



PROJECT PROFILE

Portsmouth Water

Emsworth DMA

Installation Date 1st August 2008



Intelligent Water Control



Introduction

Pressure management allows leakage to be reduced while maintaining the required standard of pressure for the customer.

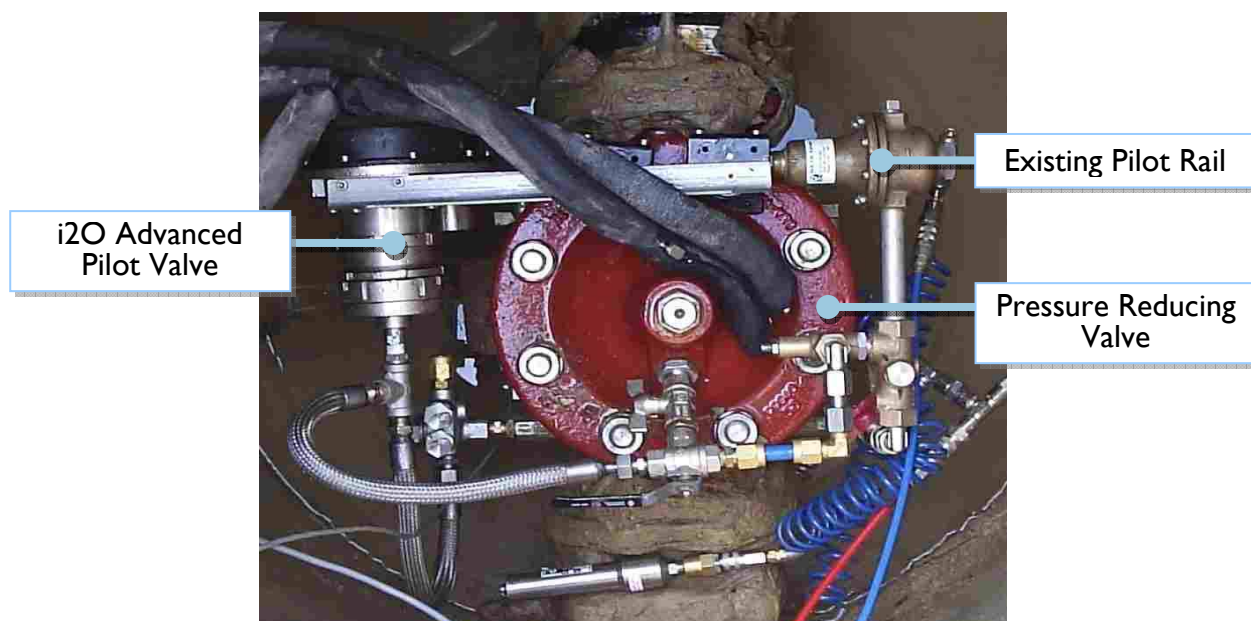
Portsmouth Water (PW) installed an i2O advanced pressure management system in August 2008. The aim was to test the potential for controlling distribution network pressure in an intelligent way, to evaluate leakage reduction and identify other benefits.

Emsworth District Metered Area (DMA) contains 2689 mainly residential customers, with a mains length of 18.339 km.

The DMA inlet is fitted with a 4 inch (100mm) Cla-Val GE pressure reducing valve (PRV) and a 100mm Sensus WP Dynamic flow meter.

i2O service engineers fitted the new system alongside the existing PW pilot rail and pressure sensors. This gave PW the facility to duplicate flow and pressure logging and switch control to the original pilot rail during the trial.

The installation layout is shown in the photograph below.



Implementation

The PRV outlet pressure was previously set conservatively high to take account of possible variations in demand during the year and changes to the network over time.

The i2O system is designed to react to variations in demand and learns changes to the network as they occur, thus enabling pressure at the critical point to be optimised for all network conditions.

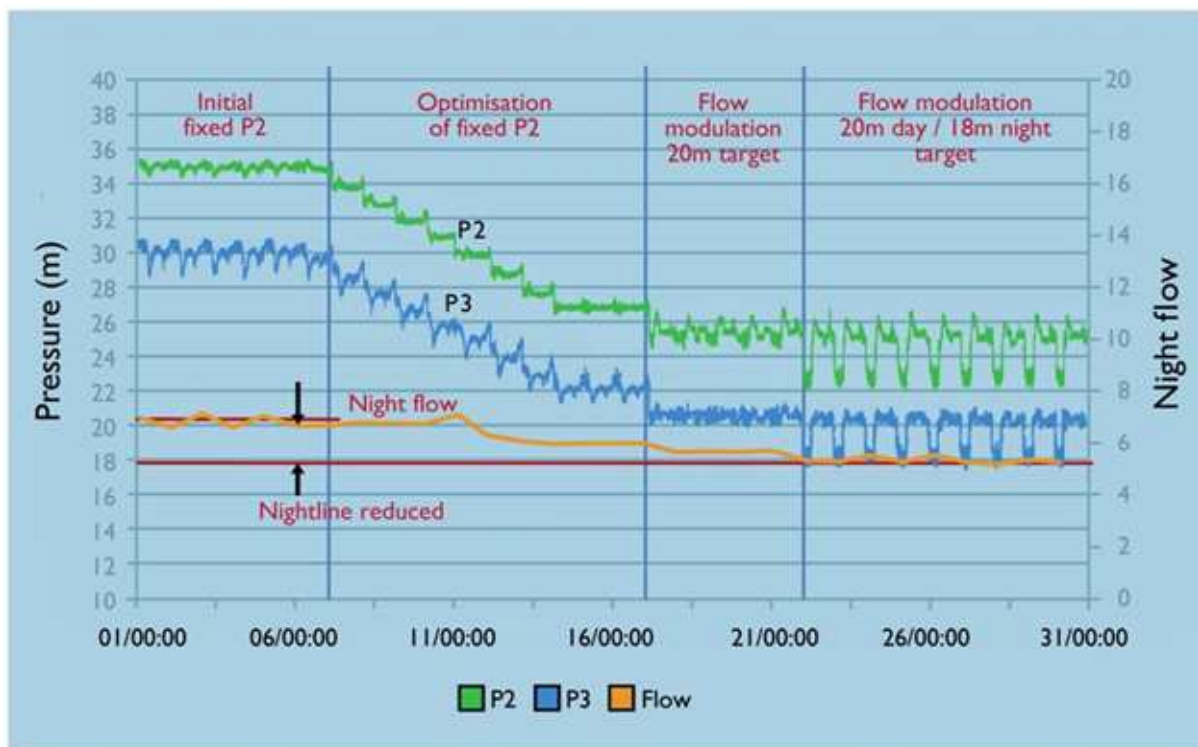
The optimisation process was carried out in three stages, following a short period of automatic monitoring of flow and pressure data by the i2O system. The graph below shows the optimisation stages.

1. Automatic optimisation of the fixed outlet PRV pressure (P2).
2. Flow modulation to achieve the specified minimum critical point pressure (P3) of 20m.
3. Flow modulation with different day and night target pressures (20m and 18m).

PW specified the daily pressure increments to optimise the fixed outlet and the target critical point pressure. This would avoid customers noticing a sudden step change in pressure.

The optimisation process was successfully managed with a target minimum day pressure of 20m and a target night pressure of 18m being introduced after a short period of operation.

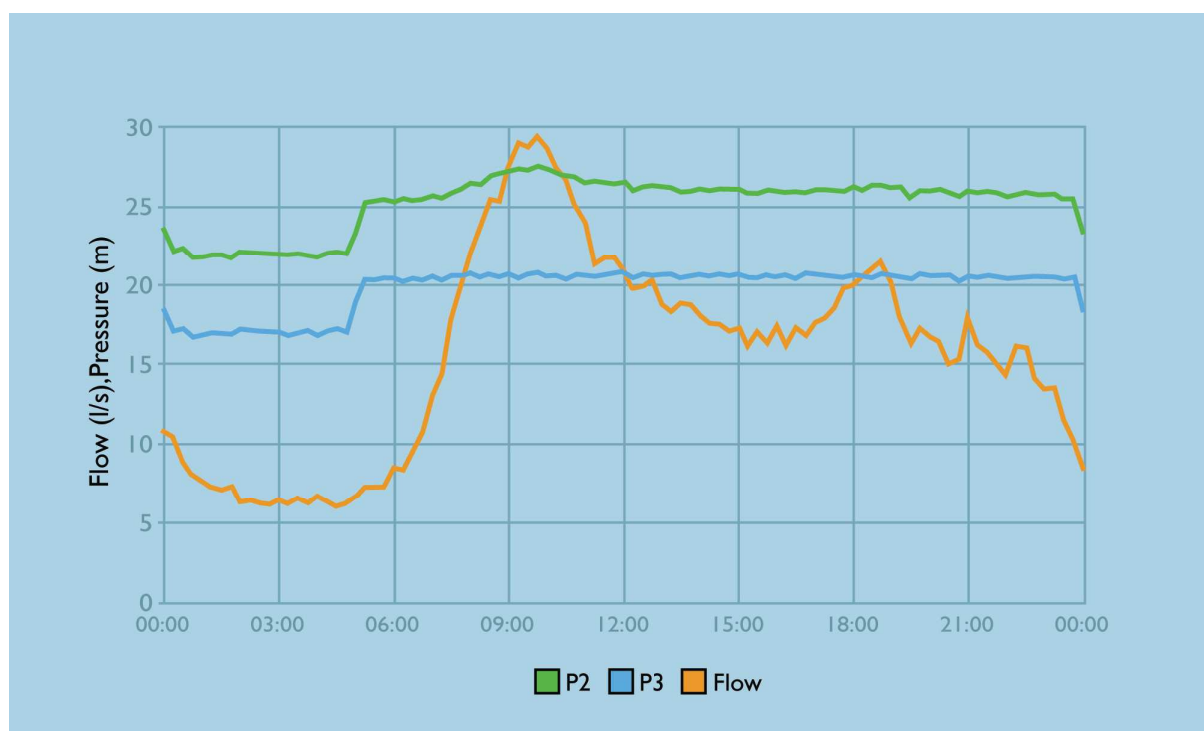
In January 2009, the target minimum night pressure was reduced to 16.5m.



Performance

The graph below illustrates the performance of the i2O system in Emsworth DMA over a typical 24 hour period.

It shows a typical diurnal flow and pressure profile at 5 minute logging intervals (5 second averaged data).



Portsmouth Water – Emsworth 26th February '09

Pressures at the critical point remain above 18m at night and 20m during the day with a typical variation in P3 pressure of +/- 0.5m.

The system has operated reliably since installation on 1st August 2008.

Data and Reporting

i2O Water have provided PW with reports on the implementation and operation of their system. A further service will be to supply integrated

pressure and flow data for the DMA. To support this service i2O is developing a web based graphical user interface for their clients to view and download data.

Benefits

The main benefits are in leakage and mains burst frequency reduction. The night flow has been reduced by 2.0 l/s, from 6.8 l/s to 4.8 l/s.

On an estimated HHNU (Household Night Use) of 2.0 l/p/h the HHNU is 1.5 l/s. The hour day factors before and after implementation are 23.6 and 25.9 respectively.

Leakage reduction is calculated as:
 $((6.8-1.5)*3.6*23.6)-((4.8-1.5)*3.6*25.9)$
=140 m³/day.

The above leakage reduction is calculated using the minimum night flows before and after installation. We are also able to calculate leakage reduction (either measured or calculated), using the FAVAD equation (Fixed and Variable Area Discharges) as well as assessing leakage reduction from calculation of 24 hour Total Integrated Flows.

Outcome

PW has confirmed that the i2O System operates reliably and is able to control the critical point pressure to a tight margin thus minimising leakage and maintaining customer service.

PW are further developing their network management through the wider implementation of DMA areas. Pressure management will be a key feature of this strategy.



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