

Gas Safety inc
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Southboro,
MA 01772

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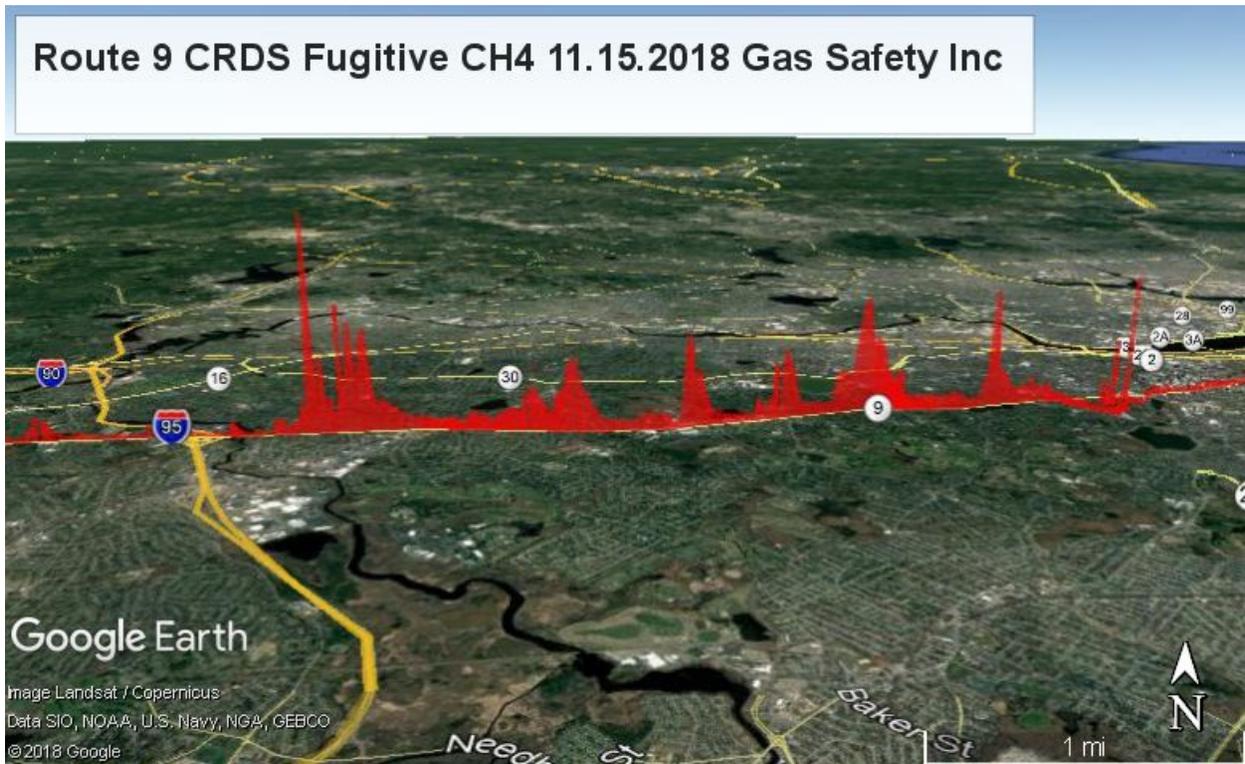
1/18/2019
Town of Weston
Gas Infrastructure Audit Proposal

I Scope

The Town of Weston has approximately 100 miles of gas pipeline infrastructure owned by National Grid (NGRID) that includes cast iron, bare steel, coated steel and plastic pipes, with some pipes dating back to the late 1800s early 1900s. At the end of 2017, over 140 unrepaired gas leaks were identified in Weston based on NGRID data. Cast iron and bare steel pipes are increasingly leak prone given their age and the changing conditions of the surrounding area, such as rising ground water. Weston also has relatively high pressure in over 50% of it's pipes, with 60 PSI compared to say Lawrence which is 0.5 PSI. Given current issues with gas utilities in MA, and specific challenges at NGRID regarding its workforce, investment in maintaining Weston's gas infrastructure is restricted to emergency work only. There is no proactive maintenance strategy or priority planning to fix the increasing number of gas leaks.

Gas Safety Inc (GSI) will conduct a Cavity Ringdown Spectrometer Survey (CRDS) of all public roadways. The CRDS instrumentation records methane (ch4) levels in parts per billion (PPB) each second, and tags each methane reading with the corresponding GPS coordinates. The CRDS technology is 1000 times more sensitive than industry standard flame ionization detection equipment, which only measures methane levels in parts per million (PPM). This provides much greater accuracy as to the location and size of the gas leak detected. The resulting data files are processed into Keyhole Markup Language (KML) files, to allow for mapping the emissions in software such as Google Earth. This provides a visual representation of the gas leaks which is helpful as a maintenance priority planning tool.

Example map of gas leaks in Newton:



Following the CRDS survey to map the location of the gas leaks, fugitive methane locations are then investigated to determine and pinpoint the source of the methane emission. Combustible gas indicators and other industry standard gas detecting equipment are used for the detailed analysis. Sources can be, but are not limited to: gas pipeline leaks, sewer gas, landfill gas, livestock/ruminant animals, and swamp gas. Each leak investigation will produce a report that records not only the location and source of the methane emission, but also the size of the gas migration area, the industry standard leak classification, and vegetation in the proximity of the leak. Gas leaks are known to suffocate the roots of trees and plants compromising life expectancy. See example report attached.

II Costs

CRDS survey of Weston gas infrastructure \$3500

Full audit of all leaks identified leveraging CRDS survey and industry reported data 12/31/2018; leak investigations @\$100 per location
(Industry reported data indicates 141 leaks 12/31/2017 - Weston could expect the CRDS survey to identify up to 250 leaks; estimated costs @\$25000)

Administrative/legal costs Weston may incur to implement management & reporting of gas maintenance \$1,500

Total cost \$30,000

III Deliverables

1. CRDS survey of Weston gas pipelines, producing data files that record ch4 detected, gps location, time and instrument status data.
2. Keyhole Markup Language files that can easily be opened in GIS software such as Google Earth.
3. A comprehensive leak report for each fugitive emission recorded by the CRDS. Each report records: location, source, gas migration area, leak classification and status of affected vegetation.

Gas Safety Inc will provide digital copies of all leak reports, which will be in pdf format.

IV Why conduct the survey

Like many communities in Massachusetts, Weston has a systemic and growing gas leak problem due to an aging gas infrastructure.

The Massachusetts Area Planning Council (MAPC) is facilitating a regional initiative to address these concerns, while individual towns are undertaking independent audits of their gas infrastructure to provide the information required for maintenance planning purposes. An independent audit of Weston's gas infrastructure would provide the following benefits:

- Accurately identify and size all leaks including any "environmentally significant" Grade 3 leaks, which by law gas utilities need to fix within 12 months of identification [*Title XXII, Chapter 164, Section 144 of Massachusetts General Laws*]
- Help the DPW coordinate leak repair and pipeline replacement with NGRID, developing a strategic plan to coordinate with town road repaving work

- Protect trees and other vegetation avoiding costly tree removal and replacement expenses
- Reduce the Town of Weston carbon footprint: gas leaks are 95% methane, a potent greenhouse gas
- Help mitigate health risks of leaking gas which exacerbate asthma and other respiratory illnesses. Research suggests that exposure to higher levels of nitrogen dioxide found in gas fumes increases the risk of respiratory issues in children by 20%
- Cut down the costs of lost and unaccounted for gas which the utility passes on to the customer.

V About Gas Safety Inc.

GSI was established in 2006 to protect trees from leaking methane. Gas leaks have been killing and damaging trees and other vegetation since gas pipes were installed in the 1800's. Leaking gas displaces natural underground ambient air and robs trees of needed oxygen. Methane causes extremely dry conditions and damages fine root systems. Any gas leak that has migrated to a tree is now weakening that tree and should be repaired as a priority.

Today GSI utilizes state of the art Cavity Ringdown Spectrometer technology to map fugitive gas emissions from any source. GSI provides consulting services to communities and individuals dealing with gas leaks, and works with researchers to better understand fugitive emissions in all aspects of gas mining, transmission and distribution. GSI has conducted surveys across the country with published studies on Boston, New York City, Washington DC, Cincinnati OH and Raleigh NC.

[Mapping urban pipeline leaks: methane leaks across Boston. *Environmental Pollution* 173:1-4, doi:10.1016/j.envpol.2012.11.003.](#)

[Natural gas pipeline leaks across Washington, D.C. *Environmental Science & Technology* 48:2051-2058, doi:10.1021/es404474x.](#)

<https://pubs.acs.org/doi/abs/10.1021/acs.estlett.5b00213>

<https://www.bu.edu/ise/files/2016/08/1-s2.0-S0269749116300938-main.pdf>

Prior to forming Gas Safety Inc., President Bob Ackley worked in the gas industry for over 30 years in government compliance leak inspections and training. GSI employees

are all DOT Operator Qualified in all aspects of gas leak investigations, leak classification, atmospheric corrosion inspection and Abnormal Operating Conditions. GSI utilizes industry standard flame ionization and combustible gas indicators along with state of the art Cavity Ringdown Spectrometer Technology.

Please send any questions regarding this proposal to robert.c.ackley@gmail.com.

Regards

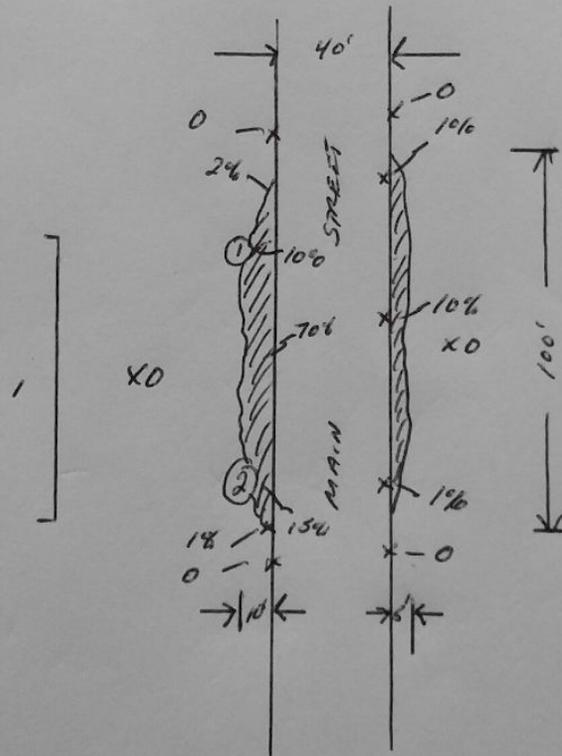
Bob Ackley
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Sample Report Attached

Gas Safety Incorporated
16 Brook Lane
Southborough, Massachusetts 01772
774-922-4626

Date 1-1-2019 Survey Type _____ Grade 2
 Address 1 MAIN STREET
 City / Town ANYTOWN USA

Sketch:



Comments

① 20" DBH SUGAR MAPLE
 ② 20" DBH SUGAR MAPLE
 MIGRATION 100' X 55 = 5500 SQ FT

Surveyed By: GAS SAFETY INC

Leak Classification per PHMSA DOT guidelines

Grade 1

Any leak that represents an existing hazard to persons or property

Grade 2

Any leak that is non hazardous to persons or property at the time of detection but represents a potential future hazard to persons or property

Grade 3

Any leak that is non hazardous to persons or property at the time of detection and is expected to remain non hazardous to persons or property.

Shaded Area - Leak Migration area verified by combustible gas indicator readings in percent gas in air, taken from 6" test holes. The migration area is measured to provide leak square footage.

Trees identified by species and Diameter at Breast Height (DBH)