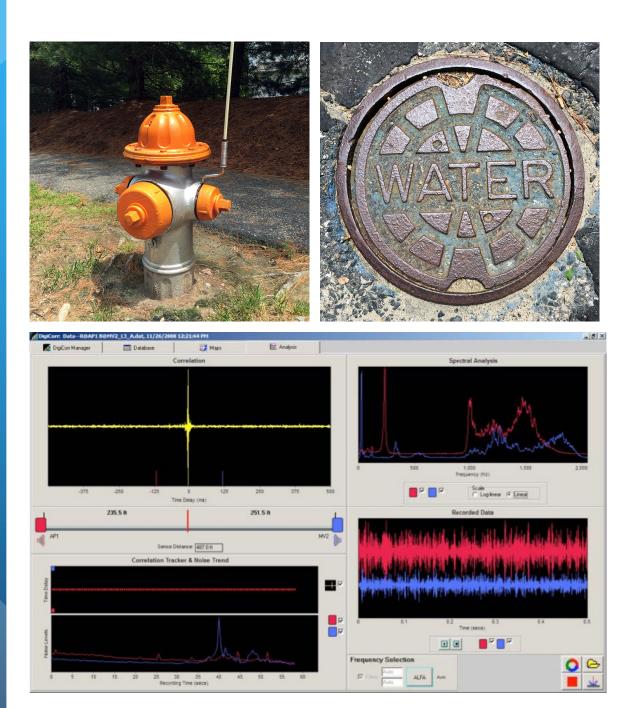


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# LEAK DETECTION SURVEY REPORT



OUR GOALS ARE TO CONSERVE RESOURCES AND SAVE YOU MONEY

## Leak Detection Survey Report

#### The Survey Company

Vital Leak Detection provides state-of-theart leak detection services to public and private water system customers. The surveyor, Allan Williams has specialized exclusively in digital leak detection for over twenty-five years. He can be contacted at:

(978) 793-2104, and at allan@vitalleakdetection.com

#### **Equipment and Methods Used**

Vital Leak Detection utilizes the following modern, high-resolution equipment:

- Digital contact microphones;
- Digital ground microphones;
- Digital leak correlators and software;
- Digital correlating loggers and software;
- · Various ancillary equipment

All surveys are performed following Industry best practices.

#### The Survey Area

#### The

water distribution system has approximately miles of distribution main piping, together with associated fire hydrants, valves, services and ancillary fittings.

#### Infrastructure & Survey Conditions

The infrastructure is old and the town has a worsening problem of leakage. A pipe replacement program is underway. The ground on which the town sits is composed predominantly of gravel bed and sand; drainage is excellent and leaks rarely surface. Due to the harsh winters that the area can undergo, the distribution mains are generally buried deeply, further hampering attempts at leak detection using ground microphony. Inhouse leak detection efforts have some success but are necessarily limited by the difficulties mentioned and the equipment available.

Five leaks were identified and pinpointed during the survey. Estimated combined loss rate for all leakage is 145 gals/min. The estimated annual saving following repair of this leakage is approximately \$67,000 in variable operating costs only. A list of all leaks is given below and includes volume of leakage by source and estimated annualized losses.

The cost estimates were calculated using the EPA, AWWA and IWA average costs figures published in 2011 of \$0.98 per Kgal (Variable Operating Costs) and \$3.67 per Kgal Total Real Costs). Costs do vary by water system. A detailed report for each leak can be found on the pages following the leak list.

Until completion of the pipe replacement program, new leakage is likely to continue to be high. In order to minimize losses and to avoid unnecessary catastrophic pipe failures and consequential damage in the town, it is recommended that in-house leak detection efforts be supplemented by a comprehensive, pro-active, digital leak survey of the type just completed, at least every 24 months.

| Leak #              | Address                      | Source        | Loss (gpm) | Pipe Material | Cover    | Map# |
|---------------------|------------------------------|---------------|------------|---------------|----------|------|
|                     | 71 Pump House Rd             | Main          |            | Cast Iron     | Soil     | 5    |
| 2                   | 23 South St                  | Main          |            | Cast Iron     | Asphalt  | 5    |
| 3                   | 220 Airport Dr (High School) | Service/Riser | 30         | Cast Iron     | Asphalt  | 4    |
| 4                   | 9 Church St                  | Service Corp' | 15         | Cast Iron     | Asphalt  | 5    |
| 5                   | West Pleasant & Taylor       | Main Valve    | 10         | Cast Iron     | Asphalt  | 3    |
|                     |                              | <u>.</u>      | }          |               | <u></u>  |      |
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|                     |                              | }             |            |               |          |      |
| <b>Total Losses</b> |                              |               | 145        |               |          |      |

| Volume of Leakage Attributed to Sources |        |              |                      |           |
|---|--------|--------------|----------------------|-----------|
|   |        |              |                      |           |
| Source                                  | Number | Est. Leakage | % of Number of Leaks | % Leakage |
|   |        |              |                      |           |
| Main                                    | 2      | 90.0         | 40%                  | 62%       |
| Corporation                             | 1      | 15.0         | 20%                  | 10%       |
| Service                                 | 1      | 30.0         | 20%                  | 21%       |
| Hydrant                                 | 0      | 0.0          | 0%                   | 0%        |
| Valve                                   | 1      | 10.0         | 20%                  | 6.90%     |
| Curb Stop                               | 0      | 0.0          | 0%                   | 0%        |
|   |        |              |                      |           |
| (Total)                                 | 5      | 145          | 100%                 | 100%      |

| Annualized Losses |                         |          |            |               |            |
|-------------------|-------------------------|----------|------------|---------------|------------|
| Source            | Est. Leakage (gals/min) | gals/day | Kgals/Year | Var Prod Cost | Total Cost |
| Main              | 90.0                    | 129,600  | 47,304     | 46,357.92     | \$173,606  |
| Service           | 30.0                    | 43,200   | 15,768     | 15,452.64     | \$57,869   |
| Hydrant           | 0.0                     | -        | -          | -             | \$0        |
| Valve             | 10.0                    | 14,400   | 5,256      | 5,150.88      | \$19,290   |
| Curb Stop         | 0.0                     | -        | -          | -             | \$0        |
|                   | I                       |          |            | -             |            |
| Total             | 130.0                   | 187,200  | 68,328     | 66,961        | \$250,764  |



| Survey Area   | Town of Bristol Water Distribution System | Survey Date   | Apr 9th - Apr 12th 2023 | Leak # 1       |
|---------------|---|---------------|-------------------------|----------------|
| Leak Address  | 71 Pump House Rd                          |               |                         |                |
| GPS           | 44.1307375460849, -73.07842792525031      | Ref. Point    | Road Has Been Marked    | <b>Map #</b> 5 |
| Leak Category | Hydrant Lateral                           | Pipe Material | Cast Iron               | Diameter 6"    |
| Cover         | Soil                                      | Loss Rate     | > 50 gpm                | Status Active  |
|               |   |               |                         |                |

### **Remarks** Correlates to a point beside the hydrant lateral Corporation. Best ground sound near corporation. However could be at hydrant base.





| Client Name   | Town of Bristol, VT                       | <b>Client Address</b> | 1 South Street, Bristol, VT 05443 |         |
|---------------|---|-----------------------|-----------------------------------|---------|
| Survey Area   | Town of Bristol Water Distribution System | Survey Date           | Apr 9th - Apr 12th 2023           | eak # 2 |
| Leak Address  | 23 South St                               |                       |                                   |         |
| GPS           | 44.13149617320177, -73.08116712352769     | Ref. Point            | Road Has been Marked Ma           | ap# 5   |
| Leak Category | Distribution Main                         | Pipe Material         | Cast Iron Diameter                | 6"      |
| Cover         | Asphalt                                   | Loss Rate             | ≤ 40 gpm Status                   | Active  |
|               |   |                       |                                   |         |

#### Remarks

Leak confirmed at, or adjacent to, main valve.







| Client Name   | Town of Bristol, VT                       | <b>Client Address</b> | 1 South Street, Bristol, VT 05443 |
|---------------|---|-----------------------|-----------------------------------|
| Survey Area   | Town of Bristol Water Distribution System | Survey Date           | Apr 9th - Apr 12th 2023           |
| Leak Address  | 220 Airport Drive (High School)           |                       |                                   |
| GPS           | 44.13595026130112, -73.09364230737954     | Ref. Point            | Riser in Pump House Map # 4       |
| Leak Category | Service Line                              | Pipe Material         | Cast Iron Diameter 4"             |
| Cover         | Asphalt                                   | Loss Rate             | ≤ 40 gpm Status Active            |

Remarks

Correlates to the point at which the service line enters the building. Leak is probably at the vertical bend, at the base of the riser pipe.







| Client Name   | Town of Bristol, VT                       | <b>Client Address</b> | 1 South Street, Bristol, VT 05443 |
|---------------|---|-----------------------|-----------------------------------|
| Survey Area   | Town of Bristol Water Distribution System | Survey Date           | Apr 9th - Apr 12th 2023 Leak # 4  |
| Leak Address  | 9 Church Street                           |                       |                                   |
| GPS           | 44.13529340148779, -73.0798349784418      | Ref. Point            | Road has been marked Map # 5      |
| Leak Category | Corporation                               | Pipe Material         | Cast Iron Diameter 6"             |
| Cover         | Asphalt                                   | Loss Rate             | ≤ 15 gpm Status Active            |
|               |   |                       |                                   |

**Remarks** Confirmed at or adjacent to corporation of service line for #9 Church St.





| Client Name   | Town of Bristol, VT                       | <b>Client Address</b> | 1 South Street, Bristol, VT 05443 |
|---------------|---|-----------------------|-----------------------------------|
| Survey Area   | Town of Bristol Water Distribution System | Survey Date           | Apr 9th - Apr 12th 2023 Leak # 5  |
| Leak Address  | West Pleasant & Taylor                    |                       |                                   |
| GPS           | 44.136219123087, -73.08195255374861       | Ref. Point            | Road has been marked. Map # 3     |
| Leak Category | Valve                                     | Pipe Material         | Cast Iron Diameter 8"             |
| Cover         | Asphalt                                   | Loss Rate             | ≤ 10 gpm Status Active            |
| Remarks       | Leak is at, or adjacent to, main valve.   |                       |                                   |



