August 15, 2025

Memo to: Newton Energy Commission Chair Philip Hanser
From: Peter J. Barrer and Denise Freed
Re: GSEP in Newton 2024
Cc: Bob Persons, Ellie Goldberg, Nathan Phillips

Summary

The Newton Gas Pipes Team, a volunteer non-governmental group, has completed an investigation into National Grid's Gas System Enhancement Program (GSEP) plans and National Grid's pipeline replacement and leak repair projects in Newton for calendar year 2024. We are investigating to what degree National Grid's (NG) leak repair and pipeline replacement activities are in the interest of the City and its resident gas ratepayers.

As Newton residents work to reduce carbon emissions, the leaky gas distribution system will be phased out as it becomes obsolete. Under GSEP, however, National Grid's continued investments in the outdated gas pipe system will impose unnecessary costs on ratepayers and perhaps taxpayers.

This report follows similar investigations of GSEP in Newton for 2022 and 2023 as well as across all National Grid territory for 2024.

We found that the current GSEP does not serve the interests of Newton and does not align with the City's Climate Action Plan goal of eliminating fossil fuel carbon emissions by 2050.

The City's priorities have evolved since the implementation of GSEP in 2014. The City now recognizes that even leaks classified as non-hazardous can still pose significant risks to health and the environment and that the City needs a plan for retiring the gas system entirely.

National Grid replaces most of its pipes in Newton without obtaining specific approval from the City Council through a Grant of Location (GOL). Although NGrid submits its GSEP plans to the DPU, the plans lack details showing all the specific street segments; as a result, Newton elected officials have little information or control over gas pipe construction in Newton streets. Newton should alter its procedures to receive detailed GSEP street segment statements (which may require action by the DPU) and to require City Council GOL review for all non-emergency pipe replacement projects.

Gas leaks are a significant contributor to Newton's greenhouse gas emissions. However, "leak-prone" pipe replacement dominates current GSEP expenses, and this pipe replacement has been ineffective in reducing existing gas leaks. Leak repair is less expensive and more effective for reducing leaks than pipe replacement. In coordination with National Grid, Newton

should now prioritize repairing gas leaks as quickly as possible. To achieve this goal while minimizing ratepayer costs, the GSEP program needs to be completely overhauled and aligned with the climate goal of eliminating gas by 2050.

Detailed Highlights

- $19,076,705 was charged to GSEP for work in Newton in 2024.
- Almost all of the eliminated leak extent (a measure of environmental harm attributable to a Grade 3 leak, the least hazardous class) was treated by lower-cost leak repair and not by pipe replacement.
- Repair of large leaks is far more cost-effective than pipe replacement. (factor of 200!)
- Over 75% of the length of pipes installed was not preceded by a Grant of Location approved by Newton's City Council
- Pipe replacement cost was $658 per ft or $3,474,000 per mile; this is the basis to compare the cost effectiveness of electrification as a non-pipeline alternative.
- Approximately $4,000,000 was spent on work that was not specifically based on the safety priority of the pipes.
- Some new leaks appeared on lengths of pipe (or the service lines connected to them) after the pipe had been replaced under GSEP.
- Over the past five years, measured gas leak extent in Newton has been reduced by 75%

Introduction

The Newton Gas Pipes non-governmental volunteer team compiles publicly available data about the Newton gas distribution system operated by National Grid. We are working with public records of Gas System Enhancement Program (GSEP) plans, end-of-year accounting reports (GREC), end-of-year Service Quality reports (SQARs), and quarterly gas leak reports filed with the Mass. Department of Public Utilities (DPU), in addition to street surveys and other data from Newton public records.

The pipe replacement program requires National Grid to evaluate leak-prone pipe segments to prioritize replacing pipes that are at significant risk of developing high-impact leaks that could be explosive. It requires National Grid to repair the dangerous leaks, and permits accelerated cost recovery for replacing leak-prone pipes. GSEP also permits accelerated cost recovery for pipes whose replacement can be coordinated with other public works jobs.

The Massachusetts legislature established GSEP in 2014 to increase the safety and reliability of the gas distribution system. This plan was made in the context of an aging system of pipes that would be used for the foreseeable future. GSEP provided a framework for classifying and repairing hazardous leaks, replacing leak-prone pipes, and expanding the gas infrastructure to replace what were considered more polluting energy sources.

However, even "non-hazardous" leaks pose health risks and can contribute significantly to greenhouse gas emissions and additional costs to consumers. To address the leak problem, the

legislature in 2017 added the repair of high-volume methane leaks to the scope of GSEP. These leaks are classified as “non-hazardous” but still have a Significant Environmental Impact (SEI).

The DPU has defined the various gas leak grades. Grade 1 leaks are hazardous and must be repaired immediately. Grade 2 leaks are non-hazardous, but could become hazardous in the near future and must be repaired within a year. Grade 3 leaks are non-hazardous and are expected to remain non-hazardous. Grade 3 leaks initially designated after January 1, 2018 are required to be repaired or eliminated within eight years. Grade 3 SEI leaks are those larger than 2,000 square feet, as measured by the leak extent method, and are required to be repaired within 1-3 years.

We are investigating the degree to which GSEP work is in the interest of the City and its resident gas ratepayers.

Methodology

Data for this investigation were compiled from National Grid’s filings submitted to the DPU. Most of these filings were downloaded from the DPU’s web-based “file room.”

Each fall NGrid files GSEP plans for the coming year, and simultaneously, files less-detailed GSEP plans (“lookaheads”) for the following four years. We focused on the 2024 GSEP plan. However, allowing for the possibility that a previous GSEP installation may have been delayed, we searched all GSEP plans back to 2019. Allowing for an unexpected acceleration of a GSEP installation, we also searched GSEP “lookaheads”[1] covering the period 2020 through 2029. We compiled GSEP plans for 2019 through 2024 into a single table, which is linked as Table L1. We compiled lookahead plans for 2020 to 2023, 2021 to 2024, 2022 to 2025, 2023 to 2026, 2024 to 2027, 2025 to 2028, and 2026 to 2029 in linked Table L2.

To compile the cost data supporting this investigation, we downloaded the CY 2024 GREC report from the DPU file room (Docket 25-GREC-03). National Grid filed its Reconciliation “GREC” report for the 2024 GSEP expenses on May 1, 2025.

We obtained gas leak data from two often coincident sources: the NG Service Quality (SQ) Report for calendar year 2024, dated March 1, 2025, and detailed leak reports produced for the DPU on a quarterly basis which can be obtained by public records request. The SQ report lists all reported leaks and identifies which ones were eliminated during the year, a summary of the quarterly snapshots. The quarterly reports provide a more complete chronology, allowing corroboration of leak conditions with dates of pipe replacement etc., but omit NGrid’s assessments of both whether a given leak can be dealt with through a planned replacement, and whether or not the leak is SEI.

[1] Our use the of the word “lookahead” refers to NGrid’s reports that anticipate pipe replacements four years out from the following calendar year, a total of five years, in compliance with regulations in 220 CMR 114.

Regarding leak repair, GSEP also provides incentivized cost recovery for the repair of Grade 3 Significant Environmental Impact (G3SEI) leaks. We compiled and analyzed the GSEP plans for such repairs in 2024, as well as the actual 2024 costs in the GREC filing.

We extracted Newton data from all the NGrid reports, analyzed the 2024 GREC filings to determine what kind of work the 2024 costs actually funded, and compiled reports of how gas leaks were eliminated in 2024.

Results: GSEP cost summary for Newton in 2024

Table 1 below summarizes GSEP costs in Newton as reported in the GREC filing by National Grid. In addition to leak repair and pipe main replacement, GSEP also allows costs to replace "service" pipes to individual buildings. Note that this table does not include the expense of repairing grade 3 non-SEI (smaller) leaks, since such repair costs are not reimbursed through GSEP and are not reported. National Grid has stated that the annual repair cost for Grade 1, Grade 2, and smaller, non-SEI Grade 3 leaks, which are not reported in GSEP, is substantially greater than the annual cost to repair SEI Grade 3 leaks.

There were fifteen SEI leaks in Newton repaired and charged in the GREC for 2024, accounting for 95,439 sq ft of leak extent; the total charge for these fifteen leaks was $70,906.

Table 1 2024 GSEP costs in Newton

GSEP costs for repairing large leaks	$70,906	0.4%
GSEP costs for pipe replacements	$14,952,606	78.4%
CISBOT[2]	$2,591,729	13.6%
lining	$0	0%
GSEP costs for in-service projects[3]	$1,461,464	7.7%
GSEP costs for service replacements[4]	$0.00	0%
Total	$19,076,705	100%

[2] CISBOT is a robotic method of repairing a gas pipe without full excavation
[3] These repairs were required on pipes that had already been replaced. Note that our Newton Gaspipes Team 2022 GSEP investigation incorrectly described the meaning of "in service replacements".
[4] Service replacements connect the main in the street to the customer's building.

Results: Pipe replacement

Analysis of 2024 GSEP pipe replacement costs as displayed in the GREC filing

We separated the costs reported in the 2024 GREC into the following five categories of projects, displayed in Table 2.

A. Projects that were anticipated in the GSEP plans for 2024.
B. Projects that appeared in any other year's GSEPs or lookaheads.[5]
C. Projects that did not appear in GSEP plans and were attributed to "encroachment."
D. Projects that did not appear in GSEP plans but had a prioritization assessment and were done because of a "pave opportunity".
E. Projects that were not in GSEP plans, that had no priority assessment, and were accomplished in accordance with Newton DPW coordination.

Table 2: 2024 GSEP pipe replacement costs compared to plans

Category	Number of projects	GSEP cost
A.	2	$1,547,092
B.	6	$9,018,314
C.	3	$117,440
D.	1	$118,402
E.	3	$4,151,359
Total	15	$14,952,607

[5] Category B includes one project that is attributed to "encroachment" but does not have a prioritization assessment.

Table 3 below consolidates results from Table 2.

Table 3 Consolidated analysis of 2023 GSEP pipe replacement costs

Description	GSEP cost	Pct.
All projects in a GSEP plan or lookahead (A plus B)	$10,565,406	70.6%
Projects that were not in GSEP plans but addressed encroachment from other utilities or had a priority assessment. (C plus D)	$235,842	1.6%
Projects without GSEP prioritization that were completed in coordination with Newton Public Works. (E)	$4,151,359	27.8%
Total	$14,952,607	100.0%

Note that 27.8% of the costs originated in coordination with Newton Public Works in the context of maintaining the gas infrastructure for the indefinite future.

Pipe replacement projects charged to GSEP in 2024 are shown in the linked Table L3. The table lists each pipe replacement project. If the project appeared in a prior GSEP plan, the previous plan is also noted in the table.

We found that most of Newton GSEP's work in 2024 was not preceded by a City Council vote for a Grant of Location (GOL). According to state law, a GOL must be approved by the city before any excavation of public roads. However, only 24% of the GSEP pipe length in 2024 was approved with a GOL, as shown in Table 4 below. At Newton's Public Facilities Committee meeting on December 4, 2024, National Grid stated that it follows a "two-foot rule" that exempts the need for GOL approval. Newton Gas Pipes Team has yet to see written documentation of the rule.

Table 4 Grants of Location preceding GSEP work

	Number of projects	Length of pipeline installed (ft.)	Pct. of length
Projects that had a GOL	2	5,644	24%
Projects that did not have a GOL	13	17,725	76%
Total	15	23,369	100%

Results - GSEP expenditures to reduce leak extent by leak repair are much more cost-effective than expenditures by pipe replacement.

The 2024 experience shows that repair of large leaks is more cost-effective by a factor of 200.

Table 5 Cost effectiveness of GSEP leak elimination methods

	Number of leaks	Cost	Leak extent sf	Cost per leak
Large Leak Repair G3SEI	15	$70,906	95,439	$4,727
Pipe Replacement	12	$14,952,606	12,109	$1,079,384

GREC reported an expense of $70,906 over the year to repair 15 G3SEI leaks comprising 95,439 sq. ft. according to the latest measurements reported in 2024.

Through pipe replacement, in 2024, GSEP may have addressed as many as 12 leaks comprising 12,109 sq. ft. leak extent measured at last check before the start of the replacement; only 5 of these leaks were ever classified as G3SEI.[6]

Seven of the 15 replacement projects included at least one of these 12 leaks.[7] See linked Table L4 where we looked at all the reported leaks from Q1 2024 to Q2 2025 along the locations where pipes were replaced. These leaks include Grade 1, Grade 2, and Grade 3 leaks.

Six Grade 1 leaks and two Grade 2 leaks were first reported during the replacement period, which indicates that these pipes were in a fragile state. At least three leaks were reported after the replacements were completed. These leaks might be in the service lines or other pipes at those locations. We conclude that replacing or repairing pipes does not prevent all new leaks, which illustrates the fragility of the whole gas distribution system.

Results - Leaks in Newton during 2024

We analyzed the National Grid Service Quality Report to collect information about how all Newton leaks were treated in 2024 regardless of whether the cost appeared in GSEP or outside of GSEP. Our analysis found the following:

[6] The cost of pipe replacement work orders that addressed at least one leak repair was $6,824,962.
[7] However, three of the 12 leaks are not yet listed as being repaired, including one of the G3SEI leaks. These three leaks have a combined leak extent of 3,375 sq. ft.

- Total reported leaks as of Jan 1, 2024: 515 leaks comprising 305,767 sq. ft. leak extent Table L5
    - 3 Grade 1 leaks
    - 20 Grade 2 leaks
    - 492 Grade 3 leaks comprising 305,767 sq. ft. leak extent

- Total reported leaks as of Jan 1, 2025: 374 leaks comprising 266,103 sq. ft. leak extent Table L6
    - 3 Grade 1 leaks
    - 15 Grade 2 leaks
    - 356 Grade 3 leaks comprising 266,103 sq. ft. leak extent

- A total of 424 leaks were eliminated during 2024, including 192 Grade 3 leaks comprising 157,330 sq. ft. of leak extent.[8]

- 63% of the eliminated leak extent for Grade 3 leaks was accomplished by leak repair. Only 4% of the eliminated leak extent for Grade 3 leaks was accomplished by pipe replacement. The remainder, 33% of the eliminated leak extent, resulted from a variety of circumstances, including leaks that ceased to be observable, duplicate leak accounting, or other factors.

- 286 new leaks were recorded during 2024 (374 + 424 + 3[9] - 515 = 286).
    - 138 new Grade 1 leaks
    - 68 new Grade 2 leaks
    - 80 new Grade 3 leaks

- 25 leaks that were non-hazardous in January 2024 were "upgraded" to a higher risk category during the year and 24 of these leaks were eliminated

Table L7 lists all the leaks that were eliminated in 2024 along with the circumstances of their elimination.
Table L8 lists leaks that were eliminated by leak repair without being upgraded to a more hazardous category.
Table L9 lists leaks eliminated by pipe replacement (GSEP and non-GSEP)
Table L10 lists leaks "eliminated otherwise", such as by being upgraded first, by repair of a nearby leak, or by some circumstance other than repair
Table L11 aggregates National Grid's statement of how leaks were "Eliminated Otherwise"

[8] Additionally, three leaks that appeared in the December 31, 2023 leak report did not appear afterwards in leak reports.
[9] See footnote directly above.

Table 6 aggregates how leaks were eliminated, according to National Grid categories.

Table 6 Leak Elimination in 2024

How eliminated	Count (All grades)	Count (Grade 3)	Leak extent sq. ft. (Grade 3)	% leak extent
Simple repair	280	68	99,107	63%
Pipe replacement	14	10	6,471	4%
Eliminated by the leak repair of other leaks or after being upgraded	11	7	9,250	6%
Eliminated by circumstances other than leak repair or pipe replacement	119	107	42,502	27%
Total	390	137	157,330	100%

Note that of the 119 leaks that were eliminated by “circumstances other than leak repair or pipe replacement,” 99 were reported as NO READS, even though they had been previously recorded to have a total of 38,092 sq. ft. of leak extent, including a 25,000 sq. ft. leak on Hammond Street and College Road. The leak extent reported as NO READS in 2024 is significantly higher than the numbers in 2022 and 2023.

Results - Leak History in Newton since December 31, 2019

Table 7 summarizes the status of reported gas leaks in Newton at the end of each quarter. Significantly, over the course of nearly five years, the extent of reported leaks has been reduced by 75%. Among the explanations for this reduction are rapid leak repair efforts, a focus on repairing SEI leaks, changes in measured leak extent after the first measurement, and a reduction in the number of new leaks.

Newton has a valuable opportunity to review its coordination with National Grid to ensure the continuous elimination of large leaks.

Table 7 Newton Reported Leak History since January 1, 2020[10]

National Grid Report Date	Number of Unrepaired Leaks	Total Leak Extent of unrepaired leaks	Percentage Reduction in Total Leak Extent from Previous Quarter
03/31/2020	856	793,062	
06/30/2020	765	648,712	18%
09/30/2020	733	554,243	15%
12/31/2020	714	520,851	6%
03/31/2021	691	568,224	-9%
06/30/2021	678	567,029	0%
09/30/2021	672	565,074	0%
12/31/2021	639	601,857	-7%
03/31/2022	622	548,597	9%
06/30/2022	639	582,140	-6%
09/30/2022	619	529,339	9%
12/31/2022	588	477,736	10%
03/31/2023	573	364,170	24%
06/30/2023	566	328,240	10%
09/30/2023	545	319,140	3%
12/31/2023	507	287,317	10%
03/31/2024	495	286,502	0%
06/30/2024	504	311,616	-9%
09/30/2024	437	301,974	3%
12/31/2024	372	266,103	12%
03/31/2025	365	234,611	12%
06/30/2025	376	201,162	14%

As of June 30, 2025, out of 376 total unrepaired leaks in Newton there were 102 unrepaired leaks which at any time in their history qualified as SEI. The sum of the leak extent of these leaks was 98,600 sq ft. which is almost half of the total leak extent in Newton (201,162 sq. ft).

[10]. Table 7 has slightly different numbers in this report from our GSEP report for 2023. This year's report deletes leaks in this table which were discovered to be double-counted in previous year reports.

Therefore, repairing SEI leaks is particularly effective in reducing methane releases to the atmosphere. However, the other (roughly) half of the leak extent in Newton is due to non-SEI leaks, which highlights the importance of eliminating as many leaks as possible, even those that are not SEI[11].

Conclusions and Recommendations

National Grid's pattern of expenses for replacing pipes and repairing leaks in 2024 was similar to 2022 and 2023.

Gas leak repair is much more cost-effective for reducing gas leaks in the short term than replacing leak-prone pipes. Gas pipe work in Newton should heavily prioritize leak repair and pipe retirement; complete pipe replacement is an expensive choice and should be avoided wherever possible.

To achieve more input and control over pipe replacement, and foster non-fossil alternatives, Newton should alter its procedures to receive detailed GSEP street segment statements (which may require action by the DPU) and to require City Council GOL review for all non-emergency pipe replacement projects. Newton should eliminate the "two-foot rule".

National Grid should be encouraged to continue repairing the most significant leaks as quickly as possible, because leaking methane is a significant current source of greenhouse gases. The plans and results for leak repair in Newton should be published quarterly for accountability.

Newton should amplify its official advocacy to State officials for an overhaul of GSEP to reflect Newton's Climate Action Plan goal of eliminating fossil gas emissions. GSEP needs to emphasize/prioritize the immediate reduction/repair of gas leaks. An overhauled GSEP needs to provide a better balance among public safety, infrastructure cost, and speedy retirement of the gas system.

GSEP should provide incentives to accelerate the retirement of the residential gas infrastructure. This approach would be in contrast to the concept behind the original program, which envisioned the indefinite operation of the gas system.

Appreciations

Thank you to others on the Newton pipes team, including, in particular, Josh Nichols-Barrer.

[11] I.e. always less than 2,000 sq ft leak extent and less than 50 barhole

APPENDIX

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Appendix: Guide to GSEP program abbreviations for pipe replacement
Quoted from NGrid filing D.P.U. 23-GREC-03, Exhibit NG-AS/MT-1, May 1, 2023, Page 7

> There are 11 types of programs included: (1) “BSMNRPL,” which indicates a bare steel main replacement project; (2) “CIMNRPL<10,” which is a cast iron main replacement project with pipe diameter less than 10 inches; (3) “CIRE101214,” which is a cast iron main replacement project with pipe diameter greater than 8” but less than or equal to 14”; (4) “ENCRCHMTPL,” which is a parallel main encroachment; (5) “PWNONREIM,” which is a public works non-reimbursable project; (6) “ENCRCHMTUM,” which is a main encroachment due to undermining of the existing facility; (7) “H2OINT,” a program that addresses recurring customer outages resulting from water intrusion into low-pressure distribution systems through the replacement of existing leak-prone pipe; (8) “REANONLEAK,” a program used to replace main that, based on conditions found in the field, is immediately prioritized for replacement regardless of leak history; (9) “ALDYRPL,” a program to replace pre-1985 vintage Aldyl-A plastic pipe; (10) “GPLNG,” which are system reliability main replacements; and, (11) BRIDGES.

END