1 PART 1 - GENERAL

1.1 Work Included

1. This SECTION refers to those portions of the work that are unique to the requirements for inspecting new and existing Wastewater, Stormwater and Combined Systems by closed circuit television (CCTV). This includes mains, service laterals, manholes, catchbasins and culverts. This SECTION must be referenced to and interpreted simultaneously with all other SECTIONS pertinent to the works described herein.
2. Inspection services shall include all labour, tools, equipment, permitting, health and safety, traffic control, supplies and materials as well as all necessary supervision and coordination to provide reporting and deliverables. All costs associated with the requirements of these specifications shall be deemed to be included in the Contractor's unit and lump sum prices for the specified contract items.
3. All work shall be done in accordance with the latest version of the National Association of Sewer Service Companies (NASSCO) Pipeline Assessment Certification Program (PACP), Manhole Assessment Certification Program (MACP) and Lateral Assessment Certification Program (LACP), except as amended or extended herein.
4. Contractor shall rigorously verify all inspection records prior to submission to the Owner. The Contractor's submissions will be subject to a comprehensive QA/QC review by the Owner during the initial contract pilot and to periodic audits throughout the term of the contract. Submissions that do not conform to the requirements of this specification will be rejected.
5. The Owner shall not be responsible for any loss or damage to the Contractor's equipment. The Contractor shall carry all necessary insurance to cover loss, damage, restoration and/or retrieval during the work.
6. The Contractor shall attend a Project Start Up Meeting with the Owner prior to commencement of the work. No work shall commence until the Project Start-Up Meeting is held.
7. All personnel responsible for operating inspection equipment, coding inspections and completing QA/QC reviews of inspections shall be certified in the NASSCO certification programs relevant to the type of inspection to be conducted.

1.2 Reference Standards

1. National Association of Sewer Service Companies (NASSCO) Pipeline Assessment Certification Program (PACP), Manhole Assessment Certification Program (MACP), Lateral Assessment Certification Program (LACP)

1.3 Definitions

1. "CCTV inspection" refers to closed circuit television inspection.
2. "ESRI" refers to Environmental Systems Research Institute.
3. "FTP" refers to file transfer protocol.
4. "HRM" refers to Halifax Regional Municipality.
5. "HRWC" refers to Halifax Regional Water Commission.
6. "ID" refers to identification.
7. "LACP" refers to Lateral Assessment and Certification Program.
8. "MACP" refers to Manhole Assessment and Certification Program.
9. "MH" refers to manhole.
10. "NASSCO" refers to National Association of Sewer Service Companies.
11. "PACP" refers to Pipeline Assessment and Certification Program.
12. "PDF" refers to portable document format.
13. "Service Lateral" as referred to in these Specifications shall mean the sewer line extending from a building to the sewer main.
14. "Sewer" refers to either combined, wastewater or stormwater pipe system.
15. "Sewer Line Section" as referred to in these Specifications shall mean the length of pipe connecting two manholes.

1.4 Pre-Start Submission Requirements

1. Submit to HRWC, at least two weeks prior to the start of the CCTV inspection operations the following:

    1. A list of all staff assigned to work on this contract and their role. Include contact information as a minimum for the Project Manager, Site Supervisor and an Emergency Contact that will be available 24 hours per day, 7 days per week for the duration of the contract.
    2. Copies of current NASSCO certifications for all staff that will be responsible for operating inspection equipment, coding and conducting quality reviews of inspections.
    3. Confirmation that all personnel assigned to this contract have valid Police Record Checks (PRCs).
    4. Inspection Sequence and Schedule.
    5. Traffic Management and Control Plan.
    6. Health and Safety Certifications for all staff involved in the work.

1.5 Work Regulations

1. All work shall conform to all applicable legislation, including the Occupational Health and Safety Act of Nova Scotia and Halifax Water's Occupational Health and Safety requirements. Provide written confirmation to HRWC that workers have

knowledge of practices and equipment required for confined space entry including any training certifications. Confirm training compliance in the following:

1. Confined space rescue.
2. Confined space entry.
3. Ventilation.
4. Atmospheric monitoring.
5. Self-contained breathing apparatus.
6. Personal protective equipment.

2. The Contractor shall follow traffic control requirements.

1. The Contractor shall prepare a Traffic Control Plan in accordance with the latest version of the Nova Scotia Department of Transportation and Infrastructure Renewal Temporary Workplace Traffic Control Manual, the HRM Traffic Control Manual Supplement, and HRM's Streets and Services Permit.
2. The Contractor shall maintain a copy of the Traffic Control Plan on site at all times while work is being conducted.
3. The Contractor shall provide all qualified labour, material and equipment required to execute the Traffic Control Plan.
4. One lane of traffic must be maintained at all times, and where required, the Contractor shall provide Traffic Control Personnel to permit the safe movement of pedestrian and vehicular traffic.

1.6 Scheduling and Sequence of Work

1. Contractors are to coordinate with HRWC to minimize service interruption to affected HRWC customers. This would include scheduling work in off peak hours.
2. The Contractor shall submit to the Contract Administrator an overall work sequence plan and schedule.
3. The Contractor shall advise the Contract Administrator on a weekly basis of the location and planned activities of all work crews.
4. The Contractor shall provide to the Contract Administrator weekly schedule updates, detailing work completed to date and planned work locations for the coming week.
5. Work shall be performed on a continuous basis from the time of commencement. If work must be discontinued for more than 24 hours, the Contractor shall advise the Contract Administrator in writing of the reason for discontinuing the work, and the anticipated date of re-commencing the work.
6. The Contractor shall make all best efforts to submit a complete inspection even if return visits are required to collect the full details.

7. All work shall commence at the upstream reach of the sewer system and proceed downstream.
8. Working hours shall be between 7:00 a.m. and 7:00 p.m., Monday through Friday with the exception of statutory holidays. Any variation in working hours, must be approved by the Contract Administrator. In the event that work is required outside of normal working hours, the Contractor shall consider the impact of noise on residential dwellings and may be required to produce and deliver notification of night work to nearby residents 48 hours in advance of night work.

1.7 Prevention and Remediation of Basement Flooding

1. The Contractor shall carry out all work in an appropriate manner to prevent basement flooding in the homes adjacent to the work area.
2. The Contractor will be responsible for all costs associated with the cleanup, disposal and replacement of items and restoration of property damaged as a result of flooding caused by the Contractor's operations.
3. Prior to commencing work, the Contractor shall plan activities to occur during periods where precipitation is not anticipated that would or could negatively impact bypass pumping activities and protection against flooding for properties in and tributary to the area served by the assets being inspected.

1.8 Prevention and Remediation of Property Damage

1. The Contractor shall undertake all work in an appropriate manner to prevent public and private property damage adjacent to and in the work area.
2. The Contractor will be responsible for all costs associated with the cleanup, disposal and replacement of items and restoration of property damaged as a result of the Contractor's operations.

1.9 Asset Inventory and Locations

1. The Owner will supply Geographic Information System (GIS) data defining the locations of sewers to be inspected and relevant information including sewer identifiers (pipe/asset IDs), upstream and downstream manhole IDs and locations. All reporting and deliverables for this project must conform to the Owner's sewer and manhole identifiers.
2. The Contractor will be responsible for locating, identifying and confirming the dimensions, shape, and material of all sewers and manholes in the field. The Contractor shall advise the Owner, immediately in writing, of buried or non-locatable manholes. Any discrepancies found shall be noted and reported to the Owner. The Contractor shall update the supplied GIS data to reflect the actual field conditions accurate to within 1 metre. Any data and video files will reflect adjusted manhole and sewer IDs.

1.10 Basis of Payment

1. Payment at the unit and/or lump sum prices bid shall be full compensation for all labour, material and equipment required to complete the work as specified herein.
2. Payment will be made following review and acceptance of all required inspection documentation. No payment will be made for inspections that do not meet the requirements of these specifications.

2 PART 2 - EQUIPMENT

The contractor shall provide all equipment, in good working order, as required for the duration of the contract. Minimum equipment requirements are as follows.

2.1 Survey Vehicle

1. Viewing, recording and control area to be insulated against noise and extremes in temperature. External and internal sources of light to be controlled to ensure the light does not impede the view of the monitor screen. Proper seating accommodation to be provided to enable one person in addition to the operator to clearly view the monitor screen.
2. All equipment utilized within the pipe to be stored outside the viewing, recording and control area.
3. Electrical power for the CCTV system to be self-contained. External power sources from public or private sources not permitted.

2.2 Survey Equipment

1. The Contractor shall provide suitable equipment designed for inspecting mainline sewers, manholes, catchbasins and service laterals all of various lengths, depths and sizes. The Contractor shall confirm that the selected equipment is suitable for inspection of the specified assets and their attributes.
2. In the event of equipment failure while on site, upon request, the Contractor shall have the capability to provide backup inspection equipment, in good working condition, at the inspection site within one hour.
3. All cameras shall produce colour video and still images.
4. Survey equipment shall be a self-propelled rubber tired or crawler type with a means of transporting the CCTV camera in a stable condition through the pipe.
5. Survey equipment shall carry sufficient numbers of guides and rollers such that, when surveying, all cables are supported away from the pipe and manhole edges. All CCTV cables and lines used to measure the camera's location within the pipe are to be maintained in a taut manner and set at right angles, where possible, to run through or over the measuring equipment.
6. Survey equipment shall interface with a data generator and appropriate software to record the alpha-numeric data associated with inspection header, and condition information.

2.3 Sewer Inspection Camera

1. Sewer inspection cameras shall be self-propelled, self-levelling, waterproof, designed for use in typical sewer conditions, and have the following capabilities:

    1. Capable of panning the pipe at 360° with tilt capability of 270°.

2. Capable of passing over minor surface imperfections including but not limited to broken joints and debris.
3. Capable of providing an even distribution of light around the pipe perimeter without the loss of contrast, flare out or picture shadowing. Lighting system shall be capable of being remotely adjusted.

2. Where conditions do not suit tractor deployment, provide a float or skid for mounting camera equipment and towing through the pipe. Situations requiring float or skid mounted inspections to be approved by HRWC in advance. Positioning shall not impede the view of the camera and stability must be achieved to ensure steady video recording.
3. Minimum recorded video resolution shall be 420 lines with a National Television Standards Committee (NTSC) size of 720 x 480 at 29.97 frames per second). Video shall be recorded in MPEG-4 standard format at a baud rate of 4000 bits per second.
4. Provide remote focus and iris adjustment capabilities to allow optimum picture quality. The focus and iris adjustment will provide a focal range from 150 mm in front of the camera's lens to infinity. The distance along the pipe in focus from the initial point of observation shall be a minimum of twice the vertical height of the pipe.
5. Provide camera capable of inspecting sewer mains ranging from 200mm diameter to 3000mm diameter inclusively, and capable of inspecting a minimum distance of 300m from a single access point.
6. Hemispherical head or fisheye lens type cameras are not permitted.

2.4 Access Point Inspection Camera

1. The inspection camera system must be 100% digital. Any analog or National Television System Committee (NTSC) video camera will be deemed unacceptable.
2. The inspection camera system must have two independently or simultaneously controlled digital cameras, one facing in the downward direction and one facing in the upward direction. Each camera must have a minimum of 185-degree field of view.
3. The inspection camera system must illuminate the interior of the manhole using a strobe light. The light shall be positioned to distribute the light evenly onto the structure walls. The lighting must be able to illuminate manholes without the need of any auxiliary lighting. Any systems not using strobe light technology will be deemed unacceptable due to motion blur during imaging recording.
4. The inspection system shall produce individual images or frames with no more than 0.025 mm (0.001 inches) of movement during image or frame exposure to produce crisp, clear images.
5. The inspection camera must provide a minimum of 3000 lines of vertical resolution in the side view and a minimum of 500 lines in the perspective view.
6. The digital film files must include an unfolded view of the manhole with a minimum of 3000 lines of vertical resolution.

7. The inspection system must descend to the lowest point within the manhole chamber to a depth that will facilitate accurate wall measurements using the software's measuring tools.
8. The digital film files must include the capability to produce a three-dimensional representation of the manhole structure. This data shall be used to perform geometric measurements.
9. The digital file must include a distortion-free virtual pan and tilt allowing review of the manhole structure from any angle, from any depth. The virtual pan and tilt must be able to view 360-degrees in any direction. The virtual pan and tilt must consist of views from the top and bottom camera. Any virtual pan and tilts that artificially create this view from a single camera will be deemed unacceptable due to distorted images on the direct side view.
10. The virtual pan and tilt and unfolded views must be able to be viewable by the Owner with all the required software included.
11. The system must be capable of inspection speeds to ensure maximum production per day with each inspection system and to minimize the time at each location to maintain traffic flow and reduce safety concerns of Contractor's employees.

2.5 Service Lateral Inspection Camera

1. Service lateral inspection camera shall be self-contained, self-leveling, waterproof, tractor-mounted camera unit capable of launching from within the sewer main and being positioned to launch the camera at the lateral line connections.
2. Capability of inspecting lateral pipe sizes from 100mm diameter up to larger diameter multi-unit dwelling/industrial/commercial/institutional (MICI) service laterals inclusively.
3. Conveyance system including cable shall be capable of inspecting a minimum distance of 50 metres from a single access point.

3 PART 3 - EXECUTION

3.1 Public Relations

1. It is crucial in undertaking this contract that good public relations be maintained between the Owner and its customers. The Contractor must at all times be professional and courteous to all residents and business owners. Complaints and problems are to be responded to immediately by the Contractor and immediately reported to the Owner.

3.2 Site Restoration

1. The Contractor will be held responsible for damage to street surfaces, curbs, gutters, existing utilities, and easements over private property, etc., that result from operations and/or negligence during inspection operations. The Contractor shall repair any damage resulting from their operations and such repairs will be subject to the approval of the Owner. All repairs shall be done at no extra cost to the Owner.

3.3 Duty to Report

1. The Contractor shall notify the Owner immediately, while the inspection is still in progress, of any significant structural or operational defects or safety issues including but not limited to collapsed sewers, deposits/obstructions >25% of depth, infiltration gushing, missing or broken manhole covers. Notification shall be made by telephone and/or email.

3.4 Pre-Inspection Activities

1. Confirm receipt of inspection request and ensure response times meet Halifax Water requirements.

    1. For non-emergency inspections, be on site and available to work within forty-eight (48) hours.
    2. For emergency inspections, be on site and available to work within two (2) hours.

2. Review and confirm the inspection project areas, location of sewer assets, direction of flow, problem areas of the sewer system, presence of any flow meters (flow meters may require removal prior to inspection by Halifax Water personnel), and whether there are access issues to the sewers in public right-of-ways and in utility easements requiring special treatment.
3. Confirm that all equipment to be used during the inspections meets the identified specifications.

4. Review all health and safety requirements and ensure personnel have the necessary certifications for the work to be undertaken.
5. Secure all permits necessary to conduct the inspection as defined.
6. Supply traffic control.
7. Review any plugging or bypassing needs with Halifax Water staff during inspection planning and secure approval from Halifax Water prior to plugging or bypassing flows.
8. Calibrate all measuring equipment for accuracy prior to and during inspection and provide upon request certification of the calibration records (including method and equipment used, accuracy measures, and any deviations from normal).

3.5 Inspection Procedure – General

1. Advise Halifax Water staff of the weekly inspection locations and schedule.
2. Provide Halifax Water staff with access to any inspection location as Halifax Water reserves the right to inspect equipment and determine its suitability for the inspection.
3. Attend to and cooperate with Halifax Water personnel assigned to determine conformity with the specification and contract and the adequacy of services being performed.
4. Record atmospheric readings tagged to access points.
5. All sewer, lateral and manhole asset identifiers shall conform to the GIS identifiers provided by the Owner.
6. Identify all variations to the Halifax Water base GIS data observed during the field inspections and provide summary with the inspection submission.
7. All measurements shall be recorded and displayed in metric units.
8. All video and still images must be clear and in focus and must not be hazy due to steam or water vapor. Camera lens to remain free of grease or other deleterious matter to ensure optimal clarity. Remove camera from sewer line, manhole, or lateral if the camera lens becomes obscured with condensation, grease, scum, or debris and clean. Reinspect the entire segment at no additional cost.
9. Eliminate steaming and fogging encountered during the inspection survey by introducing forced air flow by means of fan. Inspections obscured by steam or fog will be rejected.

3.6 Mainline Inspection Procedure

1. At the start of each inspection, record the mandatory header information. Refer to Table 1 for Mandatory PACP, LACP & Halifax Water Header fields for this contract.
2. Use a video overlay to display the following key survey information. Arrange the information on screen to minimize interference with the inspection image.

    1. At the start of each inspection display the following information on screen for five seconds:

        1. Pipe Segment Reference
        2. Upstream Manhole ID
        3. Downstream Manhole ID
        4. Direction of Survey
        5. Date
        6. Time

    2. For the duration of each inspection, use a video overlay to clearly display the following continuously:

        1. Pipe Segment Reference
        2. Distance

    3. For each observation, display the observation code and description for five seconds.

3. Perform pipe inspection one pipeline section at a time from manhole to manhole. Inspect sewers in the direction of flow unless a reversal is required. Begin with the upstream sewer in the system and proceed downstream in a consecutive manner. Inspect all contributing upstream sewers before proceeding downstream.
4. The CCTV video recording shall display an automatically updated measurement, accurate to one tenth of a meter (0.1m), between the camera position and the cable calibration point.
5. Provide accuracy for distance measurement in the sewer to within 0.5% of the above ground measurement.
6. Set zero chainage at face of every manhole or on entrance into pipe or start of pipe culvert.
7. Collect nominal pipe diameter within ± one nominal pipe size.
8. Camera Position

    1. Position camera lens centrally in the pipe with a positioning tolerance of 10% of the vertical centerline axis of the pipe. For elliptical pipe the camera to be positioned 2/3 the height of the pipe measured from the invert.

2. Position camera lens looking along the longitudinal axis of pipe except when viewing service connections or panning defects.
3. Where the camera moves from one pipe diameter size to another pipe diameter size, ensure the camera position is reset so it is in the centre of the pipe.

9. Camera Travel Speed shall be as follows:

    1. 0.1 m/s for pipe of diameter less than 200 mm.
    2. 0.15 m/s for diameters 200 mm a larger, not exceeding 310mm.
    3. 0.2 m/s for diameters exceeding 310 mm.

10. Reduce flow in pipe to 20% pipe diameter to allow CCTV inspection by combination of the following.

    1. Schedule work for off peak flow times.
    2. Plug or block flow at upstream manhole as follows:

        1. Plug designed to either block all flow or impede flow to the approximate 20% pipe diameter.
        2. Obtain the HRWC's approval and coordinate with Halifax Water Operations personnel prior to plugging or impeding any flow.
        3. Remove plug or blocks to slowly return flow to normal without surge or surcharging downstream pipe.

    3. Temporary bypass pump flow around inspection section when required, as specified in contact documents. Plug to be flow through with hoses and pipe of sufficient capacity to handle the peak flow. Hoses and couplings to be leak free. Flow to be pumped to downstream manhole on same system or run as inspection is to take place. Obtain the HRWC's approval and coordinate with Halifax Water Operations personnel prior to setting up temporary bypass pump system.

11. Keep the picture in focus during the inspection from the point of observation to a minimum of two pipe diameters ahead.
12. Illuminate at least two metres ahead of the camera to minimize reflective glare. Adjust and distribute lighting according to the size of the pipe to provide a clear picture of the entire periphery of the pipe without loss of contrast.
13. Pan each service connection at 90° such that the camera looks down the centerline of the service connection, pause for a minimum five seconds and note condition of the joint and pipe with maximum one metre tolerance measured from centerline of reference manhole.
14. Pan each feature and defect, pause for a minimum five seconds and note condition with maximum one metre tolerance measured from centerline of reference manhole.

15. Inspect continuous defects using the pan and tilt feature at intervals that will provide a representation of and fully display and identify that defect.
16. Provide reverse set up of the equipment if during the initial inspection, the camera equipment cannot pass through the entire segment due to an obstruction.
17. Advise the Contract Administrator of sewer line sections that are inaccessible and proceed to next sewer line section. Immediately notify the Contract Administrator of any blockage or obstruction that will not allow the passage of survey equipment.
18. Flag service connections exhibiting continuous clear water flow using the code Miscellaneous General Observation (MGO) and comment "Clear Water".

3.7 Inspection Procedure – Access Points (manhole/catch basins etc.)

1. At the start of each inspection, record the mandatory header information. Refer to Table 2 for Mandatory MACP & Halifax Water Header fields for this contract.
2. For manhole inspections, commence the inspection so that the frame of the manhole is clearly visible at the start of the inspection.
3. Inspect manholes for general construction, structural condition, and evidence of inflow, infiltration or surcharging together with the ground level condition within a two metre radius of the manhole cover.
4. Inspect each and every component of the manhole consistent with Table 2 inspection requirements to establish a complete inventory of observations, defects and connections.
5. All pipe connections shall be documented and identified using the Owner's unique asset identifier.
6. Measure and record the upstream and downstream pipe invert depths (manhole lid to pipe invert) when access is possible with vertical accuracy for an invert at ± 50 mm.
7. Identify locations and justification for incomplete inspections.

3.8 Inspection procedure – Service Connections:

1. At the start of each inspection, record the mandatory header information. Refer to Table 1 for Mandatory PACP, LACP & Halifax Water Header fields for this contract.
2. Provide references for the video that clearly display 'From' and 'To' (pipeline to terminus at street line or structure) and travel distance in metres on the periphery of the screen and arrange the information to minimize interference with the inspection image (defect code and description should appear on the screen while 'coding' for at least five (5) seconds).
3. Inspect continuous defects using the pan and tilt feature at intervals that will provide a representation of and fully display and identify that defect.
4. Advise the Contract Administrator of service connections that are inaccessible and proceed to next service connection in that pipeline section.
5. Inspect service connections from inside of the pipeline only up into the service connections (inspections are not permitted from cleanouts, excavations, or other

access points, unless authorized by HRWC) and record general construction, structural condition, and evidence of inflow, infiltration or surcharging together with the location of the service connection.

6. Flag service connections exhibiting continuous clear water flow using the code MGO and comment "Clear Water".

3.9 Inspection Reports

1. For non-emergency inspections, submit all deliverables within ten working days following the completion of the inspection.
2. For emergency inspections, submit the digital video inspection within forty-eight hours, followed by all remaining deliverables within ten working days following the completion of the inspection.
3. Retain a copy of all inspection records including video files, photographs, database, reports, shape files (and any other relevant associated records) for a minimum period of three years after completion of the inspection work.
4. Submit all inspection records and deliverables electronically. If using FTP site, notify the Owner via email that information has been submitted. Uploads must be from a dedicated static IP address.
5. NASSCO compliant database file suitable for upload into ESRI GIS reflecting actual field condition and a list of assets requiring GIS updates.
6. Mainline Sewer Inspection Reports shall be submitted in electronic format including the following:

    1. Inspection database in MS Access format utilizing the NASSCO exchange database standard containing all inspection "Header", "Observations" and "Ratings" data in tabular format. Inspection Observation table fields shall be included and completed in accordance with PACP. Refer to Table 1 for required Header table fields.
    2. Inspection video records in .mpg format, including any additional software required to view camera specific formats. The video file name shall be entered in the Header table Media Label field using the following naming convention:
    Street_PipeID_Direction_YYYY_MM_DD_Incremental Number (1, 2, 3, etc.)].
    3. Inspection reports in searchable .pdf format, formatted for printing on 8.5"x11" paper. File names shall match the associated video file name. A separate file shall be provided for each inspection.
    4. Completed "Pipe Inspection Report Form".
    5. Completed "Defect Report".

7. Manhole Inspection Reports shall be submitted in electronic format including the following:

1. Inspection database in MS Access format utilizing the NASSCO exchange database standard containing all inspection "Header", "Conditions", "Connections" and "Ratings" data in tabular format. Refer to Table 2 for required Header table Fields.
2. Inspection panoramas, including any additional software required to view camera specific formats such as panoramas. The panorama file name shall be entered in the Header table Media Label field using the following naming convention:
   Street_MH ID_YYYY_MM_DD_Incremental Number (1,2,3, etc.).
3. Inspection reports in searchable .pdf format, formatted for printing on 8.5"x11" paper. File names shall match the associated video file name. A separate file shall be provided for each inspection.
4. Completed "Manhole Inspection Report Form".

8. Lateral Inspection Reports shall be submitted in electronic format including the following:

   1. Inspection database in MS Access format utilizing the NASSCO exchange database standard containing all inspection "Header", "Observations" and "Ratings" data in tabular format. Inspection Observation table fields shall be included and completed in accordance with PACP. Refer to Table 3 for required Header table fields.
   2. Inspection video records in .mpg format, including any additional software required to view camera specific formats. The video file name shall be entered in the Header table Media Label field using the following naming convention:
      Street_LateralID_YYYY_MM_DD_Incremental Number (1, 2, 3, etc.).
   3. Inspection reports in searchable .pdf format, formatted for printing on 8.5"x11" paper. File names shall match the associated video file name. A separate file shall be provided for each inspection.
   4. Completed "Lateral Inspection Report Form".

9. Pilot Submission of Inspection Reports

   1. To ensure that the Contractor delivers inspection data in a format that is acceptable to the Owner, a Pilot inspection area will be identified at the Project Start Up Meeting. The Contractor shall conduct a pilot area inspection to validate compliance with Halifax Water's specification and requirements.
   2. The Contractor shall conduct one week of inspections, then cease operations until review and approval of the resulting reports by the Owner.
   3. The Contractor shall submit Pilot inspection reports to the Owner within one week of completing the inspections.

4. The Pilot inspection submission package shall also include video resolution test details and documentation of the Contractors coding accuracy verification system, for review and approval by the Owner.
5. The Owner will review the Pilot inspection report submission for conformance with the specifications and provide written comments to the Contractor within two weeks from the date of pilot documentation and deliverables submission.
6. The Contractor shall revise and resubmit the submission within two weeks of receiving comments from the Owner.

10. Regular Submission of Inspection Reports

1. Once the Owner approves the Pilot inspection report format, all other reports must be compiled and submitted as stipulated in the specification or as amended and agreed jointly between Halifax Water and the Contractor in writing.
2. Following acceptance of the Pilot Submission by the Owner, the Contractor shall submit inspection reports on a monthly basis, or more frequently if directed by the Owner.
3. The Owner will review the inspection report submission for conformance with the specifications and provide written comments to the Contractor within three weeks.
4. The Contractor shall revise and resubmit the submission within two weeks of receiving comments from the Owner.

3.10 Measurement for Payment

1. Measurement for CCTV inspection of mainline sewers and service laterals shall be measured in metres on the ground surface along the centerline of the subject pipe from one end of the pipe to the other. In the event that an inspection is abandoned due to a blockage or obstruction, measurement shall be in metres for the actual length of pipe inspected as determined from the chainage indication on the recorded media.
2. Measurement for manhole inspection shall be based on the actual number of completed manhole inspections.

4 PART 4 - HALIFAX WATER REQUIRED INSPECTION FIELDS

4.1 Mainline and Service Lateral Inspections

For mainline and service lateral inspections, Table 1 outlines the minimum PACP and LACP mandatory header fields in addition to Halifax Water requirements for CCTV inspection.

Table 1 – Mandatory PACP, LACP & Halifax Water Header Fields

PACP Field No.	Description	Halifax Water Required Field *= NASSCO Field
1	Surveyed By	Yes *
2	Certificate Number	Yes *
3	Reviewed by	Yes
4	Reviewer Certificate No.	Yes
5	Owner	
6	Customer	
7	PO Number	
8	Work Order Number	
9	Media Label	
10	Project	Yes
11	Date	Yes *
12	Time	Yes
13	Sheet Number	Yes *
14	Weather	Yes
15	Pre-Cleaning	Yes *
16	Date Cleaned	Yes
17	Flow Control	
18	Purpose of Survey	Yes
19	Direction	Yes *
20	Inspection Technology Used	
21	Inspection Status	Yes *
22	Consequence of Failure	
23	Pressure V	
24	Drainage Area	
25	Pipe Segment Reference	Yes
26	Street	Yes *
27	City	Yes *

PACP Field No.	Description	Halifax Water Required Field *= NASSCO Field
28	Location Code	
29	Location Details	
30	Sewer Use	Yes *
31	Height (Diameter)	Yes *
32	Width (non-circular)	Yes *
33	Shape	Yes *
34	Material	Yes *
35	Lining Method	
35	Coating Method	
37	Pipe Joint Length	
38	Total Length	Yes
39	Length Surveyed	Yes
40	Year Constructed	
41	Year Renewed	
42	Upstream MH No.	Yes *
43	Upstream MH Rim to Invert	
44	Upstream MH Rim to Grade	
45	Upstream MH Grade to Invert	
46	Upstream MH Northing	
47	Upstream MH Easting	
48	Upstream MH Elevation	
49	Downstream MN No.	Yes *
50	Downstream MH Rim to Invert	
51	Downstream MH Rim to Grade	
52	Downstream MH Grade to Invert	
53	Downstream MH Northing	
54	Downstream MH Easting	
55	Downstream MH Elevation	
56	MH Coordinate System	
57	MH Vertical Datum	
58	GPS Accuracy	
59	Additional Information	

4.2 Manhole Inspections

For manhole inspections, Table 2 outlines the minimum MACP mandatory header fields in addition to Halifax Water requirements for CCTV inspection.

Table 2 – Mandatory MACP & Halifax Water Header Fields

MACP Field No.	Field Name	Halifax Water Required Field *= NASSCO Field
1	Surveyed By	Yes *
2	Certificate Number	Yes *
3	Reviewed By	Yes
4	Reviewer Certificate Number	Yes
5	City	
6	Customer	
7	PO Number	
8	Work Order	
9	Media Label	Yes
10	Project	
11	Inspection Date	Yes *
12	Inspection Time	Yes
13	Sheet Number	Yes *
14	Weather	Yes
15	Pre-Cleaning	Yes *
16	Date Cleaned	Yes
17	Purpose	Yes *
18	Inspection Level	Yes *
19	Inspection Status	Yes *
20	Consequence of Failure	
21	Drainage Area	
22	Manhole Number	Yes *
23	Street	Yes *
24	City	Yes *
25	Location Code	Yes *
26	Surface Type	Yes *
27	Inflow Potential from Runoff	Yes
28	Location Details	
29	MH Use	Yes *
30	Access Type	Yes *
31	Year Constructed	
32	Year Renewed	
33	Evidence Surcharge	Yes *
34	Rim to Invert	Yes *
35	Rim to Grade	Yes *

MACP Field No.	Field Name	Halifax Water Required Field *= NASSCO Field
36	Grade to Invert	Yes *
37	Rim to Grade Exposed	
38	Northing	
39	Easting	
40	Elevation	
41	Coordinate System	
42	Vertical Datum	
43	GPS Accuracy	
44	Additional Info	Yes
45	Cover Type	Yes *
46	Cover Shape	Yes *
47	Cover Size	Yes *
48	Center Cover Size	
49	Cover Size Width	
50	Cover Material	Yes *
51	Hole Diameter	
52	Hole Number	
53	Cover Bearing Surface Diameter	
54	Cover Bearing Surface Width	
55	Cover Frame Fit	
56	Cover Condition	Yes *
57	Cover Insert Type	
58	Insert Condition	
59	Adjustment Ring Type	
60	Adjustment Ring Material	Yes *
61	Ring Condition	Yes *
62	Adjustment Ring Height	
63	Frame Material	Yes *
64	Frame Bearing Surface Width	
65	Frame Bearing Surface Depth	
66	Frame Clear Open Diam	
67	Frame Clear Open Width	
68	Frame Condition	Yes *
69	Seal Condition	Yes *
70	Frame Offset Distance	
71	Frame Seal Inflow	
72	Frame Depth	
73	Chimney Present	
74	Chimney Material1	Yes *
75	Chimney Material2	Yes

MACP Field No.	Field Name	Halifax Water Required Field *= NASSCO Field
76	Chimney I/I	
77	Chimney Clear Opening	
78	Chimney Depth	
79	Chimney Lining Interior	
80	Chimney Lining Exterior	
81	Chimney Condition	Yes *
82	Cone Type	
83	Cone Material	Yes *
84	Cone Depth	
85	Cone Lining Interior	
86	Cone Lining Exterior	
87	Cone Condition	Yes *
88	Wall Diam	
89	Wall By Size	
90	Wall Material	Yes *
91	Wall Depth	
92	Wall Lining Interior	
93	Wall Lining Exterior	
94	Wall Condition	Yes *
95	Bench Present	
96	Bench Material	Yes *
97	Bench Lining	
98	Bench Condition	Yes *
99	Channel Installed	
100	Channel Material	Yes *
101	Channel Type	
102	Channel Exposure	
103	Channel Condition	Yes *
104	Step Number	
105	Step Material	
106	Additional Component Information	Yes
107	Pipe Number	Yes *
108	Clock Position	Yes *
109	Rim to Invert	Yes *
110	Direction	Yes *
111	Material	Yes *
112	Shape	Yes *
113	Height (Diameter)	Yes *
114	Width	Yes *
115	Condition	Yes *

MACP Field No.	Field Name	Halifax Water Required Field *= NASSCO Field
116	Seal Condition	Yes *
117	Pipe Type	Yes *
118	Structure ID	Yes
119	Comment	Yes