

**CONTRACT #1099-10/06/2016**

**FOR FURNISHING SEWER LINE CAMERA EQUIPMENT FOR THE TOWN**

**OF VERNON WATER POLLUTION CONTROL AUTHORITY**

**“ATTACHMENT A”**

1. Standard Truck Mounted Sewer Camera System to include:
  - a. Control Pendant and Wireless Control
    - i. 8” hand held color touch-screen monitor with 800 x 600 display resolution for viewing, recording video and accessing control and configuration functions.
    - ii. Power on/off switch.
    - iii. Standard ability to connect to a network in order to access remote server download of for lifetime automatic performance and feature upgrades.
    - iv. CAN-bus control architecture allowing for precision control, diagnostic monitoring and future upgradeability
    - v. Backside of pendant to have mounting hardware for various storage and mounting options. System to provide hardware for tilting-mount on a desktop or other flat surface.
    - vi. Dual software programmed joysticks for camera and crawler functions.
    - vii. Video signal output.

- viii. Right multifunction joystick to control crawler's forward/reverse, left/right turning and speed.
- ix. Left multifunction joystick to control camera's pan/tilt, zoom and home functions.
- x. Controls for manual and automatic focus of camera.
- xi. Ability to display crawler pressure, temperature, sonde status, pitch (inclination) and roll.
- xii. Controls for adjusting illumination intensity of camera and auxiliary lighting.
- xiii. Ability to control cable reel functions: auto, manual, speed, direction, torque of the cable reel.
- xiv. Ability to record digital video.
- xv. Ability to capture digital stills.
- xvi. Ability to generate text on video.
- xvii. Ability to inform operator if one is getting close to flipping the crawler.
- xviii. Ability to directly engage or disengage electronic clutch.
- xix. Ability to capture, correlate and store still images with distance and observation information, all of which can be output into several reporting packages or viewed onscreen.
- xx. Captured data can be output via a file which will automatically populate relevant fields within WinCan VX software database.

- xxi. Ability to operate crawler in cruise control mode where an operator does not need to touch the joystick for crawler speed.
- xxii. Ability to view system operational history and performance.
- xxiii. Ability to view a full schematic and observation inspection report on the pendant.
- xxiv. Ability to pause video when adding an observation as to not waste video file storage capacity.
- xxv. Ability to generate a graphic inclination report to show pipe grade along inspection route.
- xxvi. 64 GB file storage for an average of 40 hours of digital video or thousands of digital stills.
- xxvii. Output compartment at top of pendant that contains s-video, USB and network connections.
- xxviii. On/off control of digital zoom functions.
- xxix. Ability to toggle front-view camera, integral rear view camera, and accessory rear view camera.
- xxx. Control for remotely controlled motorized camera lift.
- xxxi. The ability to operate larger (10" minimum diameter) and smaller crawlers (minimum 4" diameter) with no need for additional control unit or cable upgrades.
- xxxii. Ability to measure cracks and other observations without the need for external software.

- xxxiii. Portable battery powered belt clip wireless controller with crawler, camera and cable reel functions for easy direct single person deployment and retrieval of the crawler at the access point (manhole/basin).
- xxxiv. Digital control to have a range of at least 50' without radio frequency interference being able to compromise the signal. RF systems will not be accepted.

b. Crawler

- i. 6-wheel drive (3 wheels per side) to generate traction necessary to crawl 1000' in wet and slippery pipes.
- ii. In 8" configuration with the middle wheel remaining, the 4 larger wheels will overlap the middle ones to provide continuous traction to go over joints and debris and avoid high centering where 4 wheel crawlers can no longer move forward.
- iii. The tractor has proportional left, right, forward and reverse capability via manual and automatic controls via a joystick and direct buttons amongst the operator pendant and wireless controller.
- iv. Proportional steering means that the 3 wheels on the left and the right of the crawler will move proportionally at the same time to move the crawler in the intended left, right, forward, backward or combination direction.

- v. Maximum size of 12.2 x 4.3 x 3.5" (lwh), allowing proper clearance in 6" and lined pipes.
- vi. Two powerful EC drive motors.
- vii. An electronic clutch that can be engaged and disengaged without needing to move the crawler.
- viii. Can accept an option for a remotely operated lift that can raise the camera a minimum of 7" from its lowest position.
- ix. Full sensor package with inclination, roll, sonde, pressure, heat and motor readings.
- x. Integral rearview color camera with tri-LED lighting is positioned at the top rear of the crawler body.
- xi. Ability to remotely toggle between rear- and forward-viewing cameras using the operator control pendant.
- xii. Slotted locking mechanism, the simple turn of which drives 3 stainless bearings into the rotate shaft of the camera for secure, easy attachment with 1-bar waterproof rating.
- xiii. Rear connection that allows cable attachment with 2 turns of the stainless-steel cable connector's outer barrel. Not tools required.
- xiv. A spring-loaded pin on the rear receptacle to lock the stainless-steel cable connector's outer barrel, ensuring a secure connection and delivering pull strength beyond the 1000-lb-rated break strength of the cable.

- xv. Length of 12.2" (18" with camera and optional lift installed) for easy navigation through 90-degree inverters without rolling.
- xvi. Crawler body is machined from a single continuous and complete piece of machined aluminum.
- xvii. Quick change wheel hubs for easy push on and pop off of wheels. No tools required.
- xviii. Three (3) wheel sets and spacers for inspection of pipes 6-24".
- xix. Ability to fit in 8" pipe with top mount auxiliary lighting attached.
- xx. Stainless cable connector shell to carry a lifetime warranty.
- xxi. 512 Hz or 33 kHz integral sonde to facilitate locating crawler.

c. Camera

- i. 10X optical zoom with 4X digital zoom multiplier for a total zoom of 40X.
- ii. Ability to produce a high-quality color video image with a readable resolution of no less than 420 HTV lines.
- iii. Pan and tilt motors with no exposed gears or wires.
- iv. Ability to pan a full 360 degrees and tilt  $\pm 135$  degrees for full viewing of laterals and joints.
- v. Ability to view behind crawler to inspect upstream lateral rubber seal on gravity-flow PVC pipes.
- vi. Have dual lasers 50mm to gauge the size of pipeline pipe features and defects.

- vii. Solid-state circuitry designed to withstand shock and vibration while being pushed, pulled or propelled through the pipe.
- viii. Camera connection to crawler body is waterproof.
- ix. Front housing made of aluminum and stainless steel, with windshield made of impact-resistant, distortion-free material.
- x. Housing that is fully sealed and waterproof per IP68 to withstand external pressure up to 1 bar without damage or leaking.
- xi. Ability to attach to the front of the crawler by a simple turn of a slotted locking mechanism atop the crawler that drives 4 stainless bearings into the rotate shaft of the camera, all while maintaining a 1-bar waterproof seal.
- xii. Illumination provided by a minimum of 40 LEDs that deliver a 13,000-lux reading at 1' and a 3-lux reading at 25'. Lighting will illuminate targets beyond 10'.
- xiii. A valve for purge and pressurization of camera-body.  
(Pressurization helps prevent ingress of water and helps prevent internal condensation and fogging.)

d. Cable Reel

- i. Capacity for the systems 1000' cable.
- ii. A motorized system with sensors that monitor cable tension in order to coordinate cable feed/retrieval with direction and exact speed of the crawler.

- iii. Ability to perform all forward, backward and different speed functions without the operator having to control any cable reel functions directly.
- iv. An emergency stop switch.
- v. Ability to operate in both automatic and manual modes.
- vi. External cable reel chassis to be made of strong and lightweight aircraft grade aluminum.
- vii. Work with pendant based speed and torque controls to adjust for different pipe conditions and user preferences.
- viii. Weight of no more than 125 lb. (including 1000' of cable).
- ix. Work with a remote wireless pendant granting control of crawler and reel while away from the primary control pendant.
- x. Ability to operate manually, with direct control of speed, direction and torque.
- xi. Teflon coated integral drip tray at bottom beneath stored cable. Allows for liquids to drain and be collected in a specific area for health and safety reasons. Can be slid out the front without tools for emptying and cleaning.
- xii. BNC video output for local video connection.
- xiii. Size of reel: 21 x 14.5 x 24.5" (hwd) with standard cable roll bar that extends 15" from the front of the reel.

- xiv. Two handles to be at the top left and right of the cable reel for moving and transport.
- xv. All moving hazardous components are completely covered/ enclosed to prevent injury – hand or clothing can't reach dangerous moving parts.

e. Reporting Software

Description: Ability to post-process inspection data to include

- i. Basic mapping of assets and observations.
- ii. Report generation
- iii. Software Licenses with GIS – WinCan VXsoftware one for each town for a total of three (3)

f. Training

- i. Training on Software 3 private sessions one for each town
- ii. Training on Camera 3 private sessions one for each town

g. Additional Items for Camera System:

- i. Extra Large Rubber Wheels – one set
- ii. Small Quick Change Wheels Grease – one set
- iii. Medium Quick Change Wheels Grease – one set
- iv. Large Quick Change Wheels Grease – one set
- v. Small PVC Wheels – one set
- vi. Medium PVC Wheels – one set
- vii. Large PVC Wheels – one set
- viii. Crawler 4" pipe

- ix. Elevator Kit for Crawler to inspect larger pipes
- x. Push Camera
- xi. Quick View air HD with tablet Pole mounted wireless camera with tablet
- xii. 2000 watt Super quiet Honda EU 2000i Companion generator or equal.
- xiii. Laptop PC –three (3) complete with
  - Solid state hard drive, preferable 1 terabyte or larger
  - Processor with Intel Core i7
  - Windows 10
  - 8 GB memory or better
  - Microsoft Office Home & Business 2016

Tiger Tails – tow (2) sets

- xiv. Manhole Rollers – two (2) sets
- xv. Laser printer
- xvi. 5 year maintenance agreement for years' service on complete unit

h. Additional Items For Truck:

- i. 110 Volt Swing Out Light
- ii. 12 Volt Handheld Spotlight
- iii. Corner Mounter Spotlight
- iv. Cabinet Light
- v. Wall Mounted heater

- vi. Rear Awning
- vii. Sink
- viii. Insulation
- ix. Backup Camera
- x. Additional LED Strobe Lights
- xi. Additional LED Arrow Board
- xii. LED strobes 4 corners
- xiii. Navitrak Scout Locator
- xiv. 12 volt Handheld Flashlight Streamlight Vulcan 6 volt  
rechargeable or compatible

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