



Drinking Water Capacity Development Program

Helping drinking water systems improve their technical, managerial, and financial capabilities

Got Leaks?

Opportunity for Free Leak Detection Surveys

The Drinking Water Capacity Development and State Revolving Loan Programs are offering free leak detection surveys to public community water systems. Finding and fixing leaks reduces pumping and treatment costs; extends the useful life of assets; and minimizes the risks of contamination, water outages and property damage. (For more information, see the Leak Detection Survey factsheet on the [Capacity Development webpage](#)).

If you want a leak detection survey conducted at your system, please complete the Survey Request Form and email it to joshua.lochhead@vermont.gov no later than **Friday, May 31st, 2019**. The leak detection surveys will start in **August 2019**. They will be funded through the Drinking Water State Revolving Fund's (DWSRF) set-asides, and performed by a professional leak detection firm per the American Water Works Association's standards at no cost to the water system. Because there are limited funds for this project, leak detection surveys will be awarded to the systems that demonstrate the greatest potential benefits in their survey request. Please contact Joshua Lochhead (joshua.lochhead@vermont.gov or 802-622-4831) if you have any questions.

Eligibility & Requirements

- ◆ The applicant must be an active Vermont public community water system.
- ◆ The water system shall provide the assistance of the certified operator or other appropriate staff, and ensure that curb stops and main line valves are located and accessible.
- ◆ After the survey, the water system shall make repairs or prepare an improvements plan and schedule to address the leaks that are found, and complete a short evaluation providing feedback. The DWSRF loan program offers funding to help with improvement projects - contact Ashley Lucht (ashley.lucht@vermont.gov or 802-585-4904) with questions regarding the DWSRF program.



"Our surveyor did an incredible job surveying our system. He was punctual, devoted to chasing leads, and helped us find two significant leaks. Our spring sources have been struggling all summer. Both of our reservoirs were losing ground before the survey, and we were forced to issue a water conservation notice. Since finding and fixing the leaks, both of our reservoirs have begun refilling. We are lifting the water conservation notice, but keeping a close eye on things. Thank you for this service. It's still a little early to know for sure but I think it saved our butts this time around."
– Jeffersonville, 2018 Leak Detection Survey Participant

Since 2014, 111 public drinking water systems have taken advantage of the **Free Leak Detection Surveys** the Division offers. A total of nearly 920 miles of distribution pipe have been surveyed and 326 leaks identified. The identified leaks were losing an estimated 2,380 gallons per minute or approximately 3,427,200 gallons per day; **the equivalent to the design demand of approximately 45,770 residential users per day!**



LEAK DETECTION SURVEY REQUEST FORM

Please complete this form and email it to Joshua Lochhead at joshua.lochhead@vermont.gov. Email or call (802-622-4831) if you have any questions.

Part 1) Contact Information

Water System Name:

WSID:

Point of Contact:

Telephone Number:

Email Address:

Certified Operator:

Telephone Number:

Email Address:

Cell Phone Number:

Field Contact:

(if different than Certified Operator)

Telephone Number:

Email Address:

Cell Phone Number:

Certification: If chosen to receive a free detection survey, appropriate staff from the water system (e.g., certified operator, distribution system manager, etc.) will be available to assist the contractor as needed during the survey work.

I agree with the terms listed above:

Yes

No

Signature of Water System Owner
(type name for electronic submission)

Date

Part 2) Proposed Survey Area

Please indicate the material(s) of the pipe(s) for the proposed survey area (e.g. non-metallic, metallic, other, unknown). Attach additional sheets, if necessary.

Total miles of pipe in entire system:

Total miles of pipe proposed to be surveyed:

Pipe Material: Age: Miles:

Pipe Material: Age: Miles:

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Pipe Material: Age: Miles:

Are maps available for the proposed survey area? Yes No

If so, do the maps include the following (for distribution mains only)

Hydrants: Yes No Blow-offs: Yes No

Pressure Reducing Valves: Yes No Meters: Yes No

Pipe Diameter Information: Yes No Roads: Yes No

Pipe Material: Yes No

Part 3) Water System General Information

Total miles of service mains:

Number of hydrants:

Meter Types:

Please list all types used at system)

Number of service connections:

Residential:

Industrial:

Agriculture:

Commercial:

Average length of each service connection (feet):

Average pressure under normal operating conditions:

Are there pressure zones that have: Low Pressure (i.e., 0 - 35 psi): Yes No

High Pressure (i.e., 100+ psi): Yes No

Part 4) Water Audit Summary

Conducting a water audit is an important part of controlling water loss. An audit provides a snapshot of the integrity of your system and its operations, and will help you determine how to reduce water losses in a cost-effective manner. Please complete as much of this water audit summary as you can using the Water Audit Handbook for Small Drinking Water Systems ([Water Audit Handbook](#)) as a guide. Please rank the quality of your data (1 - 5, per Part 7 of this document). Submit the leak detection request even if the audit does not uncover large water losses, because finding and fixing leaks when they are small is usually more cost-effective than waiting until they grow and cause other problems (e.g., loss of pressure, pipe rupture). Contact joshua.lochhead@vermont.gov or (802) 622-4831 if you have questions or want help with the water audit.

CALENDAR YEAR OF WATER AUDIT DATA:

WATER SYSTEM INPUT VOLUME (million gallons per year - MG/year)		
1. Water produced from own sources		Rank*
2. Water imported from other systems <i>(e.g., water purchased from neighboring utility)</i>	+	Rank*
3. Meter error adjustment	+	Rank*
<hr style="width: 50%; margin: 0 auto;"/>		
4. Total System Input Volume <i>(add lines 1-3)</i>		
<i>*Data quality ranking - refer to Part 7 and/or page 6 of the Water Audit Handbook.</i>		

AUTHORIZED WATER CONSUMPTION (MG/year)		
5. Billed metered <i>(includes water sold to neighboring water utilities)</i>		Rank*
6. Billed unmetered <i>(e.g., the customer bill is based on estimate or flat fee)</i>	+	Rank*
7. Unbilled metered <i>(use 1.25% of line 4 unless you read unbilled meters)</i>	+	Rank*
8. Unbilled unmetered <i>(e.g., firefighting efforts and unmetered services)</i>	+	Rank*
<hr style="width: 50%; margin: 0 auto;"/>		
9. Total System Authorized Consumption <i>(add lines 5-8)</i>		
<i>*Data quality ranking - refer to Part 7 and/or page 11 of the Water Audit Handbook.</i>		

WATER LOSSES (MG/year)		
10. Total system input volume <i>(from line 4)</i>		
11. Total system authorized consumption <i>(from line 9)</i>	-	
<hr style="width: 50%; margin: 0 auto;"/>		
12. Total System Losses <i>(subtract line 11 from 10)</i>		

APPARENT WATER LOSSES (MG/year)

13. Unauthorized consumption (use 0.25% of line 4 unless validated data is available)		Rank*
14. Customer meter inaccuracies (use 2.0% of lines 5 and 6 unless validated data is available)	+	Rank*
15. Systematic data handling errors (systematic data handling errors are the discrepancies between when the meter is read and when the bill is sent to the user (please note if an estimate is used))	+	Rank*
16. Total Apparent Losses (add lines 13-15)	<hr/>	

**Data quality ranking - refer to Part 7 and/or page 19 of the Water Audit Handbook.*

REAL WATER LOSSES (MG/year)

17. Total Water Losses (from line 12)	+	
18. Apparent Water Losses (from line 16)	-	<hr/>
19. Real Water Losses (subtract line 18 from line 17)		

NON-REVENUE WATER (MG/year)

20. Total Water Losses (from line 12)		
21. Unbilled Metered (from line 7)	+	
22. Unbilled Unmetered (from line 8)	+	<hr/>
23. Non-Revenue Water (add lines 20-22)		

Part 5) ADDITIONAL INFORMATION

Please submit any other information that demonstrates the potential benefits of the project. Such information may increase the likelihood of your system being awarded a leak detection survey.

Examples include:

- ◆ Results of any recently completed leak detection surveys and/or a report of the findings
- ◆ Results from a recent hydraulic analysis
- ◆ Recent examples of system shortages or low pressure events thought to be caused by leaks
- ◆ Relevant financial information (e.g., annual operating costs, variable production costs and/or customer retail unit costs (costs per thousand gallons))

Part 6) TECHNICAL GUIDANCE

- ◆ The Environmental Finance Center Network's "The Water Audit Handbook for Small Drinking Water Systems": [Water Audit Handbook](#)
- ◆ US Environmental Protection Agency (USEPA) Technical Help Webpage: [USEPA Loss Control](#)
- ◆ American Water Works Association's (AWWA) Water Loss Webpage
- ◆ AWWA's "Water Audits and Loss Control Programs" (AWWA Manual M36, 3rd Edition, 2009)
- ◆ Drinking Water Capacity Development Program Contacts: [Megan Young](#) (802) 585-4903 and [Joshua Lochhead](#) (802) 622-4831
- ◆ Texas Water Development Board's "Water Loss Audit Manual for Texas Utilities": [Water Loss Audit Manual](#)

Part 7) DATA QUALITY RANKING GUIDANCE

Guidance Matrix for Ranking Information

COMPONENT	DATA QUALITY RANKING				
	1	2	3	4	5
System Data					
Water produced from own sources (line 1)	No meters; estimate only	Partially metered; multiple supply sources meted but not all	Fully metered; no regular testing or calibration of meters	Fully metered; partial testing or electronic calibration; no meters greater than 15 years old	Fully metered; annual electronic calibration and flow testing; no meters greater than 15 years old
Water imported from other systems (line 2)	No meters; estimate only	Partially metered; multiple supply sources meted but not all	Fully metered; no regular testing or calibration of meters	Fully metered; partial testing or electronic calibration; no meters greater than 15 years old	Fully metered; annual electronic calibration and flow testing; no meters greater than 15 years old
Production meter accuracy (line 3)	No testing of production meters; estimate adjustment used only as needed	Testing of production meters only where problems suspected	Systematic testing of meters; underperforming meters not always replaced	Systematic testing of all meters within at least a five-year cycle; all meters over standards replaced or repaired and retested	Testing of all production meters conducted in year of audit; replacement of all meters outside standard accuracy range
Billed metered (line 5)	No consumption data gathered; flat or fixed rate in use only	Manual meter reads and billings; no regular audits of customer billing data	Automated billing system; no annual checks of data	Automated meter reading and billing system; internally check or checked by third party on less than annual basis	Automated meter reading and billing system audited by third party on annual basis
Billed unmetered (line 6)	Estimates of consumption used	Source production meters used to determine consumption; all areas not monitored	Source production meters used to determine consumption; all areas monitored	District meters (each 3,000 or fewer connections) used to determine consumption; No total coverage; rest use production meters	District meters (each covers 3,000 connections or less) throughout system used to determine consumption

**Ranking Guidance based on the "Water Loss Audit Manual for Texas Utilities" by Texas Water Development Board and "The Water Audit Handbook for Small Drinking Water Systems" by EFCN.*

Part 7) DATA QUALITY RANKING GUIDANCE continued...

COMPONENT	DATA QUALITY RANKING				
System Data	1	2	3	4	5
Unbilled metered (line 7)	No testing; estimates only	Testing only where problems suspected	Systematic testing of all meters; underperforming meters not always replaced	Systematic testing of all meters within at least a five-year cycle; all meters over standards replaced or repaired and retested	Estimates using previous metered testing to determine overall estimated values
Unbilled unmetered (line 8)	Overall estimates throughout system	Partial estimates for some of variables; basic estimates for others	Estimates using formulae (e.g., time x gallons/flush) for known events	Partial estimates using test data; other estimates using formulae from known number of events	Estimates using previous metered testing to determine overall estimated values
Unauthorized consumption (line 13)	Arbitrary volume estimates	Default of 0.25% of input volume	Number of events of each type evaluated; multiply by estimated gallons lost per event	Number of occurrences evaluated; monitoring and enforcement program started	Monitoring and enforcement program well established with analyzed losses less than 0.25% and declining from previous years
Average customer meter accuracy (line 14)	No testing or replacement; estimates only	Testing or replacement of 1 to 5% of meters in year of audit	Analysis of test data finds meters meeting specs, or testing or replacement of 5 to 10% of meters per year	Previous test data analyzed and all meters in specifications, or testing or replacement of 10 to 50% of meters in year of audit	Previous test data analyzed and all meters in specifications, or testing or replacement of over 50% of meters in year of audit
Systematic data handling errors (line 15)	No review of billing system	Automated system but no checks of data validity	Automated system; less than annual checks of data	Automated system; internally checked on at least annual basis	Assessment of data handling errors conducted internally and audited by third party on annual basis

**Ranking Guidance based on the “Water Loss Audit Manual for Texas Utilities” by Texas Water Development Board and “The Water Audit Handbook for Small Drinking Water Systems” by EFCN.*