Comhairle Chontae na Gaillimhe
Galway County Council

Gallagh Agricultural Co-Operative Development Society Limited

Gallagh Group Water Scheme (GGWS)

Gallagh Group Water Scheme

Submission to

Multi-Annual Rural Water Programme 2024-2026

Measure A4

for

Replacement of 7" Spine Main (Trunk Main)

Measure A4(a) Water Conservation

Replacement of revenue meters, control valves and other assets

Measure A4(b) Infrastructure upgrades

Table of Contents

1.0 Introduction

Gallagh Group Water Scheme (GGWS) was formed in 1970 to raise funding and construct a water network system to supply rural farms and houses in Lavally, Claddagh, Cortoon, Coolpark, and Brownsgrove, all townland areas North East of Tuam in County Galway. The network now covers approximately 6700 Hectares in a mostly agricultural area, with a large number of private houses constructed over the past 50 years. Customer water meters were installed in 2004. Approximately 80 km of pipes serve a customer base of 650No with approximately 1100No metered connections, including:

- 2 No Primary Schools
- 1 No Community Crèche
- 1 No Sports Grounds
- 2 No Churches & a Graveyard
- Private Houses 569 No
- Farms & Agriculture 388 No

In 2011, GGWS was part of the 2nd Galway Bundle of GWS to have their source and treatment plant upgraded under the Department of the Environment Rural Water Scheme funding. This has proved very successful and Glanua Ltd operates the treatment plant and maintains the quality of water supplied to the scheme under this contract until 2031. The source of water is a natural spring well located at Meelick East and supplies an abundance of treatable raw water.

2.0 The Network – Original Distribution Mains

The Network was predominantly constructed in 1974/5 (50 years ago) using Class C PVC spigot and socket pipe. The pipe was laid in open trenches with no bed or surround used to protect the pipe. This was typical of specifications prevailing at the time as government grants and group water scheme finances were such that pipe was laid without the extra cost of shingle bedding.

3.0 7" Spine Main – Strategic Trunk Main

When originally designed and constructed, the GGWS was built as a linear network with the 7" Spine Main x 7 km running through the scheme with most areas feeding off this main on single distribution lines. It is accepted in the water industry that the Class C PVC pipe used in the construction of the GGWS has a life expectancy of approximately 40 years. The 7" Trunk Main is now 10 years outside its life expectancy. The majority of the Gallagh GWS distribution mains fall into this category. The absence of pipe bedding to the original 7" Trunk Main has resulted in a greater number of pipe failures than is normal, especially as the original pipe is subjected to an increased weight of traffic due to the size of modern-day farm machinery and the presence of a large sand & gravel quarry business in the locality.

Since 2022, GGWS has experienced increased UFW and has had multiple leaks. Much of this is attributable to the age and failing status of the spine main.

The entire network functionality of the GGWS depends on the performance and resilience of the 7" Trunk Main. This pipe is beyond its design life and it is imperative that it be replaced as a matter of urgency to ensure the supply of water without repeated disruption to the customers of the GGWS.

The map of the GGWS Network in Figure 1, with the 7" Main in Green, shows the area affected by disruption when the 7" Trunk main fails. Up to 419 members are affected when the water has to be shut off to repair a leak.

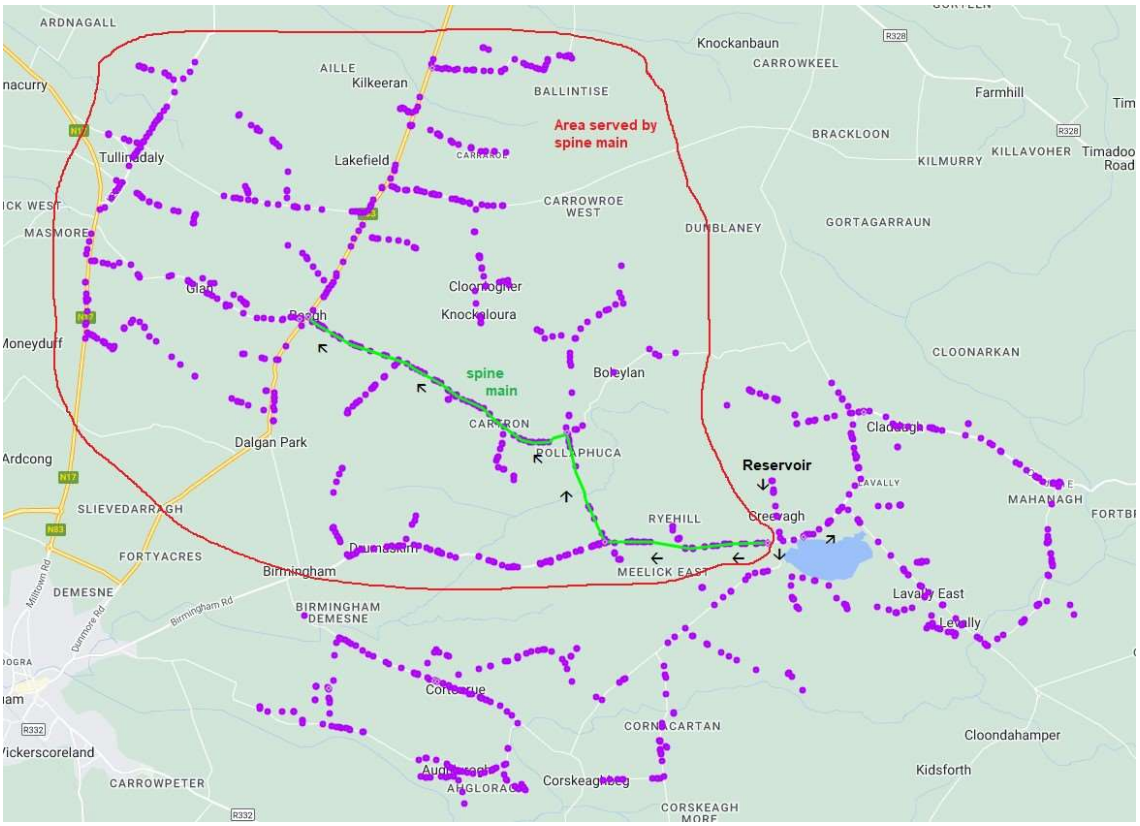


Figure 1 – map of area servd by the spine main

4.0 Failing water meters, control valves and other assets

Standard Elster V210 meters with a projected lifetime of fifteen years were installed in 2004 in WSC-R boxes with circular metal lids with a spring-lock requiring a special key. Now, twenty years later, many members have lost their keys, and many of the locks have seized, making the lids difficult to open and close. Some of the meters are faulty and leaks develop as fittings fail. GGWS have replaced problem meter boxes and meters as they found them over the past few years and have now implemented a programme of systematic replacement at a rate of 100 per year. At this rate it will take over ten years to upgrade all the meters in the scheme, by which time some of them will be thirty years old.

Figure 2 shows a box typical of those installed in 2004, and some of the boxes after replacement due to failure.

Figure 2: A WSC-R customer access box and some of the old WSC-R boxes after being replaced

When the scheme was originally constructed, all spurs off the spine mains were controlled by sluice valves at the change of diameter or tees on the mains. These valves are now continuously failing as they are heavily corroded and if the operative manages to open or close them, they result in leakage on the valve glands.

Figure 3 shows a typical valve replaced on the scheme in 2020.

Figure 3: Typical Original Sluice Valve

5.0. Funding under MARWP 2024-2026

GGWS are applying for funding under Measure A4 of the MARWP 2024-2026.

Measure A4 - Improvement of Infrastructure including Water Conservation (existing private and public group water schemes)

A4(a) Water Conservation

The GGWS Objective is to

- reduce UFW and reach a sustainable economic level of leakage
- increase the security and resilience of their high-quality drinking water supplies

This can be achieved by replacing 7 km of trunk main to secure the resilience of high quality water supplies that are consistently compliant with Drinking Water Regulations.

A4(b) Infrastructure Upgrades

The GGWS Objective is to

- improve the efficiency and accessibility of metered connections, allowing for more control and easier reading
- improve control by replacing valves

This can be achieved by replacing the failing 20-year-old meters with new meters and by replacing all original control valves.

Subject to final design and procurement (estimated 6 months), GGWS are in a position to commence works on the 7" Trunk Main as a matter of priority and are applying for Stage 3 funding. Stage 1 and Stage 2 have already been completed under previous Capital Investment Schemes.

Stage 1 - The Installation of a Water Management System

- Universal metering in place since 2004
- 11 DMAs were identified
- Bulk meters were installed and equipped with telemetric loggers
- All meters and assets were mapped
- New valves were installed where a need for them was identified

Stage 2 - Active Leakage Control

- Usage in DMAs is monitored to detect increases above normal levels
- Member meter data and data from the DBO operator are used to calculate UFW (see Section 6)
- An operative visits every part of the scheme on a regular, planned basis as part of a flushing program, and reacts quickly to any problems discovered
- Find and fix methods are used to reduce wastage – see Appendix 1 for examples
- Text communications with members encourage reporting of leaks

6.0 Justification for Replacement of the Spine Main

- Water audits showed increased UFW – section 6.1
- The spine main was identified as the most wasteful DMA – section 6.2
- The night flow rate on the spine main exceeds 0.4 m^3/hr/km – section 6.3
- There have been 13 leaks on the spine main in two years – section 6.4
- Leak fixes have caused significant disruption for members – section 6.5
- GGWS is unable to expand because the spine main is unreliable – section 6.6

6.1 Wat
er Audit - UFW 2018-2023

Unaccounted-for water (UFW) is a measure of the difference between the volume of water received into the network and the volume delivered to the consumers through their meters. GGWS have calculated the UFW across the whole scheme as a percentage of the water supplied for each 12-month billing period (September to August) from 2017/18 to 2022/23. The amount of water supplied was obtained using the Final Water Flow Meter reading from the August reports issued by the DBO operator. The annual usage from August meter readings of all the individual connections was subtracted from the amount supplied to get the volume of UFW. Table 1 and Figures 4 and 5 show the results.

Table 1

Year	August Final Water Flow Meter reading	Supplied from reservoir (m^3)	Total usage from member meters (m^3)	UFW	UFW%
2017	1193408				
2018	1398214	204806	163535	41271	20%
2019	1606393	208179	163400	44779	22%
2020	1840305	233912	189746	44166	19%
2021	2091597	251292	191972	59320	24%
2022	2421732	330135	179060	151075	46%
2023	2711171	289439	179453	109986	38%

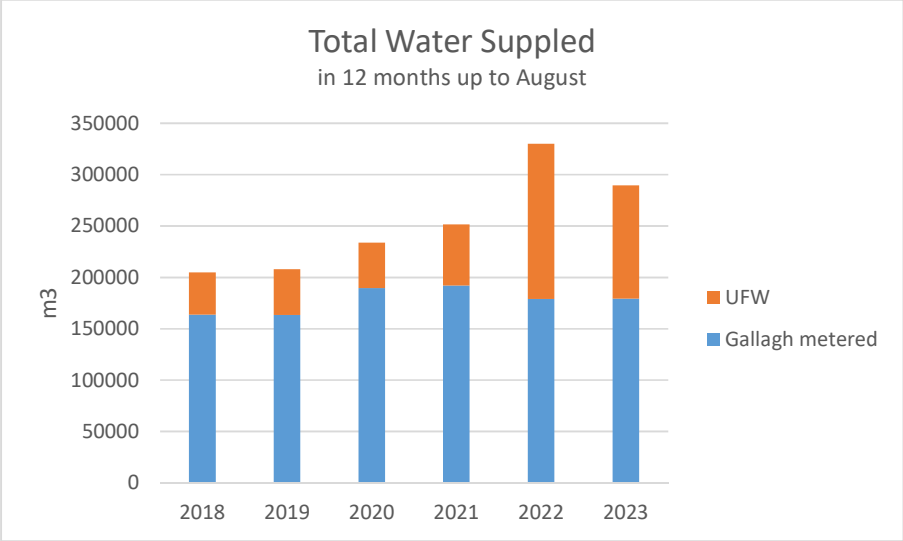
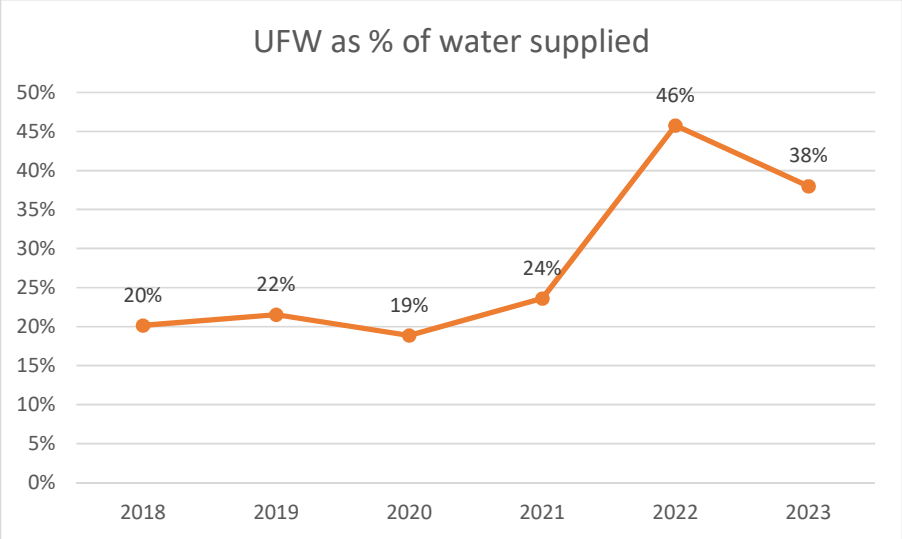


Figure 4

GGWS had an acceptable level of UFW (<25%) up to August 2021, but by August 2022 the UFW had doubled. This was the period when the 7" spine main began to fail. GGWS introduced an active leakage find and fix programme in early 2022, and had already fixed several leaks by August. However, new leaks continued to appear and the UFW was still high a year later, despite best efforts to react quickly.

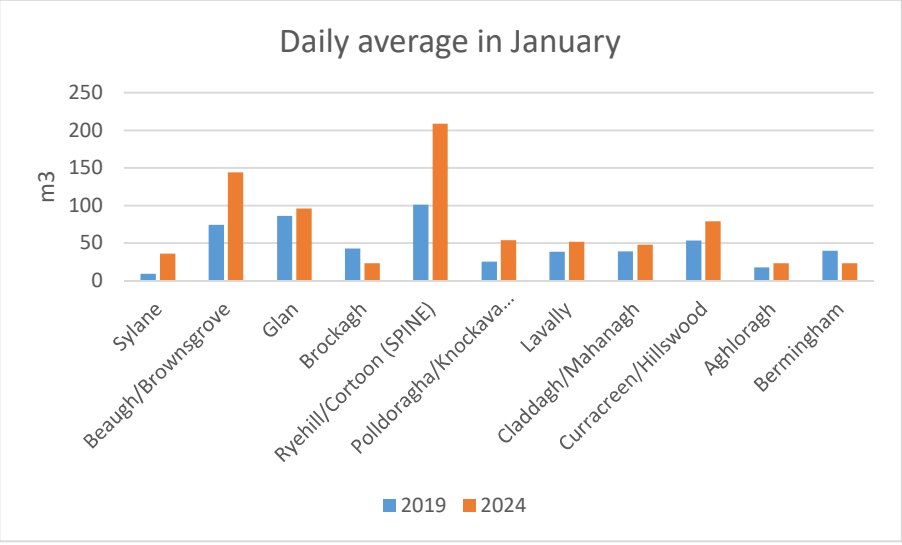
Figure 5



6.2 Contribution of Spine Main to Wastage

Daily usage in the eleven DMAs of GGWS was averaged over the month of January 2019 and also in January 2024. The comparison in Figure 6 shows that usage increased in most DMAs. Note that an extensive find and fix programme solved an over-consumption problem in Brockagh. The Beagh/Brownsgrove DMA needs some attention, but the biggest problem lies in the Ryehill/Cortoon DMA, which is the 7" spine main. It shows more than 100% increase in consumption in January 2024 compared to five years ago, despite all the leak fixes in 2022 and 2023.

Figure 6



A closer look at the data for the spine main DMA in Figure 7 shows a marked increase in leakage in 2022. GGWS implemented a find and fix and valve replacement programme which was successful in reducing the daily demand to normal levels by June of that year, but it has increased again in 2024. This further indicates the urgency in replacing this critical asset to maintain the resilience of the network.

Note: The data for January 2021 is missing because one of the relevant loggers was out of action during that month.

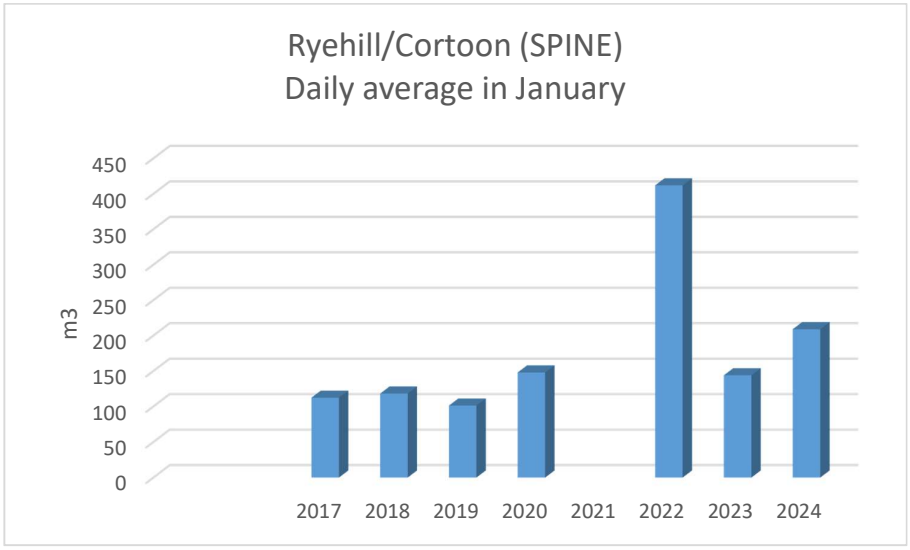


Figure 7

6.3 Night Flow Rate on the 7" Main in February 2024

The 7" Trunk Main is monitored for leakage using the McHugh's Bulk Meter (BM) as labelled and installed by Cully Automation Ltd in 2019. McHugh's BM is located on the commencement of the 7" Trunk Main, Point A on the network map. In order to measure and monitor the consumption on the spine we need to subtract the other BMs located on spur mains at points B, C, D and E.

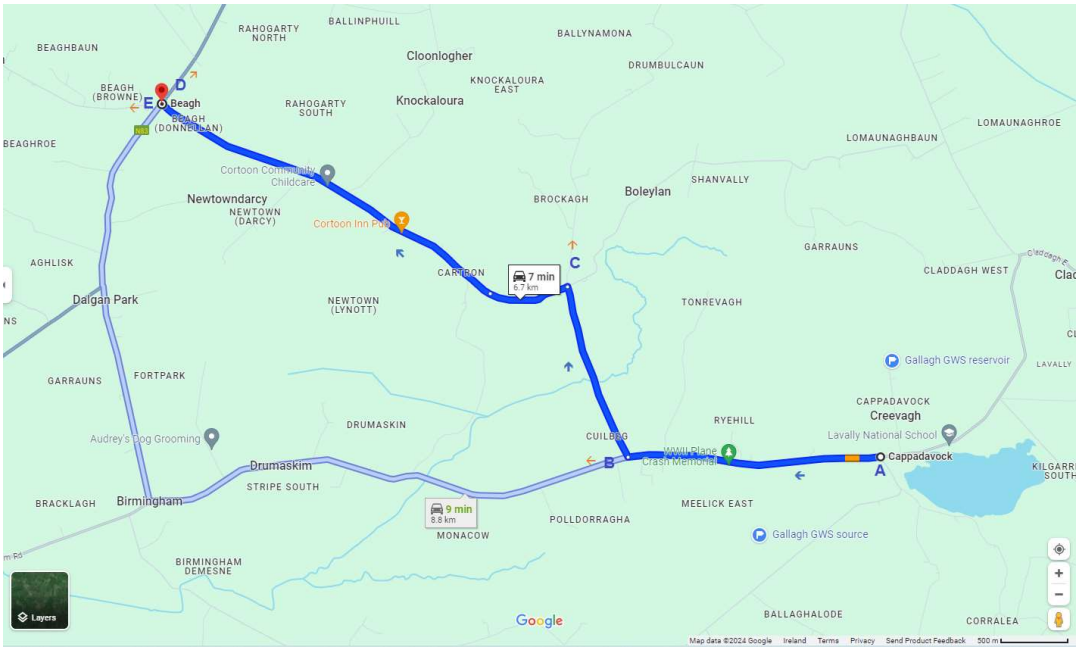


Figure 8

The table below shows the minimum flow rates recorded at the five BMs over a week in February 2024.

Table 2

Bulk Meter	Minimum flow rate 15/02/24-22/02/24
A McHughs	17.96 m^3/hr
B Polldorragha	1.440 m^3/hr
C Brockagh	0.510 m^3/hr
D Beagh	5.360 m^3/hr
E Glan	1.760 m^3/hr

A – B – C – D – E = 8.89 m^3/hr along 6.7 km of 7" pipe.

Estimated night flow on spine main = 8.89 m^3/hr ÷ 6.7 km = **1.33 m^3/hr/km**

This is well in excess of the >0.4 m^3/km/hr requirement in the framework document, Table 5 – Water conservation priority rating – Priority B.

6.4 Burst Frequency 7" Trunk Main

The 7" Trunk Main has failed on 13 No occasions over the past two years. The map below illustrates the location of these leaks along the 7 km of PVC main, numbered in chronological order. The dates of the leaks are shown in Table 3. Nine of these were splits in the pipe, of which two were repaired with a wrap and seven required a cut-out and replacement of a length of pipe.

Figure 9

Appendix 2 contains charts of the bulk meter flow at the start of the spine main during periods when leaks were fixed. Significant volumes of water were lost. Sometimes the leak was not visible and took a while to find (leak 10, for example). Other times the leak suddenly flooded

the road, making it dangerous. On two occasions in 2023 (leak 8 and leak 9), the leak flow was so high that it exceeded the fill rate at the reservoir and required that the water be shut off overnight while mobilising a crew to dig the following day.

Some of the cost to GGWS of repairing the 7" main is outlined in Table 3 as €29,165.

Table 3 – Cost to Gallagh GWS of 7" Leak Repairs 2022/23

Leak No.	Location	Date	Labour& Plant	Pipe & Fittings	Backfill Material	Reinstatement	Supervision	Total
1	Cortoon Village	09/06/22						
2	N83 Junction Cortoon	11/06/22	€4,250	€1,680	€700	€600	€900	€8,130
3	Near Cortoon Inn	11/06/22						
4	N83 Junction Cortoon	24/07/22	€1,022	€560	€350	€380	€300	€1,590
5	Cortoon ferrule at new house	29/08/22	€1,022	€80	€250	€320	€300	€950
6	Brockagh Cross (Valve)	10/09/22	€681	€900	€350	€180	€300	€1,730
7	Lavally (hill)	17/10/22	€1,362	€560	€700	€450	€600	€2,310
8	Pollaphuca Near Stream	02/05/23	€1,532	€560	€450	€150	€600	€1,760
9	Lavally Rd (Donellans)	31/05/23	€2,701	€700	€700	€280	€600	€2,280
10	Ryehill Monument	19/07/23	€3,927	€1,250	€1,050	€625	€1,800	€4,725
11	Cortoon Lynotts	23/08/23	€1,737	€560	€700	€370	€600	€2,230
12	Cortoon (Church)	29/08/23	€1,430	€560	€700	€450	€600	€2,310
13	Lavally Rd (Donnellans)	07/11/23	€930	€250	€350	€250	€300	€1,150
							Total Cost	**€29,165**

6.5 Consumer interruptions as a result of the 7" Trunk Main bursts

The consumer interruptions as a result of the above failures is immense. As previously illustrated, the 7" Trunk Main supplies water to 64% of the Gallagh GWS. Shut-offs during repairs to the 7" main have caused Brownsgrove National School and Cortoon Community Creche to close their premises at huge inconvenience to parents. There are 419 consumers directly fed off the 7" Main, including several large dairy farms, and the impact of these regular interruptions to the water supply is a cause of great concern in the locality. Fixing the water main is only part of the problem. It takes a long time to refill the network and eliminate trapped air and restore full pressure to gradients, so some areas of the scheme can remain out of water for up to 48hrs.

6.6 Inability to expand the network

GGWS has been approached by a representative of a group of 17 houses, currently on individual wells with poor quality water. These houses are in Carrowpadden, which is at the end of the Sylane line at the north end of GGWS. The residents would like to join but had to be told that GGWS is not in a position to take them in until there is more confidence in keeping an uninterrupted supply to that area. This, unfortunately, is the part of the network that is last

to get water supply restored every time there is a shut-off on the 7" main. Sometimes, other branches that have already filled need to be shut off again to get enough pressure to refill Sylane. Taking in another 17 houses in that area would only add to the problem.

7.0 Estimation of Cost of Works

GGWS have compiled costings for the replacement of their 7" Trunk Main (Table 4) and for the replacement of meters and valves across the rest of the scheme (Tables 5 and 6). GGWS are allowing for inflation in their estimate as they forecast the works will be carried out in 2025/26.

Table 4 Cost of replacement of 7" Trunk Main
Measure A4(a) Water Conservation

Item	Description	Qty.		Rate		Cost
1	Water Mains Install 180 mm HDPE + Backfill + Reinstatement 1/2 Carriageway	7000	m	€120.00		€840,000.00
2	Service Connection	100	No.	€350.00		€35,000.00
3	Hydrants	20	No.	€650.0		€13,000.00
4	Sluice Valves	12	No.	€700.00		€8,400.00
5	Scour Valves	12	No.	€650.00		€7,800.00
6	Air Valves	6	No.	€750.00		€4,500.00
					Sub total	**€908,700.00**
7	Design	6%				€54,522.00
					Sub total	**€963,222.00**
8	Supervision	3%				€28,896.66
					Total	**€992,118.66**
					Rate/m	**€141.73**

Table 5 Cost of replacement of customer revenue meters
Measure A4(b) Infrastructure upgrades

Description	Qty	Rate	Total Cost
New matrix boxes and new Elster 210 meters	800 No.	€400	**€320,000**

Table 6 Cost of replacement of control valves and hydrants
Measure A4(b) Infrastructure upgrades

Asset	Qty	Rate		Total
Sluice Valve & Chambers	81 No.	€700		€ 56,700
Scour Valves & Chambers	71 No.	€650		€ 46,150
Hydrants	26 No.	€650		€ 16,900
Air Valves	38 No.	€650		€ 24,700
			Total	**€ 144,450**

8.0 Consideration of Alternatives and Options Report

GGWS are one of 15 GWS in the 2nd Galway DBO Bundle and their water treatment plant is operated very successfully by Glanua. The GWS is a standalone scheme and supplies water to a large area of North Galway. The options considered are as follows.

- **Standalone**
  As a member of the 2nd Galway Bundle, GGWS alongside Glanua can sustainably and viably operate and manage their own supply.
- **Amalgamation**
  GGWS will always consider adoption of other GWS in close proximity to their network and supply. This has already happened when GGWS adopted Sylane GWS which was a smaller scheme and its source was not considered viable and sustainable. Other schemes in close proximity to GGWS are also in the 2nd Galway Bundle and it's not considered viable a single treatment plant would sustain 2 schemes without major investment in capacity and network enlargement. If GGWS was to consider amalgamation with another scheme, Carrowpadden, for example, the upgrade of the 7" Trunk Main, which forms the basis of this application, would have to be part of any upgrade required to connect the networks and maintain the resilience of the supply of water to customers.
- **Rationalisation**
  Rationalisation of management arrangements can be considered under the terms and future planning of the DBO Bundles.
- **Engineering**
  The failures on the 7" are mostly due to pipe breakage rather than ferrule failures and are occurring at random locations along its whole length. There is no alternative to replacing the whole spine and the 99 connections that are on it.

Whichever option is considered the capital cost of replacement of the trunk mains will remain an engineering requirement to improve the quality, resilience and reliability of the water supply to the customers of GGWS.

9.0 Summary

Gallagh GWS is an extremely well-managed Group Water Scheme but with an aging network of pipes that will require major investment over the next few years to upgrade and maintain the water distribution system to serve the customer base in the future. Replacement of the 7" spine main is crucial to the improvement of the entire distribution network. Previous investment in the water treatment must be matched with similar investment in the network to ensure GGWS continues to be part of the water asset network for the supply of water to customers in this part of North Galway.

Submission by Mick O'Shea and Claire Conway on behalf of Gallagh GWS

11th March 2024

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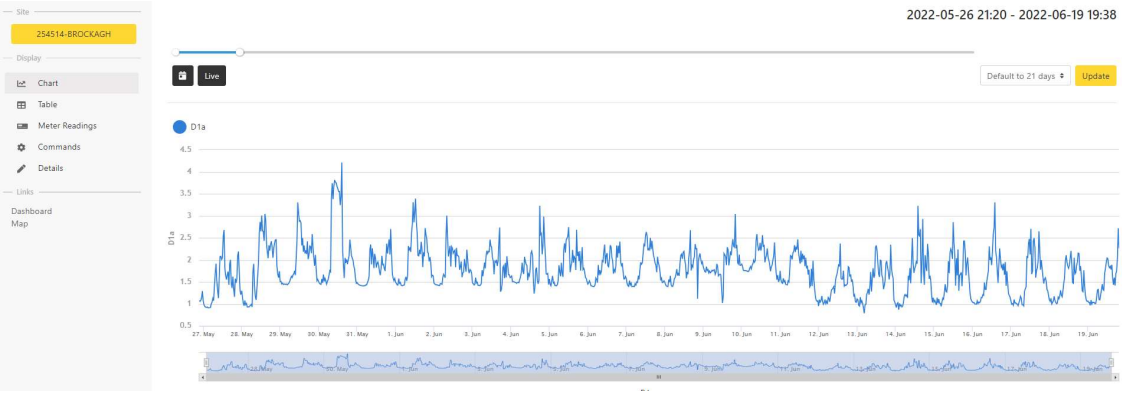
gallaghwater@gmail.com, 085 1406955

Appendix 1

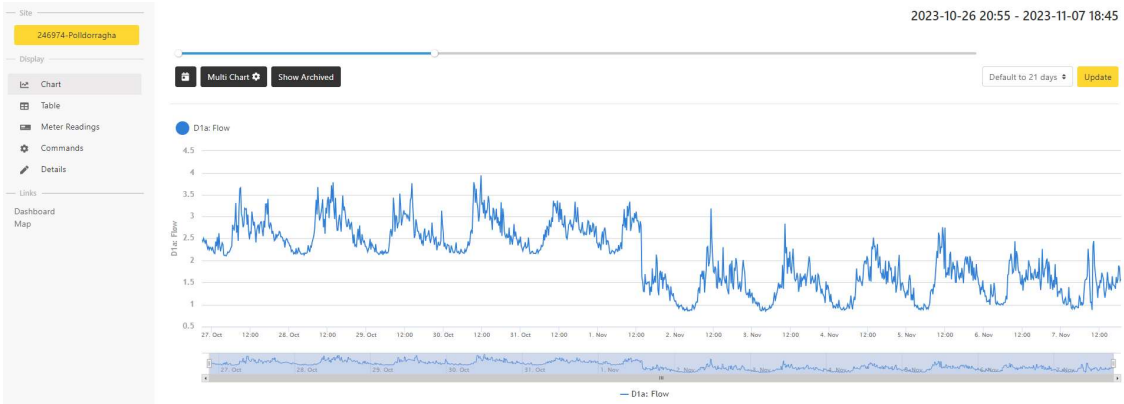
Examples of leak fixes

1. Brockagh bulk meter jumped in May/June 2022. There was no evidence of leakage above ground. Installation of new valves and employment of a listening device eventually found leaks which were then fixed.



Brockagh bulk meter

2. Polldorragha DMA was showing high usage in October 2023. A text appeal resulted in a call from a farmer reporting an area of soft ground. A mains leak was found nearby and was fixed, bringing usage back to normal.

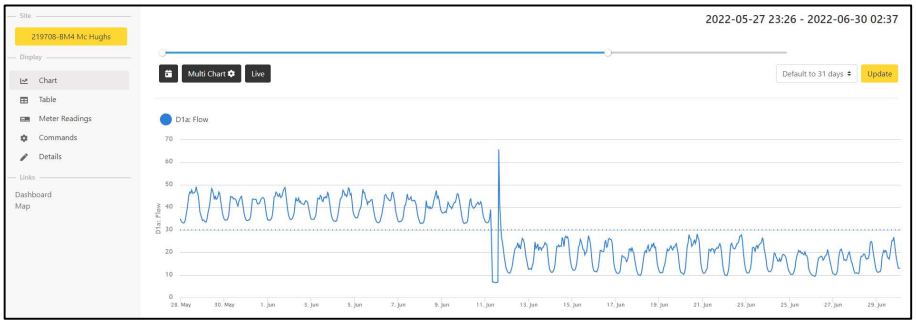


Polldorragha bulk meter

Appendix 2

Charts from McHughs bulk meter showing leak fixes along the spine main. The leak numbers correspond to those in Figure 9 and Table 3.

1,2,3



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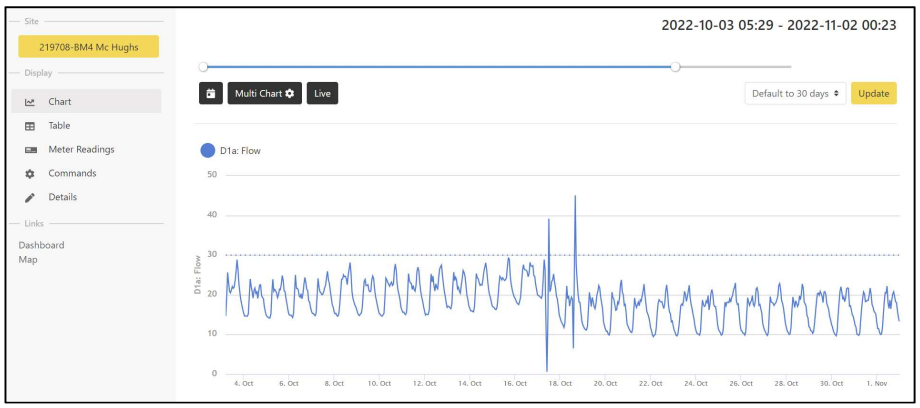

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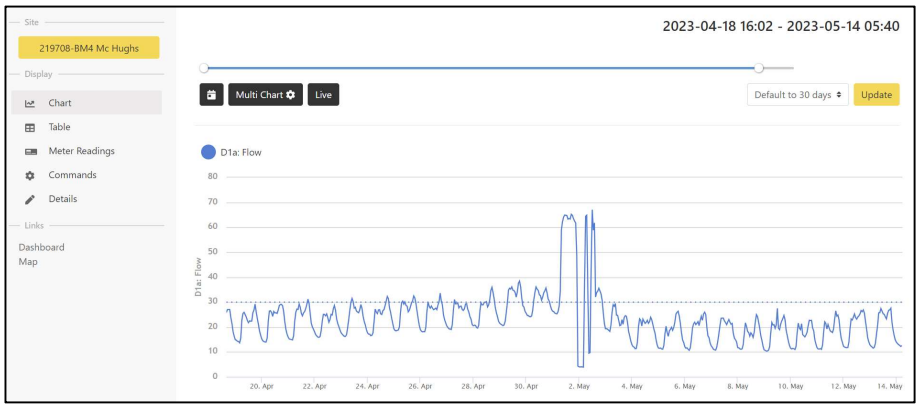

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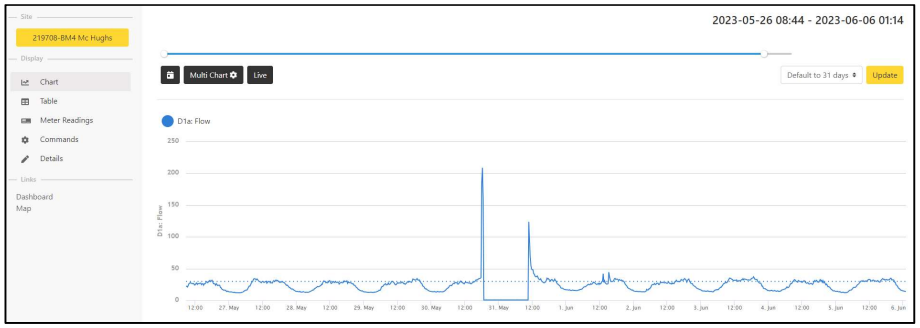

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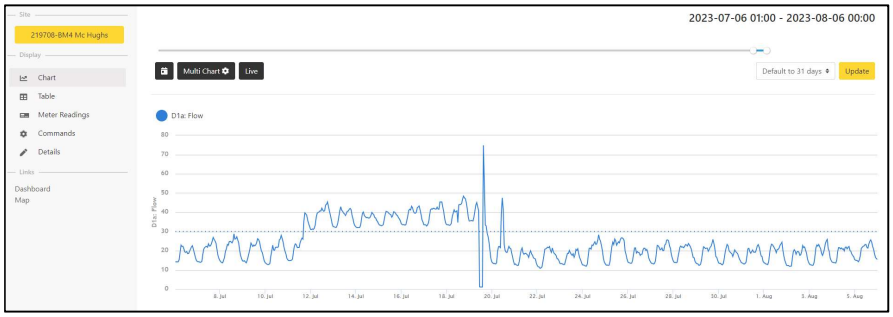
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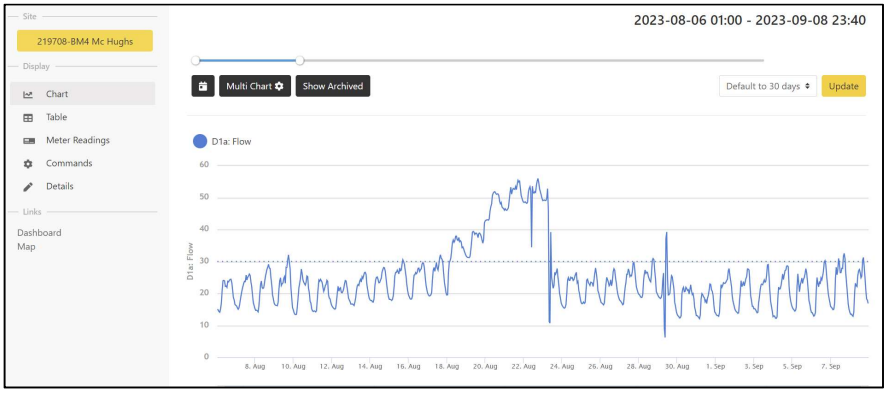
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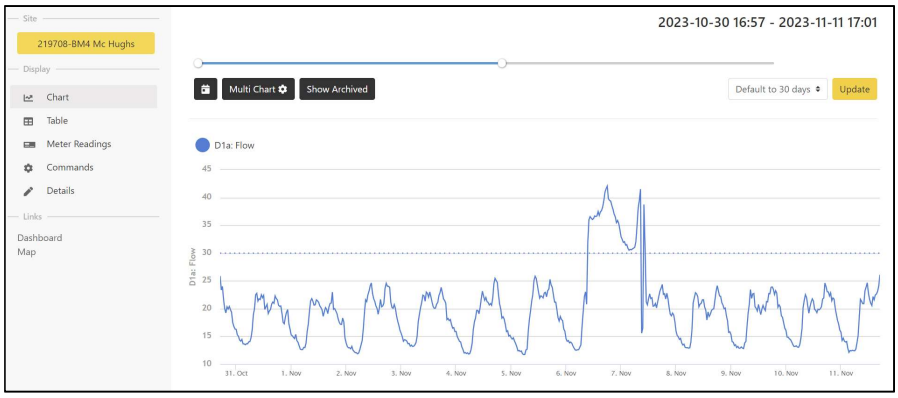
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