

Jeanne R. Colvin  
Finance Director

Birthplace of the  
Council-Manager  
Form of Government



116 W. BEVERLEY STREET  
P.O. Box 58  
STAUNTON, VA 24402  
540.332.3809 (O)  
540.332.3807 (F)

**INVITATION TO BID**  
**October 22, 2009**

**BID TITLE: Pan and Tilt Camera and Crawler** **BID #: K00109**  
**BID OPENING DATE: Thursday, November 19, 2009, at 2:00 p.m.**  
**DELIVERY DATE: Specify in Section A7**  
**BID BOND REQUIRED: No**

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The City of Staunton is seeking bids from qualified vendors to provide a new pan and tilt sewer inspection camera and crawler in the City's existing Camera truck as specified herein. Any questions regarding the specifications for this bid should be directed to Ned Davis, Utilities Superintendent, at (540) 332-3892.

Please quote lowest price and best delivery on items listed. Advise what discount, if any will be allowed for payment within a specified time. Terms and delivery date shall be specified.

Right is reserved to accept or reject bids on each item separately or as a whole, to reject any or all bids, to waive informalities or irregularities, to negotiate contract terms and options with the successful low bidder, and to contract for the bid to other than the lowest bidder in the best interest of the City of Staunton.

The City does not discriminate against small and minority businesses or faith-based organizations.

All bids shall be submitted in a sealed envelope plainly marked, Bid No. "**K00109 – PAN AND TILT CAMERA**", with the name and address of the bidder in the upper left hand corner and accompanied by complete specifications for the items offered. **E-Mail and facsimile responses are not acceptable.** No responsibility will attach the Owner or any official or employee thereof for the pre-opening of, post-opening of, or the failure to open a proposal not properly addressed and identified.

**BIDS RECEIVED AFTER THE DATE AND TIME SPECIFIED WILL BE REJECTED**  
**BIDS SHALL BE SEALED, MARKED, AND DELIVERED TO:**

**Mail To:**  
**City of Staunton**  
**Cynthia A. Steed**  
**Supervisor of Purchasing**  
**P.O. Box 58**  
**Staunton, VA 24402-0058**

**Overnight To:**  
**City of Staunton**  
**Cynthia A. Steed**  
**Supervisor of Purchasing**  
**116 W Beverley St., 3<sup>rd</sup> Floor**  
**Staunton, VA 24401**

**Phone: (540) 332-3819**

**CITY OF STAUNTON  
PURCHASING DEPARTMENT  
GENERAL TERMS, CONDITIONS, AND INSTRUCTIONS**

1. SUBMISSION AND RECEIPT OF BIDS:
  - (A) Bids, to receive consideration, shall be received prior to the specified time and date of opening as designated in the invitation. E-mail and facsimile submittals are not acceptable.
  - (B) Unless otherwise specified, bidders shall use the bid form furnished by the City. Failure to do so may cause bid to be rejected. Removal of any part of the bid form may invalidate the bid.
  - (C) Bids having any erasures, corrections, or typewriter opaquing fluid are not acceptable and will result in rejection of the bid. Prior to submission or opening, errors may be crossed out, corrections entered in ink and initialed in ink by the person signing the bid. No bid shall be altered or amended after the specified time for opening.
  - (D) All bids shall be either typewritten or filled in with ink in order to be considered. Also, all bids shall be signed in ink in order to be considered.
  - (E) Bids concerning separate bid invitations shall not be combined on the same form or placed in the same envelope. Bids submitted in violation of this provision may not be considered.
  - (F) When specified, each bid shall be accompanied by a bid bond with surety satisfactory to the City or a cashier's or certified check, made payable to the Treasurer, City of Staunton, in an amount equal to 5 per cent of the total bid price. In the event of default by the bidder the 5 per cent deposit shall be and represent liquidated damages to the City.
2. ANNUAL CONTRACT USAGE REQUIREMENTS: Whenever a bid is sought seeking a source of supply for an annual contract for products or services, the quantities or usage shown are estimates only. No guarantee or warranty is given or implied by the City of Staunton as to the total amount that may or may not be purchased from any resulting contracts.
3. PRICING:
  - (A) Bidder warrants by virtue of bidding that prices, terms, and conditions quoted in his bid will be firm for acceptance for a period of sixty (60) days from the date of bid opening unless otherwise stated by the City or bidder.
  - (B) Prices should be stated in units of quantity as specified in the bid form. In case of error in extension of prices in the bid, the unit price shall govern.
  - (C) Bids based on a firm price or those including a "Downward Escalator" clause for an annual contract period may be given preference over lower ones bearing an "Escalator" clause for an annual contract period.
  - (D) When an annual contract is not requested by the City, and the bid is for products or services to be delivered on a one time only or staggered basis, only firm pricing shall be given consideration. General terms such as "Price in effect at time of delivery" shall be cause for rejection of bid.
4. PERFORMANCE BOND: When requested in the bid, the City shall require the successful bidder to furnish a performance bond and labor and material payment bond with surety satisfactory to the City in the amount of contract price at the time of or prior to execution of the contract. If no bond is furnished by the successful bidder, the City reserves the right to award the contract to the next lowest responsible bidder with the next lowest responsive bid.
5. DELIVERY POINT: All items shall be delivered F.O.B. destination, and delivery costs and charges included in the bid price. Failure to do so may be cause for rejection of bid. The bidder shall assume all liability and responsibility for the delivery of merchandise in good condition to the specified delivery location(s).
6. CASH DISCOUNTS: Cash discounts will be considered in determining the award.
7. BRAND NAMES: Unless otherwise provided in the invitation for bid, the name of a certain brand, make, or manufacturer does not restrict bidders to the specific brand, make, or manufacture mentioned; it conveys the general style, type, character, and quality of the equipment desired. The City shall determine in its sole discretion equipment bid to be equal of that specified, considering quality, workmanship, economy of operation, and suitability for the purpose intended, shall be accepted.
8. SPECIFICATIONS: The bidders shall also indicate any variances from our specification and/or conditions, NO MATTER HOW SLIGHT. If variations are not stated in the bid, it will be assumed that the product or service fully complies with our specifications. The Purchasing Department is not responsible for locating or securing any information which is not included in the bid. Accordingly, to insure that sufficient information is available, the bidder shall furnish as part of his bid all descriptive material, (i.e., Catalog Cuts, illustrations, drawings, specifications, or other information) necessary for the Purchasing Department to determine whether the goods or services offered meet the salient characteristic requirements of the bid.
9. LATEST MODEL/QUALITY: Bidder shall bid on the latest model, design, etc. of this type of equipment by the manufacturer of which he represents. Equipment shall be new and unused.
10. NOTICE OF AWARD: Notice of award will be posted at <http://www.staunton.va.us/solicitation-results>.

**CITY OF STAUNTON  
BID FORM**

<u>DESCRIPTION</u>	<u>TOTAL COST</u>
Pan and Tilt Camera and Crawler	\$ _____
Make and Model Bid _____	

OPTIONAL ITEMS

1.	Remove and replace existing interior control station (Section H)	\$ _____
2.	Remove and replace generator with a new generator of equal rating (Section I)	\$ _____
3.	Remove and replace existing roof air conditioner with a new roof air conditioner of equal rating (Section I)	\$ _____
4.	Computer and Software (Items K1 and K2)	\$ _____
5.	Separate 165' extension cable (Item K3)	\$ _____
6.	Trade-in credit for existing Cues Pan and Tilt Camera	\$ _____

PER ATTACHED SPECIFICATIONS

Additional Items required for complete bid:

- Warranty Information (see A3)
- Manufacturer's standard literature for model of camera and crawler bid and complete specifications for each.
- Manufacturer's standard literature for DVD, TV monitor(s), and software
- Listing of three (3) references currently using the proposed camera and crawler including the company or municipality, address, contact name, email address, and telephone number.

**PRICE BID SHALL INCLUDE ALL DELIVERY CHARGES.**

**OFFER**

To Purchasing Department:

In compliance with the bid information, the undersigned offers and agrees, if this offer is accepted within \_\_\_\_\_ calendar days (30 calendar days unless a different period is inserted by the purchaser) from the bid open date specified above, to furnish any or all

items upon which prices are offered, at the price set opposite each item, delivered at the designated point(s), within the time specified.

Bidder guarantees shipment from \_\_\_\_\_ via \_\_\_\_\_  
within \_\_\_\_\_ days after receipt of order.

FOB: Staunton TERMS: \_\_\_\_\_

BIDDER/COMPANY NAME: \_\_\_\_\_

BY: \_\_\_\_\_

TYPED NAME OF BIDDER: \_\_\_\_\_

STREET ADDRESS: \_\_\_\_\_

CITY AND STATE: \_\_\_\_\_

FEDERAL ID NUMBER: \_\_\_\_\_

DATE: \_\_\_\_\_ PHONE: \_\_\_\_\_ FAX: \_\_\_\_\_

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**REPLACEMENT & RETROFIT OF PAN AND TILT SEWER INSPECTION CAMERA,  
CRAWLER, AND ACCESSORIES**  
**SPECIFICATIONS**

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**INTENT OF SPECIFICATIONS**

The intent of the following specifications is to describe an item of equipment capable of performing specified tasks. Because of the variety of approaches to designing a piece of equipment to perform certain tasks, it is not the intent of this description to specify any specific design but rather to specify features preferred and descriptive data felt to be common to most designs. The obligation of the bidder is to bid a price for a piece of equipment fully capable of performing the specified tasks, and to identify any deviations from the requirements.

The purpose of these specifications is to secure for the City of Staunton a **PAN AND TILT SEWER INSPECTION CAMERA, CRAWLER & ACCESSORIES**, as described herein. The camera shall be capable of inspecting 6” – 24” sanitary sewer lines. A detailed list of components required is included, and is the basis on which the supplier’s proposal shall be made. **This is to be a turn key installation.** Therefore, all necessary items needed to operate the unit **whether or not specifically mentioned** in the specifications shall be considered a part of the bid and supplied at the price bid. All equipment, materials and workmanship shall be of the highest grade in accordance with modern practices and all equipment supplied will be new and unused. All bidding parties shall have factory trained technicians capable of diagnosing and repairing problems with a parts department stocking factory parts at its facility.

Old equipment removed will be placed on pallets, strapped, and returned to the City of Staunton unless trade in bid is accepted.

All bidders will be required to demonstrate their equipment bid prior to acceptance of any bid. Demonstrations can be arranged by contacting Ned Davis, Utility Superintendent at 540-332-3892. To date, two companies—Cues and Envirosight—have demonstrated their equipment and have been approved.

The City reserves the right to award this equipment on a “**BEST VALUE BASIS**” with items such as ease of field maintenance, ability to camera sanitary sewer lines as small as 6” in diameter, type of crawler, and ability to upgrade camera to camera sanitary and storm sewer lines greater than 24” in diameter.

**COMPLETION OF BIDDER’S DATA**

For every item on the bid, space is provided for the bidder to acknowledge his complete acceptance of the item or any exception taken to an item. **THE BIDDER SHALL, IN WRITING, ACCEPT EACH ITEM OR WRITE IN HIS EXCEPTION.** ALL REQUESTED DATA SHALL BE COMPLETED AND ACKNOWLEDGED FOR THE BID TO BE CONSIDERED. **INCOMPLETE BIDS MAY BE REJECTED.**

**PART A – GENERAL REQUIREMENTS**

A.1 MANUALS – Complete operating manuals to be furnished with the unit. In addition, complete shop manual, operation manual and parts manual for self propelled sewer inspection camera system, generator and roof mounted air conditioning/heater unit shall be provided at time of delivery. Bidder shall list three (3) vendors, including addresses and phone numbers, who can provide parts for the self propelled sewer inspection camera system, generator and roof mounted air conditioning/heater unit.

A1. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

Vendors: List Name, Address, Phone:

- 1. \_\_\_\_\_
- 2. \_\_\_\_\_
- 3. \_\_\_\_\_

A.2 ACCESSORIES –Accessories not specifically mentioned in these specifications but necessary to furnish a complete unit ready for use, shall be included and named.

NOTE: Accessories included in Part J do not have to be included below.

LIST OF ACCESSORIES:

- a) \_\_\_\_\_
- b) \_\_\_\_\_
- c) \_\_\_\_\_
- d) \_\_\_\_\_
- e) \_\_\_\_\_
- f) \_\_\_\_\_

A2. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

A.3 WARRANTY – The Warranty period shall be a minimum of 1 year for all installed components. The bidder shall be responsible for all warranty repairs to the self propelled sewer inspection camera system. In the case of a generator and roof mounted air conditioner, bidder shall indicate the dealership that will provide warranty service for proposed generator and roof mounted air conditioner. Warranty work for the self propelled sewer inspection system shall be provided within a 180-mile radius of the City of Staunton. **All warranties are to be listed in detail and submitted at the time of bid.**

A3. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

A.4 FEDERAL, STATE AND LOCAL LAWS AND REGULATIONS – The unit shall contain all items necessary to achieve conformance to all current Federal, State, and local laws and regulations.

A4. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

A.5 DELIVERY DATE AND TERMS – The bidder shall submit, herein, a firm delivery date and all terms associated with delivery. All transportation charges shall be included in bid price.

DELIVERY DATE: \_\_\_\_\_  
TERMS: \_\_\_\_\_  
F.O.B. Staunton

A.6 TAX – No tax shall be included in the bid. A tax exempt certificate will be provided to the successful bidder.

A6. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

A.7 DELIVERY POINT/PAYMENT: - The complete unit shall be delivered to the Public Works Department, Equipment Maintenance Division, Englewood Drive, fully assembled and ready to operate. The Equipment Maintenance Division will inspect the vehicle upon arrival to ensure specifications are met before accepting the vehicle.  
**Payment will not be made until the vehicle has been accepted by the City.**

A7. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

A.8 Operator training shall be conducted by a factory representative, or a factory trained representative, for a minimum of 1 day at the time of delivery, with follow-up training of an additional day, to be provided. Factory or dealer representative will give the Equipment Maintenance Division information on operation and service requirements.

A8. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

A.9 To avoid untried and prototype equipment, the self propelled sewer inspection camera system bid shall have been in production for a minimum of 3 years. In addition, at least 200 units of the system bid shall have been produced.

A9. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

A.10 The successful bidder shall receive the City of Staunton’s current CCTV sewer inspection vehicle from the Public Works Department, Equipment Maintenance Division. The successful bidder will remove all existing equipment, if not utilizing the existing cable system (Cues) and retrofit the truck. If included as accepted options, bidder shall be responsible for removing operator’s station console, counter and all studio components in operator’s area and replacing with completely new studio work station,

replacing roof mount air conditioner, and replacing generator, as listed in specification. All the pre-existing removed CCTV sewer inspection equipment components (if not included as trade-in), and air conditioner and generator (if included as accepted options) shall be affixed to pallets and returned to the Public Works Department, Equipment Maintenance Division at the time completed retrofitted vehicle meeting specifications herein is delivered.

A10.ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

### **PART B: Zooming Pan & Tilt Color Camera**

B.1 The pan & tilt camera shall connect directly to the cable and to any crawler without modification to the cable, control unit or any other part of the system. When connected to any crawler there shall be no external wires, connectors, clamps or tie-downs.

B1. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

B.2 The camera will pan and tilt allowing for full view of laterals, joints and other various observations. Camera will have the ability to view behind crawlers to inspect upstream lateral rubber seals on gravity flow PVC pipes. The pan/tilt will have mechanical stops to avoid slip-ring maintenance issues and prevent camera from being inadvertently positioned into dirty flow at the bottom of the pipe.

B2. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

B.3 The camera shall have 10x optical and 4x digital zoom capability for viewing laterals and magnifying observations. The camera will contain built in self diagnostics to facilitate troubleshooting. Items such as humidity, temperature, camera voltage, amperage, light voltage, camera hour meter, and camera serial number will display on the monitor screen on demand.

B3. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

B.4 Camera construction shall include all solid-state circuitry designed to withstand shocks and vibrations while being pushed, pulled or propelled through the pipe. All camera electronics shall be of modular construction for ease of exchange and repair, and shall be designed to facilitate future upgrades. The housing shall be fully sealed and waterproof (IP68/UL 2044) to withstand external pressure up to 15 psi without damage or leaking. The front of the camera housing shall have a windshield made of impact resistant, distortion free material. Repackaged consumer grade cameras (i.e. Camcorders) are not acceptable for use in a pipeline television inspection system.

B4. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

B.5 The camera power supply shall be provided from a solid-state power source and the camera input shall be 12 volts DC. The lighting for the camera shall be supplied



through an isolated power supply and shall regulate the light voltage up to a nominal 3 volts DC. The pan/tilt motor power shall be 12 V/3 Watt.

B5. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

B.6 The camera shall be designed for easy removal and installation from the cable or tractor by using a single T-bar tool keyed to stainless steel waterproof swivel loc-tite camera and cable connections. Other types of connectors are not acceptable.

B6. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

B.7 Camera illumination shall be built in directional lighting and shall be either LED Lamps or Xenon Lamps. The lamps shall be field replaceable by the operator. The Lamps shall be able to light up lines from 6"-30" and be upgradeable to inspect minimum 42" lines.

B7. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

B.8 If needed, the camera may have a visible internal pressure indicator allowing the operator to detect a pressure loss. A solid red indicator will show when the system is over-pressurized, green indicator when the system is holding between 5 and 10 lbs of pressure and blinking red indicator when pressure is below 5 lbs. The camera shall have a shraeder valve for purge and pressurization of the camera body. Pressurization shall prevent the ingress of water during an accident and provide dry internal air to prevent fogging of inner lens during changing external temperatures.

NOT APPLICABLE: \_\_\_\_\_

B8. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

B.9 The camera shall pan and tilt at the same time to increase speed of inspection and home position placement when continuing forward. **Cameras that require the operator to stop in order to pan and tilt are not acceptable.**

B9. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

B.10 The camera head shall weigh a maximum of 5.75 pounds/1.7 kg. The camera shall fit into a diameter of 3.5". Side stainless steel plates shall be a minimum of 13mm for increased durability when inserting the camera into a manhole. The rotation axle shall be made of a minimum 15mm stainless steel.

B10. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

B.11 The following camera functions shall be controlled via a remote pendant:

1. Single click for normal zoom in/out
2. Double click same button for full in/out zoom position
3. Hold down for longer than 1.5 second for fast zoom in/out

4. Shutter speed button for up, down and auto
5. Focus button for near, far and auto
6. Home button for centering pan/tilt to center forward position
7. Double click home button to set wide zoom setting
8. Joystick control for pan/tilt
9. Rheostat control of lighting
10. Rheostat control of auxiliary lighting
11. Single click for changing view from forward camera to rear facing camera

Pan and tilt head shall have integrated clutch for pan and tilt motor.

B11. ACCEPTED:\_\_\_\_\_ EXCEPTIONS:\_\_\_\_\_

**PART C: Steerable Motorized Crawler**

C.1 The system shall include a gear driven, all wheel drive tractor to carry the camera for rapid remote inspection of pipes ranging from 6” to 24” in diameter. The tractor shall provide sufficient traction, under suitable conditions, to tow a minimum 660 feet of transmission cable. Such traction shall be provided by either four or six gear driven wheels (depending on Manufacturer) with tapered tires. **Tractors propelled by belts or continuous tracks are not acceptable.**

C1. ACCEPTED:\_\_\_\_\_ EXCEPTIONS:\_\_\_\_\_

C.2 The tractor shall have forward/reverse and left/right steerable movement via the pendant control and the Camera Control Unit.

C2. ACCEPTED:\_\_\_\_\_ EXCEPTIONS:\_\_\_\_\_

C.3 Both the camera and cable shall be easily removed from the tractor unit with a T-bar tool to facilitate productivity and service. The connector shall have a lifetime warranty. T-bar tool shall turn a cam lock no more than 2” to secure and release the cable or camera.

C3. ACCEPTED:\_\_\_\_\_ EXCEPTIONS:\_\_\_\_\_

C.4 The tractor shall allow proper clearance in 6” and lined pipe. Also, to allow for performance in soft sediment and debris and ease of use, the tractor shall weigh a maximum 20 lbs. and 27 lbs. with pan/tilt camera attached. The tractor shall be no longer than 20” with pan/tilt camera attached to easily navigate smaller pipe and turns without rolling or impediment.

C4. ACCEPTED:\_\_\_\_\_ EXCEPTIONS:\_\_\_\_\_

C.5 The tractor shall be powered by two (2) 20 watt DC motors.

C5. ACCEPTED:\_\_\_\_\_ EXCEPTIONS:\_\_\_\_\_

C.6 The tractor front bottom edge shall be solid anodized aluminum and be curved upward to assist with movement over and through common debris and obstacles.

C6. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

C.7 In order to prevent leaking and bending due to the torque and stress generated by a small steerable crawler, the chassis shall be a single piece of machined aluminum with only a top plate to access control boards, a bottom plate to access motors, and two zinc plated brass side cover plates to access gears. **Bronze or brass bodies of soft metals are not acceptable for chassis construction.**

C7. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

C.8 All wheels shall have tapered edges to conform to pipe sidewall. The tractor shall have a machined key fitting on all axles to facilitate easy use and ensure an exact fit with all wheels. Machined axle key shall be able to be replaced in the field without having to replace the axle. **Tractors without keyways or keyway fittings that can be replaced in the field without removal of the axle are not acceptable.** Spacers and wheel sizes shall attach with a single screw. **No plates or spacer-bars will be accepted.**

C8. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

C.9 The tractor shall be equipped with the following wheel sets or equivalents for the model bid:

1. Four (4) common 36 mm x 20 mm wide axle extensions
2. Six (6) 3.33" diameter grooved rubber wheels
3. Four (4) 4.33" diameter grooved rubber wheels
4. Four (4) 4.33" diameter carbide, high traction wheels
5. Four (4) 5.31" diameter grooved rubber wheels
6. Four (4) 5.31" diameter double width grooved rubber wheels or pneumatic tires

C9. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

C.10 The tractor shall have a single, water-proof threaded connection port for additional lighting located behind the center area. It shall have two (2) mechanical threaded holes to solidly adhere auxiliary lighting to the tractor. The tractor shall also allow for the addition of camera riser kits for the manual lift of the pan/tilt camera above the crawler for better centering and lighting of larger pipe diameters and navigation of high-flow conditions. Centering of the camera is required to conform to PACP and WRc recommended practices and enables the use of digital scanning upgrade opportunities.

C10. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

C.11 If there is electronic circuitry located in the body of the transporter, the tractor shall have a visible internal pressure indicator allowing the operator to detect a pressure

loss. Only A solid red indicator will show when the system is over-pressurized, green indicator when the system is holding between 5 and 10 lbs of pressure and blinking red indicator when pressure is below 5 lbs. The water depth rating of the crawler shall not be less than 1 bar or 33 feet. The tractor shall have a shraeder valve for purge and pressurization of the tractor body to prevent the ingress of water during an accident.

C11. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

C.12 The tractor shall have a tilting rear cable connector that points vertically when deploying the system into a manhole, but can tilt during operation in order to protect cable and connector during deployment. The tractor shall have a strain relief system for the cable that is comprised of (2) high strength steel cables and an aluminum capture device to secure to cable brass fitting.

C12. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

C.13 The tractor may allow for a removable bottom weight plate which can be used to increase the crawler weight by 5 lbs. Two (2) threaded bolts shall attach this plate to the tractor for ease of installation and removal.

C13. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

C.14 At a minimum, 60% of the entire length of any available camera shall be protected and housed within the crawler to help prevent pressure and damage to camera and to keep even balance when the system is in use.

C14. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

C.15 The tractor shall allow for future digital camera technology upgrade without modification of the tractor body. Digital Scan Evaluation technology for example should be able to plug directly into the existing tractor. The tractor or camera shall come equipped with an integral built in inclinometer.

C15. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

C.16 Crawler shall be equipped with black & white or color rear viewing camera if required to see behind crawler during camera removal operations. If required, rear viewing camera and LED auxiliary lighting shall be constructed in the same housing and be attached flush to the crawler top plate. No wires or connectors shall be required for installation. Crawler shall have the ability to operate in 6" pipe with rear facing camera / auxiliary lights installed.

NOT APPLICABLE: \_\_\_\_\_

C16. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

C.17 Crawler shall have capability to accept a heavy duty elevator kit (camera lift) that raises the Pan & Tilt camera head center line from 2" to 5" inches. Rear facing camera

/auxiliary lighting shall be capable of mounting to such elevator kit and rise and fall in conjunction with camera head. Such device shall be constructed of aluminum and stainless steel and shall be remotely controlled from the truck. (Elevator kit shall be bid separately as optional item.)

C17. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

C.18 To preserve the value of this investment, the tractor shall have the ability to accept upgrades without any modification. The following technologies shall be available:

1. Digital Scan Evaluation
2. Laser Profiler

C18. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

#### **PART D: Camera Control Unit (CCU)**

D.1 The system controls shall be contained in a damage resistant housing with carrying handles. The CCU shall include circuit protection for individual electronic components to protect against such events as power interruption, surges, component malfunction or inadvertent mis-operation of the system.

D1. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

D.2 The control unit may be available in configurations for complete portability via embedded color video monitor or a wireless portable controller in addition to rack mounted for vehicle installation. Rack mounted unit shall be 17" color flat panel LCD TV video monitor. (See also items H5 and J2.)

D2. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

D.3 The control unit shall not weigh more than 30 lbs. It will not be larger than 21 inches wide x 18 inches deep x 6 inches high. It will operate on either 115V/60W/4 amps or 230V/50W/2 amps.

D3. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

D.4 The CCU shall contain the following controls, inputs, and outputs:

- a. Keyboard input
- b. Video out BNC connector
- c. RS232 output for text and footage data to potential software
- d. Hour meter
- e. Red/Green fuse indicator per slide out card
- f. Control cable receptacle to cable reel
- g. 90V / 240V universal AC power supply

- h. External video BNC connector
- i. Pendant control cable receptacle
- j. External D connector for pendant and pendant cable
- k. Power on/off switch

D4. ACCEPTED:\_\_\_\_\_ EXCEPTIONS:\_\_\_\_\_

D.5 Two pendant controls shall be provided – One (1) in the vehicle and a 2<sup>nd</sup> at rear. Pendant controls shall have the following functions:

- a. Forward/Reverse, Left/Right tractor joystick control
- b. Rheostat variable tractor speed control
- c. Single click normal zoom in/out
- d. Double click same button for full zoom in/out
- e. Hold down for 1.5 seconds for fast zoom in/out
- f. Focus far, near and auto
- g. Center pan/tilt to center forward position
- h. Double click home button for wide zoom setting
- i. Joystick control for pan/tilt
- j. Rheostat control for variable light , 2<sup>nd</sup> rheostat for auxiliary lights

D5. ACCEPTED:\_\_\_\_\_ EXCEPTIONS:\_\_\_\_\_

D.6 The proposed system shall have electronic controls for the CCU mounted on modular slide out cards for ease of repair/replacement. The cards are to include:

- a. Video card
- b. Text generator card
- c. 12V power card
- d. Main power card
- e. Camera card

D6. ACCEPTED:\_\_\_\_\_ EXCEPTIONS:\_\_\_\_\_

D.7 The CCU shall operate larger or smaller crawlers with no need for additional control unit or cable upgrades. The pendant controller will also be equipped to operate smaller or larger crawlers without modification.

D7. ACCEPTED:\_\_\_\_\_ EXCEPTIONS:\_\_\_\_\_

**PART E: Text Generator**

E.1 The system shall include a video text generator capable of displaying alphanumeric text material directly onto the video monitor. The facility for this data shall remain in memory when the unit is powered off and shall be retained without system use for a minimum of 30 days.

E1. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

E.2 The video text generator shall supply at least seven (7) separate screen page memories for text storage and display. Screen page memories shall be selected by no more than 2 keystrokes at any time during the inspection. Each screen page memory shall contain a minimum capacity of 32 characters across by 20 lines down allowing for flexibility in formatting footage, date, time, job descriptions, defect codes, etc. in any location desired.

E2. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

E.3 Characters generated by the video text generator shall be available in the following formats:

- a. Black on video
- b. Black on white background
- c. White on video
- d. White on black background

E3. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

E.4 Footage of cable extended shall appear on the screen in conjunction with the cable counter. Reset or preset of the footage counter shall also be possible using the video text generator. Time and date shall be maintained by keypad and displayed on the screen at the discretion of the operator. Date and time shall remain in memory when the unit is powered off.

E4. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

E.5 At least seven (7) special fields shall be provided in which recurring data may be programmed and selected for entry onto the screen by no more than two (2) keystrokes. These fields shall have a capacity of no less than thirty (30) characters and shall be placed onto any screen page as selected by the operator. These special fields shall retain all information for a minimum of thirty (30) days when the unit is powered off. In addition, arrows pointing UP, DOWN, RIGHT and LEFT shall be provided by the character set. A QWERTY keyboard shall be provided.

E5. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

#### **PART F: Motorized Auto-Sensing Cable Drum**

F.1 If not compatible with existing CUE's Motorized Cable Drum, a cable drum shall be provided to contain the cable for camera and crawler operation. The hub of the cable drum shall be equipped with a continuous contact slip-ring assembly to allow the cable to be dispensed and retrieved while the camera and tractor are operational. The slip-ring contacts shall be of an alloy of gold and rhodium and shall be housed in an environmentally sealed housing.

NOT APPLICABLE: \_\_\_\_\_

F1. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

F.2 Cable payout and retrieval shall happen **AUTOMATICALLY** via a motorized system with sensors that operate the cable drum at the speed and direction of the crawler. Cable shall be paid-out toward the crawler so the crawler does not have to pull the cable off the reel which reduces power and traction. **Cable reels that require operator control or lack the ability to operate in tandem with the speed and direction of the crawler without operator intervention are not acceptable.**

F2. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

F.3 The cable reel shall be equipped with an automatic level wind system which will help neatly roll and store cable without excessive loops or tangles.

F3. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

F.4 The cable reel shall have a red lighted emergency stop switch. To further enhance safety, the cable drum shall have an automatic shutdown if the reel is tilted beyond 30 degrees.

F4. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

F.5 The cable reel shall have a normal and inverse switch which allows the crawler controls to be used normally in the event the crawler was to flip and be operated in an upside down position. The cable reel shall have the ability to be operated in both automatic and manual modes. The system shall have back-up manual crank arm in case of power loss.

F5. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

F.6 Reel front panel shall have LCD readout of footage. The reel shall also have an outward cable rolling arm to assist with the pressures of the cable when the crawler is being reversed and for ease of deployment when the crawler is moving forward. Roller and arms shall be able to be stored in an upright position when not in use to facilitate portability.

F6. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

F.7 The cable reel system shall have an overheat sensor so motors will not be destroyed in the event the reel pulls on an object that is immovable for a long period of time. The cable drum shall have speed and torque controls to adjust for differing pipe conditions and user preferences.

F7. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_



F.8 The cable reel shall weigh no more that 150 lbs. with a full 660' compliment of cable installed. It shall be able to be carried easily in the field (e.g., it may include a top handle, side grips, and/or have removable transport tires).

F8. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

F.9 The cable reel shall come with a stationary mounting plate where cable drum remains secure, but can easily be removed for maintenance, shipping or portable use without the use of tools or loose hardware.

F9. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

F.10 The cable reel shall come in a UPS capable shipping case (if not using existing reel).

NOT APPLICABLE: \_\_\_\_\_

F10. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

F.11 A footage counter shall be included which measures the amount a cable extended. It shall be mounted on the level-wind mechanism and be constructed of machined aluminum. It shall have the necessary guide wheels to maintain cable tension. The footage counter shall function electronically and transmit footage data for monitor display and video recording in increments of 0.1 foot steps.

F11. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

F.12 If not using existing Cues Equipment, the cable drum shall be no larger than 14" x 21" x 20" and will pull no more that 2 amps at 115V.

NOT APPLICABLE: \_\_\_\_\_

F12. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

**PART G: Transmission Cable**

G.1 If not using existing Cues Cable System, a minimum 660' of continuous length multi-conductor transmission cable shall be provided. The cable shall be Kevlar reinforced and have minimum break strength of 500 lbs. The cable shall be no greater than .375 inches in diameter and weigh no more than 21 lbs. per 328 feet.

NOT APPLICABLE: \_\_\_\_\_

G1. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

G.2 The transmission cable shall be able to connect to the camera and crawler independently and shall be adequate to facilitate any future upgrades to the system (i.e. a digital scanning camera).

G2. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

G.3 The transmission cable shall be easily removed from the cable reel without tools in the event of needed maintenance or repair.

G3. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

G.4 The outer jacket shall be tear and scrape resistant. It shall be smooth to reduce friction and water resistant.

G4. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

G.5 The camera/crawler connect end shall be a solid stainless steel, military style connector that locks with a single quarter turn. It shall have a minimum 8” steel armored jacket to prevent cable damage while navigating pipe bends and during entry. The connector shall have an electrical keyway for proper alignment of transmission cable to camera/crawler without damaging electrical pins. Connector end shall be a minimum 12 mm stainless wall thickness with minimum 2 mm points to mechanically secure to camera/crawler.

G5. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

G.6 The transmission cable shall be able to be directly reterminated without the need for epoxy. **Scotch cast style units that require lengthy cure times are not acceptable.**

G6. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

G.7 The cable shall have easy, single twist style connectors for tool-less and easy connection to all available cable drums.

G7. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

**PART H: Optional Bid Item #1 - Interior Retrofit**

The optional interior retrofit shall include the following items:

H.1 The existing operator's station shall be completely removed and replaced with a minimum 24” x 60” commercial grade desk countertop mounted at a height of 30 inches.

H1. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

H.2 An over desk forward facing rack mount cabinet for CCU and DVD recorder components with a side access door shall be installed.

H2. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

H.3 Rack mount cabinet shall be permanently affixed to desk countertop and covered with commercial grade sound absorbing carpet.

H3. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

H.4 An internal/external camera & crawler control selector shall be desk mounted to allow for transfer of operation from either operator station control pendant or secondary control pendant mounted in the rear of the vehicle in equipment area. Portable wireless controllers will also be acceptable for this task.

H4. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

H.5 The 17" color flat panel LCD TV video monitor shall be permanently mounted to desk counter top. (See items D2 and J2.)

H5. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

H.6 A minimum 24" x 24" RV grade sliding window shall be installed in bulkhead wall between operator station and equipment area.

H6. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

**PART I: Optional Bid Items 2 And 3 - Generator & Air Conditioner Retrofit**

I.1 Existing generator shall be removed and replaced with 4.0 Onan Super Quiet Gas on Gas generator mounted against bulkhead wall in equipment area or in existing space in a cabinet on the driver side.

I1. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

I.2 Generator shall include Auto Transfer Switch, 12V Converter, Wall Mounted Start/Stop/Hour Meter and Starting Battery.

I2. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

I.3 Retrofit shall include an enclosed generator compartment with access openings to do daily oil checks and complete maintenance, Enclosure shall be covered with commercial grade sound absorbing carpet and top with commercial grade impact resistance black rubber sheeting.

I3. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

I.4 Generator shall be fueled from vehicle's fuel tank. Exhaust shall be plumbed through floor and out driver side of vehicle.

I4. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

I.5 The current roof mounted air conditioner shall be removed and replaced with new 13,500 BTU unit.

I5. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

I.6 Both generator and air conditioner will be palletized and returned to the City at the time completed retrofitted vehicle meeting specifications herein is delivered

I6. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

**PART J: Included Accessories**

The following accessories shall be included in base bid:

J.1 Top manhole cable roller, 2" diameter Tyger Tail manhole rubber cable protector and Nylon camera lowering tool shall be included.

J1. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

J.2 Two (2) 17" TV monitors shall be provided and installed. One shall be permanently mounted to desk counter top in interior control room. (See items D2 and H5.) The second monitor shall be mounted in the in storage area of the Van so that the person operating at the rear of the Van can view the inspection with camera, Cable connection to video monitor in control room and monitor mount. Second TV monitor shall be mounted above the cable reel with mounting position which provides maximum protection from direct sunlight for enhanced viewing. Monitors shall be compatible with both NTSC and PAL signals, shall have auto-detect function for receiving NTSC and PAL signals and automatically switch. Monitors shall have ability to automatically monitor / adjust the video input and optimize the display settings without manual adjustments. Monitors shall include an on screen menu for adjusting monitor parameters, shall operate from 120V AC or 230 V AC power sources.

J2. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

J.3 A DVD/VCR recorder capable of supporting all media mode, DTS capable CD-R Capable With S-Video inputs -2 Rear and 1 Front, shall be mounted securely on operator's desk or rack mounted at the operators desk for convenience. Cable Assembly to Power Control Unit. Remote included.

J3. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

J.4 An inclinometer shall be built into camera so that changes in grade can be determined while using the camera.

J4. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

J.5 Sonde in pan and tilt camera shall be built into camera and Digital Receiver shall be designed to pickup magnetic pulses/signals from a transmitter with a minimum working distance of 15 feet. Camera shall operate with any constant tone, 512 hz. Shall include Screens for peak, line, sonde and depth designed to guide the operator through the locating process. Shall include a speaker to allow the operator to hear the transmitter and a phone jack for optional headphones.

J5. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

**PART K: Additional Optional Equipment**

K.1 Optional Bid Item #4 - Optional Software shall be CCTV software for Granite XP-Asset Management Na Decision Support Software (or equivalent).

K1. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

K.2 Optional Computer (Item #4) - Pipeline Data Collection & Real Time Video Capture System, Rack mount, to include:

- Mother board w/775 Socket and Intel P45 Cipset
- Latest Intel processor.
- Minimum 1GB of DDR2 5400 Ram
- PCI video Capture Boadr for MPEG1/2/4 Video Capture with Hardware Compression
- Video raphics Card, Supporting up to 256 MB, 16X PCI- Express
- Lan, on board Network Connection, Intel 82547 E1 10/100/1000
- 8 USB 2.0 Ports (6 on rear, 2 on front)
- 3 RS232 serial ports
- Soundblaster Compatible on Board Sound
- DVD +/- RW DVD burner 20x X CD –RW 40 X internal
- 2-250 GB (7,200RPM SATA Hard Drives)
- 650 Watt ATX Power Supply
- Video Character Generator & Titler with Rack mount.
- 101 Key Enhanced Heavy Duty Keyboard
- Optical PS2/USB mouse
- 17” multimedia Monitor With Speakers

K2. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_

K.3 Optional Bid Item #5 - A separate 165’ extension cable – Cable shall run from the cable reel to the CCU in order to allow the cable reel to be transported and operated 165’ from the vehicle if desired.

K3. ACCEPTED: \_\_\_\_\_ EXCEPTIONS: \_\_\_\_\_