

Metro Water Services Leakage Control (DMA Analysis and Leak Detection Services)

Client: **Metropolitan Government of Nashville and Davidson County**

Metro Water Services (MWS) provides water to a population of 545,524 through 155,712 service connections. Two water treatment plants produce 31,026 million gallons of water per year which is distributed by 57 pumping stations through 2,718 miles of water main. The overall goal of this five year project is to reduce the real losses to the Economic Level of Leakage (ELL) previously calculated in the Water Audit at an Infrastructure Leakage Index (ILI) of 3.3.

The distribution system is being sectorised into approximately 78 temporary District Metered Areas (DMA) by closing valves within the network. Flow and pressure in each DMA is monitored over a 48-hour period using insertion type metering devices and data loggers.

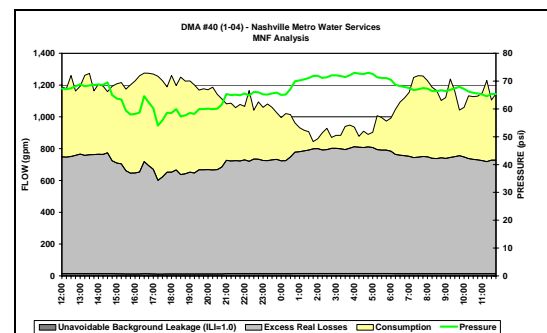
Large customers with exceptional night use are also logged to measure their actual consumption during the low flow periods normally between about 2 A.M. – 4 A.M. This consumption, along with the other legitimate night time usage, is then deducted from the measured inflow into the district to determine the actual amount of leakage with the district using the Minimum Night Flow (MNF) analysis methodology.

Pressure step testing is also carried out to determine the leakage – pressure relationship in each DMA. This allows WSO to determine the amount of fixed and variable are leakage in the DMA and provides an estimate of the amount of recoverable leakage which can be detected and pinpointed with sonic and leak correlation equipment.

The DMA are prioritized for leak detection and, if warranted, sonic leak detection is performed by WSO within the DMA to pinpoint detectable leaks. Each detected leak is reported to MWS and their direct labour crews then respond to carry out repairs.

Once all leaks in the DMA have been repaired, WSO carries out a re-measurement of flow and pressure to determine the baseline flows for the DMA. Periodic re-measurements are then carried out to determine the rate of rise of leakage. This will provide data to enable calculation of the economic level of leakage intervention.

Year 1 of the contract was completed on 14 November 2005. During the first year, 57 DMA flow tests were carried out and over 914 miles of main were inspected for leaks. Some 276 previously undetected leaks, with an estimated leakage rate of 2,700 million gallons per year (approximately 8% of the total demand), were detected and repaired.



DMA Minimum Night Flow Analysis