

Leak Survey

Town of Shrewsbury Massachusetts

December 2015



Prowler Water Conservation Systems, llc

Supplying Leak Detection Solutions for Water & Sewer

6 Marshall St. Leicester, MA 01524 Tel. 508-868-6300

Fax 508-752-5750 www.prowlerwater.com



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Leak Detection Services and Devices- Since 1975

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LEAK SURVEY REPORT- Shrewsbury Mass Complete Distribution System

Purpose: Survey for Leaks in section

Instrumentation Used in this survey:
 Flexim Fluxus Ultrasonic flow device- Model F601
 ZCorr Digital Acoustic Remote Loggers
 Enigma Digital Acoustic Remote Loggers
 Subsurface LD-18 Digital Acoustic
 Phocus II Digital Sound Loggers

Scope of Survey & Overview beginning February 2015

Specific focus on line from Oak St. pumps to Temple St. tank.

Meter calibration tested at Oak St. on December 1st discovered an 8% discrepancy on flow measured by Siemens totalizer in plant. Total Gallons in output from this station should be corrected for this 8% discrepancy until this totalizer is corrected.

Flow was measured at Oak St. 12" Ductile Iron Main in the station. Flow was then measured at the Temple Hill storage tank. Flow at 9 a.m. was approximately 950 gpm at Oak St. and approximately 200 gpm going in to the Temple tank approximately 45 minutes later. The approximately 750 gpm is either usage in the system or a water leak.

The main from Oak St. to Melody Lane off Rte 140 north was logged overnight 12-1 to 12-2. No measureable leak noises were found at 3, 3:30 or 4 a.m.

No leaks were apparent to the equipment in this area.

On 2-10-15 the Temple St. tank was tested on the output side by Ultrasonic Flow devices to measure flow in the early morning hours. This testing supported the fact that extra-ordinary flow was leaving the tank between 2 a.m. to 5 a.m. This survey was commenced to help find the cause of this flow.

LEAKS FOUND IN REDUCED HIGH AREA 2015

Address/Location	Result	GPM loss
Hydrant 110 Walnut St.	Corrected by Paul Gallagher	8
*Service- 23 Trowbridge St.	Added to construction or homeowner contact list. Curb not uncovered.	12
*Service- 7 Trowbridge	Added to construction or homeowner contact list. Curb not uncovered.	5
*Main- 469 Grafton St. (Left of)	Hydrant branch leak	17
* Service 753 Main St.	Added to construction or homeowner contact list. Curb not uncovered.	13
*Hydrant Corner Adams Dr and Jane St.	Leaking and not draining. Reported to water crew , Rick Nalli	2

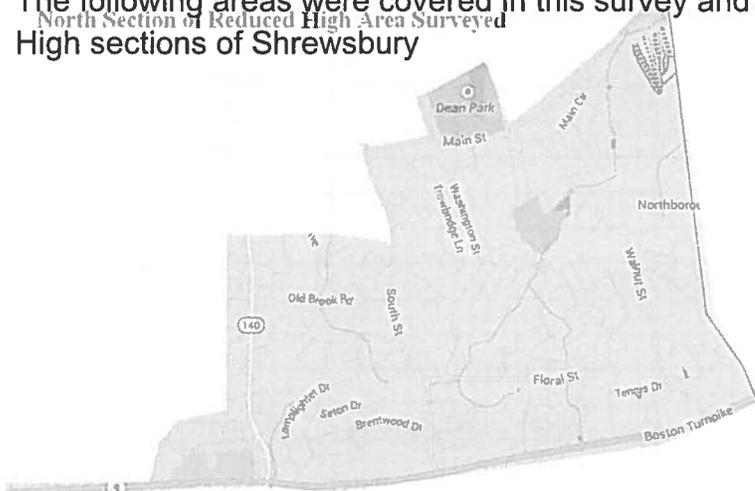
In addition to the areas above, several 'cross country' lines were also electronically tested by digital correlators. These areas were:

Commons Drive to Rte 20
Sadja St. to Tralee
Stoney Hill to Cherry St.
Cherry St. to Hills Farm Industrial Park
Yorkshire Apts to Cherry St.
Main St. to Dean Park
Floral elementary school to Floral St.

The following area was tested for any high pressure leakage between Oak St. and the Temple St. tank. Due to its location along the heavily traveled area of Route 9, this area was done by digital correlating loggers, which took several noise samples at 3 a.m., 3:30 a.m and 4 a.m.



The following areas were covered in this survey and represent the approximate area of the Reduced High sections of Shrewsbury



HIGH AND LOW PRESSURE SYSTEMS- SURVEY BEGUN AUGUST 2015

Overview- The High Pressure System is non-metallic in most of its area. For this reason the High Pressure system was surveyed both electronically and acoustically, with the exception of any house services that were known to be plastic were contacted at the house valve whenever possible. This was done because most leaks on plastic service lines that are long in nature cannot be heard from the street at the water main. This method was the direct cause of a leak found on Lantern Lane. The leak was heard on Vista Place on a house valve. This led to a discovery of an extended feed line from Lantern Lane to Vista Place that was not documented on maps in the Shrewsbury system.

The Low Pressure System encompasses the 'Edgemere' of the system. Due to its relative age, this area is intrinsically metallic with Iron Mains with a mixture of plastic and copper services. This section was done acoustically. Sections of this area which had recent houses built were sampled at the house by listening on garden hose valves. Any older housing sections were sampled at the service tap at the main.

All water mains on provided system maps were surveyed. Every hydrant and each valve box, where visible, in the system was contacted by our personnel. In addition any service boxes that were visible near the street were also contacted. Water mains into private sections that did not have master meters were also inspected.

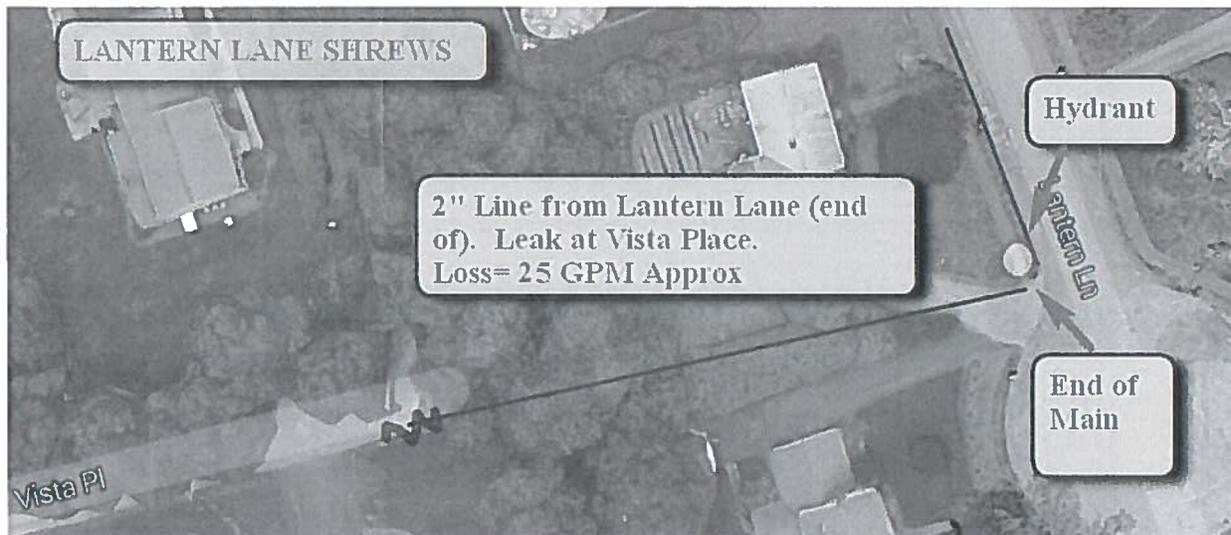
Cross country transmission lines that passed through wooded areas and under rivers were also surveyed by our crew as well as heavily traveled areas, these include:

Home Farm Lane Plant to N. Quinsigamond Ave
 West Main St. through Lamberts pit to N. Quinsigamond Ave.
 Dalton Dr. to Ireta (transite line)
 Old Fait Rd. to Sunset Lane (Edgemere)
 Hartford Ave. to Purinton
 Maple Ave from Commonwealth to Elm St.

This area produced the following leaks:

Item	Place	Loss GPM
Hyd	21 Glenberry	2 gpm
Hyd	Cobblestone Way (End of, has broken breakaway, needs repair) No Leak but inoperable	NA
Hyd	80 Colonial	4 gpm
Hyd	Woodchuck , End of	8 gpm
Hyd	Hickory Rd (off Grafton at House 14)	12 gpm
Hyd	Hickory Bend (front house #9)	9 gpm
Hyd	Westview St at Junction of Monadnock	12 gpm
Hyd	Broushane Circle	12 gpm
Main/Srvc	Lantern Lane (end of, apparent 2" service to Vista Place)	25 gpm
Main	South St. (near 504) 8" Main	25 gpm
Main	Hutchins @ Orchard 6" Main Transite	20 gpm
Service	Faulkner St. off Hemingway	18 gpm
Total GPM Approx		147 GPM





FINAL LEAK SURVEY REPORT – Shrewsbury water system

Full SECTION COMPLETED December 30, 2015

(An average GPM - gallons per minute - was conservatively estimated for each category of the leaks located throughout the system.)

Total gallons per minute for each category -

Main / Service leaks = 2 Total 135 GPM

10 Hydrant leaks found - GPM estimated –Total 69 GPM

Total GPM for all categories of leaks detected - 204 GPM

Total estimated *daily water leakage* from leak detection - Approx. 293,760 gal.

Total water leakage per month from leak survey -Approx. 8.81 Million Gals

REVENUE SAVED FROM UNACCOUNTED FOR WATER LEAKAGE=

As of June 2010 the A.W.W.A. quotes the national average cost for pumping 1,000,000 gallons of water per year is \$2,020.00. This cost is based on electricity, chemical treatment, maintenance, manpower, etc.

Revenue saved from unaccounted for water leakage:

Total annual leakage detected in Shrewsbury system– 105.7 Million Gals Year

Total annual potential revenue value saved from these repairs -\$213,514.00 /year

Employees involved in this survey:

Alan Banks- 42 years leak detection experience

Mat Masi- 5 years leak detection experience

Matt Gruff- 3 Year leak detection experience

Jesse Riedle – 7 years Leak detection experience

Chris Seariac – 16 years leak detection experience

Dan Maurer – 12 years leak detection experience

Rick Marko- apprentice

Dawn Gouin – 2 years leak detection experience

Summary

An exemplary water distribution system. The water department crew should be commended for the lack of leaking hydrants in a system as large as this. It should be noted that very few hydrants were found leaking in comparison to the total numbers, this tells us that the water personnel are vigilant about proper shutdowns after flushing or hydrant usage. Typical numbers of hydrant leaks on a system of this size would be in the 30 to 40 range. We found only 10 leaking hydrants in your system which has nearly 2500 hydrants.

Report submitted by:

Alan Banks, President

Prowler Water Conservation Systems, LLC

