Unlocking Development at Belfast Harbour

Sewer Rehabilitation using Trenchless Technology

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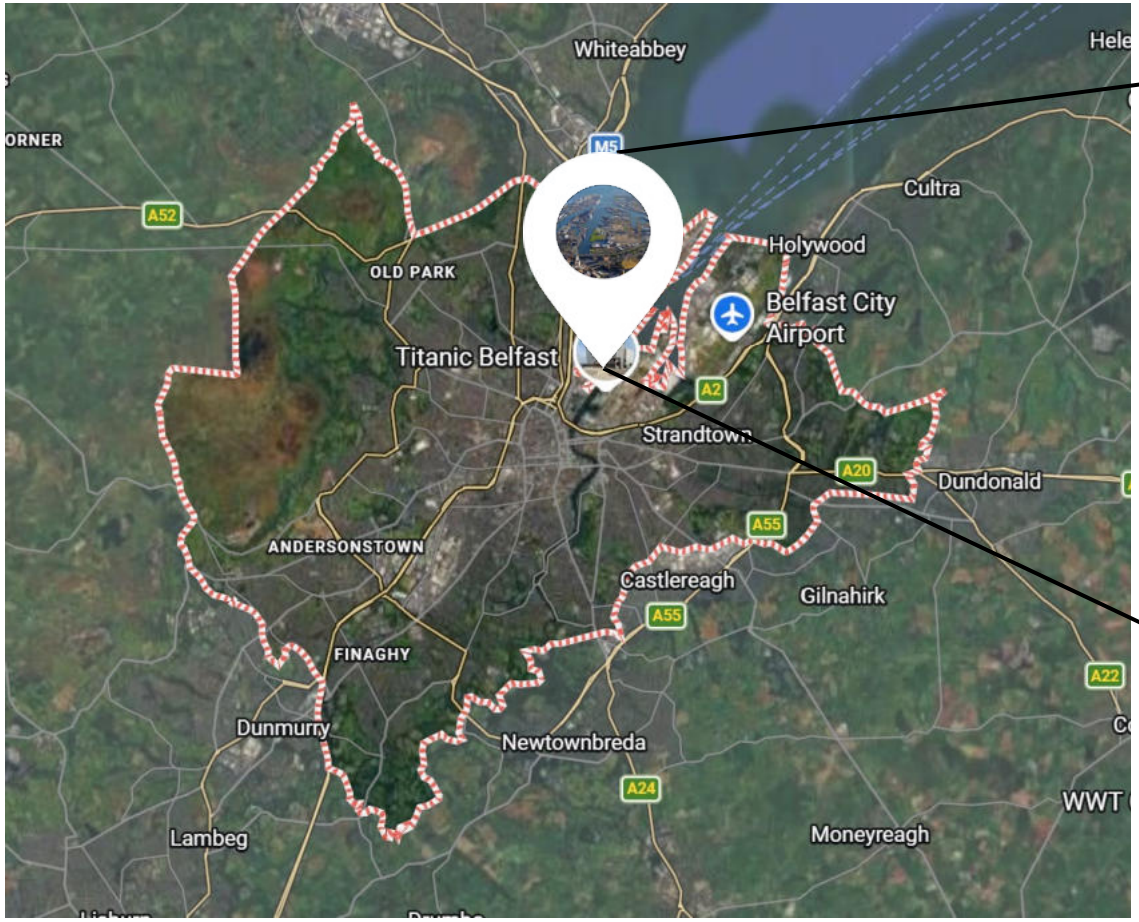
12th March 2026

Project Background

Location



Project Background

Belfast Harbour Commissioners (BHC)

- Enable Economic Growth
- Develop & Improve the Port
- Create Vibrant Places to Live & Work
- Innovate for a Better Tomorrow
- Accelerate to Net Zero

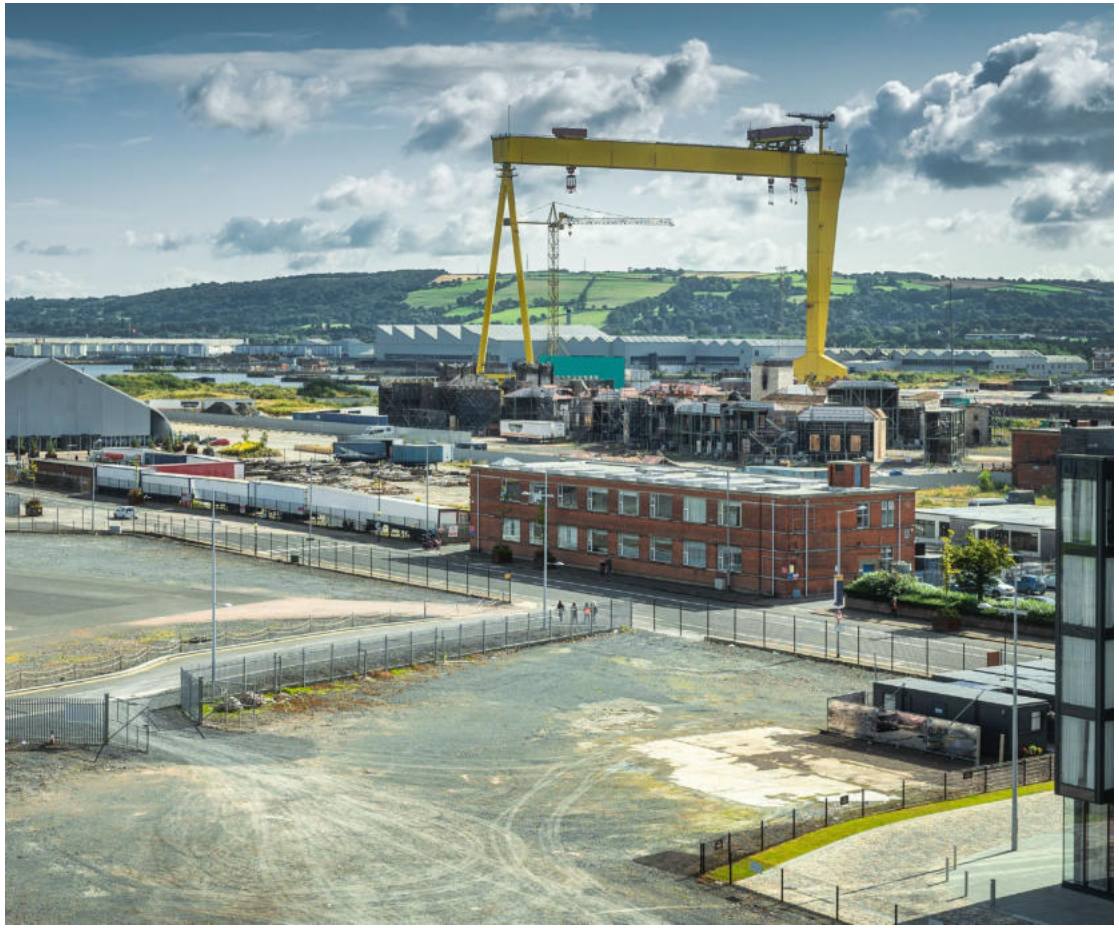
Development Plans

Ongoing and Future Development

Project Objectives

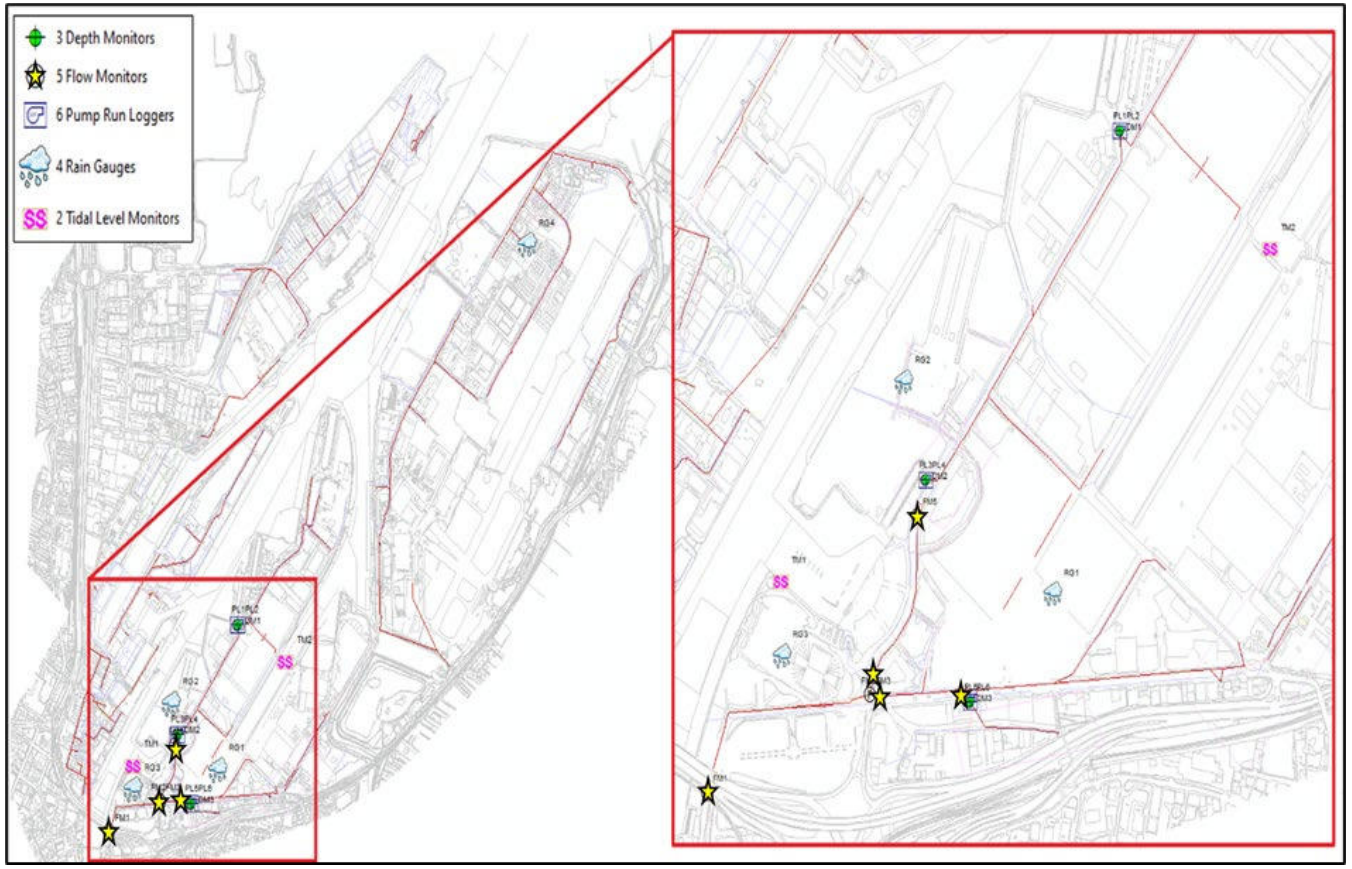
Investigation & Understanding

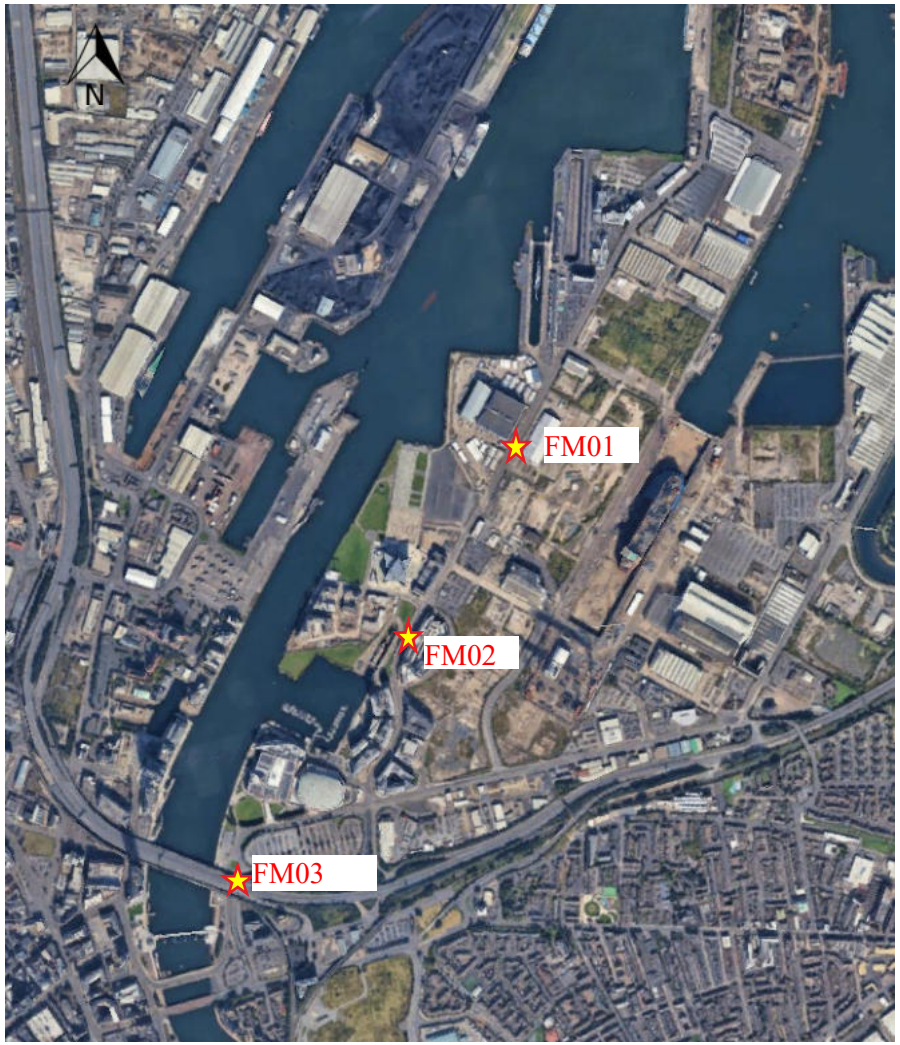
- Data Gathering & Model Development
- Investigations
- Network Analysis using Hydraulic Modelling
- Strategic Review & Solutions Prioritsation
- Delivery of Rehabilitation Solutions
- Monitor and Review Benefits/Impact – Use the Data



Investigations

Sensor Strategy alongside CCTV & condition assessment





Procurement & Specification

Procurement

- Robust tender documentation & process
- Site information provided to select list of competent contractors
- Site visit during tender process
- Bespoke specification taking onboard best industry practice and innovation

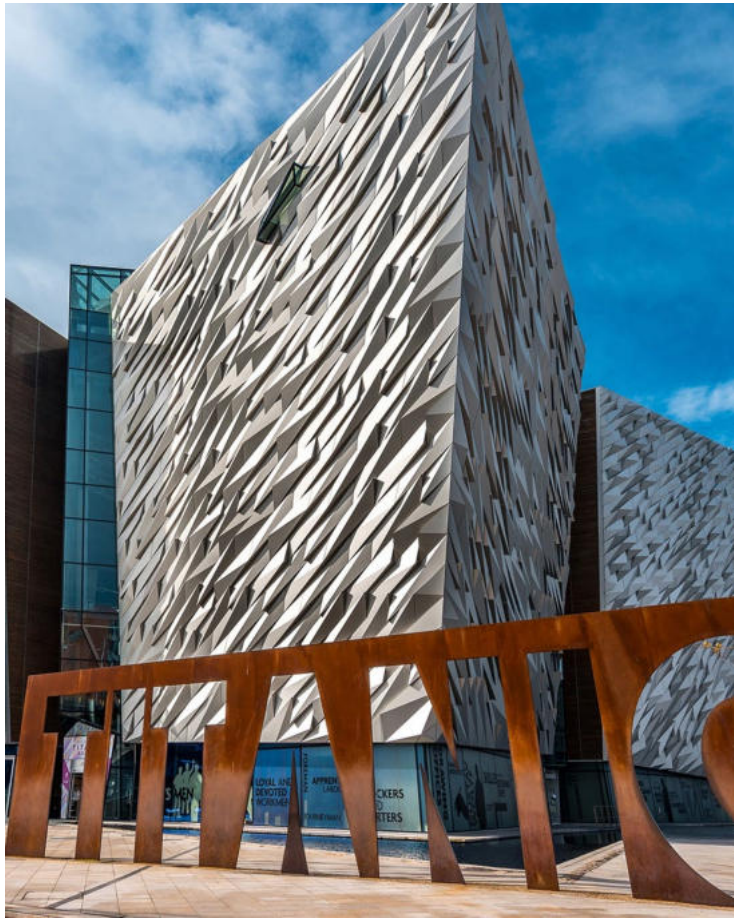
Specification

- Minimum design life of 60 years
- Groundwater loading

Why CIPP Lining?

Ageing Infrastructure beneath a Growing Harbour

- No excavation required
- Reduced infiltration
- Restored structural integrity
- Critical interfaces with operating businesses reducing stakeholder disruption
- Lower whole-life cost solution
- Minimal disruption to traffic and environment



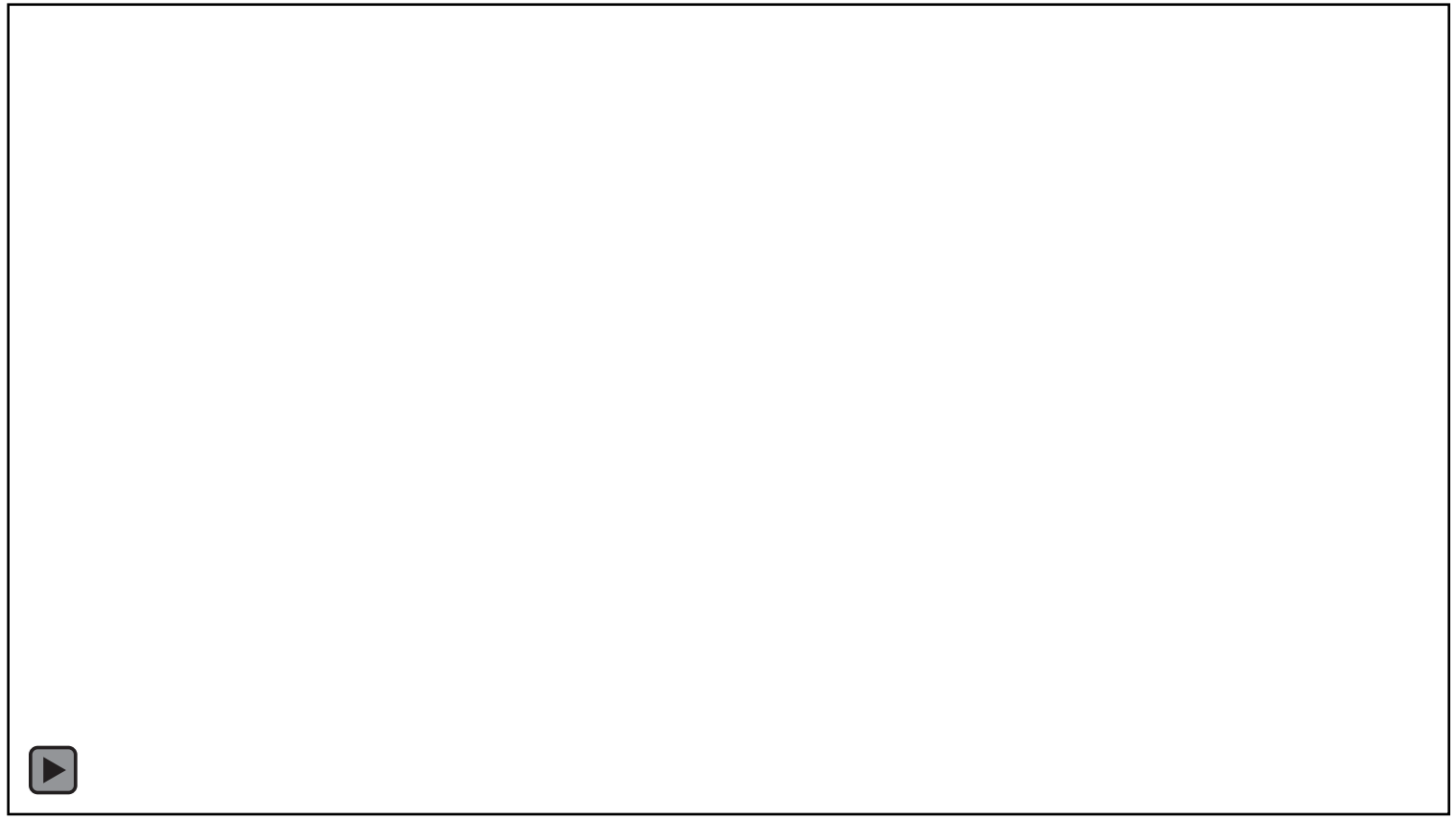
CIPP Curing Methods

Option Selection

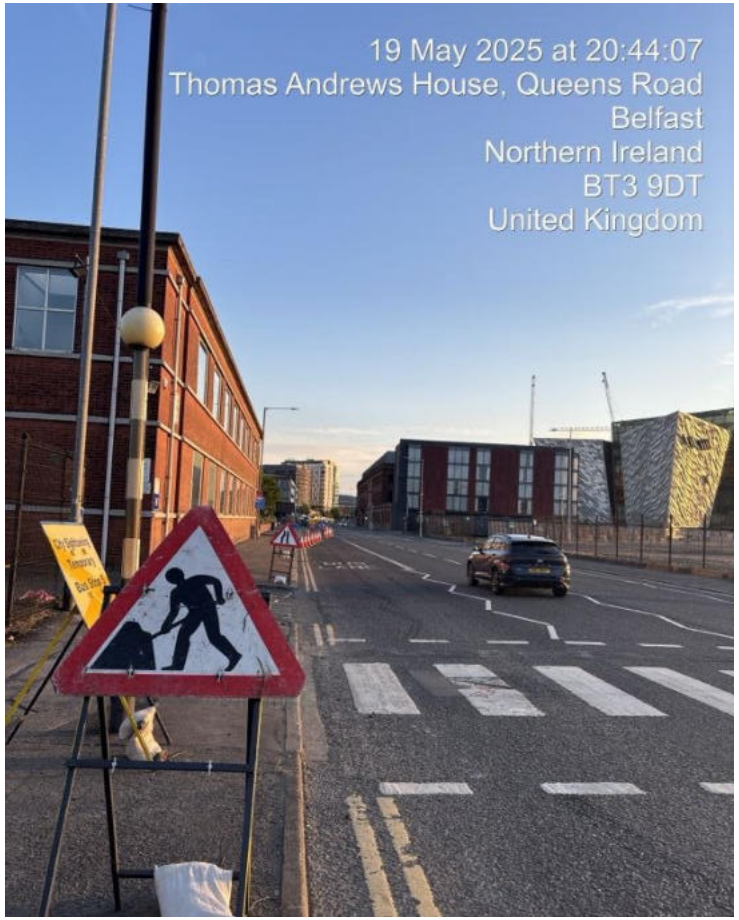
- Hot Water Cure – Traditional method for larger diameters
- Steam Cure – Faster heat-up and efficient for small diameters
- UV Cure – Controlled curing using light-activated resin

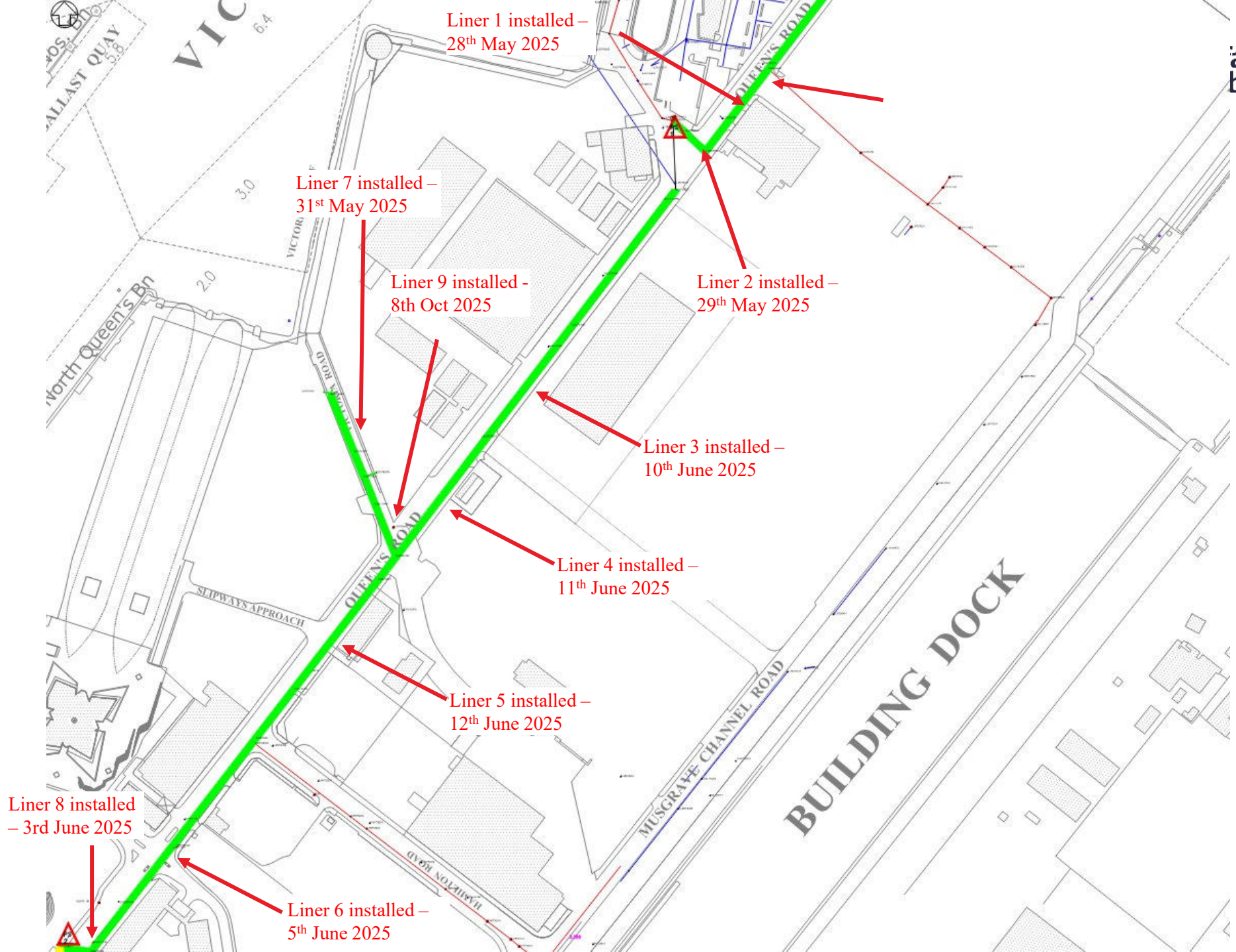
Why Steam Cure?

- Small diameter pipes with many joint displacements
- Minimises risk of liner distortion at displaced joints
- Steam provides rapid, uniform heat distribution
- Fast installation and cure times



Successful Installation & Delivery





ARUP

Sewer Lining (CIPP) Installed

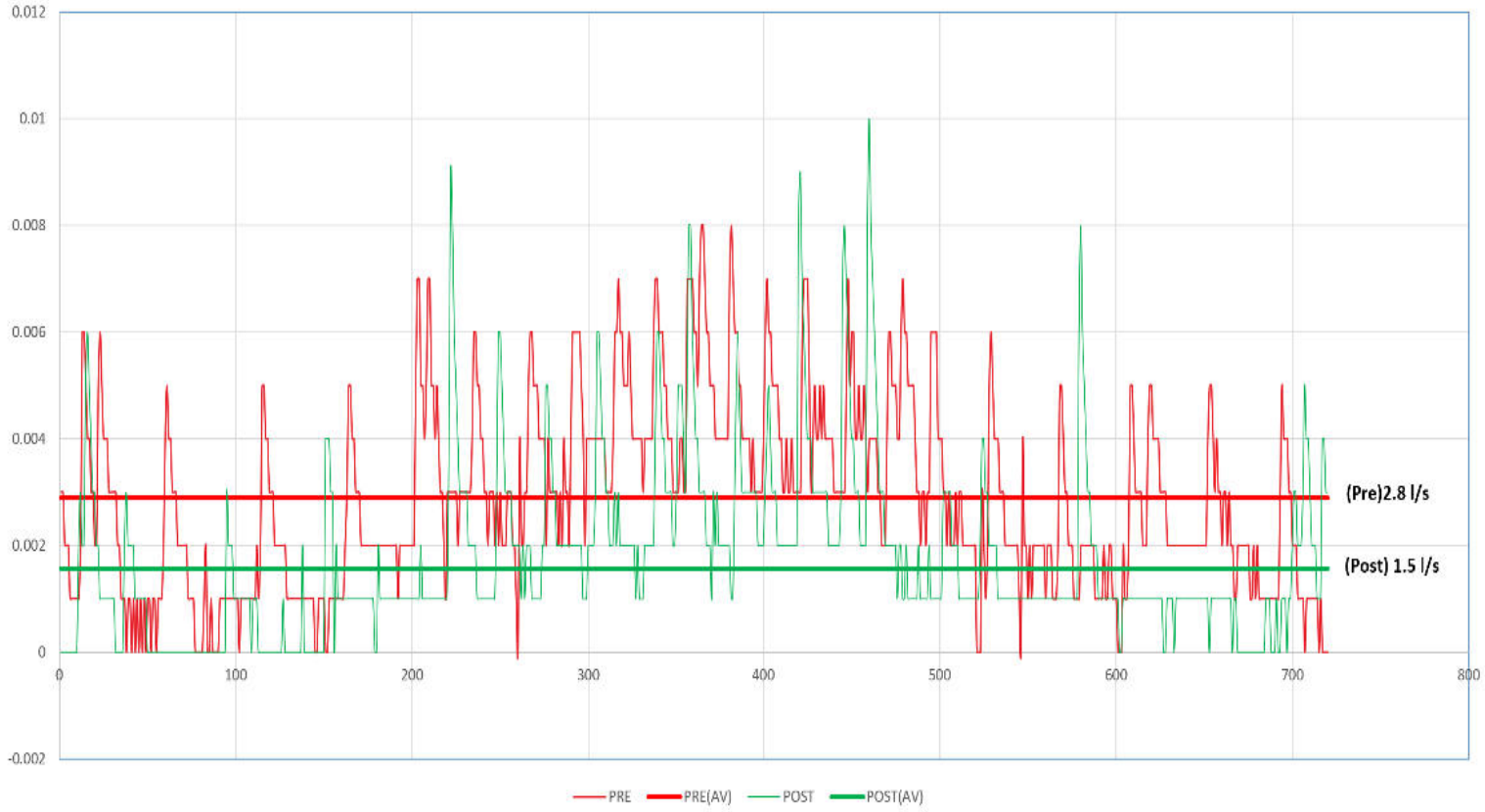
Phase 1 Sewer Rehabilitation Works

Environmental Techniques Contract

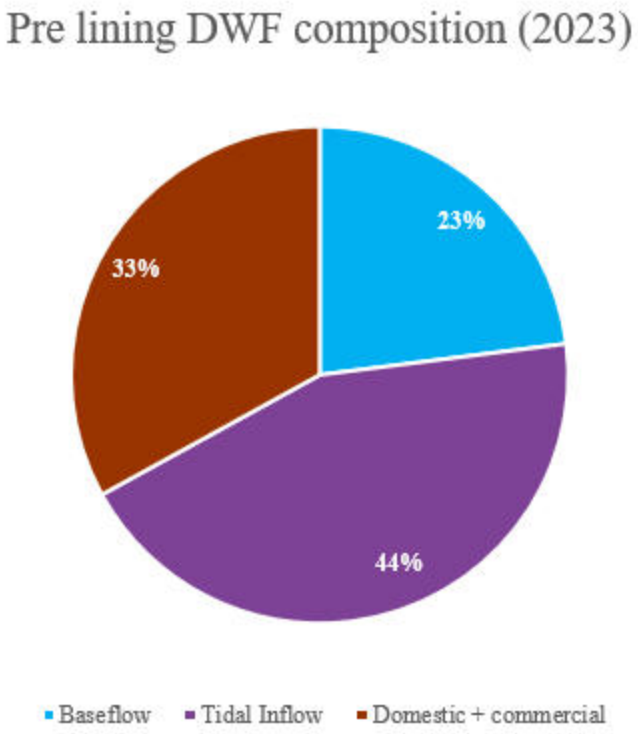
Modelling Results & Analysis

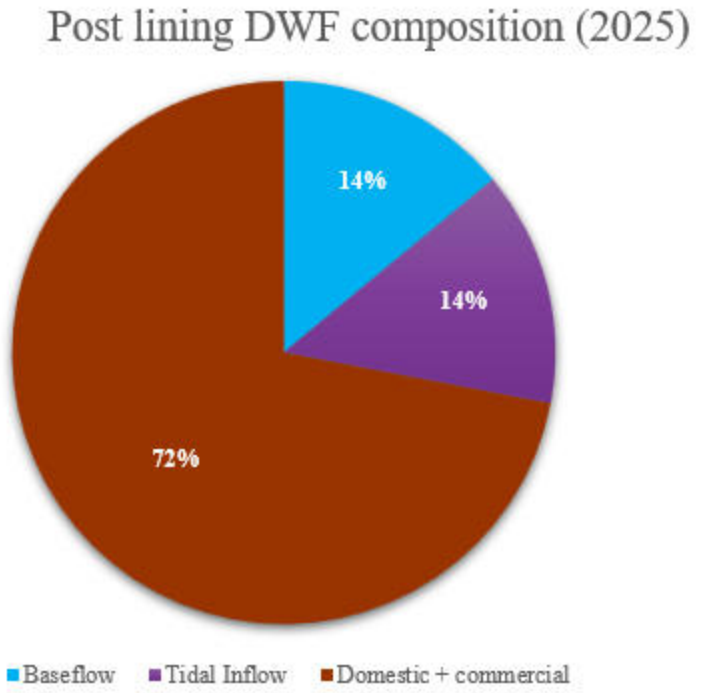
Results – Flow Monitoring

- Image shows DWF pre and post lining with average flow shown over a 24-hour period at FM02.
- Average flows were 2.8 l/s with sewer lining showing average flows reduced to 1.5 l/s after the sewer was lined (2025 data).
- Note that a limited number of 24-hour businesses operate in Belfast Harbour.



2023 vs 2025 – Dry Weather Flow

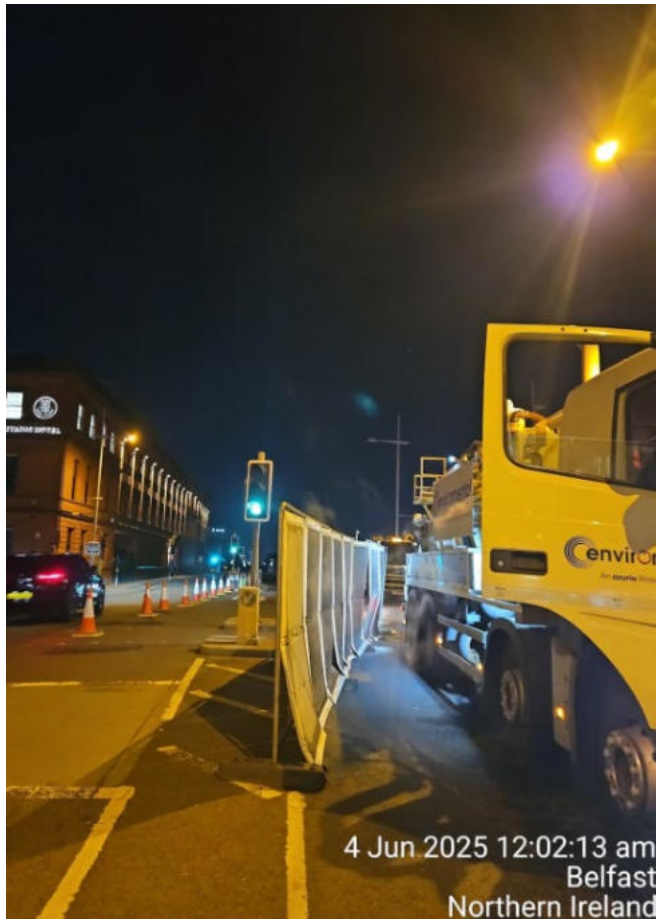




* Some businesses in Queen's Island area operate 24 hours per day

Lessons Learned

- Traffic Management incl. night working
- Early engagement with businesses e.g. hotels
- Fragility of network needs carefully managed
- Unexpected bitumen and bricks found in sewer
- Flexibility for added value – e.g. additional CCTV survey upstream network carried out
- Unexpected sewer diameters
- Avoid open cut where possible!



Next Steps

- Align rehabilitation with development phasing
- Continue targeted monitoring and investigation
- Prioritise investment in interventions
- Whole-life asset thinking

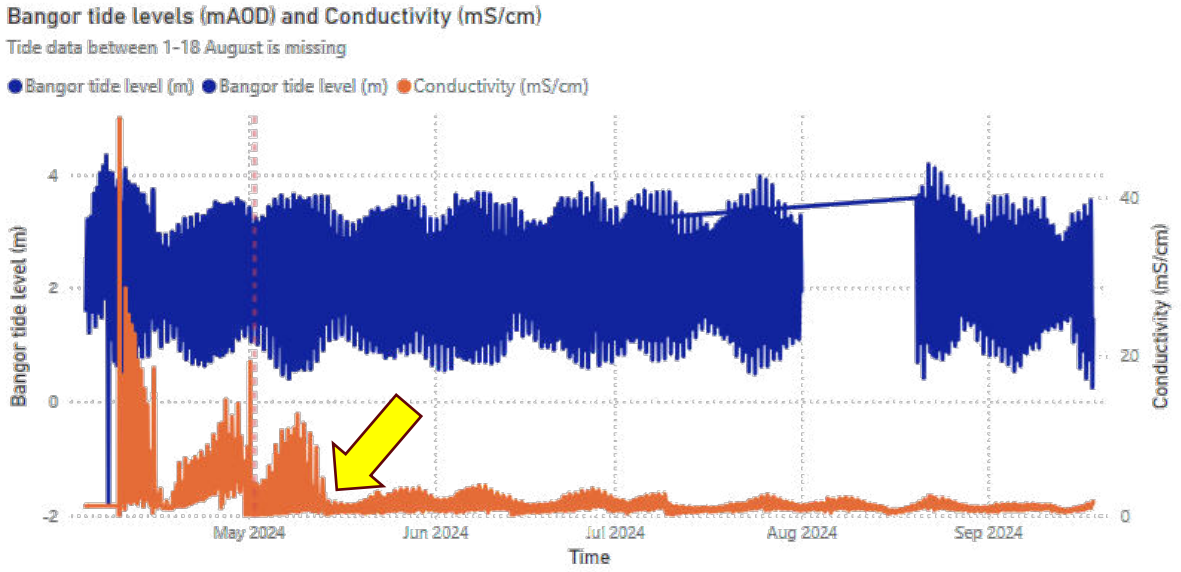
→ **Resilient network fit for future**


Belfast
Harbour
ARUP

Strangford

Salinity Reduction

- Client: Northern Ireland Water
- NIW & Arup in conjunction with GRAHAM & BlockBusters Environmental Services
- Total Investment of £110k
- Step change in salinity levels



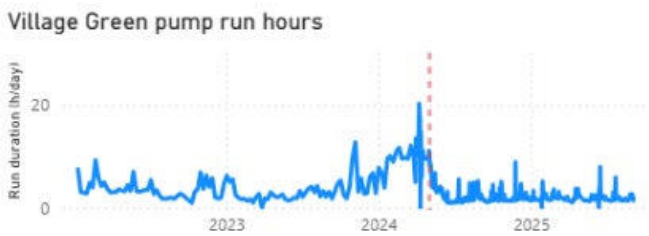
Strangford

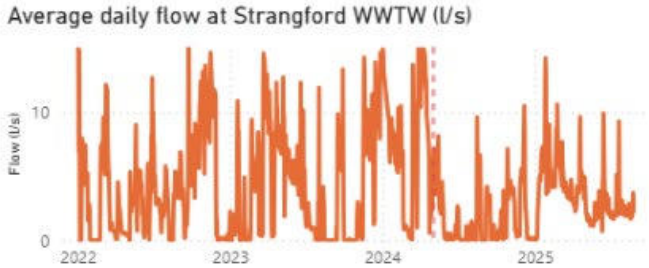
Salinity Reduction

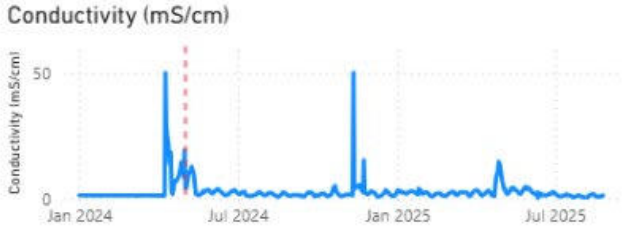
Types of the remedial work carried out (left) and Quay Road sewer before (top right) and after (bottom right) CIPP lining © Arup

Strangford

Salinity Reduction







	BEFORE	AFTER	
Village Green pump run hours	4.49 Average pump run time (h/day)	2.21 Pump run time (h/day)	-50%
Average daily flow at Strangford WWTW (l/s)	4.97 Average of Strangford FFT (l/s)	2.75 Average of Strangford FFT (l/s)	-45%
Conductivity (mS/cm)	Insufficient data	1.50 Average of Conductivity (mS/cm)	

Time

01/01/2022 30/09/2025

Culmore Trunk Sewer – Pushing the Boundaries

CIPP Liner Installation

- Client:
  Northern Ireland Water
- NIW & Arup in conjunction with GRAHAM, BlockBusters Environmental Services and WaterWorX
- 186m length, 1350mm diameter CIPP liner - Work completed August 2025
- Using cutting-edge UV-cured technology