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HSE Capital & Estates
Sustainable Infrastructure Office

St Finbarr's Hospital - Best Practice Example

Developing a long term water infrastructure strategy: lessons learned from St. Finbarr's Hospital Water Conservation Programme

St. Finbarr's Hospital - a site with history

Originally developed as the Cork Union Workhouse and Infirmary in 1847, St. Finbarr's Hospital became the Cork District Hospital in 1898.

In 1923 it was designated by ministerial order as the as the Cork County Home and Hospital responsible for the treatment of medical, surgical and maternity cases. It was also assigned responsibility for cases of infectous and contagious diseases.

Today, the site provides a range of healthcare related services including:

- Administration
- Support Medical Services e.g. Irish Blood Transfusion Service (IBTS)
- Community Nursing Unit
- Orthodontal Services

The Issue: Old Water Infrastructure

1. Much of the water distribution and waste water discharge infrastructure has been in place for many decades including cast iron, clay and lead pipework.

2. As with other older HSE campus style sites, the maintenance team in St. Finbarr's Hospital is continually reacting to leak related issues associated with the old infrastructure.

3. When leaks occur, they have an impact on water quality and can have implications for bacterial growth. In the case of long standing leaks, these can also impact site infrastructure by undermining buildings and roadways.

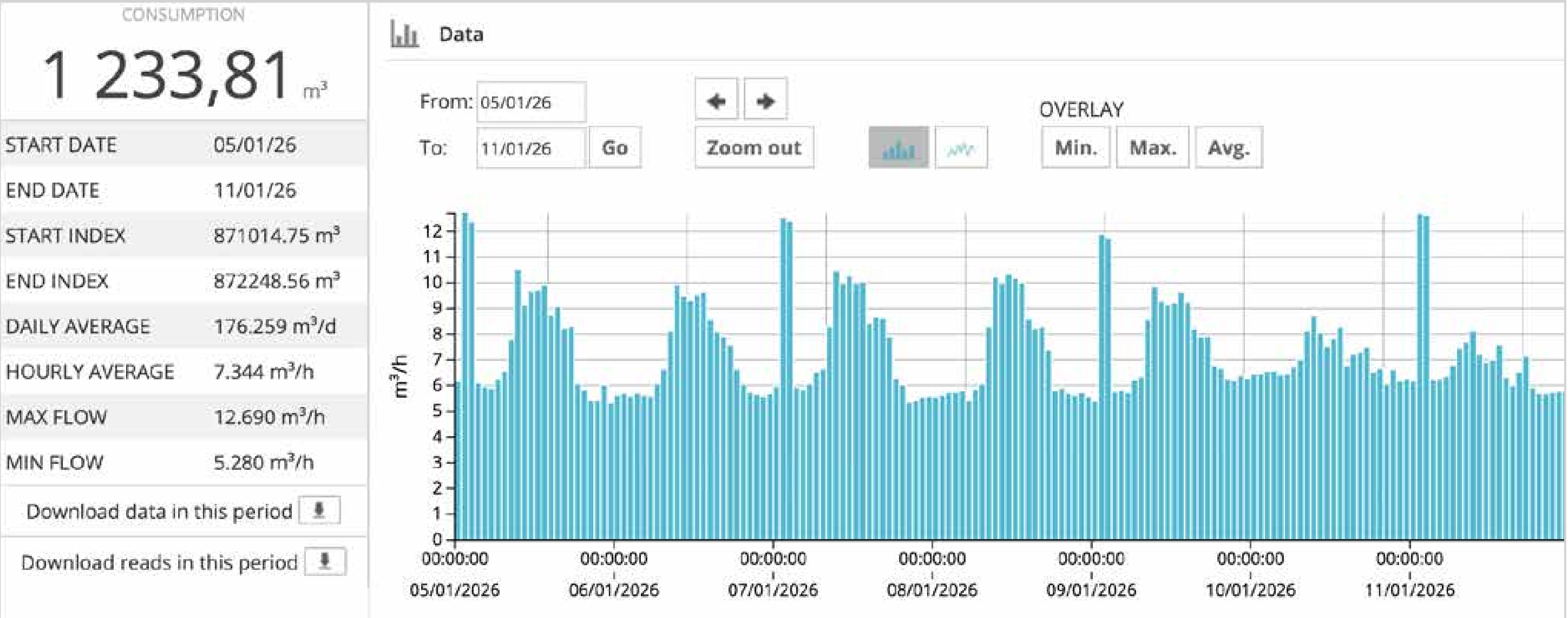
4. These leaks can also cost a lot of money in terms of paying for the leaking water, the time involved in finding the leaks and then the work involved in repairing them.

The Issue: Understanding the extent of the problem

St. Finbarr's Hospital already has an online logger installed on the mains meter. This provides live information on the water consumed on site.

The logger has been used successfully to measure water consumption and monitor for new leaks. As seen in the graph below, the meter's software provides data which can clearly show when water consumption is high and low.

This graph shows water consumption for 1 week but the data can be displayed as needed e.g. monthly, annually etc.


CONSUMPTION

1 233,81 m³

START DATE	05/01/26
END DATE	11/01/26
START INDEX	871014.75 m³
END INDEX	872248.56 m³
DAILY AVERAGE	176.259 m³/d
HOURLY AVERAGE	7.344 m³/h
MAX FLOW	12.690 m³/h
MIN FLOW	5.280 m³/h

Quantifying the cost of leaks

Based on these weekly snapshots taken over the past few years, and using these to scale up for a year, the annual costs for the site could vary between €190,000 and €350,000 with the difference (~€160,000) attributable to leaks.

NOTE: a number of leaks have been repaired during this period but new ones have also appeared.

€190,000
Late 2022
Estimated Annual Costs

€280,000
Late 2023
Estimated Annual Costs

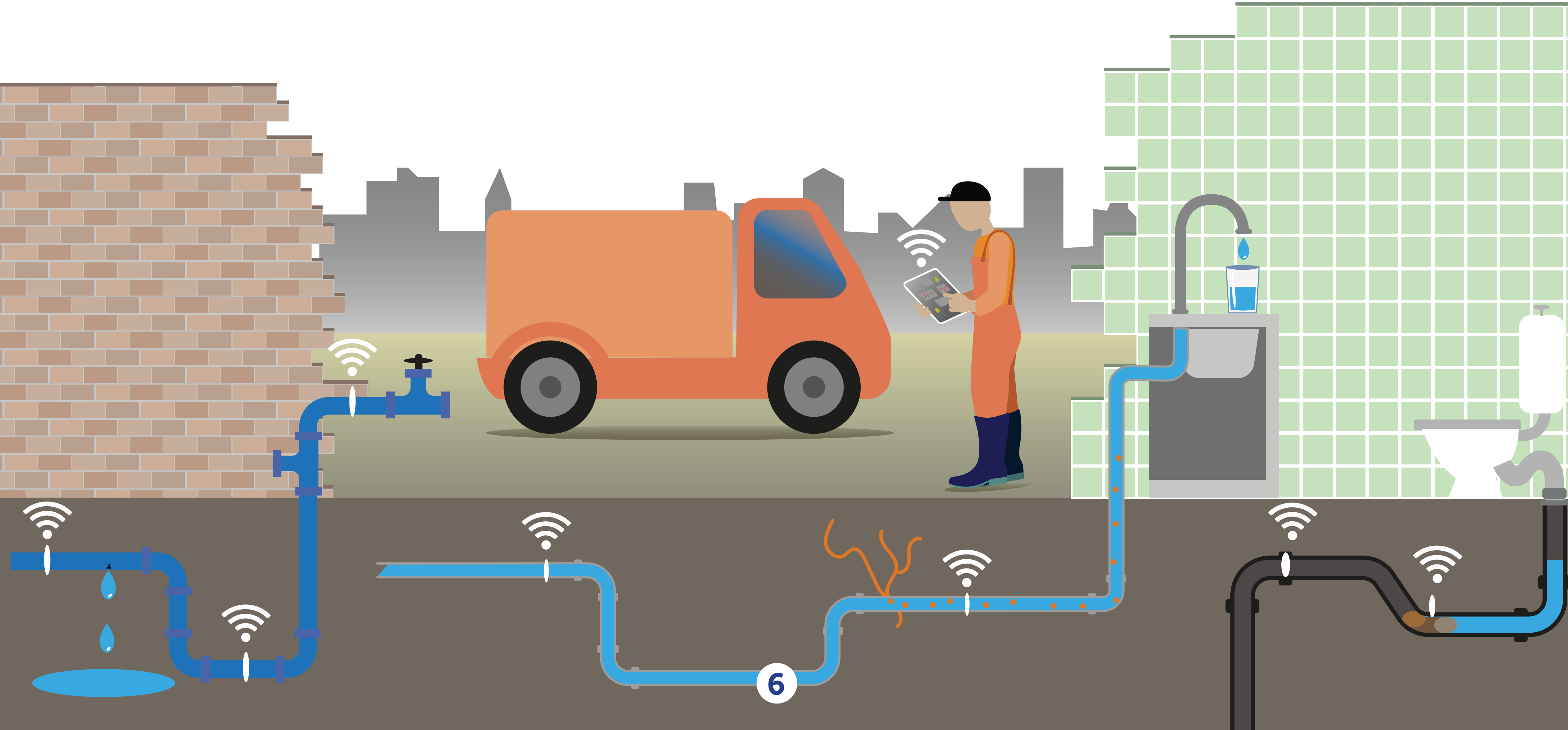
€350,000
Early 2024
Estimated Annual Costs

While the weekly profile is similar for each week the baseline usage has increased. The baseline (or background water use) is typically linked to what is happening in the middle of the night when water use should be at a minimum. While there will always be some water used in the background, if this volume is larger than expected then it is usually an indication of leaks on-site.

What happens when leaks occur...

As there are currently no internal sub-meters installed, the on-site team uses sluice valves to turn off water in certain areas to try and determine where leaks occur.

While this helps determine where the leak is located, the continual cycle of leak and repair without a **full infrastructure upgrade strategy** (see p9) can be an ongoing burden that results in water loss, increased costs, time to repair and water quality implications.



St. Finbarr's Hospital: putting a leak detection system in place

St. Finbarr's Hospital onsite Maintenance team, with the support of the HSE Capital & Estates Regional Sustainability Officer, carried out the following actions to address the ongoing issue of leaks on site. It is important to note that because they already had their mains data available through an online system they didn't need to do this important first step.

1. A basic pipe mapping assessment was carried out to provide the onsite team with an up-to-date network drawing.

2. Based on this mapping, a sub-metering plan was drawn up to identify the types & possible locations for a series of sub-meters for around the site.

3. The first phase of sub-metering involved installing 10 sub-meters for strategic water use locations/buildings around the site.

4. Based on a gap analysis of the data from the first phase of sub-metering, a second phase of sub-metering at strategic locations (e.g. near sluice valves or linked to geographic areas of the site) is planned.

When finalised, the sub-metering system will provide comprehensive site wide water consumption information that will help to identify (a) high water users to target for water conservation interventions and (b) leaks as they occur which will ensure a responsive repair.

Photo of St. Finbarr's Hospital by David Hawgood, CC BY-SA 2.0, https://commons.wikimedia.org/w/index.php?curid=79071512

What we can learn from St. Finbarr's Hospital

1. If you are not monitoring, you are in the dark

Having live data from the mains meter(s) is an essential first step for any water conservation work. This will help identify current levels of background water use as well as providing information on any new leaks as they occur.

2. Once you know your use profile, get strategic and use technology

Without live information, it will always be difficult to minimise leaks and reduce water costs. By implementing a comprehensive sub-metering system, which should be based on good network drawings, hospital maintenance teams will be able to pin-point existing leaks and respond quickly to new ones as they occur.

3. For older sites, a long term plan makes sense

For older sites with a larger footprint, development of a long term plan for network upgrades that works with day-to-day actions is a crucial step. This will help ensure that the money spent on repair works are part of a long term upgrade rather than being individual work items.

4. Think 'best practice'

Consider what plan you would come up with today, based on best practice, for the distribution system around the site. Budgets and time constraints will always apply, but it can help to visualise what would be the ideal and most effective water system for the site.

A strategy for the future

With older healthcare sites, where the old infrastructure leads to a continual cycle of leak and repair, a long term **infrastructure upgrade strategy** should be developed.

The cost and complication of completely upgrading all the old infrastructure at one time means that this will never be feasible. However, by having a **long term plan** for a healthcare site, any ongoing leak repairs and other civil works that may occur can be used proactively to upgrade the main distribution network over time, section by section.

Such an approach will ensure that the water distribution infrastructure will be future proofed to:

- reduce ongoing costs
- improve water quality
- minimise the unaccounted water losses
- and, most importantly, mitigate the risks posed by leaks to the healthcare services provided

A strategy for the future - How to do it

1. Compare & Collate

Start by collecting all current network drawings and related information from external sources.

This could include:

A	**A review** of existing drawings and comparing them with older ones	✓
B	**Comparison** with any local authority site drawings; a lot of the historic pipe upgrades would have happened in collaboration with local authorities when they managed local water services	✓
C	**Interviews** with on-site staff (past and present) and external contractors that are frequently onsite	✓

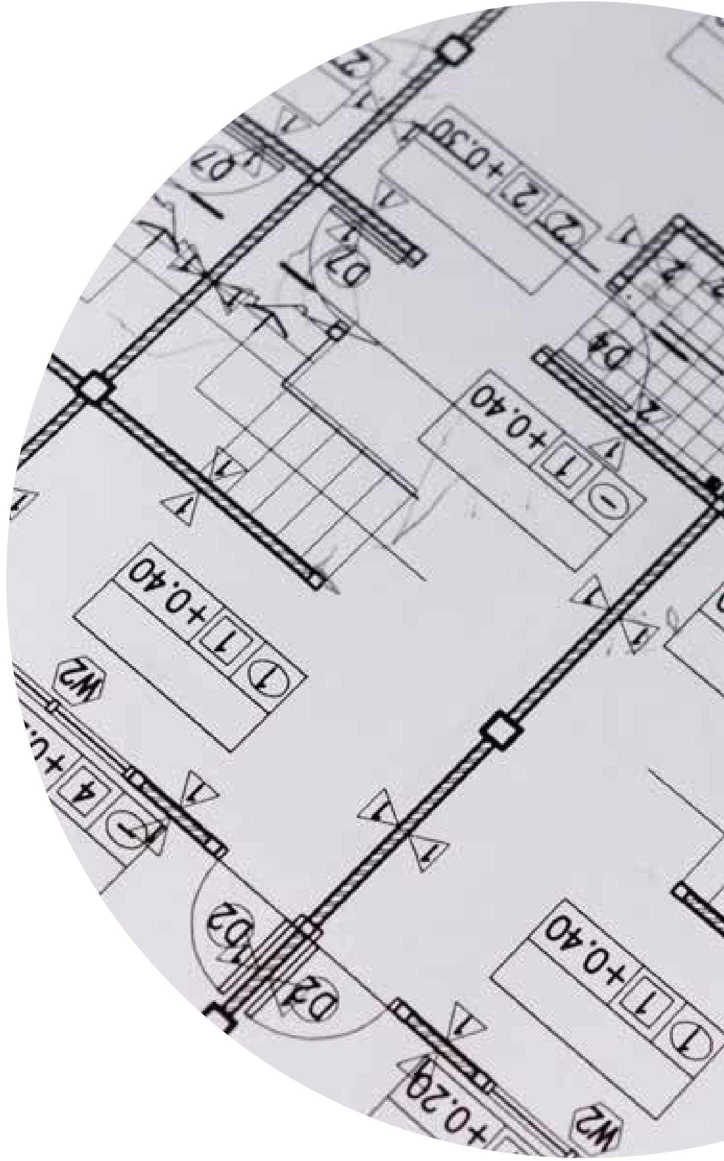
A strategy for the future - How to do it

2. Develop Up-To-Date Drawings

Based on the data gathered in the previous step, develop an up-to-date network drawing. This should be for the main distribution network rather than the internal pipework within buildings and also include wastewater.

Such a drawing should:

A	**Identify** all mains meters supplying the site and confirm the associated WPRNs	✓
B	**Track** the location of the main water distribution pipework	✓
C	**Identify** sizes and material of the pipes	✓
D	**Note** where repairs and upgrades have already taken place	✓
E	**Locate** valves and fire hydrants (if not on a separate ring main)	✓
F	**Identify** any existing internal sub-meters	✓



A strategy for the future - How to do it

3. Collaboration is Key

Once this current and historic information has been pieced together, and an accurate network drawing produced, it should then be used to develop a **long term infrastructure plan for the site.** This should be done in collaboration with the onsite maintenance team, engineer, Sustainability Officer and any other key stakeholders involved such as key external contractors and Úisce Éireann.

4. Prepare Upgrade Strategy

Based on this **long term infrastructure plan**, an **upgrade strategy** should be developed. This strategy will ensure that any water repair or other related civil works carried out in the short term fit into a **long term infrastructure plan** rather than being stand-alone work items.

Additionally, should other un-related civil works occur on-site (e.g. road upgrades) then these should, where possible, be leveraged to address the long term infrastructure upgrade plan (e.g. pipe upgrade, etc.).

A strategy for the future - How to do it

5. Review and Improve

Once the strategy has been developed, it is important that it is disseminated to the relevant managers and that priority actions are set for the coming year.

The strategy and infrastructure plan should be reviewed on an annual basis with the site drawings updated and the priority actions revised.

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GreenHealthcare

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