



Leakage Investigation Survey

7-8 June 2015

Client

Holiday Park, Northumberland

Mains water meter information

Size (mm)	15-28		32-50	✓	75-100		125-200		Above 200mm	
Serial number	08UF001234									
Reading 1	193584.430				Time:	01:00 08 June 2015				
Reading 2	193625.050				Time:	17:40 08 June 2015				
Location	Main meter located in large chamber in edge of road at junction and A123 South Road – accessed with pair of small lifting keys.									

Leakage Activities

Acoustic sounding	✓	Correlation	✓	Ground microphone	✓	Environmental Inspection	✓
Other	Step-testing of water network using isolation valves installed Nov 14 – Feb 15						
Pipe traced	CAT & Genny				Distance		
Pipe correlated	Accelerometer	✓	Hydrophones	Distance	45m approx		

Background Information

<p>The minimum night flow to the park has risen incrementally over recent weeks from a minimum of just under 1.0m³/hour to 1.53m³/hour.</p> <p>This survey follows on from a number of previous visits during 2014/5 which include leakage surveys, pipe tracing and valve installation work.</p> <p>Meter readings taken during the early hours of June 8th confirm the leakage volume.</p>

Summary of Survey

Leak Investigation Work

The main meter was read at 01:00 and confirmed to be recording water consumption at a rate of 28 litres per minute. This rate will also include a small amount of legitimate consumption as a number of residents were still awake around the park.

The sub-meter to Cheviot View was monitored for a few minutes and found to be recording a minimum of 1-2 litres per minute, indicating a fairly tight network in this area. The small amount of consumption may be attributed to several minor underground leaks (weeps and drips from joints, etc) which are uneconomic to locate.



Meter reading 8 June

At approximately 01:30, the wheel valve located in the field near the main meter was shut to quantify the volumes of leakage on the gravity and pump fed sections of the park. From a starting volume of 26 litres per minute, this dropped to 10 litres per minute when the valve was shut, confirming the volume on the gravity section to be 16 litres per minute ($0.96\text{m}^3/\text{hour}$). The remaining volume (10 litres per minute or $0.6\text{m}^3/\text{hour}$) was therefore on the pipework between the meter and the pump house, or on the pumped section itself.

The pump set located between Bamburgh Court and Woodside was inspected and noted to be operating at 45 second intervals between the pumps starting, indicating only a small amount of water consumption/leakage. Isolation valves were operated in Wool Park and the area around the play area to determine the approximate location of any leakage on the pumped network. The operation of all valves had virtually no effect on the pump operating frequency suggesting no leakage issues in these areas, or the main under the river. The sub-meter to Cheviot View continued to record consumption at around 1 litre per minute. From this investigation work it was determined that the most likely area for leakage to be occurring would be along the main from the meter towards the pump house, including the new Woodside development.

Further step-testing of all known isolation valves on the gravity system did not identify any flows for further investigation, which has been the case on previous surveys. All isolation valves were then returned to their original positions.

All water connections to plots in River View (85 plots), Morpeth Mews (75) and Bamburgh Court (31) were acoustically sounded for leak noise, and inspected for any visible leaks on connections and fittings underneath each home. It was communicated by park staff that a visible leak had been noticed underneath the decking of plot 116 River View. This leak was confirmed, together with a few minor weeps and drips on stoptaps, and a tap left running at plot 52 Morpeth Mews. Whilst undertaking the survey, a few residents at the far end of River View mentioned they experience low water pressure during periods of high water demand (usually Sunday mornings).

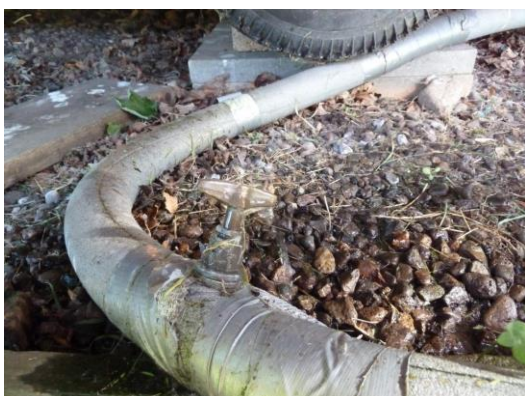
A check of the new area recently developed (Woodside) indicated a significant leak on the stoptap off the 125PE main across the field. Audible leak noise could be heard in the valve chamber itself, which increased in volume when the base of the chamber was cleared of concrete lumps to identify the connections of the stoptap itself.



Leaking stoptap supplying new Woodside development



Stoptap in chamber



Leak on stoptap – plot 69 Morpeth Mews



Quantifying volume of water left running – plot 52

Summary of all leakage issues identified:

Park Area	Plot	Fault
Gravity fed section:		
River View	114	Underground leak (Park aware)
	119	Stoptap dripping
	99	Minor drip on stoptap
Morpeth Mews	20	Drip on stoptap
	52	Tap running in mobile home (1.2 litres/min)
	69	Leak on stoptap (approx 1 litre/min)
Pump fed section:		
Woodside		Leak on upstream side of large stoptap which tees off 125PE main to supply Woodside

Summary & Recommendations

Although the survey identified and confirmed a number of leakage issues, the remaining leakage (anticipated to be around 15 litres per minute or 0.9m³/hour once all identified issues have been resolved) on the gravity fed section of the park (up to and past reception area towards River View) cannot be identified without further valve installation and tracing work, as has been previously carried out on the pump fed section of the park.

Summary:

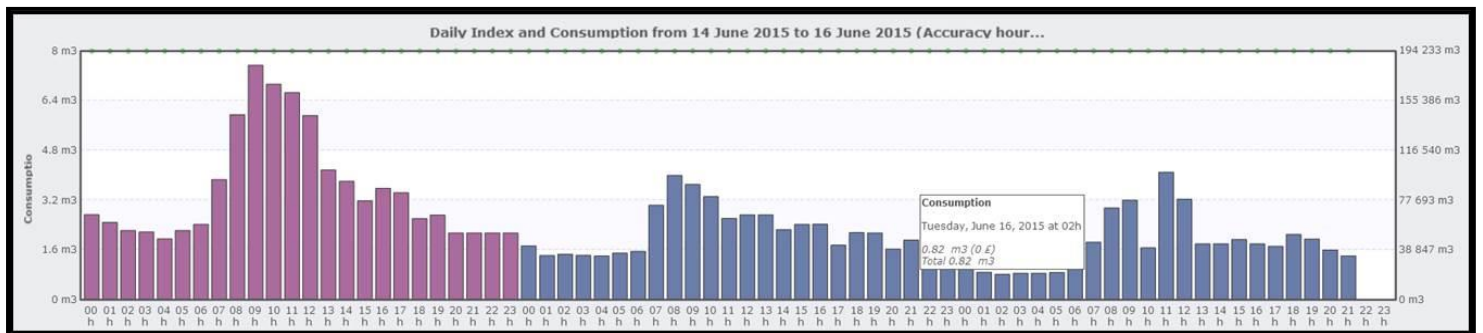
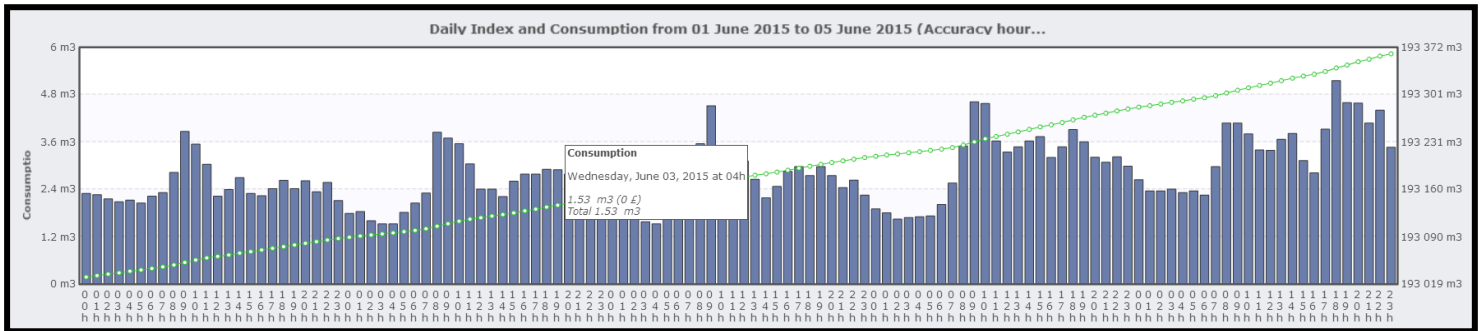
1. Significant leak identified on upstream connection of stoptap supplying new development – Woodside;
2. Leak confirmed at 116 River View;
3. Tap left running at 52 Morpeth Mews;
4. Other minor leakage identified on a number of plots.

Recommendations:

1. Repair all identified leakage issues;
2. Further tracing and valve installation work will be required to track down the remaining leakage on the gravity fed half of the park. Additionally, the installation of further sub-meters at strategic locations around the park once the principle routes of pipework have been identified will be advantageous for the continued management of water at Riverside.

The customer completed the necessary repairs at the Holiday Park and as soon as this work was completed, we monitored the data logger to confirm that all the leakage found during our visit had been eradicated.

As we can see from the below data logger snapshot, the minimum flow rate has **now dropped from an average minimum flow rate of 1.53m³ per hour to a minimum flow rate of 0.82m³ per hour (820 litres per hour)**. The first data logger snapshot shows the flow rate before H₂O intervention and the bottom snapshot shows the flow rate after H₂O intervention and subsequent repair works carried out.



As a result of carrying out the repairs successfully, the Holiday Park are now **saving approx. 0.71m³ per hour (710 litres per hour) and approx. £37.65 per day on water costs.**

The **remaining 0.8m³ per hour would save a further £42.43 per day if eradicated**, adding up to a **further saving of approx. £15,487 over a year**. These savings, as mentioned above, are subject to further leak detection and supply tracing works.

Survey carried out by

Engineer:	H2O Building Services	Date	7 th – 8 th June 2015
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