**UNIFIED FACILITIES GUIDE SPECIFICATIONS**

**References are in agreement with UMRL dated January 2021**
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SECTION 33 01 30.16

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**08/16**

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SECTION 33 01 30.16

TV INSPECTION OF SEWER PIPELINES
**08/16**

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**NOTE: This guide specification covers the requirements for pipeline cleaning and TV inspection of sanitary or storm sewer pipelines. Use tailoring options to select the appropriate system for the project.**

**Adhere to UFC 1-300-02 Unified Facilities Guide Specifications (UFGS) Format Standard when editing this guide specification or preparing new project specification sections. Edit this guide specification for project specific requirements by adding, deleting, or revising text. For bracketed items, choose applicable item(s) or insert appropriate information.**

**Remove information and requirements not required in respective project, whether or not brackets are present.**

**Comments, suggestions and recommended changes for this guide specification are welcome and should be submitted as a Criteria Change Request (CCR).**

**TV inspection of sewer pipelines is commonly referred to as closed circuit television inspection (CCTV). CCTV inspection is used to determine the condition of existing pipelines and to identify lateral connections prior to slip lining. It is also used to verify slip lining of existing piping conforms to project specifications, warranty requirements and to confirm lateral re-connections post-construction. CCTV inspections indicate the location of service connections along the main, the location of pipe conditions warranting further action or confirmation.**

**Cleaning or heavy cleaning is always performed prior to CCTV inspection.**

**Point repairs may also be required prior to Pre-TV inspection; requirements for point repairs are not addressed in this section. Point repairs are**

**typically less than 3.0 meters 10 feet in length.**

**Prior to conducting a Pre-TV inspection the engineer should conduct a field investigation to determine pipelines or sections of pipes requiring heavy cleaning and the potential for point repairs. Pre-TV inspections of mains and laterals are needed to assess existing conditions, confirm point repairs and assist in preparing project specifications for 33 01 30.72 RELINING SEWERS and may be done during field investigation. Once the contract is awarded the contractor, the contractor will need to do a second PRE-TV inspection before beginning slip lining work.**

**Post-TV and Warranty TV inspection portions of these specifications are needed to confirm work performed for slip lining sanitary sewer and storm drainage systems conforms to the project specifications.**

**********

PART 1 GENERAL

[1.1 UNIT PRICES

**********

**NOTE: Depending on the size of the job, consider establishing unit prices for Cleaning, CCTV inspection, heavy cleaning and other items like root removal may be advantageous to the Government in the event significant amounts of work are added or deleted from the contract.**

**********

Measure heavy cleaning distance from the downstream manhole or structure prior to any upstream cleaning.

]1.2 REFERENCES

**********

**NOTE: This paragraph is used to list the publications cited in the text of the guide specification. The publications are referred to in the text by basic designation only and listed in this paragraph by organization, designation, date, and title.**

**Use the Reference Wizard's Check Reference feature when you add a Reference Identifier (RID) outside of the Section's Reference Article to automatically place the reference in the Reference Article. Also use the Reference Wizard's Check Reference feature to update the issue dates.**

**References not used in the text will automatically be deleted from this section of the project specification when you choose to reconcile references in the publish print process.**

**********

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

U.S. DEPARTMENT OF DEFENSE (DOD)

DODI 4150.07 (2019) DOD Pest Management Program

## 1.3 DEFINITIONS

### 1.3.1 CCTV Video

CD or DVD storage media containing the recorded video.

### 1.3.2 Cleaning

To remove soil or solid deposited materials from a pipe segment when the pipe is less than half full of deposited materials.

### 1.3.3 Defects

Defects in the pipe, manholes, structures, and services include cracks, separation of joints, collapsed pipe, grade irregularities, leaks, roots, grease buildup, offset joints, reverse grades, obstructions, delamination, missing pipe, restrictions, fractures and similar structural irregularities.

### 1.3.4 Entry Point

The leading edge of the access point or the manhole or structure wall where the pipe segment begins. Only the pipe is video inspected from manhole or structure wall to manhole or structure wall and does not include any portion of the manhole or structure.

### 1.3.5 Exit Point

The point where the downstream access manhole or structure wall is encountered. Only the pipe is video inspected from manhole or structure wall to manhole or structure wall and does not include any portion of the manhole or structure.

### 1.3.6 Heavy Cleaning

To remove soil or solid deposited materials from a pipe segment when the materials in the pipe are between half full to full.

### 1.3.7 Hydraulically Propelled Cleaning Tools

Tools that depend upon water pressure to provide their cleaning force.

### 1.3.8 National Association of Sewer Service Companies (NASSCO)

National Association of Sewer Service Companies (NASSCO) identifies the generally accepted industry standards for CCTV inspection, observation coding, and certification.

### 1.3.9 Pipe Segment

The length of pipe from entry point to exit point along the main or

service.

1.3.10 Pipeline Assessment and Certification Program (PACP)

A CCTV Inspection standardization certification and observation coding system sponsored by NASSCO.

1.3.11 Point Repair

The location of a failure where a repair is has occurred.

1.3.12 Post-Installation CCTV (Post-TV)

Post-TV inspection is used to determine the slip lining of sanitary or storm sewers has been completed in accordance with the contract documents.

1.3.13 Pre-Installation CCTV (Pre-TV)

Pre-TV inspection is a video inspection of existing sewer lines to confirm cleaning activities, locations of service connections, and identify defects in the existing sewer system infrastructure prior to any work being performed.

1.3.14 Re-TV Inspection

Upon the completion of repairs made after performing a Post-TV Inspection or Warranty TV inspection, the mains or services are re-inspected by performing a Re-TV inspection. Also, refers to rework for a TV-Inspection that has video interruptions, gaps, or is not continuous.

1.3.15 TV Inspection Log

Information collected and recorded by the CCTV operator for each CCTV inspection effort and includes pertinent information for the respective inspection section; such as, date of inspection, location of site, CCTV technician, direction of CCTV inspection with manhole or structure identifiers, weather conditions, pipe size(s), pipe materials, conditions found, locations where the conditions were found.

1.3.16 Warranty CCTV (Warranty-TV)

Warranty-TV inspection is used to determine the slip lining of sanitary or storm sewers does not have any defects present, remains in compliance with project specifications and Post-TV inspection.

1.4 ADMINISTRATIVE REQUIREMENTS

1.4.1 Disposal Plan

Submit a disposal plan prior to performing any work that might generate waste materials. Include a complete description of the materials that are expected to be encountered and their proposed disposal sites. No changes to the disposal plan will be made without prior written acceptance by the Contracting Officer.

1.4.2 Sewage Handling Permit

Prior to commnencing application of herbicide, obtain and maintain a valid State sewage handling permit and permits required by local jurisdictions.

Submit a copy of this permit to the Contracting Officer prior to beginning any cleaning or pump and haul operations.

## 1.5 SUBMITTALS

**********

**NOTE: Review Submittal Description (SD) definitions in Section 01 33 00 SUBMITTAL PROCEDURES and edit the following list, and corresponding submittal items in the text, to reflect only the submittals required for the project. The Guide Specification technical editors have classified those items that require Government approval, due to their complexity or criticality, with a "G". Generally, other submittal items can be reviewed by the Contractor's Quality Control System. Only add a "G" to an item if the submittal is sufficiently important or complex in context of the project.**

**For Army projects, fill in the empty brackets following the "G" classification, with a code of up to three characters to indicate the approving authority. Codes for Army projects using the Resident Management System (RMS) are: "AE" for Architect-Engineer; "DO" for District Office (Engineering Division or other organization in the District Office); "AO" for Area Office; "RO" for Resident Office; and "PO" for Project Office. Codes following the "G" typically are not used for Navy, Air Force, and NASA projects.**

**The "S" classification indicates submittals required as proof of compliance for sustainability Guiding Principles Validation or Third Party Certification and as described in Section 01 33 00 SUBMITTAL PROCEDURES.**

**Choose the first bracketed item for Navy, Air Force, and NASA projects, or choose the second bracketed item for Army projects.**

**********

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are [for Contractor Quality Control approval.][for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government.] Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Herbicide Application Plan; G[, [_____]]

Sewage Handling Permit; G[, [_____]]

SD-03 Product Data

Herbicide; G[, [_____]]

Cleaning Products; G[, [_____]]

SD-05 Design Data

Herbicide Records

SD-06 Test Reports

Calibration Test

SD-07 Certificates

List of Equipment

Disposal Plan; G[, [_____]]

Qualifications; G[, [_____]]

CCTV Technician's Qualifications; G[, [_____]]

Pre-TV Inspection; G[, [_____]]

Post-TV Inspection; G[, [_____]]

Warranty-TV Inspection; G[, [_____]]

SD-11 Closeout Submittals

Pest Management Report

Records of Disposals

Verification of Measurement

## 1.6 QUALITY CONTROL

### 1.6.1 Regulatory Requirements

**********
**NOTE: Herbicides are a type of pesticide. Contact regional pest management consultant to obtain service specific reporting requirements for the use of herbicides.**

**For Navy projects, contact the cognizant NAVFAC Applied Biologist. Contact information can be found at** https://hub.navfac.navy.mil/webcenter/faces/oracle/webcenter/page/scopedMD/s
**For Army projects, contact the cognizant Army Applied Biologist. Contact information can be found at** http://www.aec.army.mil/services/conserve/pestmanagement.aspx
**********

Comply with DODI 4150.07 for requirements on Contractor's licensing, certification, and record keeping. Maintain daily records using the Pest Management Maintenance Record, DD Form 1532-1, or a computer generated equivalent, and submit copies of records when requested by the Contracting Officer. These forms may be obtained from the main web site:

http://www.dtic.mil/whs/directives/forms/eforms/dd1532-1.pdf

### 1.6.2 Qualifications

For the application of herbicides, use the services of an applicator who is commercially certified in the state where the work is to be performed as required by DODI 4150.07. Herbicide applicators must also be certified in the U.S. Environmental Protection Agency (EPA) pesticide applicator category which includes sewer root pest control. Submit a copy of the pesticide applicator certificates.

### 1.6.3 CCTV Technician's Qualifications

Provide a CCTV technician with three years of total experience with the CCTV technology. Submit a current PACP Operator certification for personnel performing closed circuit television inspection and pipeline assessments.

## 1.7 DELIVERY, STORAGE, AND HANDLING

### 1.7.1 Delivery

Deliver herbicide material to the site in the original unopened containers bearing legible labels indicating the EPA registration number, manufacturer's registered uses and in new or otherwise good condition as supplied by the manufacturer or formulator.

### 1.7.2 Inspection

Inspect herbicides upon arrival at the job site for conformity to type and quality in accordance with paragraph HERBICIDE. Each label must bear evidence of registration under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), as amended or under appropriate regulations of the host county. Inspect other materials for conformance with specified requirements. Remove unacceptable materials from the job site.

### 1.7.3 Storage

Storage of herbicides on the installation will not be permitted unless it is written into the contract.

### 1.7.4 Handling

Handle and mix herbicides in accordance with the manufacturer's label and Safety Data Sheet (SDS), preventing contamination by dirt, water, and organic material. Protect herbicides from weather elements as recommended by the manufacturer's label and SDS. Spill kits must be maintained on herbicide control vehicles and must be available at the mixing site. Conduct herbicide mixing in an area with adequate spill containment.

## 1.8 SITE CONDITIONS

Application of herbicide will not be permitted during or immediately following heavy rains, when conditions may allow runoff, or create an environmental hazard. Herbicide is not permitted to enter stormwater systems, aquifers, or endanger humans or animals.

## PART 2 PRODUCTS

### 2.1 SYSTEM DESCRIPTION

TV inspection of sewer pipelines encompasses cleaning, heavy cleaning, CCTV inspection and video recording of the existing sanitary or storm sewer mains included in the contract documents. This work includes by-pass pumping or diversion of sanitary sewer, sound reduction enclosure of by-pass pump, inspection logs, video requirements, permits, traffic control and the legal disposal of materials removed from the mains. It is typically used in coordination with slip lining existing piping.

It includes the mechanical equipment used to clean and dispose of the materials found in sewer pipes and structures, CCTV cameras and recording devices used to record the internal conditions of non-pressurized sewer piping.

### 2.2 EQUIPMENT

#### 2.2.1 Cleaning Equipment

Utilize mechanically powered equipment necessary for the proper rodding, bucketing, brushing, root cutting, and flushing of the sewers, including a heavy duty power rodding machine that is compatible with the cleaning to be performed.

##### 2.2.1.1 Rodding

Provide rodding equipment capable of rodding distances of up to 305 meters 1000 feet in one set-up and having the following capabilities:

a. The ability to spin the rod either clockwise or counter-clockwise, and be able to be pushed straight out or pulled back without rotating the machine.

b. The capability of pulling pipe-size swabs or brushes back through the pipeline for cleaning and flushing purposes.

##### 2.2.1.2 Bucket Machine

Provide heavy-duty bucket machines for use on dragline work to clean the pipeline with buckets, brushes, scrapers, swabs or other similar devices in order to effectively remove debris and provide a clean sewer for the CCTV inspection, repair, or lining activities.

##### 2.2.1.3 Hydraulic Flusher

Provide hydraulic high-pressure sewer cleaners used for sewer cleaning, specifically designed and constructed for such cleaning, that have a minimum usable water capacity of 2270 Liters 600 gallons and a pump capable of delivering at least 1.9 Liters per second (L/s) 30 gallons per minute (gpm) at 690 kPa 100 psi and having the following capabilities:

a. Pressure regulator nozzle capable of adjustment from 7 kPa 1 psi to 10 MPa 1500 psi.

b. Constructed for ease of use and safety of operation with two or more high-velocity nozzles capable of producing a scouring action from 15 to 45 degrees in lines designated to be cleaned.

c. A high-velocity gun for washing and scouring the manhole or structure walls and floor capable of producing flows from a fine spray to a solid stream.

d. Carry its own water tank, auxiliary engines, pumps, and hydraulically driven hose reel.

2.2.1.4 Sanitary Sewer Cleaning Equipment

Provide movable dam type hydraulically propelled equipment constructed in such a way that a portion of the dam may be collapsed at any time during the cleaning operation to protect against flooding of the sanitary sewer and having the following capabilities:

a. A movable dam equal in diameter to the pipe being cleaned.

b. A flexible scraper around the periphery to ensure the removal of grease.

Sewer cleaning balls or other equipment, which cannot be collapsed, are not allowed when cleaning sanitary sewer.

2.2.2 CCTV Equipment

Provide a video system capable of producing a sharply focused, well-lit and color balanced picture in accordance with the following requirements:

2.2.2.1 Pipe Inspection Camera and Associated Equipment

a. Provide a pipe inspection camera system that produces a video using a pan and tilt, radial viewing, that pans a minimum of 275 degrees and rotates 360 degrees. Illumination sensitivity of 3 Lux or less and a minimum of 460 lines of resolution is required.

b. Utilize video cameras specifically designed and constructed for CCTV inspection.

c. Provide a camera that is operative in 100 percent humidity conditions.

d. Provide a camera with an accurate footage counter that displays on the monitor the exact distance of the camera to the nearest 3.0 centimeter 1/10 of a foot.

e. Provide a camera with a height adjustment so that the camera lens is typically centered in the pipe, or higher depending on water levels in the pipe.

f. Provide equipment that will produce digital color images and allows the CCTV technician to remotely balance the iris and color to produce a clear and true video of the pipeline.

g. Provide lighting for the camera that is suitable to provide a clear color picture of the entire periphery of the pipe.

h. Provide a reflector in front of the camera as necessary to enhance the lighting on dark or large diameter pipes.

i. Provide an accompanying computer and recording device capable of

projecting and recording the facility location, project name, Contractor's name, date, line size, material type, line identification, manhole or structure ID numbers and ongoing footage counter onto the video screen.

## 2.3 MATERIALS

### 2.3.1 Herbicide

**********

**NOTE: The herbicide must be pre-approved by regional pest management consultant and the wastewater treatment plant operator.**

**Herbicide may be applied to roots prior to mechanical removal or after mechanical removal to prohibit future root growth.**

**********

Provide herbicides currently registered by the EPA or approved for such use by the appropriate agency of the host county and approved by the Contracting Officer. Select a herbicide that will eliminate root growth, [inhibit future root growth,] is suitable for the wastewater treatment plant, climatic conditions at the project site and apply at the highest labeled rate. Submit manufacturer's label and SDS for herbicides proposed for use.

### 2.3.2 Cleaning Products

Select cleaning products that do not present a health and safety concern, are allowed for use in the sewer system according to Federal and State regulations, will not adversely affect the water quality of the water being conveyed in the sewer system, are suitable for the wastewater treatment plant and the climatic conditions at the project site. Submit manufacturer's label and SDS for the cleaning products proposed for use.

# PART 3 EXECUTION

## 3.1 PREPARATION

**********

**NOTE: Sewer line cleaning removes foreign materials from the pipes to prepare for CCTV inspection, repair operations, or installation of lining materials. The success of the CCTV, pipe repairs, or lining operations depends on the cleanliness of the lines and cannot be over emphasized.**

**********

### 3.1.1 Herbicide Application Plan

Prior to commencing application of herbicide, submit an herbicide application plan with proposed sequence of treatment work including dates and times of application. Include the herbicide trade name, EPA registration number, chemical composition, formulation, application rate of active ingredients, method of application, area or volume treated, and amount applied. Include a copy of the pesticide applicator certificates.

### 3.1.2 Sewer Line Cleaning

**********

**NOTE: Indicate on the drawings the pipe segments requiring heavy cleaning. Heavy cleaning may not be required if the field investigation cleaning and Pre-TV inspection were recently completed. Heavy cleaning may be needed for small diameter pipes in areas known to have frequent maintenance cleaning due to heavy grease or root intrusion. Larger diameter pipes (equal to or greater than 18 inches) will typically not require heavy cleaning unless previous problems have been observed or are known. This should be easily discernible when conducting field investigations.**

**********

Immediately prior to conducting CCTV activities, thoroughly clean the segment of sewer pipe to be video inspected. Clean the segments using hydraulically propelled, high-velocity jet, or mechanically powered equipment.

a. During cleaning and preparation operations, undertake precautions to protect the sewer system and property from damage. Restore property damaged as a result of such cleaning and preparation operations to pre-existing conditions.

b. During the course of normal cleaning operations immediately report pre-existing damage such as broken or missing pipe to the Contracting Officer.

c. When hydraulically propelled cleaning tools or tools which retard the flow in the sewer line are utilized, take precautions to ensure that the water pressure created does not damage or cause flooding on the adjacent site.

d. Maintain access to fire hydrants for the purpose of fire protection at all times.

e. If cleaning of an entire sewer section cannot be successfully performed from one manhole or structure, set up the equipment on the other entry or exit point and attempt cleaning again.

f. If successful cleaning cannot be performed from the opposite end or the equipment fails to traverse the entire pipeline section, cease cleaning those specific sewer sections, notify the Contracting Officer and CCTV inspect both sides of the pipeline section to determine the cause of the blockage.

#### 3.1.2.1 Sanitary Sewer Cleaning

Minimize the interruptions to the existing flows to perform the cleaning of the sewers. Prevent sewage backups and immediately clear back-ups resulting from the cleaning operations. When possible, utilize the flow in the sewer system to provide the necessary pressure for the hydraulic cleaning devices. Return sewage diverted during cleaning operations to the sanitary system and do not discharge onto any surface, or into any water body or storm drain system.

[3.1.3 Manhole or Structure Cleaning

**********

**NOTE: Indicate on drawings manholes or structures to be cleaned.**

**********

Clean concrete and masonry surfaces prior to CCTV inspection. Completely remove grease, laitance, loose bricks, mortar, unsound concrete, loose or damaged wall mounted steps (cut flush with wall), and other materials.

Utilize water blasting (minimum 8.3 MPa 1200 psi) with compatible nozzles as the primary method of cleaning. It is acceptable to use other methods of cleaning such as concrete cleaners, degreasers or mechanical means to clean the surfaces. When other cleaning methods are utilized submit cleaning product data or process for approval. Thoroughly rinse, scrub, and neutralize the surfaces in order to remove cleaning agents and their reactant products. Do not allow material to pass to pipeline sections, which could adversely affect water quality, cause stoppages, accumulations of sand in wet wells, or damage to pumping equipment.

]3.1.4 Flow Control

Reduce the flow depth to allow a minimum of 80 percent of the pipe wall to be displayed at all times during inspection so that defects, features, and other notable information can be collected.

3.1.4.1 Flow Reduction

Flow depth reduction can be accomplished by:

a. Providing bypass pumping.

b. High-pressure jet nozzle.

c. Plugging or by pulling the camera with a swab.

d. Performing the CCTV inspection during periods of minimal flow.

3.1.4.2 Floating the Camera

Video inspection performed while floating the camera is not acceptable. Lower water levels as indicated in paragraph FLOW CONTROL.

3.1.5 Root Removal

**********

**NOTE: The existence of roots indicate pipe fractures, joint openings or other failures. Typical root removal is performed by use of cutting heads. Extreme conditions require the use of chemical root treatment in order to obtain clear, unobstructed video images.**

**Use the CCTV field investigation report to determine sections of pipe containing roots. Indicate on drawings sections of pipe, manholes or structures requiring root removal.**

**********

Remove roots in the designated sewer sections[ and manholes or structures]. Ensure complete removal of roots to the joints. Use mechanical equipment that can be operated remotely, such as rodding machines, bucket machines, winches using root cutters and porcupines, and equipment such as high-velocity jet cleaners. Capture and remove roots from the sewerline at the downstream manhole or structure.

3.1.6 Material Removal and Disposal

Remove sludge, dirt, roots, grease, and other solid or semi-solid material resulting from cleaning operations at the downstream manhole or structure of the section being cleaned.

3.1.6.1 Dams or Weirs

When hydraulic cleaning equipment is used, place dam or weir in the downstream manhole or structure to trap such materials. Do not allow material to pass from pipeline section to pipeline section, which could cause stoppages, accumulations of sand in wet wells, or damage to pumping equipment.

3.1.6.2 Sludge and Debris Storage

Under no circumstances is sludge or other debris removed during these operations to be stored, dumped or spilled into streets, ditches, storm drains, or other sanitary sewer systems.

a. Dispose of solids and semi-solids resulting from the cleaning operations no less often than the end of each work day in accordance with the approved Disposal Plan.

b. Under no circumstances will debris be allowed to accumulate on the work site beyond the end of each work day, except in totally enclosed containers and as acceptable by the Contracting Officer.

c. Continuously maintain the haul route and work areas neat, clean, and reasonably free of odor. Cleanup any spill which occurs during the transport of cleaning or surface preparation by-products. Perform the cleanup of any such material pursuant to this Contract and in accordance with applicable law and environmental regulations.

d. Immediately notify the Contracting Officer of any spill and begin clean up any such spill or waste.

e. The Government will charge to the Contractor for any costs incurred or penalties imposed upon the Government as a result of the spill, dump or discard.

f. Under no circumstances is this material to be discharged into the waterways or any place other than where authorized to do so in accordance with the approved Disposal Plan.

3.1.6.3 Hauling of Waste Material

Provide vehicles hauling such waste material that meet the following requirements:

a. Provide transport vehicles of the type(s) approved for this

application by the jurisdictions where those vehicles will be operated in the performance of activities associated with this Contract.

b. Provide transport vehicles with watertight bodies equipped and fitted with seals and covers to prohibit material spillage or drainage.

c. Clean vehicles to prevent deposits of material on roadways.

d. Load vehicles within legal weight limits and operate safely within traffic speed regulations.

e. The routes used for the conveyance of this material on a regular basis is subject to approval by the local governing bodies having jurisdiction over such routes.

## 3.2 APPLICATION

### 3.2.1 Chemical Root Treatment

Where permitted by the Contracting officer, State sewer regulations and the utility provider's requirements use a herbicide to aid in the removal of roots, treat pipeline sections that have root intrusion with an acceptable herbicide and in accordance with the following conditions:.

a. There can be no adverse effects on the performance of the wastewater treatment plant caused by the active ingredients of the herbicide. If adverse effects are identified in the wastewater treatment system, the Contractor must immediately suspend the application of the herbicide as directed by the Contracting Officer. Application of herbicides will be terminated, as directed by the Contracting Officer, if the adverse effects cannot be corrected to the satisfaction of the wastewater treatment plant operator.

b. Adhere to safety precautions as recommended by the manufacturer concerning handling and application of the herbicide.

c. Apply the herbicide to the roots in accordance with the manufacturer's recommendations and specifications.

#### 3.2.1.1 Equipment Calibration and Tank Measurement

Submit a list of equipment to be used. Conduct calibration test on the application equipment to be used immediately prior to commencement of herbicide application. Measure the volume and contents of the application tank. Testing must confirm that the application equipment is operating within the manufacturer's specifications and meets the specified requirements. Submit written certification of the equipment calibration test results within 1 week of testing. Where results from the equipment calibration and tank measurements tests are unsatisfactory, re-treatment will be required.

#### 3.2.1.2 Mixing and Application

Perform all work related to formulating, mixing, and application in the presence of a DOD certified pesticide applicator, Pest Management QAE/PAR, or Integrated Pest Management Coordinator. Submit herbicide records. Records will include the following information: date of application, location and site, type of operation, area treated, name of applicator, pesticide information (trade name, active ingredient, and formulation),

amount of pesticide applied, and calculated pounds of active ingredient applied.

A closed system is recommended as it prevents the herbicide from coming into contact with the applicator or other persons. Only use water from designated locations. Fit filling hoses with a backflow preventer meeting local plumbing codes or standards. Prevent overflow during the filling operation. Spill kits must be maintained on the root control vehicles and must be available at the mixing site. Herbicide mixing must be conducted in an area that has been designated by the Contracting Officer and that has adequate spill containment. Inspect the application equipment for applying herbicides prior to each day of use for leaks, clogging, wear, or damage. Immediately perform repairs on the application equipment to prevent or eliminate leaks and clogging.

#### 3.2.1.3 Clean Up, Disposal, And Protection

Once application has been completed, proceed with clean up and protection of the site without delay. Clean the site of all material associated with the treatment measures, according to label instructions, and as indicated. Remove and dispose of excess and waste material off Government property.

##### 3.2.1.3.1 Disposal of Herbicide

Dispose of residual herbicides and containers off Government property, and in accordance with the approved disposal plan, label instructions and EPA requirements.

### 3.2.2 Inspection of Sewer Lines

Inspection of sewer lines applies to Pre-TV inspection, Post-TV inspection, RE-TV inspection and Warranty-TV inspection. Perform inspections of sewer lines in the presence of the Contracting Officer.

[#### 3.2.2.1 Communication

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**NOTE: Ensure hand operated radios and cell phones are allowed in the project area.**
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Set up hand operated radios, telephones, or other means of communication between the entry and exit points being inspected to ensure uninterrupted communication between members of the CCTV crew when manually operated winches are used to pull the television camera through the line.

]#### 3.2.2.2 Flush Main

Introduce a minimum of 3785 Liters 1000 gallons of clear, potable water into the upstream manhole or structure or access structure of the mains to be CCTV inspected just prior to inserting the camera. The Contractor is responsible for collecting and disposing of the water in accordance with the approved disposal plan.

#### 3.2.2.3 Camera Operation

Set counter to 0.00 meters 0.00 feet at the entry point, which is the beginning manhole or structure wall. Move the camera through the line in

either direction at a moderate speed, stopping to permit proper documentation of the sewer's condition or service connection locations. In no case will the camera be operated at a speed greater than 9.1 meters per minute 30 feet per minute. Slowly pan and tilt the camera at the beginning and ending manhole, structure connections, service connections, joints, visible defects, and pipe arterial transitions. Provide a full 360 degree view of the pipe, joints, and service connections.

Utilize manual winches, power winches, cable, powered rewinds or other devices that do not obstruct the camera view or interfere with camera operation or CCTV inspection of the pipe conditions as the camera is moved through the sewer line.

3.2.2.3.1 Recording Defects

During CCTV inspection, temporarily stop the camera at each defect or feature along the line.

3.2.2.4 Documentation of CCTV Inspection

Documentation of CCTV inspection applies to Pre-TV inspection, Post-TV inspection, RE-TV inspection and Warranty-TV inspection.

Utilize a data logger and reporting system that is PACP compliant to make a video and audio recording of the CCTV inspections. Submit video recordings, inspection logs and digital photographs as indicated below.

3.2.2.4.1 Video Recordings

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**NOTE: Video recordings supply a video and audio record of pipe segment inspections that may be replayed.**

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Provide a color video showing the completed work and document the inspection on a digital recorder. Capture inspection video in either MPEG4 or Windows Media Video (WMV) format with a minimum resolution of 352 x 240 pixels and an interlaced frame rate at a minimum of 24 frames per second. Save video on CD or DVD. However, the CCTV inspection video of a segment must be wholly contained on a single CD or DVD. The video recording must meet the following requirements:

a. Provide a continuous and uninterrupted recorded video for the pipe segment being examined. Include the official project title, Contracting party, Contractor's name, street name, manhole or structure ID numbers, direction of video and flow, date and time video was recorded, continuous counter text, pipe size and material, material changes in the pipe segment, audio and text call outs of laterals, fixtures and problem areas in the recorded video.

b. Include an audio track recorded by the CCTV technician during the actual inspection work with a description of the parameters of the line being inspected on the video recordings. [The audio may be from the voice of the CCTV technician or it may be computer generated.]

c. Include the location, pipe diameter, pipe material, defects, service lateral locations and any unusual conditions found in PACP format.

d. Submit labeled CDs or DVDs of the video inspections.

e. Without exception, CCTV inspections must be continuous without video interruption or gaps for pipe segments.

f. Clean, flush, and RE-TV pipe segments with video interruptions or gaps.

3.2.2.4.2 TV Inspection Logs

Submit computer generated records that clearly show the location and orientation in relation to an adjacent manhole or structure of each infiltration point observed during the inspection.

Record other points of significance such as locations and orientations of service connections, missing or broken pipe, roots, the presence of grease, scale or corrosion, bellies, fractures, cracks, and other discernible features using PACP designations.

3.2.2.4.3 Digital Photographs

Submit JPEG images at a minimum resolution of 640 x 480 pixels. Save digital photographs in JPEG file format on CD or DVD. Document noted defects and lateral connections as color digital files and hard copy print-outs. Photo logs are to accompany each photo submitted.

3.2.3 Pre-TV Inspection

Immediately after cleaning has been performed, complete a Pre-TV inspection, in accordance with paragraph INSPECTION OF SEWER LINES. Submit Pre-TV inspection documentation in accordance with paragraph DOCUMENTATION OF CCTV INSPECTION.

[3.2.4 Post-TV Inspection

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**NOTE: Post-TV inspection is performed to verify slip lining does not have any defects and to verify all lateral connections are open.**

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Immediately after visual, deflection, pressure and leak testing and service reconnections are complete on a pipe segment, complete Post-TV inspection accordance with paragraph INSPECTION OF SEWER LINES. Submit Post-TV inspection documentation in accordance with paragraph DOCUMENTATION OF CCTV INSPECTION.

3.2.4.1 Post-TV Defects

If defects are found in the mains or services during the Post-TV inspection make repairs according to the specifications. RE-TV all repairs accordance with paragraph INSPECTION OF SEWER LINES. Provide additional RE-TV inspections of complete pipe segments as follows:

a. Perform a RE-TV inspection of the complete pipe segment. If no additional defects are found in the Re-TV inspections, then the Post-TV inspection is complete.

b. If defects are found in these additional inspections make repairs according to the specifications and provide Re-TV inspection for the

complete pipe segment.

c. If defects are found in these additional inspections make repairs according to the specifications and Re-TV the repaired pipe segments until no Post-TV defects are found.

][3.2.5 Warranty-TV Inspection

Complete a Warranty-TV inspection starting no earlier than [60][_____] days prior to expiration of the warranty and submit no later than [30][_____] days prior to the expiration of the warranty. Comply with paragraphs TV INSPECTION OF SEWER LINES and DOCUMENTATION OF CCTV INSPECTION. Complete Warranty-TV inspections in the presence of the Contracting Officer. The Contracting Officer has the option to select the pipe segments for the Warranty-TV inspection. Comply with the following requirements:

a. Provide a complete pipe segment Warranty-TV inspection of pipe segments where a liner repair was performed during Post-TV Inspection.

b. Provide a complete pipe segment Warranty-TV inspection of pipe segments where a point repair was performed.

c. Provide a Warranty-TV inspection of at least one full pipe segment of each size and type of slip lining installed.

d. Provide a Warranty-TV inspection of at least [10][_____] percent of the total length of all pipe segments.

All of Warranty-TV inspections above may be included to satisfy the percentage of total length requirement. If no defects are found in the mains and services in the above minimum pipe segments inspected, then the Warranty-TV inspection is complete.

3.2.5.1 Warranty-TV Defects

If defects are found in the mains or services during the Post-TV inspection make repairs according to the specifications. RE-TV all repairs. Provide additional Warranty-TV inspections of complete pipe segments as follows:

a. Warranty-TV inspect an additional 15 percent of the footage based on the length of the total project. If no additional defects are found in the additional Warranty-TV inspections, then the Warranty-TV inspection is complete.

b. If defects are found in these additional inspections make repairs according to the specifications, RE-TV all repairs and provide Warranty-TV inspections for the remaining pipe segments in the project.

c. If defects are found in these additional inspections make repairs according to the specifications and Re-TV the repaired pipe segments.

]3.2.6 RE-TV Inspection

After repairs are made to a main or service, complete RE-TV inspection accordance with paragraph INSPECTION OF SEWER LINES and DOCUMENTATION OF CCTV INSPECTION.

## 3.3 FIELD QUALITY CONTROL

### 3.3.1 Verification of Measurement

Once herbicide application has been completed, measure tank contents to determine the remaining volume. The total volume measurement of used contents for the application must equal the established application rate for the project site conditions. Submit written verification that the volume of herbicide used meets the application rate.

### 3.3.2 Inspection

#### 3.3.2.1 Technical Representative

Provide a technical representative who is a DOD certified pesticide applicator or Pest Management Quality Assurance Evaluator (QAE)/Performance Assessment Representative (PAR). The technical representative must be present at all meetings concerning root removal and during treatment application. Contact the Integrated Pest Management Coordinator prior to starting work.

## 3.4 CLOSEOUT ACTIVITIES

### 3.4.1 Sewer Cleaning

Submit copies of Records of Disposals indicating the disposal site, date, amount, and a brief description of the materials disposed.

### 3.4.2 Herbicides

Upon completion of this work, submit the Pest Management Report DD Form 1532, or an equivalent computer product, to the Integrated Pest Management Coordinator. This form identifies the target pest, type of operation, brand name and manufacturer of pesticide, formulation, concentration or rate of application used.

-- End of Section --