ITEM I - SANITARY SEWER PIPE INSPECTION AND CLEANING

Index for Section VI-I

1.01 Scope of Services

(a) Purpose: The purpose of this bid is to obtain competitive unit prices for all labor, material, and equipment necessary to clean and inspect via closed-circuit television (CCTV) and sonar, existing sanitary sewers ranging in size from 12 to 42-inches in diameter. All project locations will be within the DISTRICT service area and all within Buncombe County, NC.

(b) Pipe Sections and Maps: The following nine pipe sections shall be inspected and cleaned as follows:

ID	Pipe Section Name	Pipe Size	Footage *	Pre-Insp. CCTV	Cleaning **	Post-Insp. CCTV	Sonar Pre & Post
A	North Fork (Upper)	12	5,002	**N**	Y	Y	**N**
B	Flat Creek	18	8,097	**N**	Y	Y	**N**
C	Upper Swannanoa-1	18	7,939	**N**	Y	Y	**N**
D	Tomahawk Branch	18	4,518	**N**	Y	Y	**N**
E	North Fork (Lower)	20	1,676	**N**	Y	Y	**N**
F	Upper Swannanoa-2	24	6,747	Y	Y	Y	Y
G	Upper Swannanoa-3	30	17,150	Y	Y	Y	Y
H	Middle Swannanoa-1	36	22,069	Y	Y	Y	Y
I	Middle Swannanoa-2	42	9,783	Y	Y	Y	Y
		Total:	82,981				

* Footage are approximations. Actual price will be computed utilizing the actual footage cleaned/inspected and the per-foot price.
** The decision to clean, and the level of cleaning (light vs heavy) for pipes 24-inches and greater shall be based on results of the pre-inspection. All pipes less than 24-inches diameter shall be cleaned without a required initial inspection.

Component Tables: See attached full component tables (manholes, pipes, length, material, etc.) for each of the nine (9) work sections (A-I).

Maps: See attached (1) an overall map and (2) individual maps of each work section.

Additional pipe information and locations are available on MSD GIS at: https://geo.msdbc.org/msdgisviewer/

(c) Qualifications Required with Bid: No proposal will be considered from any bidder unless they are known to be skilled in work of a similar nature to that covered by the contract, and has sufficient capital to meet all obligations to be incurred in carrying out the work. In addition, the CONTRACTOR shall be able to provide conclusively to have the following:

1. A minimum of five (5) years experience in the municipal sewer cleaning business. List of projects and contacts with submittal.
2. A minimum of five (5) years experience in the field of pipeline inspection by means of closed circuit television and sonar. List of projects and contacts with submittal.
3. Sufficient quantity of both cleaning equipment and CCTV cameras, (multiple units), to ensure continuous work, and proof of ownership of equipment. Include copy of titles of at least three units, each.
4. Cleaning equipment capable of cleaning lengths up to 800 feet with vehicular access to one structure only. Additionally, high-pressure water jetting equipment must be capable of a minimum of 80 GPM @ 2000 psi.
5. Four (4) references from similar jobs where work was performed, within the past three (3) years.
6. On-site supervisor of the field crews performing these functions shall have the proper training and up to date NASSCO PACP certification in these types of equipment and monitoring functions, and have a minimum of five (5) years' experience in performing such assignments including safe work practices, etc. Submit supervisor summary of the above.

1.02 Work Phasing

(a) Phase 1 – Pre-Cleaning Inspection shall be conducted only for pipe diameter sizes 24-inches and greater. The inspection shall consist of both CCTV and sonar as follows:

1. CCTV conforming to NASSCO Pipeline Assessment Certification Program (PACP), and for the data to be exported electronically in a PACP certified format.
2. SONAR: Sanitary sewers 24-inch diameter and larger shall be inspected via CCTV only (no sonar) if the flow depth is 25% or less of the pipe diameter. If the flow depth exceeds 25%, the sewer shall be inspected via a combination of CCTV and sonar.

   The sonar data will be used to generate a debris graph/profile for each pipe segment inspected showing the upstream and downstream manholes, debris level according to pipe footage, and total volume of debris observed in cubic feet. The graphic will be provided in PDF format.

(b) Phase 2 – Decision to Clean.

1. Pipes < 24-inches: All pipes less than 24-inches shall be cleaned without a required pre-cleaning initial inspection.
2. Pipes ≥ 24 inches: Based on the ENGINEER's review, the DISTRICT will determine if cleaning will be required. It is the sole discretion of DISTRICT to either declare the work on the particular sewer segment complete or notify the CONTRACTOR of additional work (i.e. Phase 3: Light Sewer Cleaning or Heavy Cleaning).
3. Should the level or type of debris differ from the original inspection during the cleaning process, the work type can be adjusted by the ENGINEER to the proper work type and the work shall be paid at the adjusted, proper rate. The CONTRACTOR shall be responsible for providing evidence of the change in conditions to the ENGINEER.

(c) Phase 3 – Cleaning Process

1. Light Cleaning
   i. Definition - For pipes determined by CCTV/Sonar to have percentage deposits settled by height (as compared to full pipe) of less than:
      - Up to and including 12-inches: 25%
      - >12-inches up to and including 24-inches: 15%
      - >24 inches: 10%

      In addition, light cleaning shall be defined as sewer reaches that do not require heavy cleaning, produce little debris, and/or require three or less passes of the high-velocity hydro cleaning equipment.
   ii. The CONTRACTOR shall provide equipment that is specifically designed and constructed for sewer cleaning. The CONTRACTOR shall clean the sewer, to remove deposits settled such that the pipe is 95% clear of debris at any location in the pipe segment (this is not an average). All debris must be caught at the downstream manhole and removed from the sewer. Alternate cleaning equipment to hydraulic flushing may be required and is subject to approval by the DISTRICT.

2. Heavy Cleaning
   i. Definition - Removal of obstructions and deposits settled that exceed the parameters established for light cleaning or otherwise determined by the DISTRICT to require heavy cleaning. Compliance with this section requires substantial effort towards cleaning. Under this bid item, the CONTRACTOR shall remove all

obstructions in the sewer including, but no limited to, all grease, rocks, debris, sticks, etc. that will reduce the hydraulic capacity of the sewer and limit future maintenance access of remote equipment. The CONTRACTOR shall clean the sewer, to remove deposits settled such that the pipe is 95% clear of debris at any location in the pipe segment (this is not an average). This work may include an unlimited number of passes by high velocity hydro-cleaning equipment. Alternate cleaning equipment to hydraulic flushing may be required and is subject to approval by the DISTRICT.

ii. The CONTRACTOR shall maintain detailed documentation of cleaning efforts made to remove these items. Such documentation shall be made available to the ENGINEER at any time. The CONTRACTOR shall provide equipment that is specifically designed and constructed for sewer cleaning.

iii. The CONTRACTOR shall immediately notify the ENGINEER if he believes that this level of cleaning will cause a sewer collapse due to the existing deterioration of the host pipe. The DISTRICT's determination whether to continue or stop work is final.

(d) Phase 4 – Post Cleaning Inspection

1. Final televising of each sewer segment shall be conducted to evaluate the condition of the segment after cleaning has been performed in Phase 3. Phase 4 will be reimbursed at the bid unit price.
2. The recorded video must show the entire circumference of the sewer as best as possible. It is not the intent of this specification to require bypass pumping to control heavy flow. The CONTRACTOR must also consider weather conditions to obtain the best video image of the sewer. This may require the CONTRACTOR to delay any video work after major rain events until the system can return to lower dry weather flow. The CONTRACTOR shall submit PACP data to include the electronic video reports, logs, etc. for the ENGINEER's review as required in Section 1.04.
3. Sanitary sewers 24-inch diameter and larger shall be inspected via CCTV only (no sonar) if the flow depth is 25% or less of the pipe diameter. If the flow depth exceeds 25%, the sewer shall be inspected via a combination of CCTV and sonar.

(e) Cleaning Work Acceptance - Cleaning work acceptance will depend on internal CCTV (and/or sonar) inspection results.

1. If post-cleaning inspection shows cleaning to be unsatisfactory to Engineer, the pipe shall be re-cleaned and re-inspected at no additional cost to DISTRICT until work is satisfactory to Engineer.

1.03 Sewer Pipe Cleaning

(a) Summary: The designated Sanitary Sewer sections shall be cleaned using hydraulic high-pressure sewer cleaners specifically designed and constructed for such cleaning. Selection of the equipment used shall be based on the conditions of the lines at the time the work commences. The equipment and methods selected shall be in accordance with industry best management practices. Alternate equipment to hydraulic flushing may be required and is subject to case-by-case approval by ENGINEER. By-pass pumping is not expected and should not be conducted without approval by the ENGINEER. Cleaning shall be from upstream to downstream for each pipe segment, and also upstream to downstream for the designated network of pipes, unless otherwise approved by the ENGINEER.

(b) High-velocity, hydro cleaning equipment minimum requirements:

1. High-pressure hose: 800 feet, minimum.
2. Hydraulically driven hose reel.
3. High-velocity nozzle:
    i. Two minimum.
    ii. Capable of producing scouring action from 10 degrees to 45 degrees in lines to be cleaned.
    iii. High-velocity gun:
    iv. Capable of producing flows ranging from fine spray to long distance solid stream.
4. Water tank: 1,000-gallon storage, minimum
5. Auxiliary engines and pumps.
6. Equipment operating controls: Locate above ground.
7. CONTRACTOR shall furnish equipment which will be efficient, appropriate and large enough to secure a satisfactory quality of work. At a minimum:
    i. 2,000 pounds per square inch.
    ii. At 80 gallons per minute.
8. Vacuum cleaning equipment shall have the ability to vacuum debris from the line/manhole at a minimum airflow of 3,600 cubic feet per minute (cfm) through an 8-inch tube, to depths of at least 25 feet.
9. Sanitary sewer lines shall be cleaned in the downstream direction only, unless approved by ENGINEER.

(c) Solids Disposal

1. Collected solids shall be disposed of in the designated dump station behind the **MSD Maintenance Building at 2110 Riverside Drive Asheville NC**.

The CONTRACTOR is responsible for transporting the collected material to this location. The cost involved to transport and dump the material to the MSD location are considered incidental to the contract. Coordination of this activity, notification of full dumpster, and dump site access concerns shall be coordinated with: Jason Norton jasonn@msdbc.org 828-225-8237 (o) / 828-768-0147 (c). There is no fee to dump at the designated MSD location, and the DISTRICT shall provide for final disposal of the material after dumping.

2. The CONTRACTOR shall provide equipment that is specifically designed and constructed for sewer cleaning. Solids and debris resulting from the cleaning operation shall be collected and removed from the downstream manhole. The CONTRACTOR shall provide appropriate screening to stop passing of materials into downstream sewers. Passing material from pipeline section to pipeline section shall not be permitted. Under no circumstances shall sewage solids be dumped onto the surface, street, or into ditches, inlets, or storm drains.
3. CONTRACTOR shall keep records of material type and amount dumped in cubic feet (CF).
4. The CONTRACTOR shall keep his haul route and work area(s) neat and clean and reasonably free of odor, and shall bear all responsibility for the cleanup of any spill which occurs during the transport of cleaning/surface preparation by-products and the cleanup of any such material which is authorized by or pursuant to this Contract and in accordance with applicable laws and regulations. The CONTRACTOR shall immediately clean up any such spill or waste. If the CONTRACTOR fails to clean up such spill or waste immediately, the DISTRICT shall have the right to clean up or arrange for its cleanup and shall charge to the CONTRACTOR all costs, including administrative costs and overhead incurred by the DISTRICT, in connection with such cleanup. The DISTRICT shall also charge the CONTRACTOR any costs incurred or penalties imposed on the DISTRICT as a result of any spill, dump or discard.
5. Additional requirements for vehicles hauling such waste material are as follows:
    i. Transport vehicles must be of type(s) approved for this application by the political jurisdictions involved.
    ii. Vehicles must have watertight bodies and be properly equipped and fitted with seals and covers to prohibit material spillage or drainage.
    iii. Vehicles must be cleaned as often as is necessary to prevent deposit of material on roadways.
    iv. Vehicles must be loaded within legal weight limits and operated safely.

v. All regulations of the Environmental Protection Agency and all other regulating agencies shall be followed.

(d) Water Access - CONTRACTOR shall be responsible for paying for and obtaining a water source required for cleaning. Approval for potable water withdrawal from hydrants must be obtained by the CONTRACTOR from the Water System Owner prior to any cleaning operations. Any costs for such approval and delivery/disposal of such potable water shall be borne by the CONTRACTOR. This may involve the City of Asheville Water Resources Department and Town of Black Mountain Water Division.

(e) Submittals / Weekly Cleaning Reports / Documentation

1. Electronic tabulation of debris removed from each sewer segment, submitted weekly, to a shared cloud drive, by 9:00 AM the following Tuesday, listing:
    i. Upstream and downstream manhole and/or structure identifications.
    ii. Sewer pipe ID.
    iii. Linear feet cleaned.
    iv. Size and material of sewer.
    v. Method of cleaning.
    vi. Amount in cubic feet (CF) removed.
    vii. Amount of water used.
    viii. Composition of material removed.
    ix. Observations made during cleaning process.
    x. Date of cleaning.
    xi. Date of disposal.
2. Safety Plan, Contacts, etc. required per CCTV Submittals below (1.04(b)).

1.04 Internal Inspection of Sewers (CCTV)

(a) Summary:

1. This section defines the requirements for internal television inspection of the sanitary sewer (sewer) pipelines before and after rehabilitation.
    i. CONTRACTOR shall be responsible for properly inspecting the pipe and providing acceptable inspection data.
    ii. Field operator(s) of inspection equipment must have current National Association of Sewer Service Companies (NASSCO) Pipeline Assessment and Certification Program (PACP) Certification.
2. The information for each pipeline inspection shall be recorded on an inspection report. The inspection report shall be in NASSCO exchange

database format and delivered on a cloud-based server as agreed upon by CONTRACTOR and DISTRICT. All pipeline inspection work shall be accomplished in accordance with current NASSCO PACP (Pipeline Assessment and Certification Program) Standards.

(b) Submittals:

1. The CONTRACTOR shall submit the following information for review following notification of award of the contract.
    i. Identification of project field supervisor, emergency contact, and equipment operators to be used on Project and their contact information.
    ii. Copies of NASSCO PACP Certifications for operators and any person reviewing or coding data proposed on project.
    iii. Shop Drawings: Catalog and manufacturer's data sheets for television equipment. Must be submitted and approved by ENGINEER prior to the start of work.
    iv. CONTRACTOR's project-specific safety plan. CONTRACTOR is solely responsible for the safety of workers and the public. Must be provided prior to the start of any field work.
    v. QAQC Plan.
    vi. Project Specific Data Management Plan.
2. Quality Control Submittals:
    i. List of staff, with contact information, and equipment to be used on Project.
    ii. Copies of NASSCO PACP Certifications for operators proposed on Project.
3. Data Delivery
    i. Data should be uploaded to a shared cloud drive weekly (by 9:00 AM Tuesday the following week). Once uploaded, CONTRACTOR shall notify the ENGINEER by email so data can be reviewed and processed.
    ii. Each data submittal shall have one consolidated NASSCO database that contains all inspections associated with that submittal. Submittal shall contain all inspections collected from the time of the last submittal.
    iii. The Engineer will review the submittal to make sure that the required information is provided, and the recording is of acceptable quality. If the Engineer determines that the inspection does not meet quality guidelines, the CONTRACTOR shall CCTV inspect again at no additional cost to the DISTRICT.
    iv. ****After Bid acceptance and PRIOR to any work performed, the CONTRACTOR shall contact the MSD IT Department**

(Matthew Walter; mattw@msdbc.org; 828-225-8217) to consult on CCTV and sonar data delivery and acceptance. The purpose of this consult is to verify the data delivered is in adequate format, nomenclature, and acceptable for incorporation into MSD's GraniteNet Database.

(c) Products

1. Television monitor, Computers for Storing Electronic Data, Cables suitable for wet environment, Power source, Remote Transmitted Camera locator, Wheel Walker, Green Spray Paint.
2. Remote Reading Footage Counter:
    i. Accuracy: two-tenths of a foot over length of section being inspected.
    ii. Marking on cable will not be allowed.
    iii. Calibration: Each day prior to setup.
3. Camera (Camera must be capable of traditional recording and/or 360 recording):
    i. Traditional:
        - Recording format: color, digital;
        - High resolution video and still images;
        - 65-degree field of view, minimum, and either automatic or remote focus and iris controls;
        - Operative in 100% humidity conditions;
        - Mount on appropriate transport system, sized for each pipe diameter;
        - Equip with tag line suitable for pulling camera backwards;
        - Focal Distance: Adjustable through range from six (6) inches to infinity;
        - Equip with winch, power winch, optic cable, powered rewind, or other device used to move camera through pipe;
        - NRTL Certification for suitability in hazardous environment use.
    ii. 360 Capable:
        - Inspection equipment shall be 100% digital;
        - The inspection camera system must have a minimum of 185 degree field of view;
        - The inspection camera system must illuminate the interior of the pipeline using either xenon strobe light or strobe LED lights. The light shall be positioned 360 degrees around the camera lens to distribute the light evenly onto the pipe walls. The lighting must be able to illuminate pipeline from six (6)

to 66 inches in diameter without the need of any auxiliary lighting. Any systems not using strobe light technology will be deem unacceptable due to motion blur during imaging recording;

iii. The inspection system shall produce individual images or frames with no more than 0.001 inches of tractor movement during image or frame exposure to produce crisp, clear images;
iv. The inspection camera system must provide a minimum of 3000 line of vertical resolution in the side view and a minimum of 500 lines in the perspective view;
v. Inspection speeds must be no more than 70 feet per minute and no less than 35 feet per minute to ensure maximum production per day with each inspection system and to minimize the time at each location to reduce the chance of backups from plugging, maintain traffic flow, and reduce safety concerns of CONTRACTOR's employees;
vi. The inspection robot shall have a remotely controlled camera elevating device to center the camera in pipeline from eight (8) to 66 inches in diameter.

4. Camera Lighting:
   i. Minimize reflection;
   ii. Ability to achieve proper balance of tint and brightness;
   iii. Appropriate for range of diameters in project;
   iv. Lighting quality to provide clear, in-focus picture of entire inside periphery of pipe.
5. Inspection images:
   i. Continuous View;
   ii. Distance measured along reach (tape counter footage).
6. Personal Protective Equipment in line with CONTRACTOR's project specific safety plan.

(d) Execution

1. Structure numbers are identified on maps and/or listed on pipe inventory.
2. Traffic Control: See Section V *Special Conditions*.
3. Clean up:
   i. Wash debris from camera cleaning back in sewer.
   ii. Area to be left clean.
4. Use NASSCO PACP standards, most current edition. Mandatory Fields according to PACP format standards and valid codes, including additional *mandatory* project-specific codes per attached header field checklist.
5. Video Recording:
   i. Do not provide voiceover pipe defects. Voiceover can be used to

document operational issues only, equipment issues, or other pertinent information to describe an interruption in image.

ii. Set camera so axis is at centerline of pipe. Distorted views or tilted inspections may be rejected.

iii. Show continuous footage reading on continuous image. Place on screen where it is clearly visible (e.g., if black font, do not place on dark background, if white font, do not place on light background). Place high enough on screen to be visible on image when viewing images. Inspections with malfunctioning footage counter shall be rejected by DISTRICT.

iv. Inspection shall be in direction of flow, except while camera is being used in a reverse setup. Inspection shall proceed from upstream to downstream, unless prohibited by an obstruction.

v. If upstream (or reverse) setup is required, establish new inspection run separate from downstream (or normal) setup. Inspection video and images for both downstream and upstream runs shall be submitted at the same time for review and processing by the DISTRICT.

vi. Keep camera lens clean and clear. If material, moisture, or debris obscures image or causes reduced visibility, clean or replace lens prior to proceeding with inspection. Inspections may be rejected if clarity is too low as determined by the DISTRICT.

vii. Camera lighting shall be sufficient to provide a clear, in-focus picture of entire inside periphery of pipe including any defects. Inspections may be rejected if visibility is too low. Additional lighting may be required for pipes larger than 24".

viii. Camera lens shall remain above visible water level and may submerge only while passing through clearly identifiable line sags (or vertical misalignments). If flow is such that camera lens becomes obscured, inspection shall be stopped until flow subsides. If necessary, reschedule inspection. Surcharging (and flooding of camera lens) is not an excusable condition if it has been artificially created upstream, i.e., placement of flowplugs or flushing in pipe. The recorded video must show the entire circumference of the sewer as best as possible. It is not the intent of this specification to require bypass pumping to control heavy flow.

ix. Recordings shall clearly show corrosion, cracks and fractures, and their severity, in addition to obvious features, i.e., laterals and joints. Pan feature shall be used to view defects with appropriate lighting and focus adjustments.

x. Recordings shall show correct perspective of severity of defects.

xi. Immediately report obstructions that restrict flow and cause inspection to be interrupted to the ENGINEER.

xii. Speed: (1) If using a traditional camera, 30 feet per minute, maximum, during inspection; (2) If using a 360 capable camera, 70 feet per minute, maximum, during inspection.
xiii. Loss of color or severe red or green color will be cause for rejection of inspection.
xiv. Recordings shall be without distortion or outside interference.
xv. Line segments shall be televised complete from structure-to-structure, as appropriate in one continuous run.
xvi. Video must clearly show structure when starting or ending at a structure unless a defect or manhole configuration does not allow it.
xvii. View of entire line segment, structure-to-structure (typically manholes) needs to exist in one inspection in order to be acceptable, unless reverse setup or obstruction. If a portion of line is unacceptable, entire segment shall be deemed unacceptable and shall be re-televised.
xviii. The DISTRICT may accept inspection that does not adhere to minimum standards if adverse conditions are encountered and re-inspection is not advised. In such a case, enough data shall be provided to permit accurate assessment and the ENGINEER must be notified in advance of submittal if no reversal or further attempts have been made
xix. Still Images and Photos: Provide still images of all moderate and severe defect images. If no defects, provide still images of typical conditions every 100 feet in pipe or where flow levels change in accordance with NASSCO PACP.

6. Measurement:
   i. Record in English units.
   ii. Obtain pipe diameter by physical measurement in upstream and downstream access structure. Show on video.
   iii. Verify pipe material (e.g., RCP, VCP, PVC) and pipe diameter before beginning inspection.
   iv. Use calipers or measuring rod to determine diameter of inlet and outlet pipe. For traditional CCTV, measurement rod or calipers must be visible at the beginning of the video.
   v. Footage measurements shall begin at centerline of upstream manhole.
   vi. Continuous Footage Readings: Line segment recording will be unacceptable if continuous footage meter inaccuracy, or identified defects or features leave doubt as to accuracy of locations or total length.
7. Documentation:
   i. NASSCO PACP Current Version
      - Electronic data using NASSCO PACP exchange database.

- All electronic files should be fully compatible with NASSCO PACP and the DISTRICTS GraniteNet Database.
    a. All 360 capable inspections must be submitted as .ipf files
    b. All traditional inspection video files must be submitted as .mp4. Video compression codec must be H.264 – MPEG-4 AVC (part 10) (avc1)
- Provide video image at 1:1 scale of vertical to horizontal.
- If line is partially televised, due to excusable condition, i.e., collapsed line, submitted televised length shall be viewed for acceptability.

ii. File naming conventions: Files named incorrectly will be rejected and will need to be fixed prior to resubmittal by CONTRACTOR.
- CCTV
    a. PipeID_USMHID_Direction_DSMHID_DATE.ext Ext: either .ipf or .mp4
    b. Direction: "U" for upstream or "D" for downstream.
    c. Date: YYYYMMDD
    d. Make sure to use underscores "_" and not spaces or hyphens.
- Photos
    a. PipeID_USMHID_Direction_DSMHID_DefectCode_DefectFootage.jpeg
    b. Direction: "U" for upstream or "D" for downstream.
    c. Make sure to use underscores, "_" and not spaces or hyphens.

iii. Data Delivery - Data should be uploaded to a shared cloud drive weekly, by 9:00 AM the following Tuesday. Once uploaded, CONTRACTOR shall notify the ENGINEER by email so data can be reviewed and processed.

All electronic pipe inspection data delivered shall be compatible with the DISTRICT's GraniteNet asset and GIS software.

1.05 Sonar Inspection

(a) Summary: Operation necessary to complete an inspection for verification of existing internal pipe conditions including amount of debris in the bottom. Sonar inspection will supplement, not replace, CCTV, unless otherwise approved. Contractor shall furnish all labor, materials, equipment, tools, software, and other incidental services for sonar inspection in accordance with standard industry practices for sewer inspection. Sonar inspection of a particular pipe will only be conducted when approved by the ENGINEER. Silt levels will be assessed as a

percentage depth of sewers for each pipeline surveyed.

(b) Sonar Equipment Requirements (unless otherwise approved):

1. Digital and capable of operating in pipelines with diameter sizes shown on the pipe table.
2. Specifically designed for municipal wastewater environments and operable in fully submerged conditions.
3. Have a Sonar head capable of being mounted on either a crawler or floatation equipment if necessary.
4. Capable of making 400 measurements per minute with an accuracy of ±0.5%.
5. Have a maximum beam width of the Sonar energy pulse no greater than two (2) degrees from the center of the transducer.
6. Have a high-speed scanning capability of 1.3 seconds per 360 degree revolution.
7. Programmable multi-frequency profiling sonar which supports a range of frequencies from 600 kHz to 3.0 MHz, and an acoustic beam width of less than 1.1 degrees in order to produce accurate clear cross sections of the pipe being scanned.
8. Ability to operate as required to perform the work shown, but not less than 1,000 feet, remotely from the surface equipment.
9. Have a minimum of 0.9 degree angular resolution with at least 400 sectors per revolution.
10. Record full revolution scans with a density of one (1) complete sonar scan per second.
11. Have pitch and roll tilt sensors (inclinometer) with 0.1 degree resolution showing the numerical attitude of the scanner on the screen both pictorially and numerically in analog and digital form.
12. Range Resolution Measurement Error Requirements:
    i. Be no greater than 0.08 inches from a distance of three (3) to 12 feet.
    ii. Be no greater than 0.4 inches from distances beyond 15 feet.
    iii. Have a minimum detectable range of six (6) inches.
13. Error Tolerance Accuracy for Calculating Sediment Quantification:
    i. A minimum 92% for pipelines up to and including 54 inches diameter.
    ii. A minimum of 95% accuracy for pipelines greater than 54 inches in diameter.

(c) Inspection Report Requirements:

1. A table showing minimum, maximum and average sediment depth in feet and percent of pipe.

2. A graph showing sediment depth in feet and percent of pipe blockage.
3. An estimate of sediment volume over total length of pipe in cubic feet;
4. A color Sonar image and a mark of the location of the Sonar sensor on a single page.

Submit Sonar inspection recordings weekly and concurrently with the pipe inspection data.

1.06 Additional Compliance (all costs below considered incidental to the project)

(a) Retrieval of Materials and Equipment: In the instance that the CONTRACTOR's equipment becomes lodged in the sewer, the CONTRACTOR shall notify the ENGINEER immediately (within 1 hour). The ENGINEER shall decide the appropriate approach for equipment removal which may include DISTRICT personnel and/or outside contractors. The CONTRACTOR shall be responsible for any costs incurred for the removal of equipment.

(b) Maintaining Flow and Sewer Backup: It will be the responsibility of the CONTRACTOR, throughout the tenure of this contract, to provide and maintain sufficient flow at all times to pass any flash of storm flow and prevent any backwater flooding due to obstruction caused by cleaning or CCTV equipment. Existing flows shall not be interrupted. The CONTRACTOR shall take necessary precautions to prevent sewage backup and shall be responsible if damage results there from. Sewage diverted during cleaning operations shall be returned to the sanitary system and not discharged into streams or storm drain system. Contractor shall document all backups and submit documentation to Engineer including the reason for the backup, the time and date of the backup, the property owner's name, address and phone number, the resolution to problem, the time and date the problem was resolved, and any special cleanup work that had to be performed.

(c) Restoration: CONTRACTOR shall repair any damaged property and restore the site to original condition, including but not limited to: landscaping, seeding, and mulching. CONTRACTOR shall install weight distributing devices under equipment when equipment is parked directly over existing sewer lines that may be compromised. Approved devices are timber deck matting, steel plating or approved equal.

(d) Violations: The CONTRACTOR shall be fully responsible for any and all violations of these special provisions, permit conditions, and State and Federal Regulations. In the event that a violation occurs or if a Notice of Violation is received, the CONTRACTOR shall take immediate action to correct the violation as directed or required by State and Federal Agencies and in consult with the DISTRICT. Any penalties resulting from such violation shall be

assessed to the CONTRACTOR.

(e) SSO Emergency Response: In the event of sanitary sewer overflow (SSO) the CONTRACTOR shall contact MSD immediately (Jason Capizzi 828-768-0653; jasonc@msdbc.org). The CONTRACTOR shall assist as needed under guidance from MSD to resolve the SSO and take actions in accordance with the DISTRICT SSO Policy (attached).

(f) Damage Notification: If observed defects are believed to be such that further cleaning operations may compromise the structural integrity and/or cause the pipe to become unusable, the CONTRACTOR must provide written communication to the DISTRICT's designee of the observed condition(s) and reason to believe that continued cleaning operations may cause substantial damage. The DISTRICT will then direct the CONTRACTOR as to what services, precautions, etc., the DISTRICT will require of the CONTRACTOR. If the contract documents do not address this potential, then the DISTRICT and CONTRACTOR will negotiate in good faith, the conditions under which the work is to continue or cease to continue. This exception may only be used to prevent asset damage and shall not be used to eliminate difficult or adverse cleaning areas that were previously documented in these documents or by prior written communication with the DISTRICT.

(g) Personnel Required: The CONTRACTOR shall furnish a trained supervisor who has had a minimum of five (5) years experience in the entire field of sewer and rehabilitation such as will be undertaken in the project, and sufficient personnel to perform all the work required. At least one person on the crew must have:

1. CCTV operators must be PACP Certified
2. First Aid Certified
3. Confined Space Certified
4. Proof of Completion of Flagger Trainer Course

(h) Access: The segments of sewer to be cleaned and televised through this contract will be located both within the public right-of-way and within public easements on private property. The successful bidder, with assistance of the DISTRICT as required, will be responsible to coordinate access to any and all sewer segments. For manholes located in easements of private property, the Contractor, with assistance of the DISTRICT, shall provide the resident with 24-hour advanced notice for easement access prior to entering the property, unless the resident provides immediate permission.

(i) Work Schedule: This schedule shall outline the sequence in which the CONTRACTOR proposes to conduct his operations and shall be approved by the ENGINEER before work is started. The level of detail of activities shall provide clear, concise communication of the plan of work. At a minimum,

activities showing initial mobilization, start-up, cleaning and televising, shall be included. Work shall be completed during normal business hours Monday – Friday (7AM-5PM) and outside of DISTRICT Holidays, unless otherwise approved. Updates to the work schedule shall be provided to the ENGINEER no later than 1:00 PM on the Friday preceding the next week's cleaning and televising work.

PACP Header Field Checklist

Field #	Header Field	Mandatory Field	Required for this Project
1	Surveyed By	X	
1a	Certificate No.	X	
2	Owner		
3	Customer		
4	Drainage Area		
5	Sheet Number	X	
6	P/O Number		
7	Pipe Segment Ref.		Required
8	Date	X	
9	Time		
10	Street	X	
10a	City	X	
11	Location Details		
12	Upstream MH No.	X	
13	Upstream MH Rim to Invert		
14	Upstream MH Grade to Invert		
15	Upstream MH Rim to Grade		
16	Downstream MH No.	X	
17	Downstream MH Rim to Invert		
18	Downstream MH Grade to Invert		
19	Downstream MH Rim to Grade		
20	Sewer Use		Required
21	Direction	X	
22	Flow Control		
23	Height	X	
24	Width	X	
25	Shape	X	
26	Material	X	
27	Lining Method		
28	Pipe Joint Length		
29	Total Length		Required
30	Length Surveyed		Required
31	Year Laid		
32	Year Renewed		
33	Media Label		
34	Purpose		
35	Sewer Category		
36	Pre-Cleaning	X	
36a	Date Cleaned		Required
37	Weather		
38	Location		
39	Additional Info.		
40	W/O #		
41	Project		
42	Pressure V		

Metropolitan Sewerage District of Buncombe County Standard Operating Procedure	
Title: Sanitary Sewer Overflow First Assessment	
Document #: SOP-TS-17	**ISO Procedure #:** EMSSOPSS-19
Division: System Services	**Department:** Technical Services
Author: Grady Brooks	**Approval by:** Jason Capizzi
Issue Date: 10/1/09	**Revision Date:** 10/20/21

Purpose: Emergency response, assessment, and reporting requirements for all Sanitary Sewer Overflows. ***Reduction of Sanitary Sewer Overflows, correction, and remediation when they occur is the number one priority of System Services.***

Procedure:

1. Response to possible Sanitary Sewer Overflow overrides all other duties and is the number one priority.
2. Verify the reported overflow is genuinely affecting any water source and/or exceeds 1,000 gallons.
3. If the situation is determined to indeed be a Sanitary Sewer Overflow, notify other persons to assist with corrective action. Document time.
4. Notify supervisor on call and/or Operator in Responsible Charge to determine if special requirements for additional testing of water source is affected.
5. Begin attempts to correct problem using available means, i.e., striker, sewer tape. Continue attempts until assistance arrives or the problem is resolved. Document time Sanitary Sewer Overflow is corrected.
6. Initiate Code Red if flow cannot be restored.
7. Notify appropriate agency of Sanitary Sewer Overflow. Normal business hours: notify NC Division of Environment and Natural Resources. After hours: notify The Division of Water Quality as soon as possible. Must be within 24 hours.
8. If Sanitary Sewer Overflow volume reaching surface waters is over 1000 gallons, a press release must be made within 24 hours of determination. If Sanitary Sewer Overflow volume reaches 15000 gallons an ad must be placed in the local newspaper within 10 days of incident.
9. Within 5 business days complete and submit written documentation of the Sanitary Sewer Overflow to the agency originally reported to verbally. Once follow up procedures have been completed, review work done to evaluate actual cause of overflow and complete Sanitary Sewer Overflow written report.

Follow Up Work:

- **RODDING LINE** to remove possible root blockage, if necessary.
- **SEWER LINE CLEANING** to ensure entire section of line is clear of debris. Clean multiple sections above and below problem section.
- **CCTV INSPECTION** to inspect and video section of pipe where blockage occurred.

- **SL RAT post testing for acoustic assessment**
- **SEWER SPILL REMEDIATION** to restore and minimize impact to surrounding environment.

Special Conditions: All written documentation of Sanitary Sewer Overflows is the responsibility of the First Responder or Supervisor who originally responds to the overflow.

DATE	NUMBER	CHANGES
10/20/21	2	Added change log at the end of procedure