

## ELECTRICAL TRANSMISSION

### PROBLEM OVERVIEW

CUES was contracted by an electricity provider in western Canada to perform an in-pipe video inspection/assessment and internal pipeline mapping project for approximately 41,338 ft. of buried electrical pipeline. The client was concerned that the age of the system and material of construction would prohibit proper installation of newer electrical cabling into the pipeline. The objective of the project was twofold: 1) to provide the client with video documentation detailing the internal condition and perform a condition assessment of any defects present within the pipeline structures, and 2) to provide 3D positional measurements for development of plan and profile depictions with bending radius analysis.

### CUES APPROACH

The pipeline was installed circa 1960s and material of construction was asbestos cement material (ACM). The pipeline itself was approximately 5-inch ID, contained 21 segments (with three pipelines per segment), and was a substation to substation circuit. As such, we utilized a small CUES ProScout Camera (ref. to Figure 1) to effectively navigate through a 5-inch ID pipeline with known offset joints, images and observations recorded utilizing CUES Granite XP asset management software. Immediately following video inspection of a segment, the CUES Accurate Mapping Probe (AMP™) was employed in the same run to gather X, Y, and Z centerline data for each pipeline.

### RESULTS

Utilization of Granite XP asset management software allowed for the creation of a condition assessment report for each pipeline, with the reports documenting each of the three pipelines per segment (see Figures 2 through 6 for a few notable segments). Utilizing these condition assessment reports in conjunction with the CUES AMP™ data, the client was able to easily and accurately determine specific areas of the pipelines that might cause difficulty in cable installation. In addition, we were able to enhance our traditional AMP™ data outputs (plan and profile) to produce bending radius analysis reports enabling the client to determine if the pipeline segments could support the new cable installation specifications. (\*Line and arc segmentation data obtained from the AMP™ was not utilized for this project due to field access constraints. See case study Underground Electrical Transmission AMP™ Results for further explanation of line and arc deliverables).



Operational range of 3.5in ID (90mm) to 58in ID (1473mm).

Whether the pipeline is made of steel, concrete, PE, or PVC, this mapping system can be used to accurately locate any pipe.







Figure 1: ProScout Camera with Centralizing Brush Assembly



Project Name: <b>Cable Duct Survey From GTP-HSS</b>		Mainline ID: <b>MHKB(2)-767(2)</b>		City: <b>Victoria</b>	Address: <b>Borden St. and McKenzie Ave.</b>	
Start date/time: <b>04/04/2013</b>	Pipe width: <b></b>	Pipe height: <b>125</b>	Pipe type: <b>Cement</b>	Surface condition: <b>Other</b>	Weather: <b>Heavy Rain</b>	
Direction: <b>Downstream</b>	Surveyed footage: <b>299.5</b>	Operator: <b>Thomas</b>		Comments: <b>4/APRIL/2013</b>		

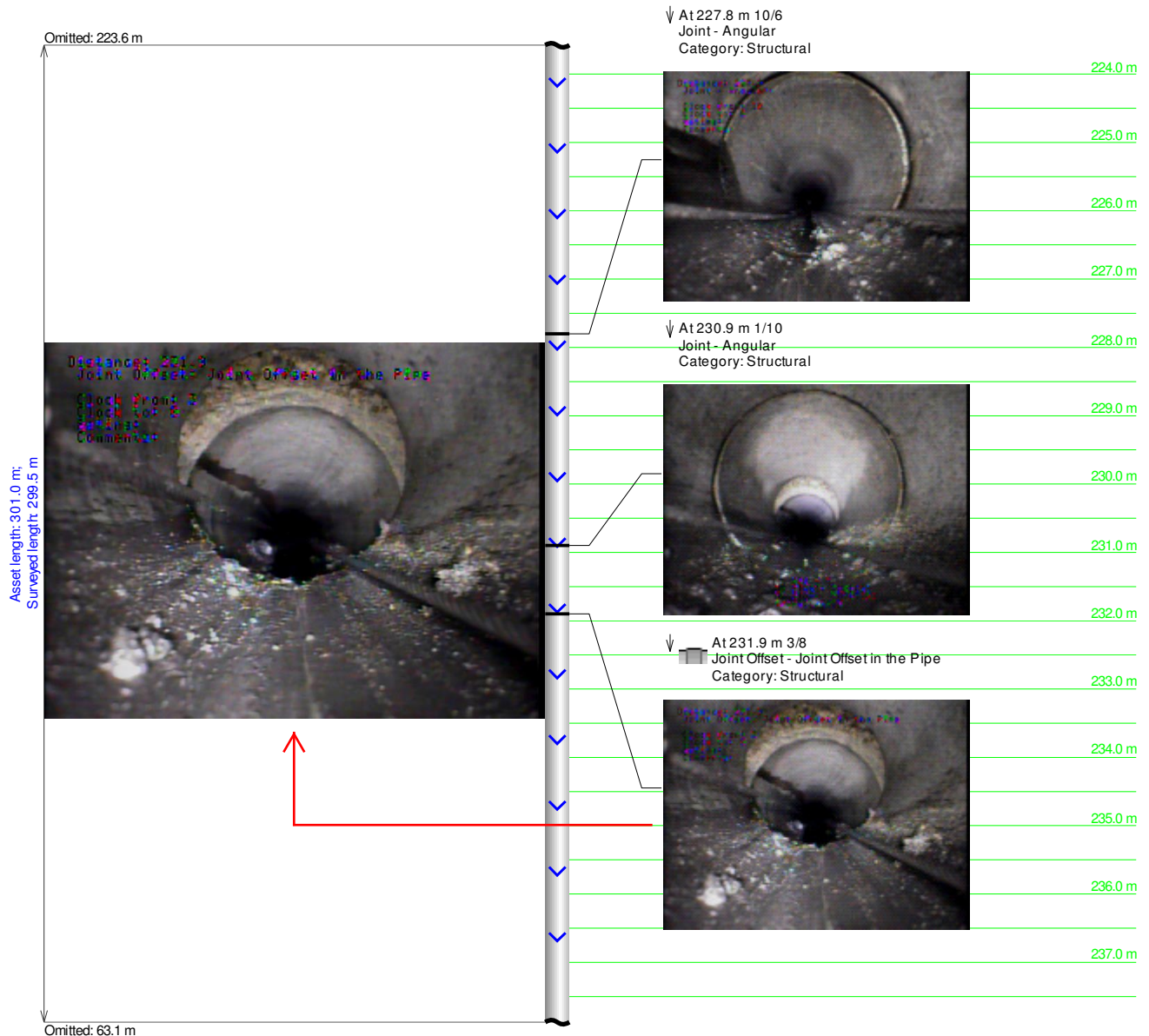


Figure 2

Project Name: <b>Cable Duct Survey From GTP-HSS</b>		Mainline ID: <b>MHKB(1)-767(1)*</b>		City: <b>Victoria</b>	Address: <b>Borden St</b>	
Start date/time: <b>05/04/2013</b>	Pipe width: <b></b>	Pipe height: <b>125</b>	Pipe type: <b>Cement</b>	Surface condition: <b>Other</b>	Weather: <b>Dry</b>	
Direction: <b>Downstream</b>	Surveyed footage: <b>227.9</b>	Operator: <b>Thomas</b>		Comments: <b>5/APRIL/2013</b>		



↓ At 227.8 m 8/8  
 Joint Offset - Joint Offset in the Pipe  
 Category: Structural



222.0 m

223.0 m

224.0 m

↓ At 227.8 m

Broken  
 Category: Structural



225.0 m

226.0 m

227.0 m

↓ At 227.9 m 12/12  
 Crack - Crack in the pipe  
 Category: Structural



↓ At 227.9 m  
 STOP - Inspection Stopped  
 Category: Miscellaneous

Figure 3



Project Name: <b>Cable Duct Survey From GTP-HSS</b>		Mainline ID: <b>MHKB(1)-767(1)</b>		City: <b>Victoria</b>	Address: <b>Borden St. and McKenzie Ave.</b>	
Start date/time: <b>22/03/2013</b>	Pipe width: <b></b>	Pipe height: <b>125</b>	Pipe type: <b>Cement</b>	Surface condition: <b>Asphalt</b>	Weather: <b>Dry</b>	
Direction: <b>UPSTREAM</b>	Surveyed footage: <b>63.1</b>	Operator: <b>Thomas</b>		Comments: <b>22/MARCH/2013</b>		

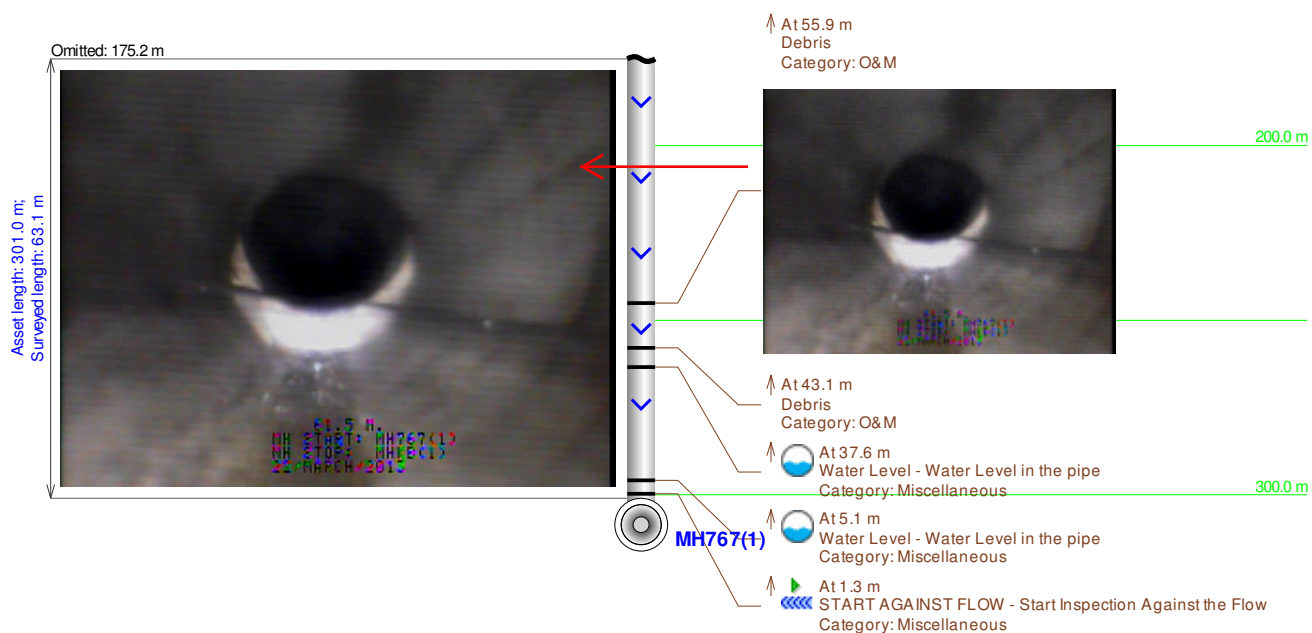


Figure 4

Project Name: <b>Cable Duct Survey From GTP-HSS</b>		Mainline ID: <b>MHKB(2)-767(2)</b>		City: <b>Victoria</b>	Address: <b>Borden St. and McKenzie Ave.</b>	
Start date/time: <b>22/03/2013</b>	Pipe width: <b></b>	Pipe height: <b>125</b>	Pipe type: <b>Cement</b>	Surface condition: <b>Other</b>	Weather: <b>Dry</b>	
Direction: <b>UPSTREAM</b>	Surveyed footage: <b>358.3</b>	Operator: <b>Thomas</b>		Comments <b>22/MARCH/2013</b>		

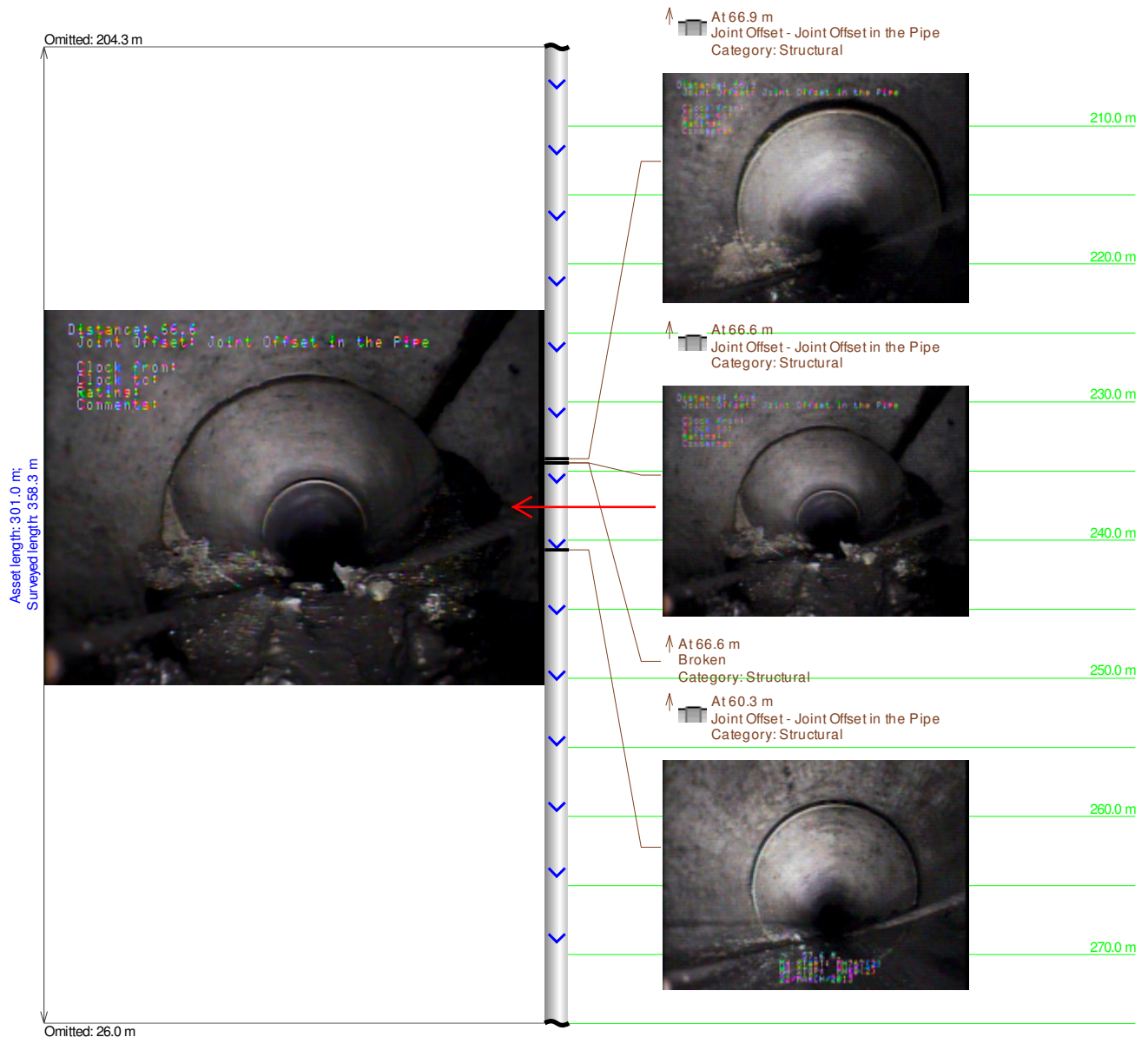


Figure 5



Project Name: <b>Cable Duct Survey From GTP-HSS</b>		Mainline ID: <b>MHKJ(1)-KK(1)</b>		City: <b>Victoria</b>		Address: <b>Nanaimo St. (Victoria Real Estate Board Parking lot)</b>	
Start date/time: <b>23/03/2013</b>		Pipe width: <b>125</b>		Pipe type: <b>Cement</b>		Surface condition: <b>Asphalt</b>	
Direction: <b>UPSTREAM</b>		Surveyed footage: <b>397.7</b>		Operator: <b>Thomas</b>		Weather: <b>Dry</b>	
				Comments <b>23/MARCH/2013</b>			

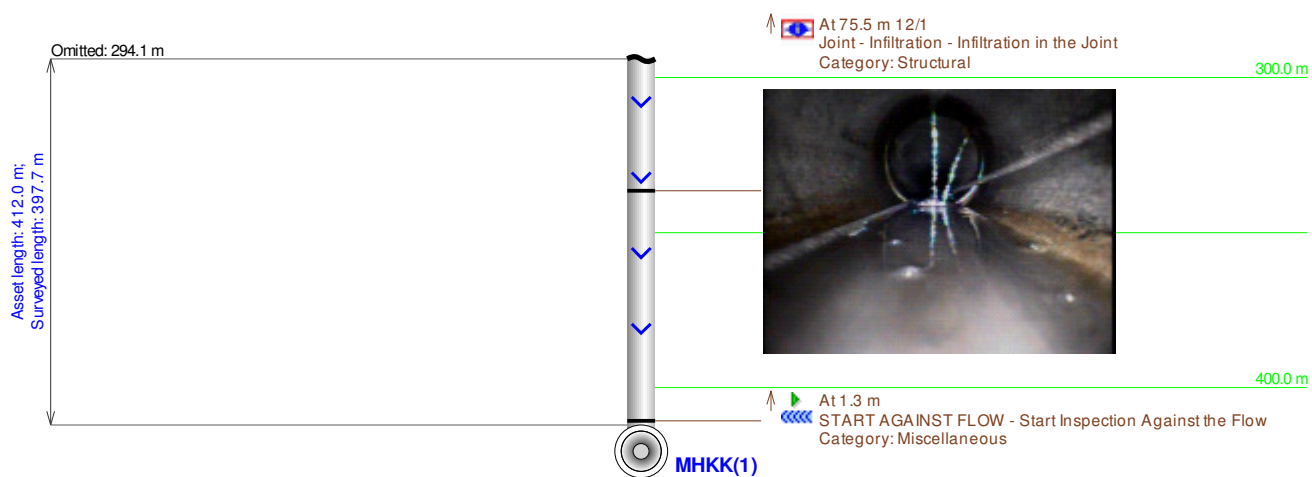


Figure 6