MassDEP

Leak Detection & Unaccounted-for Water Session

Tuesday, November 18, 2008

8:30 am to 12:00pm

Shrewsbury Town Hall

9:30 am-10:15 am

Loss Detection & Prevention Efforts in the Town of Southbridge, MA

Town of Southbridge
Department of Public Works
Water Division

Operated by: WhiteWater, Inc.

Introduction

- Kenneth Kalinowski, P.E., Director Town of Southbridge Department of Public Works
- Thomas W. Cutler, WhiteWater, Inc., Southbridge Water Division Operations Manager

Outline

- Introduction
- History
- Southbridge Water Supply Company Background
- Southbridge Water Loss Prevention Grant
- What we have done for improvements
- Water Loss Calculations
- Future Improvements

History of the Town of Southbridge

- Town was incorporated in 1816
- First Aqueduct Company was established in 1825 at a spring from the rear of 399 Main Street
- Second Aqueduct Company was established in 1831 at a spring from the rear of 23 South Street

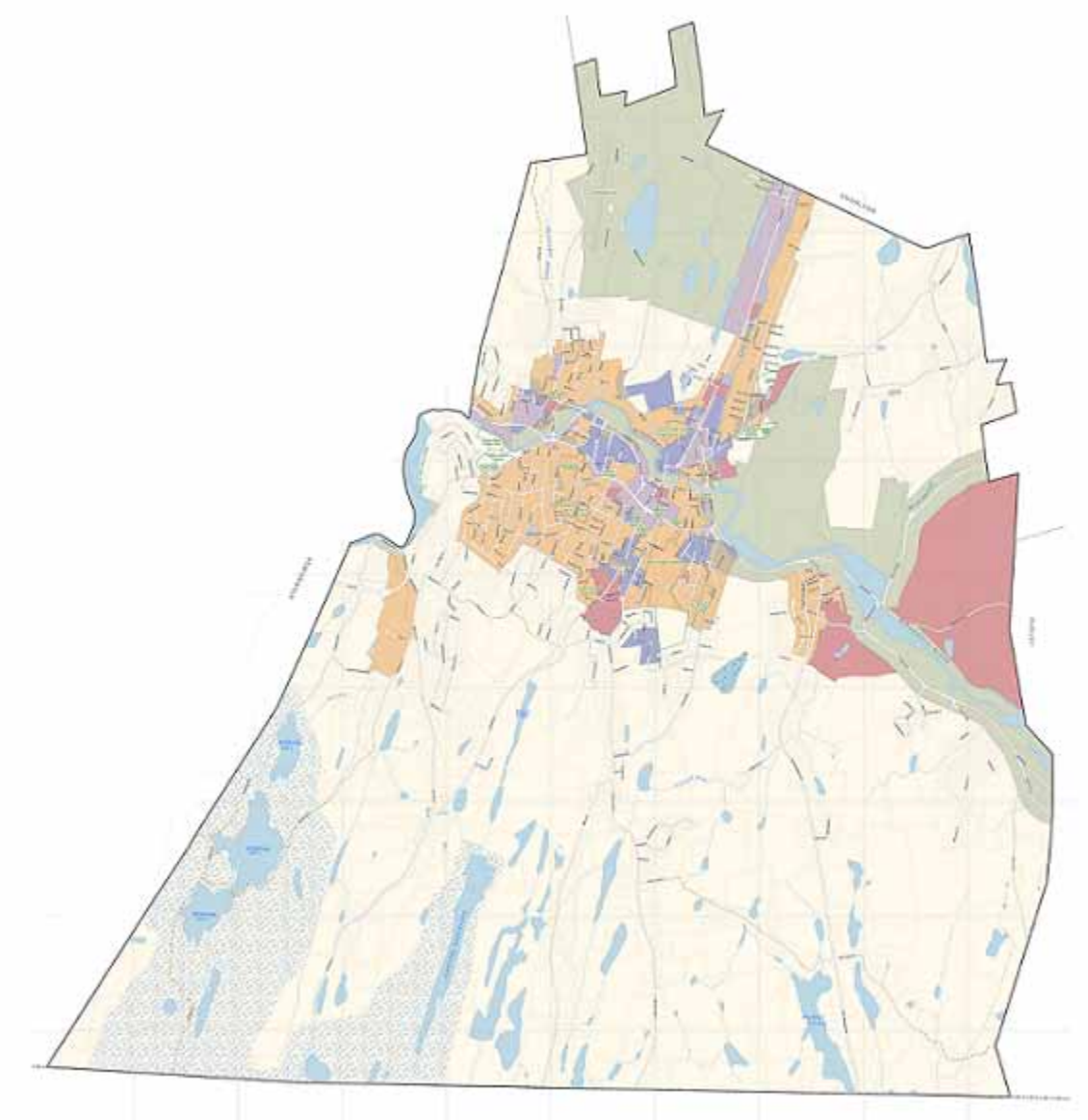
History Continued

- Town Hall was built in 1837 for $3,809.78. The High School was housed on the second floor
- Southbridge Water Supply Company was incorporated on March 11, 1880 as a private company with no Town control or oversight
- Southbridge Water Supply Company was known for meticulous record keeping, developing & maintaining a pristine watershed with an abundant supply of water

Southbridge Water Supply Company Background

- The SWSC obtains its water supply from a series of four man made reservoirs located in the southwesterly portion of the Town known as Hatchet Brook Watershed
- In 1966 the company constructed another surface supply reservoir known as the Cohasse Brook Reservoir. This is currently the largest source at 350-400MG of storage and is used sparingly
- Water can be transferred from Cohasse Reservoir to Hatchet Brook Reservoir #4 via pumps, transmission main and an open channel

Southbridge Massachusetts



Southbridge Water Supply Company Background

- The distribution system is split by two primary systems a low service and high service with multiple pressure zones off of each. To date there are 82 miles of water main, 5 pumping stations and 4 storage tanks
- Total Reservoir Safe Yield 4.82MGD. Current annual average is 1.50-1.70MGD. Withdrawal permit 2.00MGD Annual Average
- Town of Southbridge purchased the companies assets, infrastructure, watershed (3,000+ ac.), pumping stations, and 70+ miles of water main in 1990 for $4.2 M

Southbridge Water Supply Company Background

- We currently service the Mass Turnpike service areas 5E and 6W along with approx 180 residential homes in Charlton due to gasoline spills on the Turnpike
- Southbridge Water Supply Company contracted with the Town of Southbridge to handle all operation and maintenance of the current system with 8 employees. In the 1940's the system was operated with 20+ employees. In the 1950's it was operated with 16 employees and prior to the Town taking over in 1990 there were 12 employees.
- In 2004 the Southbridge Water Supply Company merged with WhiteWater, Inc. and continues to operate the Southbridge Water Department

Southbridge Water Loss Prevention Grant

- Conducted in years 2003, 2004 and 2005

1. Analyzed billing software at Town Hall
2. Analyzed water department records and procedures
3. Leak Detection completed on 78 miles of water main

Results found by Water Loss Audit

- No issues were found with new KVS billing software or procedures at Town Hall. Software tabulated metered sales more efficiently than previous outdated software.
- 78 miles of water main leak detection were completed. 8 leaks were found and rated at total loss of 44GPM or 23.1MGY. All leaks were repaired in-house within two weeks.
- Water Department developed tasks and procedures to better track usage and daily activities. They are as follows:

Steps the Water Department took

a) Simple Excel™ spread sheets were created and put into three ring binders for staff to complete daily tracking of hydrant connections, hydrant flow tests, fire fighting, hydrant flushing, bleeders and un-authorized use.

b) High Service flow meter was replaced at the Filter Plant. The meter was oversized when the Plant was built in 1999-2000 and was not very efficient or accurate

c) Large meters are tested more frequently than in previous years

Steps the Water Department took (cont.)

d) Actively replacing meters that are outdated and no longer accurate

e) Percent error was not recorded or accounted for on semi annual flow meter calibrations at the Filter Plant

f) Public relation/outreach including sending ‘high read’ letters to customers, leaving cards or knocking on doors when high readings are detected

WHITEWATER

A DIVISION OF RH WHITE COMPANIES, INC.
253B Worcester Road
Charlton, Massachusetts 01507
TEL 1-888-377-7678
FAX 508-248-2895

August 20, 2008

[redacted]
Southbridge, MA 01550

Account # [redacted]
Location: 173 Worcester St.

Dear Homeowner,

Recently, the Water Department took the quarterly readings on this property. This is just a courtesy letter to advise you that you appear to have a higher than normal consumption.

The higher consumption could be many things. Your usage could have gone up for this quarter based on number of occupants or there could be a leak in your system. The easiest way to check for a leak is to shut off all the faucets in the house to ensure no water is running. Check the meter in your basement. If the numbers are still moving, and you are sure all water is off, there is a leak somewhere.

Enclosed is a sheet showing how much a small water leak can waste, which in turn shows up on your bill.

Sincerely,

Thomas W. Cutler
Operations Manager

cc: Mr. Kenneth Kalinowski, P.E., Southbridge D.P.W. Director
Mr. Wil Cournoyer, Southbridge Principal Assessor

Worcester Telegram
8-27-2006

Fixing a leaky toilet is not very difficult

By Morris and James Carey
THE ASSOCIATED PRESS

An average leaking toilet will waste up to 78,000 gallons of water per year. Think about it — that's enough water to fill two average sized backyard swimming pools. What follows are some common toilet problems and their solutions.

• **FAULTY FLAPPER:** The majority of toilet leaks are caused by a faulty or worn flapper — the name (being that rubber) you to flapple the tank handle. Over time, the rubber stopper at the base of the tank can become brittle, worn, dirty or misaligned with the flush valve seat, or the seat itself is so corroded that the stopper will not seal properly. This creates a leak that lowers the tank's water level, causing the fill valve to turn on and refill the tank.

This can be fixed by cleaning the flapper or tank ball and flush seat thoroughly using a brush or scouring pad. If the leak persists, remove the existing flapper and replace it with a new one.

• **OVERFLOW PIPE/FILLVALVE:** Sometimes the overflow pipe or flush valve assembly can become so corroded it creates leaks that lower a tank's water level, causing the valve to turn on and refill the tank. The best fix is to replace the flush valve assembly with a new one that will work for your particular toilet.

Another overflow-related problem occurs when the water level is set too high and reaches the top of the overflow pipe where the fill valve shuts off. This results in small amounts of water pouring into the overflow pipe, causing the valve to turn on to refill the tank. This can usually be solved by setting the tank water to a lower level.

There are various ways to do this, depending upon the type of toilet and style of flush valve. Some valves have an adjustment screw, while others have an adjustment clip on the top of the valve. An old trick is to bend the rod that travels between the flush valve and the float ball. However, this can backfire if the rod rotates a half turn, raising the water line and resulting water pouring down the drain.

• **FILL VALVE:** Another common problem that causes a toilet to leak is a fill valve that will not shut off, leaving water continually pouring down the overflow pipe. This is usually caused by debris lodged under the valve's seal. Debris can consist of hard water (calcium deposits), tiny pieces of corroded pipe, pebbles or sediment, which are transported to the seal via the water pipe.

The simplest means of dealing with this problem is to shut off the water supply to the toilet and remove the valve top. Cover the opening with an inverted cup and turn the water on and off a few times to flush the valve and remove water line debris. If the problem persists after flushing the fill valve, the valve seal is probably cracked or split. Replacing the seal will usually solve the problem.

UNREPAIRED LEAKS CAN BE COSTLY

Leak Thru Size	Loss Per Day	Loss Per Month
•	120	3,600
•	360	10,800
•	660	20,700
•	1,200	36,000
•	1,920	57,600
•	3,096	92,880
•	4,296	128,880
•	6,240	187,200
●	8,964	268,920
●	8,424	252,720
●	9,888	296,640
●	11,520	345,600
●	12,720	381,600
●	14,952	448,560

Water Loss In Gallons

Water Loss Calculations

- Unaccounted for Water last five years

1. 2003-Database limitations
2. 2004-Database limitations
3. 2005-10.6%
4. 2006-2.42%-Flow meter replacement in progress!
5. 2007-8.14%

Challenges

- Aging Infrastructure – mains, valves, tanks, etc...
- Increasing regulatory pressure (Disinfection by-product issues) creates competition for funding
- Budgetary & rate constraints – no rate increases implemented for 10 years!
- Stretching of resources (proposed expansion of service to Charlton)

Future Goals

- Capital meter replacement program: Radio-read models with leak detection
- Switch to monthly billing (requires radio-read system)
- Continue tracking and documenting daily tasks and events in log books and work orders
- Continue proactively sending out ‘high read’ letters to customers
- Create proactive master & capital planning for infrastructure improvements
- Filter Plant Improvements project – $2.5 – 3.0M, 6MGD capacity, chloramines
- Regionalize the system into Charlton and become a water district

Questions?

- ***"Water is a very good servant, but it is a cruel master."***
  C.G.D. Roberts, "Adrift in America", 1891

- ***"Man - despite his artistic pretensions, his sophistication, and his many accomplishments - owes his existence to a six inch layer of topsoil and the fact that it rains."***
  Unknown author

- ***"When the well is dry, we learn the worth of water."***
  Benjamin Franklin