



Leakage Investigation Work

Client: Leisure Park, Northumberland

Mains water meter information

Size (mm)	15-28	✓	32-50	✓	75-100		125-200		Above 200mm	
Serial numbers (Meter 1)	081230456									
(Meter 2)	14BA123458									
Reading (Meter 1)	182179.400				Time:	08:55 15 November 2023				
Reading (Meter 2)	00691.050				Time:	09:00 15 November 2023				
Location(s)	Meter 1 located in large chamber in edge of road Meter 2 located in footpath outside restaurant.									

Leakage Activities

Acoustic sounding	✓	Correlation	✓	Ground microphone	✓	Environmental Inspection	✓
Other	Excavation and tracing of mains around site						
Pipe traced	✓	CAT & Genny			Distance	500m approx	
Pipe correlated	Accelerometer		✓	Hydrophones	Distance	80m approx	

Background Information

Following on from previous survey work in September which found a number of above ground leakage issues, the main cause of leakage had still to be identified. This was proving difficult due to an absence of isolation valves around the site, and the unknown routes of pipework.

Data logging has confirmed the nightline to be around 1 litre per second (60 litres per minute). Meter readings taken during the survey confirmed this volume.

Summary of Survey

Investigation Work –13th November 2023

The main meter was read and confirmed to be recording water consumption at a very high rate relative to the number of occupants on the park.

To start identifying the route of pipework around the park, the 90 degree elbow was disconnected in the pump house and the tracing wire inserted. The wire could only be inserted about 6m to a point just after the hydrant in the chamber outside the pump house. With the hydrant bowl removed, the wire was inserted again and pipework traced approximately 50m up to a tee near plot 189.

A hole was then excavated at the traced point to locate the tee piece, which was found to run together with other services (foul drainage and electricity cable) around Bamburgh Court (photo 1). From the tee piece, pipework was traced to the limit of the trace wire (approximately 120m) in both directions. Another hole was excavated near plot 183 to pick up the line of the pipework (photo 2).



Photo 1: excavation near plot 189



Photo 2: excavation near plot 183

Investigation Work –14th November 2023

From the excavation outside plot 183, the pipework was cut and the trace wire inserted up to a point where it stopped against a fitting – approximately 30m. The route of the pipework was traced out towards plot 170, then across the road towards the play area.

The marked area was excavated and immediately under the turf was found 2x concrete slabs. Under these were found plastic ducts full of soil, which when removed contained 2x brass stoptaps and a bit of standing water. The area around the stoptaps was excavated and the water supply reinstated. Once pressure in the network returned, significant leaks were noticed on both stoptaps (photos 3&4).



Photo 3: Excavation near play area



Photo 4: Leak on stoptap 1



Photo 5: leak on stoptap 2



Photo 6: worn compression nut and olive

Once the leaks had been identified, the water was shut off again and the leaks temporarily repaired.

A supply pipe found in the excavation heading towards the river was traced out to confirm its location. The full length of the trace wire was inserted into the 63mm MDPE pipe which was traced across to the other side of the river (laid approximately 4.5 metres away from the bridge) past plot 48 and towards plot 57.

The main meter was read at 22:30 to confirm the amount of water saved, and to confirm the volume of any further leakage. The meter was found to be recording water at an average rate of around 16 litres per minute (0.96m³/hour or 23m³/day) with minimal legitimate usage prevailing.

Investigation Work –15th November 2023

Further testing of the mains in the Cheviot View area confirmed that there was another pipe across the river as the pipework in this area remained live when isolation tests were carried out. Further excavation work revealed a second 63mm MDPE connection (photo 7), with pipework heading towards the river. This was traced out and found to follow the line of the first pipe across the river.

This second pipe crossing the river was traced to the same point as the first, and a trial hole excavated to confirm its location (photo 8). Within the excavation was found an electricity cable and one 63mm MDPE pipe.



Photo 7 – 2x connections from across river (l/h pipe live, r/h pipe capped off?)



Photo 8 – Trial hole (filled in) to right of fire hose

A second new valve was installed on the pipework to allow control of what is believed to be a 'dead' 63 MDPE pipe crossing the river (capped off somewhere?). This is the first pipe that was traced across the river (refer to attached site sketch).



Photo 9 – Line of trace past plot 48



Photo 10 – line of trace through parking space of plot 49

Summary & Recommendations

Summary:

1. Approximately 500m of 63mm MDPE pipework traced out from the pump house (see attached sketch);
2. 2x leaks identified and repaired on brass stoptaps near play area;
3. Leakage confirmed to be reduced by a volume of around 45 litres per minute (**approximately 64m³/day or 23,650m³/year**);
4. 2x river crossings found – only one believed to be serving any useful purpose at present.

Recommendations:

1. Further tracing work is required to confirm the route of pipework from 57 Morpeth Mews towards the main entrance of the park;
2. Installation of robust isolation valves at identified points around the network;
3. Installation of a sub-meter and isolation valve on pipework leading to Cheviot View and Lakeside. This will allow consumption and leakage to be monitored in this area which supplies around 140 plots (around a third of the site). Note: pipework must be traced out to other side of play area as there is insufficient room for a meter in the existing excavation due to the proximity of the wooden fence and play area;
4. Further tracing work will also be required to track down the remaining leakage on the park. This may involve the installation of additional isolation valves and hydrants around the park to close sections of pipework off and to check pressures.

Survey carried out by

Engineer: Team:	H2O Building Services	Date	13 th – 15 th November 2023
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