of the following (minimum):

Transporter

Shall include the following (minimum) equipment: (6) Driven Wheels, available in various sizes.

Shall operate through a minimum of (1200) feet of multi conductor video cable in suitable pipe conditions.

Shall utilize a rear tip-up bulkhead connector to minimize stress and strain on the cable connection. The cable-to-transporter connection shall be secured via a twist-locking feature.

The corresponding pan and tilt or pan and tilt zoom camera shall plug directly into the transporter with no external exposed cables.

Shall include a two-speed transmission to optimize traction by doubling the torque in difficult pipe conditions or in larger diameter pipe.

There will be a protected manual shifter assembly on the transporter to facilitate quick gear ratio changes.

CAMERA TRANSPORTERS WITH A ONE SPEED / GEAR RATIO TRANSMISSION SHALL NOT BE ACCEPTABLE DUE TO THE SUBSTANTIAL REDUCTION OF TORQUE / TRACTION PRODUCED WHEN LARGER DIAMETER WHEELS ARE USED.

Shall have sufficient power and traction to inspect a minimum of (1200) feet from the manhole entry point in suitable pipe conditions.

Shall include (2) heavy-duty drive motors specifically designed to meet the power requirements of the system, regardless of size of pipe being inspected.

The motors shall incorporate over-current protection circuitry.

Shall be equipped with self-propelled power forward, power reverse, and free wheel capabilities.

Shall be constructed of brass, stainless steel, and aluminum alloy.

Shall have speed and direction controlled from the control console.

Shall be retrievable in the free wheel mode by the video cable reel to reduce the normal wear on the drive motor by 50%.

Shall have full, variable speed in power forward or power reverse modes.

The maximum speed for camera / transporter assemblies shall be minimum 30 fpm in high gear for pipe configurations up to 15" and minimum 45 fpm in low gear for pipe configurations up

to 30".

CAMERA / TRANSPORTER ASSEMBLIES INCAPABLE OF OPERATING AT THE SPECIFIED SPEEDS WILL BE DEEMED UNACCEPTABLE.

The transporter connector shall integrate directly to the camera, securing with a cam-locking action for positive sealing and retention.

The transporter shall have a forward-locking feature to secure the camera, increasing the strength of the camera-to-transporter interface.

The self- propelled camera carrier shall weigh a minimum of 27 lbs.

The length of the transporter shall not exceed 14.5".

TRANSPORTERS EXCEEDING 14.5" SHALL BE DEEMED UNACCEPTABLE.

Shall include full proportional steering with the ability to conduct a complete 360 degree turn within its own radius.

Camera Compatibility

Shall be designed to be compatible with the CUES pan and tilt III / optical zoom pan and tilt III cameras.

The transporter, when used with an optical zoom pan and tilt camera, shall fit into an 6" diameter relined pipe and will have the ability to operate in an 8" diameter pipe with offsets.

ALL TRANSPORTER / OPTICAL ZOOM CAMERA COMBINATIONS THAT ARE UNABLE TO OPERATE IN 6" DIAMETER PIPE WILL BE DEEMED UNACCEPTABLE.

ALL TRANSPORTER / PAN & TILT COMBINATIONS THAT ARE UNABLE TO OPERATE IN 6" RELINED PIPE SHALL BE DEEMED UNACCEPTABLE.

The combined length of the transporter / pan & tilt camera assembly shall not exceed 19.56" with the camera in the home position.

This will allow the inspection and traversal of 6" diameter pipe with off sets or meandering conditions and facilitate entry into short inverts.

CAMERA / TRANSPORTER ASSEMBLIES EXCEEDING 19.56" IN LENGTH WILL BE DEEMED UNACCEPTABLE.

Tires

The Transporter shall include (6) wheels, available in various sizes, designed to maximize traction in each pipe size.

The transporter shall be capable of inspecting pipes up to 30" diameter with the addition of Larger diameter wheels.

The (2) smaller diameter wheels, designed to help negotiate offsets in larger pipe configurations, shall remain affixed to the middle axle, regardless of pipe size to be inspected.
SEE COMPONENT LIST FOR EXACT CONFIGURATION OF WHEELS

TRANSPORTERS DRIVEN BY BELTS WILL NOT BE ACCEPTABLE.
TRANSPORTERS WITH EXTERNAL DRIVE TRAIN COMPONENTS WILL BE UNACCEPTABLE.
* Kits contain complete sets of wheels.

Comply Yes_____ No_____

6"-15"PIPE SPACER KIT

Comply Yes_____ No_____

CAMERA ASY,REARVIEW,CPR/SPR,W/O LFT

The rear-view camera shall be designed to facilitate the internal inspection of pipelines to avoid obstacles and potential tip-over when retrieving a steerable transporter or driving in reverse. The camera shall be designed to operate in conjunction with the customer's existing Compact Pipe Ranger (CPR) wheeled transporter, mechanical or no lift, and mainline inspection camera and shall consist of the following (minimum):

Camera
Shall be manufactured with solid state circuitry to withstand shocks and vibrations.
Shall include fixed focus, fixed iris, and auto speed shutter.
Shall include a lighthead containing a minimum of 12 light emitting diodes equaling 78 foot candella.
Shall be a color camera.
Must illuminate up to 30" pipe.

Electrical Specifications & Camera Requirements

Image Sensor
CCD, solid state 1/4" diagonal with DSP.
Pixels, 512 H x 492 V.
Total pixels, 251,904
Minimum Illumination
2 Lux.
Resolution
380 Lines TV Horizontal.
System Standard
NTSC, Color
Video Output
1 V, S/N 46dB or greater
Lens
2.8mm, F/2.2
Field of View
98 degrees diagonal, 79 degrees (H) wide, 59 degrees (V) high
Electronic Shutter
1/60 s to 1/96,000 s
White Balance
Auto track
Light Power
120VDC, 160mA., 1.92W Supplied from the internal power supply
Input Camera Voltage
30VDC to 75VDC, 3W
Working Pressure
50 PSI (minimum)
Operating Temperature
0 degrees to 45 degrees C

Camera Lightring
The camera shall include a built-in lightring containing 12 solid state light emitting diodes (LED's).

Lightring

Shall be sealed to prevent water entry.
Shall include variable light intensity to allow for a clear picture in the pipeline.
The LED's shall be recessed and o-ring sealed to prevent damage from obstacles in the pipe.
Systems with exposed bulbs subject to breakage will not be acceptable.
The total light output of the 12 LED's shall equal 78 foot candella.
Shall include a unique over-voltage protection circuit to prevent burnout of the LED's.
LED's shall be individually serviceable and replaceable at the service facility.
LED's that cannot be replaced individually and / or lightheads that have to be completely replaced for servicing shall be deemed unacceptable.

Camera Protective Housing
The camera electronics shall be housed in a sealed, damage resistant, rugged enclosure capable of being easily attached or removed in the field.

Camera Integration to Transporter
The rear-view camera shall be connected and secured to the transporter body utilizing the existing transporter connector scheme, enabling operation in 6" lined pipe.

Comply Yes_____ No_____

QUICK CABLE LOCK PIGTAIL COUPLER KIT

Comply Yes_____ No_____

COMBINATION VIDEO TRANSMISSION/TOW CABLE, KEVLAR FIBER ARMORED, - MULTI-CONDUCTOR

A combined video and towing cable shall be furnished in a continuous length of 1000 feet (minimum) and shall consist of the following (minimum):

Cable

The cable shall consist of a coaxial core wrapped with a braided wire shield ground return.

An additional braided wire shield shall encircle both the coax and ground return and shall act as a Faraday shield.

CABLES WITH ONLY A SINGLE BRAIDED WIRE SHIELD ACTING AS A GROUND RETURN SHALL BE DEEMED UNACCEPTABLE.

A total of 10 separately insulated and color-coded 18/20 gage standard copper conductors shall be bundled and twisted in groups of 3 with one conductor remaining single.

To prevent cable breakage when placed under load, all wire bundles, wires, and the coax shall twist in a serpentine pattern for the entire length of the cable so that all wires, including the coax, are the same total lengths.

CABLES THAT HAVE A 'CENTER' COAX, MAKING IT THE SHORTEST AND THEREFORE THE MOST EASILY BROKEN CONDUCTOR, SHALL BE DEEMED UNACCEPTABLE.

The cable diameter shall be no greater than .450 inches and shall be able to withstand external pressures of up to 400 psi.

The cable weight shall not exceed 110 lbs. per 1000 feet.

Cable Jacket

The exterior of the cable shall consist of a minimum 1/16" thick abrasion resistant high-density nylon composite outer jacket embedded with Kevlar fibers to provide the cable with the required towing tensile strength.

Shall provide a lower coefficient of friction to reduce drag and therefore increase its resistance to wear.

Cable Connection

The end of the multi-conductor cable shall be equipped with a waterproof scotchcast and/or waterproof metal splice chamber to allow for the direct wiring of the female connectors.

An adjustable strain relief shall be provided to transfer the cable towing strength from the cable to the camera skids or transporter.

The termination shall consist of the necessary connectors and dummy plugs.

Comply Yes_____ No_____

TV CABLE REEL ASSEMBLY

A TV cable reel assembly will be supplied with a minimum storage capacity for 1000' of 1/2" or 5/8" maximum diameter video transmission cable. The reel shall be chain driven and properly reinforced to withstand 200% of the maximum motor torque to insure trouble-free operation. The reel shall be powered by a variable speed electric motor and driven through a multi-gear ratio transmission. The transmission will have multiple speeds to limit the motor load during varying towing conditions. The reel shall be equipped with an automatic level wind assembly to evenly pay out or rewind the cable to prevent pile-ups, entanglements and burying. The reel shall be built into a rugged frame designed for fixed mounting into a unit. The TV reel shall include a stainless steel drip pan that is removable for complete cleaning. The stainless steel drip pan shall be removed by unpinning it, then sliding it out from below the reel towards the rear of the truck. The reel shall have a black thermoplastic powder coated frame that provides excellent corrosion and UV protection and is resistant to chemical such as acids and alkalis. The reel drum and level wind shall be open to view to allow for inspection during operation. TV REEL SYSTEMS THAT ARE NOT CONTROLLED REMOTELY OR DO NOT HAVE A MULTI RATIO TRANSMISSION WILL NOT BE ACCEPTABLE.

TV CABLE REEL SLIP RING ASSEMBLY

The reel shall be equipped with a continuous contact rotary slip ring assembly. The assembly will be equipped with a minimum of twelve (12) slip rings to conduct the necessary current and signals through the reel. SLIP RING ASSEMBLIES WITH LESS THAN TWELVE (12) RINGS WILL NOT BE ACCEPTABLE. The slip ring assembly shall be fully enclosed in a dust and weatherproof high strength aluminum housing. Systems equipped with the high maintenance copper slip ring assemblies shall not be considered acceptable. Mercury Slip Rings shall not be considered acceptable.

CABLE FOOTAGE METER, LOCAL/REMOTE ELECTRONIC READOUT

The unit shall be equipped with a distance counting meter designed to accurately measure cable travel in feet and tenths of feet. The metering head shall be constructed of machined cast aluminum parts and shall include the necessary sheaves, wheels and guides. The counter shall be equipped with a meter for use at the rear of the unit and an electronic counter, which is connected to the Data Display System at the operator's station.

TV CABLE REEL CONTROL REMOTE AND LOCAL

A gearshift selector and linkage shall be provided at the control console to operate the reel mounted transmission. The combination of the reel motor controller and transmission gearshift selector will maximize the efficiency of the television inspection operation and minimize the load on the reel and motor. A speed controller, gearshift selector and on/off switch shall be provided at the reel for local control during set up.

Comply Yes_____ No_____

AUTOMATIC PAYOUT SYSTEM FOR REEL - INSTALLED

Comply Yes_____ No_____

PCU ASSEMBLY

A fully integrated camera, lighting, and crawler control system, built into rack-mounted chassis for installation in a built in control console consisting of a Power Control Unit (PCU) and a Camera Control Unit (CCU) not occupying more than 8-3/4" vertical rack height, shall be provided.

The Power Control Unit (PCU) portion of the Control Center must be capable of operating a mini camera, pan & tilt camera, pan & tilt zoom camera used with skids or a steerable tractor without the use of external adapter modules.

The PCU shall provide all the necessary power to operate and monitor the television inspection system. The faceplate shall be heavy gauge aluminum finished with an industrial grade finish. The PCU shall operate from a 110VAC or 220VAC 50Hz. or 60 Hz. power source. All circuits shall be of solid state design. Circuits shall be isolated to provide operator protection from electrical shock hazards.

The PCU shall contain a solid state light head power source, a left transporter motor power source, a right transporter motor power source, and a camera power source. All four power sources will include electronic over current protection to protect connected equipment from excess current. The PCU circuit protection will prevent damage to the PCU in the event of a cable short and shall recover immediately without operator action after the short condition is removed. All four power supplies shall be voltage controlled and current limit controlled by the CCU without operator action.

Comply Yes_____ No_____

CCU ASSEMBLY

The CCU shall connect to and control all functions of the PCU, the camera, and the transporter. The CCU faceplate shall be heavy gauge aluminum finished with an industrial grade finish. External connections shall include two buffered external video monitor outputs, two USB ports, audio and video VCR/DVD input/output plugs. The CCU will also include hardware and software to display video, system configuration and diagnostic conditions with a built-in alpha/numerical video character generator. The character generator shall generate footage count, defect Information, and/or free-form comments, for display on a video monitor and video recording device.

The CCU software shall be field upgradable with a USB thumb drive. The CCU shall also be capable of full external control by Asset Inspection/Decision Support software. The CCU Software will include cable diagnostics which can determine an open or short in the mainline cable. It will also allow monitoring of the voltage and current on all four power supplies and testing the handheld controller.

A standard (IBM) "QWERTY" keyboard shall be provided for generating defect and commentary entry. The format and position of the on-screen data shall be adjustable, within the video display, to fit pipe conditions or operator requirements. An inspection report can be saved and exported In an ASCII file format. The data generator shall have the capability send an inspection report

copy containing contract data, footage and defects to a USB thumb drive. The inspection report shall include the following minimum information: date of inspection; pipe size, material, total Length; upstream access location; downstream access location; direction of inspection (N-S-E-W and upstream/downstream); name of line; lateral location and footage; observations and comments (6 lines) , 55 preprogrammed defect codes and 70 user definable.

Comply Yes_____ No_____

PORTABLE CONTROLLER

A hand held portable controller for a pan & tilt type camera, steerable transporter and reel will be provided. The controller will be capable of wireless operation, and include a weatherproof 24 key membrane panel with indicator lights. Joystick controls will be provided for camera pan and tilt operation and transporter forward, reverse and steerable functions. Camera controls will include focus and iris override, zoom, lights and light intensity, pan and tilt homing, one button auto focus, and diagnostics. Transporter controls will include cruise control and camera lift operation. Reel controls will include retrieve and release mode, and speed [Not applicable on Dolly applications]. The controller shall be fabricated of a high impact plastic material, and housed in a neoprene boot for protection. A holster shall be provided for storing the remote at the control unit.

Comply Yes_____ No_____

PORTABLE CONTROLLER

A hand held portable controller for a pan & tilt type camera, steerable transporter and reel will be provided. The controller will be capable of wired operation, and include a weatherproof 24 key membrane panel with indicator lights. Joystick controls will be provided for camera pan and tilt operation and transporter forward, reverse and steerable functions. Camera controls will include focus and iris override, zoom, lights and light intensity, pan and tilt homing, one button auto focus, and diagnostics. Transporter controls will include cruise control and camera lift operation. Reel controls will include retrieve and release mode, and speed [Not applicable on Dolly applications]. The controller shall be fabricated of a high impact plastic material, and housed in a neoprene boot for protection. A holster shall be provided for storing the remote at the control unit.

Comply Yes_____ No_____

8.7" MINI KEYBOARD

Comply Yes_____ No_____

SHORTING PLUG

Comply Yes_____ No_____

TEST CABLE

Comply Yes_____ No_____

19" (MINIMUM) FLATSCREEN COLOR INDUSTRIAL TV MONITOR NTSC / PAL COLOR STANDARDS

Shall be a high quality, ultra-thin, industrial grade color unit.
Shall be a desk-mounted computer display in the Viewing Room of the vehicle.
Shall be compatible with both NTSC and PAL signals; shall include an auto-detect function

that has the ability to identify the signal that's being input and automatically switch from NTSC or PAL.

Shall have the ability to automatically monitor / adjust the video input and optimize the display settings without manual adjustments.

Shall include an On-screen Menu for adjusting monitor parameters. The menu shall include a user-friendly graphical interface to guide users through the customization of features and Individual preferences.

Shall operate from 120V AC or 230V AC power sources.

Shall be black in color with a metallic finish.

Comply Yes_____ No_____

GENERIC CCTV SOFTWARE SPECIFICATIONS FOR GraniteNet ASSET MANAGEMENT & DECISION SUPPORT SOFTWARE FROM CUES

FUNCTIONAL REQUIREMENTS OF THE SOFTWARE

Industry Standards

a. The software shall fully support CMOM activities as defined by the USA EPA.
b. The software shall support GASB 34 regulations.
c. The software shall be NASSCO PACP, LACP, and MACP version 6.0 and 7.0 certified and conform to its pipeline assessment procedures.

Database Organization

a. The software shall include and optional module to offer the enforcement of Security privileges to control access and user rights to certain levels of permissions natively within the software itself.
b. The software shall maintain a unified database of infrastructure assets (pipelines, manholes, lateral service connections, lift stations, etc.) in a single repository.
c. The software shall offer tool bars, drop-down menus, and "auto-complete" features to speed data entry.

User Interface

a. The softwares data entry interface shall be intuitive, easy to use, and able to provide on-line help files within the software to assist remote users with questions they may have.
b. The software shall have a Main Window compose of three areas:
    a. The Toolbar: The Toolbar works as the softwares Main Menu. Using the Toolbar you can access all of the softwares functions. For each screen of the application, a different set of Toolbar elements are available. The Toolbar can be docked to any side of the screen.
    b. The Main working area shall display the pane(s) of the current screens selected Layout. Panes included in the loaded layout shall be all docked. They shall have a fixed location and cannot be hidden. The panes shall be resizable by dragging their splitters. If the layout consists of only one pane, this pane shall be resized by main application window resizing only, because the pane shall always occupy the whole main working area. The last layout selected for a screen and its configuration (resizing) shall be remembered during the session and displayed when you navigate back to the application screen.
    c. The Status Bar shall appear at the bottom of the softwares Main Window. It shall display the current state of the system. On the left, it shall allow you to select the organization you are working for. The GPS section shall show whether a GPS device is connected and if so, it shall also show the number of satellites used to determine the location, horizontal and position dilution of precision, an average Signal to Noise Ratio of the satellites being tracked, and the GPS coordinates received from the GPS device. The database section on the right shall show the name of the database to which the software is connected. In the right corner, the nickname of the user who is logged in shall be displayed.

c. The panes shall be synchronized, whereby interaction with the main navigation window will determine the display of data in other associated panes.

d. Users shall be able to burn CD/DVD's or generate reports without requiring any third party software.

e. The softwares reporting engine shall allow for the generation of batch reports based on user defined object types (mainlines, projects, etc.), objects (mainline ID's, project names, etc.), the types of reports, the destination (printer, file, email, etc.), and the format (PDF, Excel, HTML, etc.).

f. The software shall allow the user to create "single entry" continuous defects, where the continuous defect is defined by the start distance and the length.

g. A pipe graph shall be interactive and the pane viewable during the inspection. The pipe graph shall show service connections with a graph indicating the location of the connection. The user shall have the ability to control the graphical representation of the observations made during the inspection by selecting any combination of the following features: Connections, Defects, Continuous, Laterals, Informational, and/or Status Bar.

h. A zoom feature shall be available for the pipe graph that allows the user to select a portion of the pipe with a mouse and zoom to that specific portion. A grid system shall be provided to display the location of a "zoomed" observation within 10 feet.

I. To start an inspection, the user shall be able to select structure, nodes or manhole Information already within the database. if the data is not available, the operator shall be able to enter the correct information and the information shall be retained in separate tables for future selection. A graph shall be provided for structures that allow for the direction of entry and exit and flow direction of each main and lateral.

J. The user shall be able to display live video, playback video, and capture pictures on the screen.

k. The software shall provide a simple way to control entry standards to define specific business logic, change labels, define field controls (optional, mandatory, disabled, read only, etc.) and define default field values and input "masks".

a. The ability to change labels shall be part of the system and shall not require third party software.

b. All drop down look up values shall be customizable by the end user without the use of third party programs.

c. The software shall allow for the addition of custom fields available in the user interface without the need of third party software.

d. City Administrators shall be able to set visual mandatory entry fields for both pipe information and defect entry fields and import them into this basic module.

l. Asset details and feature changes indicated by an assessment will be managed by an "Accept" or "Reject" procedure to ensure the quality of the asset data.

m. An Automatic Voice Over feature shall be available to read out loud and record on video the observation entries.

n. It shall be possible to Create Custom Tasks to record multiple types of inspections or surveys.

o. NASSCO PACP Access Point and Water Level automatic creation when starting a task.

p. Transporter or Camera speed will be displayed on the Live Video Pane.

q. It shall be possible to copy or "Carry Forward" the relevant information from any Task or Inspection to a new Task or Inspection to reduce effort and duplicate information entry.

r. It shall be possible to continue to record on an existing video file even if the computer was turned off.

s. Multiple video files for the same task can be merged into a single file for ease of management.

t. A Graphical Clock shall be used to describe the position for observations.

u. It shall be possible to define selected and commonly used observation or codes as

"Favorites" for quick entry.

v. "Asset Location" functionality. This feature allows a user to have assets with the same names but different physical locations (cities, counties, towns, etc.) to be contained in the same database. Now multiple "123 Main Street" addresses can be stored in a single database by the contractor. This capability is especially useful for Gas Cross Bore contractors who often encounter duplicate asset names.

w. "change Standard" feature. Tasks created or already completed in one standard (such as PACP v6 or CUES Standard, etc.) can now be changed to a different standard allowing the user to make the appropriate changes to comply with the desired standard's rules and validation.

Technical Requirements of the Software

The software shall be coupled with a firmware controller or with a USB data acquisition device to receive multiple, simultaneous inputs from connected devices to, for example, allow mainline footage, lateral footage and manhole depth to be received into the software without the need for manual input from multiple keyboards.

The software shall also automatically generate text overlay titling to highlight problem areas and asset inspection information. The titling options and position shall be customizable and titling display shall not require special separate controls.

Database Structure and Requirements

a. The inspection database shall include an asset-based architecture which allows multiple Inspections to be performed and retained as a historical record for a specific physical location (asset).

b. The software shall be able to track tasks and assignments even if the tasks are performed in multiple sessions or by different personnel.

c. The software shall be able to import an entire asset database.

d. The software shall have the ability to import and retain the entire list of assets despite not ever having generated an inspection.

e. The inspection database shall have the ability to support and synchronize with multiple data sources, such as Oracle Server 10.2-11.2, Oracle Client 10g Release 2, Oracle Client x32 Version 11g (for both Win x64 and x32 with ODAC no less than version 11.2.0.3), SQL Server 2008R2, 2012, or 2014. All or part of the inspection and asset information shall be able to be synchronized between the field and office with built-in automatic validation and error checking.

a. The software must be based on Microsoft Windows and can be a 32 or 64 bit Windows application, compatible with Microsoft Windows 7, Windows 8.1, Windows 10, Windows Server 2008 R2 SP1, Windows Server 2012, or Windows Server 2012 R2 SP1.

b. The collected CCTV survey data shall be stored in either a SQL or Oracle tables, and be available for use by the system owner.

b. Databases shall be able to be created in the default directory or on any writable local drive available.

f. The Database structure shall have the ability to use OLE DB drivers, such as Oracle or Microsoft SQL Server.

g. The database shall support simultaneously the following code system: PACP, LACP, MACP, CUES standard, EN 13508-2, and individual custom codes. The "Customer" shall provide the "Contractor" the code requirement prior to inspection creation. The Management Console code editor shall provide the ability to add, modify, and/or delete the code systems per the inspection requirements or the user's preferences. Each project shall be able to utilize a different code system and units of measurement based on the "Customer" inspection requirements. The "Customer" shall have full and independent access to the code editor for customization needs without the use of third party applications.

h. The database structure shall retain information on the various structures found within a

Sewer, Storm, Hydrant, Gas, or any other system. It is important that the structures, nodes, Identifiers and related attribute information be retained as separate tables from the inspection allowing import of existing data from multiple sources. The data structure allows different projects to reside within a single database. Information gathered in projects shall be available to view by project or by system. Data gathered during project inspection shall be available to view by the selected structure. Therefore, all inspections can be viewed on a structure even if gathered in different projects.

l. The software shall support metadata and all panes and forms shall be stored in the database so that any field or interface customization be immediately available to any user that connects to the database.

Media Handling Capabilities and Requirements

a. Digital video files (Inspection Videos) shall be captured and/or recorded in the MPEG1, 2, 4,H.264, .HD or WMV formats as specified by the client in corresponding cameras and optional software modules. The video files shall be linked to the Inspection and Observations stored in the database. The "Link" of the video capture file to the database observation entry is required and each Observation shall record the name of the video file and the frame number referencing the time in the video when the inspection was made. The Inspection observation(s) shall link to the video record in real-time.

b. A Main, Lateral, or Node Inspection may have one or many linked video files. Video recording can be paused and then restarted without generating a new file.

c. On playback, single click selection of a Main, Lateral or Node Observation shall start the video from the moment the observation was made, and subsequent selections of observations will "jump" the video playback to the corresponding spot. If no additional observation selection is made, the software will play sequentially all linked videos in the inspection.

Image (Photos) Capture Format Capabilities and Requirements

a. The Inspection image files (pictures) shall have the ability to be exported to Industry Standard Formats to include JPEG and PNG formats and be transferable by CD, DVD and/or External Hard drive to an external personal computer utilizing standard viewers and printers.

b. The video image capture module shall be capable of collecting multiple color video frames of the defects found during inspection and then linked to the inspection reports. There shall not be a limitation to the number of pictures allowed per observation.

c. Images or video clips shall be easily launched for viewing during inspection report review.

d. Images can be captured and linked to an observation directly from the "live" video during the TV inspection, or from the video playback at the office.

e. Footage count shall be attached to the corresponding video image and shall appear on the reports indicating the correct footage when the image was captured during the pipeline Inspection.

f. Shall be able to print any captured image on the color printer in the inspection truck. Picture files shall be stored and exported with inspection data.

g. A "thumbnail" preview of all pictures at an observation shall be available. The pictures shall be able to be expanded from thumbnail to full size by utilizing the mouse.

h. Images will be captured automatically when creating observations.

Export of the Database, Videos, Pictures - Capabilities and Requirements

a. The database, videos, pictures shall have the ability to be "Exported". Export is the process of selecting all or portions of the original data, video, and pictures, and creating a complete and Independent copy of this Information, which can be run Independently or synchronized by a Citys or Countys office program.

b. The office program shall have the ability to select the Assets and Projects to transfer to a particular database.

c. All or part of a database can be exported from the TV Inspection database with or without videos and pictures. This new file can be burned to a CD/DVD, or transferred to a USB Hard drive and brought into the office from the truck, or vice versa.

d. Export GraniteNet Dynamic layers to KML (Export to Google My Maps)

e. Use the built in Data Transfer functionality to transfer additional settings (such as inspection profiles and other specific GraniteNet settings) associated with the data being transferred to another user.

Synchronization Capabilities and Requirements

a. The software shall have the ability to synchronize with assets and inspections from exported databases.

b. The synchronization process shall have built-in error checking for duplicates, conflicts, updates and any modifications to the data being synchronized using a unique hash revision control mechanism for every data object.

c. Log files must be created for review purposes.

d. During the synchronization process, validation dialogs shall be used to allow the user to select which data takes precedence when a conflict is challenged.

e. All filtering capabilities previously described must be available for all exporting and synchronization tasks.

f. The software will allow for multiple sources of data to be effectively consolidated into a single unitary database for analysis and evaluation.

Televising Survey Collection/Reporting Capabilities and Requirements

a. The software shall be capable of customization with the ability to modify/add to the pipeline condition descriptions/codes and to group them for ease of use.

b. The software shall allow footage reading from the existing mainline and lateral camera equipment to be automatically entered in the current survey record and directly correspond to the noted defect location throughout either the main or lateral pipe graph and in all tabular reports generated.

c. A context-sensitive, complete on-screen help file should be available.

d. Drop-down boxes shall be available to quickly reference common information such as defects, pipe materials, survey purpose, locations, pipe usage, etc.

e. The softwares database shall have the means to sort in ascending and descending order according to date, pipe id, street name, structure id, observed footage, pipe materials, pipe diameters, work order numbers, etc.

f. Summary reports compiling data from multiple inspections shall be available. Reporting order shall be user defined.

g. Individual inspection summary reports shall also be available, and tabulate pipe survey results.

h. Quarter section (or map or project areas) summary reports are to be made available so that all surveys within a quarter section are listed showing purpose of inspection, dates, work order numbers, structure ids, street names and total lengths.

I. A report showing defects by inspection shall be available and programmable to list specific defects observed with corresponding footage, starting and ending manhole numbers, structural pipe defects (i.e. cracks, offsets, defective laterals, collapsed pipe, etc.) and service oriented defects (i.e. roots, grease, obstructions, infiltration, etc.)

J. A report showing grading scores shall be available and summarize the structure ID's, pipe material and diameter, and the grade scores for each survey with totals.

K. Reports showing service and structural aspect scoring shall also be available and shall list the pipe ID, total observed length, number of defects and total score with reference to the condition of the total pipe, average of the pipe, total defects and average of defects.

L. The data structure shall allow different projects to reside within a single database.

Information gathered in projects shall be available to view by project or by unique system ID number or asset ID. Data gathered during the project inspection shall be available to view by the selected structure.

m. The data structure shall allow for the entire asset data inventory to be created or imported even if no inspections have been performed on the assets.

n. Observation's clock positions shall be entered via a graphical clock interface.

Data Analysis/Reporting Capabilities and Requirements

a. Users shall have the ability to perform data entry and automatically control the video text overlay simultaneously to eliminate the need for dual entry.

b. Users shall have the ability to transfer data between the Data Acquisition System and the Software Interface without the need for any user supplied programming, special scripts, or macros.

c. The user shall be able to build a code system from active codes.

d. The software shall have the ability to filter all data using any data field in the software. Filter state should be savable for future use. Multiple filters can be saved. Filters can be defined graphically or by SQL query language.

e. Users shall be able to filter the list of mainline inspections or assets to be exported. Users shall be able to select the mainline inspections by any default or custom field.

f. Upload/download features shall be available to move surveys, assets, or projects between databases, to allow information and media stored on a truck system to be incorporated into a master database on the Citys network or a supervisor's computer. The software program shall be able to combine databases from multiple sources into a master database and link media to a central location. A revision control system shall automatically monitor changes and resolve conflicts between the databases.

Vendor Requirements

a. Vendor shall design, develop and support the software in the US. The software shall not be designed and supported offshore.

b. Vendor shall offer comprehensive Annual Support Plans which include Web-based troubleshooting tools, online assistance, user forums, and access to downloadable upgrades and documentation via an established Support web site.

c. Vendor shall provide referencable clients similar in size and scope.

d. Vendor shall not be engaged in software patent or copyright infringement litigation.

Comply Yes_____ No_____

DEFINITIONS

ASCII: The American Standard Code for Information Interchange is a standard seven-bit code. In the software rendering a Report to ASCII means to save it in ASCII format (also known as plain text format).

Asset: A general term representing sewer physical structure (see Lateral Asset, Main Asset, and Node Asset). All inspections in the software can be grouped into Assets because all Inspections (and their respective Observations) are performed on Assets. Multiple inspections can be linked to an asset to provide a historical perspective.

Code System: A set of Codes that comprise the menu of possible choices when assigning defect description values to observations. For example, when recording a specific type of Inspection observation, the Code System will provide the user with a full range of codes to choose from, including all of the types of defects that the Observation may have (e.g. crack, sag, blockage, etc.).

Codes: A value assigned to fields in the software. Codes control the type of information that can be entered for a particular field.

CSV file format: Comma-separated values contain table values as a series of ASCII text lines organized so that each column value is separated by a comma from the next column's value and each row starts a new line. This is useful for importing data into spreadsheets, such as Microsoft Excel.

Template: A field template is used for assigning certain fields in the software specific values. Field templates are used for Asset Addresses, Node Asset ID's, and Site ID's.

Footage: The distance from a Node Asset (or other starting point) from which an inspection began. Footage is used to describe the location of observed defects in pipes. Footage also is used to describe the current camera position during an Inspection. Footage also refers to the distance in a service line inspection from either the mainline asset or the cleanout / property line.

HTML: The Hyper Text Markup Language is the language that web pages are written in to format the presentation of content. Reports exported in HTML format retain formatting and are viewable in many email applications and word processing applications.

Inspection: General term to refer to the procedure of investigating the quality and conditions of pipes. An Inspection means a TV inspection in which a camera presents live video and / or records video and still pictures for later playback to determine the status of a pipe.

Integration: The process by which one software application can interact, import, process and export data from another software application using predefined and preferably certified methods. Integration does not only copy the contents of individual fields, but also maintains the relationships between the fields and implements the required business rules to ensure the proper operation and data integrity of the software applications involved.

Labels: The names of fields in the software dialogs.

Lateral Assets: An adjoining pipe to the main pipe of a Main Asset. A Lateral Asset intersects and opens into the main.

Lateral Inspection: An investigation of a Lateral Asset usually undertaken in the context of a TV Inspection, but may also be an independently generated inspection.

Lateral Observation: A defect found during a Lateral Inspection of a Lateral asset.

Main Asset: A physical structure defined by two Node Assets and the interconnecting pipe.

Node Asset: The physical manhole or entry point into the sewer system. It can also be any type of an end point (e.g. catch basin, pumping station, ditch, etc.).

Node Asset Inspection: An investigation of the type and condition of a Node Asset. This procedure also enters Node Asset data into software.

Observation: General term to describe a peculiarity during an Inspection. In the software, Observations are perceived defects, informational items, or general comments noted during a TV Inspection.

ODBC Data Source: Open Database Connectivity standard, an integration tool to access Information from a range of databases including Access, dBase, DB2, Excel, SQL Server, Oracle, and Text. Reports may be generated to ODBC data sources.

PACP: NASSCO's Pipeline Assessment and Certification Program. It is a coding standard used to evaluate and classify sewer pipe conditions.

Pane: A window containing different views of data and processes in the software. These panes are synchronized, wherein operating in one of the panes will effect changes in another pane. Panes can be laid out in any custom arrangement.

PDF: Portable Display Format document. PDF files are viewable independent of the application that created them using PDF viewers such as Adobe Acrobat Reader. The software shall allow generating of reports into this format.

Plug-ins: Additional components of an application that can be added to the basic system configuration to extend the applications functionality. The software shall use plug-ins to allow for an expandable application to meet the needs of different users.

Project: A grouping of Inspections completed or assigned and the Assets upon which these Inspections have been or will be performed by the contract, customer, or other manner. In the software, all Inspections in the system are grouped into projects since inspections are completed for specific reasons (e.g. customers, contracts, etc.).

Report Filter: This is a means of selecting only relevant information to be presented in a report. In the software, reports can be filtering by applying a Report Template to include user-defined information for the Report.

Report Preset: A Report Preset is a setting to generate reports rapidly. It is useful to specify persistent filters for daily or weekly reports and for selecting and generating several reports at a time, Using Report Preset can substantially reduce report processing time.

Report Template: Defines the content and look of a report. Reports packaged with the software will be represented as templates (in conjunction with report presets to set up filtering criteria) and when run, request values for variable parameters to be entered, such as dates, operators, etc.

Report: A paper or electronic file based presentation of data contained in the application. Customized reports can be generated that meaningfully present the data contained in the software.

Synchronization: The Database Synchronization is a process of forcing two data subsets of two databases to have the same content. This is useful for data transfer between the Inspection and the Enterprise / Engineering databases, when the Inspection Edition user brings the updated database to the office and synchronizes completed inspections (for example) with the Enterprise / Engineering database. Also in the software, the Panes representing different modules of the application must be integrated and synchronized so a change in one pane effects a change in another.

Toolbar: Graphic tool that contains buttons with small images (the same images you see next to corresponding menu items), menus, or a combination of both. The software should include

many built-in toolbars that you can show, hide, and position as needed.

Tool-tip: Notes that appear when you position the mouse over a control element (button, field, etc.) that describes the element usage.

TV Inspection: The main method of inspected pipes and nodes. The procedure includes viewing television output of a camera traversing the pipe between two node assets.

Viewer Edition: A special version of the software. A Viewer is any user interested in simply viewing the results of the Inspections. Viewers cannot change data stored in the software, but have full access to review all of the stored data using the appropriate Panes. Viewers can print reports and review the video.

Comply Yes_____ No_____

KEYBOARD AND MOUSE COMBO,WIRED

Comply Yes_____ No_____

PRINTER,HP OFFICEJET COLOR PRINTER

Comply Yes_____ No_____

GraniteNet BASIC SUPPORT PLAN

Comply Yes_____ No_____

ALL NECESSARY CABLING AND COMPONENTS TO COMPLETE THE INTERFACE BETWEEN THE DATA ACQUISITION SYSTEM, PERIPHERALS, AND THE VIDEO INSPECTION EQUIPMENT

Comply Yes_____ No_____

GraniteNet OFFICE KIT

Comply Yes_____ No_____

GraniteNet OFFICE SUPPORT PLAN

Comply Yes_____ No_____

ACCUPOINT 512Hz, 8kHz, 33kHz SONDE LOCATOR

Comply Yes_____ No_____

KIT,DOWNHOLE,STD

Comply Yes_____ No_____

REDI EVALUATION KIT

Comply Yes_____ No_____

TRAINING, ON-SITE (THREE DAYS)

The supplier shall fully instruct and test buyers in the operation of the equipment furnished after delivery. The instruction period shall be of sufficient duration (number of days shown on the component list) to fully familiarize the buyers operating personnel. The instruction and testing shall be conducted by the supplier's field service technician and shall include component familiarization, theory of operation, equipment operation, field procedures, techniques of use, troubleshooting, maintenance recording and logging of sewer conditions and safety procedures. Training provided by sales or office personnel will not be acceptable.

Comply Yes_____ No_____

OPTIONAL ITEMS

Comply Yes_____ No_____

Optional Item Detailed Specifications-Not Included in Base Quote

ELECTRIC CAMERA LIFT

An electronic, remote controlled, infinitely variable camera lift shall be provided to prevent the need for an operator to enter the manhole to position and/or reposition the camera height.

Shall be constructed of stainless steel and aluminum and designed for optimum use in pipe diameters of 18" and larger.

Shall be capable of optically centering the camera in 21" - 30" pipe.

Shall be capable of powering the lift in both up and down directions and holding camera position throughout the defined range of motion.

Shall be operated remotely with CUES wired or wireless camera/transporter controllers.

Distance from camera centerline to bottom of wheel (in large tire configuration) shall be 8.7" (collapsed) and 14" (extended) to optimize camera height for image centering, negotiating obstructions, and positioning camera above flow.

The full range of lift motion shall be achieved in 5 seconds (maximum).

Shall incorporate both mechanical and automatic upper/lower electronic stop-features to prevent user from over-extending camera maximum height, protecting the lift drive system.

Shall include an automatic drop-down feature when powered 'OFF" to ensure safe retrieval.

Shall be compatible with CUES Compact Pipe Ranger transporters.

Shall be compatible with CUES OZIII pan and tilt optical zoom cameras.

Shall include a mechanical latching hook with steel wire cable to bypass/protect lift drive system during deployment and extraction.

Shall be manufactured with o-rings and oil seals that are designed to prevent water intrusion.

Shall have integrated electrical and mechanical provisions for attaching a rear viewing camera. Lift can be operated with or without the rear viewing camera.

Shall have integrated electrical and mechanical provisions for attaching two additional externally mounted lights. Lift can be operated with or without external lights.

Shall have a minimum operating input voltage of 66 volts.

Comply Yes_____ No_____

Optional Item Detailed Specifications-Not Included in Base Quote
SELF PROPELLED LATERAL INSPECTION / EVALUATION SYSTEM, WHEELED, FOR 6" - 15" MAINLINE AND 3" - 8" LATERAL INSPECTION, WITH PAN AND TILT / ZOOM MAINLINE CAMERA, AND WIRELESS CONTROL

Comply Yes_____ No_____

Optional Item Detailed Specifications-Not Included in Base Quote
MICRO PAN & TILT CAMERA

Comply Yes_____ No_____

Optional Item Detailed Specifications-Not Included in Base Quote
REAR VIEW CAMERA ASSEMBLY FOR USE WITH LAMP SYSTEM

The rear-view camera shall be designed to facilitate the internal inspection of pipelines to provide cable management and avoid obstacles / potential tip-overs by providing visibility when retrieving the lateral and mainline inspection system or driving in reverse. The camera shall be designed to operate in conjunction with the customer's new or existing lateral and mainline II inspection system and shall consist of the following (minimum):

Camera Assembly

The camera field of view shall be a minimum of 53 degrees vertical, 67 degrees horizontal, and 79 degrees diagonal.

Operating temperature ranges of the camera shall be -10 degrees C to +40 degrees C. Cameras incorporating built in lighting systems that generate heat exceeding the operating parameters listed by the base stock camera manufacturer will be unacceptable.

Depending on the specific wheel configuration(s), shall operate in 6" diameter pipe up to 48".

Chassis construction shall include 100% solid state circuitry designed to withstand shocks and vibration normally sustained during an inspection.

Shall be available in NTSC and PAL formats.

Shall work in conjunction with new or used lateral and mainline II inspection systems. A retrofit kit shall be available.

Shall work with both lateral and mainline II fiberglass and stainless steel push systems.

Shall be able to toggle between the front, rear, and lateral camera imagery by using the switch thats installed on the truck panel or PCU.

Camera Housing

The camera mechanics and electronics shall be housed in a high strength, watertight, damage resistant, aluminum housing.

Lightring Assembly

Shall include a 12 LED self-contained infrared lightring designed to allow for a clear picture in the pipeline.

Camera shall be able to automatically detect low-light conditions and switch from a color Image to an Infrared-Illuminated monochrome Image to provide the maximum amount of Illumination required for the Inspection.

Electrical Specifications & Camera Requirements

Format

NTSC / PAL

CCD type
Color / IR Mode (black and white)
CCD Pixels
537(H) x 505(V) NTSC
537(H) x 597(V) PAL
Image Sensor
1/3 inch CCD color
Lux Rating
3.0 color mode, 0 in IR (black and white) mode
Resolution
380 TV Lines
Power Requirements
19-50 VDC
Power Consumption
250mA
Dimensions
6.00" L x 2.50" W x 4.40" H
Lens Focal Length
3.6mm F2.0
Signal to Noise Ratio
greater than 45db (AGC off)
Output Type Video Level
1Vpp Composite @ 75 OHM
Electronic Shutter
1/60 - 1/100,000 auto NTSC
1/50 - 1/100,000 auto PAL
White Balance
Auto
Operating Temperature
-10 degrees C to +40 degrees C
Camera Lightring
IR (Infrared) LED Lightring with 12 self-contained LED's with auto light sensor
Camera Body Specifications
Aluminum body with anodized finish

Comply Yes_____ No_____

Optional Item Detailed Specifications-Not Included in Base Quote
LATERAL INSPECTION GraniteNet SOFTWARE

Comply Yes_____ No_____

Specifications For: Blakely, City of (GA)

1 DIESEL CAB CHASSIS 205" WB 2X4 CHASSIS
- 1 6.7L V8 Diesel Engine
- 1 6-Speed Automatic Transmission
- 1 19,500 lb. GVWR
- 1 205" Wheel Base
- 1 Cab Air Conditioner
- 1 AM / FM Radio

1 16' CARGO BOX FOR CAB/CHASSIS
- 1 LED Light Package Includes Body Clearance and Stop / Tail / Turn
- 1 Full Width Barn Doors with CAM (Pipe) Locks on Each Door
- 2 Laminated Steel Lock
- 1 Kemlite Covering on Inside Rear Doors
- 1 Back Up Alarm

1 TWO (2) STEP REAR BUMPER

1 KICKPLATE 2 DRAWER STACK ALUMINUM STORAGE

1 KICKPLATE TRANSPORTER STORAGE
- 1 Lockable Storage Compartment for Camera and Transporter
- 1 Sliding Drawer
- 1 Notch in rear door threshold of body for TV cable to pass through to transporter storage drawer

1 TV HIGH CUBE VAN EXTERIOR LIGHTING & CONTROL ROOM - EVOLUTION 3.0 TO INCLUDE:
- 2 Amber LED Strobe Warning Beacons
- 2 Adjustable LED Floodlights Rear of Vehicle Area Illumination

Control Room Interior:
- 1 Lonseal Lonplate Flooring
- 1 Kemlite Wall & Ceiling Covering
- 1 Bulkhead Wall With Passage Door From Control Room to Equipment Room
- 1 Tinted Viewing Window in Bulkhead Wall
- 1 Tinted Viewing Window in Bulkhead Door
- 1 Above Desk Control Console with Rack Mount for Electronic Equipment
- 1 Desktop / Work Area
- 1 12V High Intensity LED Light Fixture
- 2 Electrical Outlet with Dual Receptacles
- 1 Fire Extinguisher with Bracket, 10BC Rating
- 1 Operators Chair, Swivel With Casters
- 1 Breaker Box Storage Area with Locking Positive Latch

1 ROOF TOP AIR CONDITIONER, 13,500 BTU WITH HEAT STRIPCONTACT VA IF MULTIPLE UNITS ARE REQUIRED TO CONFIRM POWER REQUIREMENTS****

1 BENCH SEAT IN VIEWING ROOM

1 CUSHION FOR BENCH SEAT

1 CLOSET IN VIEWING ROOM

1 CURBSIDE DOOR FOR EVO 3.0

1 SIDE DOOR STEPS

1 TV HI-CUBE VAN EQUIPMENT ROOM INTERIOR - EVOLUTION 3.0 TO INCLUDE:
- 1 Lonseal Lonplate Flooring
- 1 Kemlite Wall & Ceiling Covering
- 1 Electrical Outlet with Dual Receptacles
- 1 12V High Intensity LED Light Fixture
- 1 15 Minute Courtesy Timer Located at Rear Door Area for 12V LED Interior Lights

1 MULTI-OUTLET WORKSTATION WITH LIGHTS AND USB PORTS

1 20-GALLON WASHDOWN SYSTEM TO INCLUDE:
- 1 20-Gallon Fresh Water Tank
- 1 Electric Water Pump
- 1 Retractable Hose Reel with 25' Water Hose and Nozzle

1 UPPER AND LOWER STORAGE CABINET IN EQUIPMENT ROOM
- 1 Lower Storage Cabinet / Work Top
- 1 Upper Wall Mounted Storage Cabinet

1 5-DRAWER TOOL CHEST, MODULINE

1 24" REAR FLAT SCREEN MONITOR MOUNTED IN BULKHEAD WALL
- 1 Flat Screen Monitor
- 1 Cable Assembly - Video Monitor to Monitor in Control Room
- 1 Electrical Outlet

1 7500 WATT QUIET DIESEL ONAN GENERATOR
- 1 120 Volt 60 HZ 7500 Watt (Minimum) Commercial Grade "Quiet" Generator
  - 1 Diesel Powered
  - 1 Electric Start

1 GENERATOR COMPARTMENT [UNDER CHASSIS MOUNT]
- 1 Generator Storage Compartment with Lockable External Access Door
- 1 Commercial Power Supply Receptacle, 25' Cord, and Plug
- 1 Electrical Supply Center with Circuit Breaker Box
- 1 Commercial power and Generator Power Connectors
- 1 Automatic Power Transfer Switch

1 SYSTEM ENGINEERING PANEL, FOR POWER INFORMATION AND GENERATOR FUNCTIONS, RACK MOUNTED, TO INCLUDE:
- 1 Four Function AC Power Meter displaying Critical Power Information including:
  - 1 Voltage
  - 1 Hertz
  - 1 Amperage
  - 1 Active Power (Watts)
- 1 Front panel Selector Switch for two modes of operation:
  - 1 Fixed reading
  - 1 Continuous Auto-cycling
- 1 Generator Battery Meter to Display Starting and Charging Voltage
- 1 Generator Hour Meter
- 1 Generator Remote Start/Stop Control Switch

1 On/Off Switch for Emergency Warning beacons (Switch to Illuminate When On)

1 P&T ZOOM III M/C LED CAMERA
- 1 Solid State Color Sewer TV Camera
- 1 Pan & Rotate Camera Head, 40:1 Zoom Ratio, 10x Optical Zoom, 4x Digital Zoom
- 1 NTSC Color Standard with 4x Light Integration
- 1 4 X 5W Cluster LED's for 6" through 72" lines
- 1 Camera Transportation and Storage Case

1 BUILT-IN SONDE FOR MAINLINE CAMERA TO INCLUDE:
- 1 Built In Transmitter, 512 Hz

1 BRASS COMP STEERABLE CAM TRANS, WHEELED -60V
- 1 Steerable Unit Designed to Turn 360 Degrees Within Its Own Radius
- 1 Set of Driven Rubber Wheels to Inspect 6" Pipe
- 1 Two (2) Speed Transmission to Maximize Torque in Large Diameter Pipe with:
  - 1 Manual Shifter on Camera Carrier
- 1 Unit Shall Have Forward, Free Wheel, and Power Reverse Capablities
- 1 All Six (6) Wheel Drive Transporter Assembly to Include:
  - 1 Motor & Enclosed Drive Train
- 1 Tip Up Rear Connector

1 8" RUBBER WHEEL KIT FOR COMPACT TRANSPORTER

1 10-15" RUBBER WHEEL KIT FOR COMPACT TRANSPORTER

1 6"-15"PIPE SPACER KIT

1 6" STEEL 10/12 GR WHEEL KIT FOR COMPACT TRANSPORTER

1 8" STEEL 10/12 GRIT WHEEL KIT, v2

1 10-15" STEEL 10/12 GR WHEEL KIT FOR COMPACT TRANSPORTER

1 12"-15" PNEUMATIC TIRE KIT FOR COMPACT TRANSPORTER

1 REAR VIEW CAMERA
- 1 Color NTSC Camera
- 1 Lightring with (12) Solid State White LEDs

1 QUICK CABLE LOCK PIGTAIL COUPLER KIT

1 1000' CABLE ASSEMBLY, M/C 12PIN METAL
- 1 1000' Gold Multi Conductor Kevlar Fiber Armored Combination TV Transmission / Tow Cable
- 1 .450 Diameter
- 1 Metal Splice Chamber with Pigtail
- 1 Cable Strain Relief

1 TV REEL ASSEMBLY, MECHANICAL FOOTAGE FOR SUMMIT .450 CABLE
- 1 Black Thermoplastic Powder Coated Frame
- 1 Power Levelwind & Multi Ratio Manual Transmission
- 1 Footage Meter with Local Counter and Remote Electronic Counter
- 1 Transmission Control at Viewing Station
- 1 Local Reel Mount Electrical and Mechanical Control
- 1 Sealed Continuous Contact Collector Assembly
- 1 Removable Drip Pan for Cleaning

1 AUTOMATIC PAYOUT SYSTEM FOR REEL - INSTALLED

1 PCU ASSEMBLY [RACK MOUNT]

1 CCU ASSEMBLY [RACK MOUNT]
- 1 Alpha Numeric Information Display, with Multi Paging and Defect Coding
- 1 Remote "QWERTY" Keyboard
- 1 On Screen Footage Display

1 WIRELESS CONTROLLER
- 1 Joystick Control for Pan and Tilt Zoom Camera to Include:
  - 1 360 Degree Rotate
  - 1 330 Degree Optical Pan
- 1 Joystick Control for All Steering Functions & Forward / Reverse Directions for Transporter
- 1 Camera Lift Control for Optional Electronic Camera Lift
- 1 All Other Controls for Camera to Include:
  - 1 Camera Iris and Focus Override & Zoom
  - 1 Camera Lights & Shutter Control for Light Enhancement
  - 1 Camera Diagnostics & Auto Home
- 1 Cruise Control to Set Speed of the Transporter for Hands Off Operation
- 1 All Reel Controls to Include: Retrieve, Release, and Variable Speed [Excluding Dolly Systems]

1 WIRED USB CONTROLLER
- 1 Joystick Control for Pan and Tilt Zoom Camera to Include:
  - 1 360 Degree Rotate
  - 1 330 Degree Optical Pan
- 1 Joystick Control for All Steering Functions & Forward / Reverse Directions for Transporter
- 1 Camera Lift Control for Optional Electronic Camera Lift
- 1 All Other Controls for Camera to Include:
  - 1 Camera Iris and Focus Override & Zoom
  - 1 Camera Lights & Shutter Control for Light Enhancement
  - 1 Camera Diagnostics & Auto Home
- 1 Cruise Control to Set Speed of the Transporter for Hands Off Operation
- 1 All Reel Controls to Include: Retrieve, Release, and Variable Speed [Excluding Dolly Systems]

1 8.7" MINI KEYBOARD

1 SHORTING PLUG

1 TEST CABLE

2 19" (MINIMUM) FLATSCREEN COLOR INDUSTRIAL TV MONITOR NTSC / PAL COLOR STANDARDS

1 [RACK MOUNT] COMPUTER W/GraniteNet BASIC TO INCLUDE (MINIMUM):* **

- 1 Motherboard with Intel 8th Gen. LGA 1151 Socket; Intel Z390 Chipset
- 1 Intel Core i7-8700 Processor at 3.2 GHz
- 1 Intel UHD Graphics 630 with HDMI / Display Port
- 1 Graphics Card 2GB with VGA/DVI/HDMI
- 1 8 GB DDR4 RAM, 2400 MHz
- 1 Intel Gigabit Network adapter
- 1 Wireless AC 9462 802.11 a/b/g/n/ac
- 1 Bluetooth 3.0, 4.0, 5.0
- 4 USB 3.1 Gen 1 ports (2 rear, 2 front)
- 2 USB 3.1 Gen 2 ports (1 type A, 1 type C)
- 2 USB 2.0 Ports
- 1 250 Gigabyte M.2 Solid State Drive
- 1 1 Terabyte SATA Hard Drive, 7200 RPM
- 1 DVD +/- RW Optical Drive
- 1 USB Video Capture Device for MPEG 1 / 2 / 4 / WMV
- 2 RS232 Serial Comm Ports
- 1 500 Watt 1U ATX Power Supply
- 1 Industrial Hardened Case Slim 2U Design for 19" Rack
- 1 Windows 10 Professional 64-bit Operating System
- 1 GraniteNet Basic Software

*Spec for computers can change without notice

**International Configuration may vary to comply with the U.S. Department of Commerce, Bureau of Industry & Security regulations on export of technology

1 KEYBOARD AND MOUSE COMBO,WIRED

1 OFFICEJET COLOR PRINTER

1 GraniteNet BASIC SUPPORT PLAN

1 ALL NECESSARY CABLING AND COMPONENTS TO COMPLETE THE INTERFACE BETWEEN THE DATA ACQUISITION SYSTEM, PERIPHERALS, AND THE VIDEO INSPECTION EQUIPMENT

1 GraniteNet OFFICE KIT

1 GraniteNet OFFICE SUPPORT PLAN

1 ACCUPOINT 512Hz, 8kHz, 33kHz SONDE LOCATOR

1 KIT,DOWNHOLE,STD

- 1 Toproller Assembly, Manhole, TV Only, Al
- 1 Claw Hook, Manhole Adapter, f/WT319
- 1 Hook Assembly, Retrieval (SNGL,SHTY/LMP/PR)
- 6 Pole Assembly, Retrieval / Downhole tl,58"
- 1 Roller Assembly, Invert f/ WT319

1 REDI EVALUATION KIT TO INCLUDE:

- 1 Rugged Weather Proof Storage Case
- 1 Digital Hi-Resolution Wide Angle Web Camera
- 1 Diagnostic Test Box To Include:
  - 1 Voltage Test Points
  - 1 Built-In Mini Camera
- 1 Footage Test Box
- 1 Digital Multi-Meter
- 1 USB Diagnostic Tool
- 1 Video Cables And Adaptors

1 TRAINING, ON-SITE (THREE DAYS)

1 TRUCK DELIVERY-GEORGIA

OPTIONAL ITEMS
[NOT INCLUDED IN BASE QUOTE]

1 ELECTRIC CAMERA LIFT FOR COMPACT TRANSPORTER (Optional)

1 SELF PROPELLED LATERAL INSPECTION / EVALUATION SYSTEM, WHEELED, FOR 6" - 15" MAINLINE AND 3" - 8" LATERAL INSPECTION, WITH PAN AND TILT / ZOOM MAINLINE CAMERA, AND WIRELESS CONTROL TO INCLUDE: (Optional)

- 1 Mainline Pan, Tilt, and Zoom Camera to Include:
  - 1 Mainline Solid State Color Sewer TV Camera with:
    - 1 Pan, Tilt & Rotate Camera Head
  - 1 40:1 Zoom Ratio, 10x Optical Zoom, 4x Digital Zoom, NTSC Color Standard
  - 1 360 Degree Range of Rotation, 270 Pan Viewing Angle, Panning 360 Degrees
  - 1 Auto Iris, Auto Focus, Manual Override of Focus and Iris
  - 1 Camera will also be Used for:
    - 1 Monitoring Lateral Pan & Tilt Camera During Extend / Retract Operation
  - 1 Light Assembly, Pan & Tilt Zoom Camera, 6" - 72" lines
  - 1 White LED Field Replaceable Lamps
  - 1 Automatic Centering
- 1 Lateral Launcher, for Lateral Pan and Tilt Camera to include:
  - 1 Self Propelled Launcher Robot with Freewheel, Forward, and Power Reverse
  - 1 Camera Head Mounting Assembly with Rotation Positioning, Articulating Hinge
  - 1 Push Cable Drive Assembly - Two-Speed Extend / Retract Camera Positioning
  - 1 Rear tip-up connector
  - 1 Interconnect Cable for Launcher to Push Cable
  - 1 Interconnect Cable for Control System to Power Control Unit
  - 1 Single-point quick wheel removal system
  - 1 6 each 3.5" diameter tires for 6" pipe
  - 1 6 each 4.375" diameter tires for 8" pipe
  - 1 6 each 5" diameter tires for 10"-15" pipe
  - 1 Pneumatic Tire Kit for 12" - 15" pipe
  - 1 Rear Housing Assembly to Add Optional Rear View Color Camera
  - 1 SYSTEM MUST BE LATERAL PAN & TILT CAMERA READY
- 1 Lateral Reel / Control Assembly / Wireless Controller
  - 1 Electric Reel with Slipring and Clutch for:
    - 1 Powered Retrieve of Push Cable
  - 1 Control System to Include Launcher / Self Propelled Robot Control with:
    - 1 Extend / Retract, Left / Right Rotation, Camera Selection
    - 1 Picture In Picture Selection / Cable Drive Speed
  - 1 1000 ft. Video Cable with Cable End Termination

1 Controller with Forward, Freewheel, and Power Reverse / Variable Speed Control:
1 Self-Propelled Launcher Robot
1 All Launcher, Camera, and Reel Functions Shall be Controlled by the Wireless Hand Held Summit System Controller
1 Compact Mainline Video Monitor

1 MICRO PAN & TILT CAMERA (Optional)

1 REAR VIEW CAMERA ASSEMBLY FOR USE WITH LAMP SYSTEM (Optional)
1 Color NTSC Camera
1 Lightring with (12) Solid State White LEDs

1 120' PUSH CABLE FOR LATERAL INSPECTION SYSTEM (Optional)

1 SPARE 120' PUSH CABLE FOR LATERAL INSPECTION SYSTEM (Optional)

1 LATERAL INSPECTION MODULE GraniteNet SOFTWARE (Optional)