AI-04-CCTV INSPECTION OF CONSTRUCTION WORKS

Ver.1 Date: October 2014

1. SCOPE

This section covers inspection of newly constructed pipelines before they are put into service, and of existing pipelines before and after lining or other repairs, using CCTV (closed circuit television) and still digital camera images to directly inspect the internal surfaces of these structures.

The facilities to be inspected and the information required are defined in the Particular Clauses.

2. TRAFFIC CONTROL

Many of the Watercare manholes are located in roads, and access into these structures will require diversion of traffic. All work within the road shall be conducted in accordance with the Road Opening Notice issued by the Road Controlling Authority, and with Transit New Zealand's current "Code of Practice for Temporary Traffic Management".

3. ACCESS TO SEWERS AND COORDINATION WITH WATERCARE SERVICES

The Contractor shall co-ordinate the timing of his inspections with Wastewater Operations Point of Contact to ensure that inspection equipment or personnel safety is not endangered by sudden high flows resulting from the release of stored wastewater, siphon flushing, or pumping station operation. It is imperative that Wastewater Operations are informed of the presence of personnel and equipment in the sewer system at all times.

4. HOURS OF WORK

The hours of work shall be coordinated with daily or seasonal sewer flows and other site conditions including construction work, to utilise the best opportunity to gather the condition information. This will require some work during nights and weekends. When proposing work outside normal daytime working hours full consideration must be given to minimisation of inconvenience to the public. The hours of work shall be subject to the approval of the Engineer or his representative.

The Contractor shall allow in his rates for the working hours that are necessary to satisfactorily carry out the sewer inspections.

5. WORK ON PRIVATE PROPERTY

The work method, equipment used, and the hours of work for inspections and associated work carried out in private property shall be conducted in a manner that will minimise disruption to landowners, tenants, members of the public, or other affected parties. Any damage to private property shall be repaired at the Contractor's cost. Residents of any private properties affected by inspection works are to be kept fully informed of working plans.

6. WASTEWATER FLOW MANAGEMENT

The Contractor shall liaise with Watercare Wastewater Operations Point of Contact prior to implementing any changes to sewer operation or provision of any flow control or diversion measures.

To permit inspection of defects at any location on the pipe's circumference, inspections should be carried out when flow and water level are very low.

The Engineer's representative may authorise exceptions to be made to this provision if and when he considers that reduction of flow to 15% of the pipe depth is impracticable for operational

reasons, and unnecessary for the type of inspection required. Otherwise, the contractor will be required to arrange flow management so that the pipeline circumference is visible throughout, including at sags or dips in the pipe structure where water is ponded to greater than 15% of pipe diameter.

Where it is necessary to carry out an inspection with the pipe in an empty condition, the Engineer will require the pipe to be emptied. The Contractor shall ensure that this operation does not increase the risk of sewer damage or blockage.

The following methods may be appropriate for locally reducing flow depths in a sewer.

6.1 HYDRO-BLASTING AHEAD OF THE CCTV CAMERA

Accelerating the flow with a water jet can locally reduce the wastewater level immediately in front of the CCTV camera. The Contractor may employ this technique provided that is does not increase the risk of sewer blockage or damage to the pipes, and the operation is approved by the Engineer for the particular section of pipeline.

6.2 USE OF STORAGE WITHIN THE WASTEWATER NETWORK

Pumping stations, wet wells, and some larger diameter sewers may have capacity that can be utilised to contain flow for short periods. The storage time available may be sufficient to complete CCTV condition inspection in the downstream sewer without the presence of a wastewater flow.

Storage may be utilised by shutting down a pump station, or blocking the upstream end of the pipe section with an inflatable bag or plug (Vetter Bag).

Pumping station shutdowns or the installation of any flow-holding device must be authorised by Wastewater Operations Point of Contact . Alterations to the automatic controls of pumping station will be carried out only by Watercare personnel, and all changes to normal flows must be under the direct supervision of Watercare Wastewater Operations Staff. All possible overflow outlet points, upstream of the installed blockage or shut down pumping station, must be continuously monitored while the sewer flow is isolated or restricted in any such operation.

6.3 BYPASS PUMPING

Bypass pumping may be utilised to temporarily divert flow around a section of pipeline to be inspected, including inflows via laterals entering the pipeline in the section being inspected. The Contractor shall provide a detailed bypass pumping operational plan for assessment and written approval of the Engineer and Wastewater Operations Point of Contact The work must be carried out under the direct supervision of, and in cooperation with, Watercare Operations staff.

7. SEWER CLEANING

The inside surface of the sewer conduit must be clear of fat, sediment and loose material, to the extent that the pipe material surface can be clearly viewed using a CCTV Camera. The Contractor shall investigate the sewer before beginning the recorded CCTV inspection to determine the need for any cleaning.

The Contractor shall ensure that all debris cleaned from the section of sewer to be inspected is removed from the sewer immediately downstream of the working area, or at such other site as may be approved by the Engineer.

8. PRE-INSTALLATION CCTV INSPECTION

The CCTV inspection shall be carried out immediately prior to liner installation or pipeline repair. The quality of the video picture shall be such that the condition of the pipe surface, and its suitability for the installation or repair, is readily apparent and any defects or obstructions are clearly visible.

In the case of newly assembled polyethylene pipeline strings prior to installation in the trench or existing pipeline, the inspection shall be able to confirm that all joints have been properly made and (if so specified) trimmed or de-beaded.

9. POST-CONSTRUCTION CCTV INSPECTION

Following installation of the liner, or completion of repairs, or laying of the new pipe (whichever is applicable), the line shall be CCTV inspected before its commissioning or return to service.

This inspection shall conform to the provisions of the New Zealand Pipe Inspection Manual (Second Edition)

The video picture quality shall be such as to show any defects in construction, joints, repair surfaces or liner, and to permit judgement of the vertical and horizontal alignment of the pipeline.

In case of inspection following rehabilitation by CIPP or other lining technique, the inspection must clearly show the pipeline invert, and the leading and trailing edges of the lining at the entry and exit manholes.

10. INSPECTION AND VIDEO RECORD

The video data, pipeline grading and image reports, and any other pipeline inspection information is to be compiled and presented in the current WSL excel spreadsheet format, to be obtained from Wastewater Operations Point of Contact.

Inspection and reporting of condition data shall conform in general to the standards set out in the "New Zealand Pipe Inspection Manual (Second Edition)".

Watercare may require the use of additional or alternative condition codes or methods for describing and quantifying condition.

The video records shall be submitted on DVD, and inspection log reports shall be provided as files on a separate CD.

10.1 OVERLAYED TEXT INFORMATION

Text Information overlaid on the video record shall follow consistent format and content and shall be displayed for 15 seconds. The overlay information provided on the running video view shall be positioned so as to minimise obstruction on the picture of pipeline faults or pipe alignment information.

The Start Header shall include the following information,

a) Facility code

Asset number

Sewer name

Nearest street address to the setup manhole

Pipe diameter / dimensions as measured in the manhole by the Contractor

The pipe shape, and material designation

The numbers and depths of the upstream and downstream manholes

The setup manhole number

The day, date and time of the inspection

The running video view of the pipe shall display overlay text including the following information:

- The running meterage from the start manhole
- The upstream and downstream manhole numbers.
- camera orientation
- inclinometer reading

The end inspection page shall display text that identifies,

- The 'End of Inspection' caption and the reason for abandonment where applicable,
- Appropriate references to related surveys

10.2 CAMERA SPECIFICATION, POSITIONING, AND TRACTOR SPEED

The CCTV camera shall proceed at a height corresponding to the centreline of the pipeline ±10% of the pipe's internal diameter. The speed of the camera shall not exceed 0.2 m/sec.

The camera shall be a pan and tilt type with a zoom capability.

10.3 INSPECTION COMMENCEMENT

The camera shall be set to record immediately before entering the manhole, and shall be kept running until the end of the inspection. The pipeline survey shall start with a clear view of the pipe, with the on-screen display indicating the measured distance the centre of the setup manhole / node to the area of view immediately in front of the camera. A continuous record of the camera picture over the total duration of the inspection shall be made on video and delivered to the Engineer as part of the asset condition information required.

The microphone shall be set to record fault comments and other significant features of the inspection, for the entire duration of the inspection.

11. RECORDS AND ASSET CONDITION INFORMATION

11.1 CCTV LOG RECORDS

The inspection log shall be an electronic record in the current WSL format., (to be obtained from Wastewater Operations Point of Contact, see Appendix A) and shall identify all of the defects, asset condition information, dimensions, and other data shown on the video record or otherwise required from the inspection.

11.2 VIDEO RECORD

The video record shall comply with all the requirements of Clause 10.

11.3 STILL PHOTOGRAPHIC IMAGES

The Contractor shall deliver a still image of every fault that is visible on the video record. The facility code, asset number, start manhole, distance in metres from the start manhole and view orientation of the image shall be clearly readable on each image. These images shall be included on the CD containing the CCTV inspection log sheet(s).

12. COPYRIGHT

All video records and asset condition records, including all rights associated with them, shall become the property of Watercare Services immediately upon payment for the work.

APPENDIX A – CCTV LOG

EXAMPLE OF ACCEPTABLE LOG SHEET

WSL Ref No.	Sheet No.	Equip. ID	Date Started	Time Started	Time Completed
9999	01	10004226	17.12.08	12.44	13.45

Facility Name	Facility Code	Weather	Flow Depth
Branch 7B Sewer Mount Eden	DSOB7B	Showers	0.1

Contractor	Operator	Record No.
Auckland CCTV Ltd.	Johnny Smith	B7B 17.12.08

Node Type	Upstream MH/Node No.	Street No.	Street Name
SMH	DSOB7B005	5	Ace Place, Mt Eden

Node Type	Downstream MH/Node No.	Street No.	Street Name
SMH	DSOB7B004	Crn of	Alexander Street, Mt Eden

Set-Up MH U/D	Line Length (M)	Surveyed Length (M)	Diameter (MM)	Joint Spacing (M)	Material	Shape	Use
U	160.91	160.91	300	0.6	EW	CP	F

Currency of Inspection	Status of Pipe	Inspection Completeness	Video Rec Format	Date of Entry
CI CURRENT	OC ORIGINAL	IC COMPLETE	DVD	17.12.08

Comments: Job # 52346 - Various Cracks in line - 300mm PIPE

Condition Score:

Video Reading	Distance From (m)	Condition Code	Severity	Position from	Position to	Photo No.	Remarks
0:00:00	0	IS					Starts at DSOB7B005 Going downstream
	0.69	CC	S	1	9		
	5.93	CL	S	3			
	6.5	CL	S	1			
	9.02	ED	S	5			
	10.21	ED	S	5	6		
	12.67	CL	S	5			
	14.55	CM	S	4	5		
	17.55	CM	S	3	9		
	18.8	CM	S	10	1		
	20.13	CL	S	3			
	20.13	GP				9999_01_01.jpg	CONDITION PHOTO
	21.94	CL	S	1			
	23.46	CL	S	8			
	25	CL	S	3			
	25.6	CL	S	8			
	26.22	CM	S	3			
	40.2	GP				9999_01_02.jpg	CONDITION PHOTO
	56.22	GP				9999_01_03.jpg	CONDITION PHOTO
	70.14	ED	S	5	6		
	72.13	IP	S	6	11	9999_01_04.jpg	CONDITION PHOTO - Minnor via joint

EXAMPLE OF UNACCEPTABLE LOG SHEET

WSL Ref No.	Sheet No.	Equip. ID	Date Started	Time Started	Time Completed
		104502	17.12.08	12.44	13.45

Facility Name	Facility Code	Weather	Flow Depth
Branch 7B	DSOB7B	Showers	0.1

Contractor	Operator	Record No.
Auckland CCTV Ltd.	Jimmy Smith	B7B 17.12.08

Node Type	Upstream MH/Node No.	Street No.	Street Name
SMH	MH5		Ace Place, Mt Eden

Node Type	Downstream MH/Node No.	Street No.	Street Name
SMH	MH4		Alexander Street, Mt Eden

Set-Up MH U/D	Line Length (M)	Surveyed Length (M)	Diameter (MM)	Joint Spacing (M)	Material	Shape	Use
	160.91			0.6		CP	F

Currency of Inspection	Status of Pipe	Inspection Completeness	Video Rec Format	Date of Entry
				17.12.08

Comments	Condition Score

Video Reading	Distance From (m)	Condition Code	Severity	Position		Photo No.	Remarks
				from	to		
0:00:00	0	IS					Starts at MH5
	0.4	CC	S	1	9	4256_1_01	
	6.6	CL	S	9		4256_1_02	
	50						End at MH4