

Saggart Reservoir

reservoir expansion and on-site electro-chlorination plant to enhance storage, resilience, and sustainability for the Greater Dublin Area's water supply

by Coffey

The Saggart Reservoir Expansion Project represents one of the most significant investments in Ireland's water infrastructure in recent years. The Greater Dublin Area is almost entirely dependent on treated water from Ballymore Eustace WTP. This single facility is Ireland's largest water treatment works and supplies approximately 70% of Dublin's drinking water demand. With a daily output exceeding 300 million litres, Ballymore Eustace is a critical asset in the national water network. The Saggart Reservoir plays an equally vital role as a downstream storage facility, ensuring that treated water is available in sufficient quantities to meet demand fluctuations.



Aerial view of the completed Saggart Reservoir – Courtesy of Coffey

Background

Over the past decades, water demand in the Dublin region has grown steadily, driven by population expansion, urbanisation, and increasing commercial activity. At the same time, extreme weather events and climate pressures have highlighted the risks of operating with limited storage resilience.

The existing Saggart Reservoir had performed reliably for many years, but its existing capacity was no longer adequate to safeguard against operational shocks or prolonged outages. Its chlorination system was also reaching obsolescence; raising risks for water quality compliance.

The €59m expansion project was conceived to address these strategic risks. By delivering a new 100,000m³ covered reservoir, alongside an advanced OSEC plant, Uisce Éireann sought to secure a resilient, sustainable water supply for the Greater Dublin Area for decades to come. The project also represents an important step in meeting national infrastructure goals for resilience and climate

adaptation, aligning with Ireland's commitments to long-term sustainable development.

Project drivers and challenges

Several interlinked drivers made this project essential:

- **Increasing storage capacity:** The need to expand storage was critical in safeguarding against potential service disruption; particularly given Dublin's reliance on a single treatment works.
- **Chlorination upgrade:** The chlorination plant could not deliver the efficiency, energy performance, or operational resilience required for long-term security of supply.
- **Future-proofing:** All structures were required to meet a 50-year design life with mechanical and electrical installations designed for serviceability over 20–30 years.
- **Sustainability:** Uisce Éireann embedded a requirement for reduced embodied carbon, sustainable construction methods, and environmental enhancement.

The delivery challenges were significant. The new reservoir had to be built adjacent to an operational section of the existing reservoir without disrupting supply. Live connections into existing trunk mains required advanced methods to prevent outages. The confined site added logistical complexity, particularly for deliveries of reinforcement mats, precast roof units, and concrete. Managing the sequencing of works while maintaining strict health and safety standards demanded precise coordination across the delivery team.

Another key challenge was managing the programme to meet strict regulatory timelines. With Dublin's water supply under pressure, delays could have exposed the region to significant resilience risks. This meant that early procurement of reinforcement mats, precast units, and specialist equipment was critical. By employing standardised design elements, the delivery team achieved economies of scale and streamlined production, reducing the risk of programme slippage.

Project scope

The works were divided into three distinct but interconnected stages:

1. **Construction of the new reservoir & OSEC building:** Bulk excavation, construction of the reinforced concrete base, erection of internal columns and spine beams, installation of precast roof units, and development of the new chlorination facility.
2. **Decommission the existing OSEC facility:** Decommission the existing OSEC facility to allow for the operation of newly constructed facility, and refurbish the existing building for future use.
3. **Commissioning & operation:** A 90-day proving phase that integrated the new infrastructure with the existing live system and validated performance across hydraulic, mechanical and water quality parameters.

The scope also extended to ancillary civil and mechanical works, including installation of GRP access systems, landscaping around the reservoir, and integration of drainage and waterproofing systems to protect the structure over its 50-year design horizon.

Saggart Reservoir: Supply chain - key participants

The programme benefited from strong collaboration across the supply chain, with repeatable design elements and standardisation helping to accelerate delivery and reduce procurement risks.

- **Project delivery & process & MEICA design:** Coffey
- **Civil & structural engineer:** Ayesa (formerly ByrneLooby)
- **Precast concrete (reservoir):** Banagher Precast Concrete
- **Precast concrete (valve chambers):** FLI Precast Solutions
- **Concrete supply:** Kilsaran
- **BAMTEC® reinforcement system:** Hy-Ten Ltd
- **Shear reinforcement system:** Peikko Group
- **OSEC plant:** De Nora Water Technologies UK
- **Pumps:** SPP Pumps Ltd
- **Chemical dosing tanks:** Forbes Technologies Ltd
- **Chemical dosing pumps:** Grundfos Pumps Ltd
- **MCC supply & installation:** Right Group
- **GRP safety system:** Relinea
- **H&S (fall protection system):** FreeFalcon

Reservoir base & reinforcement

The reservoir's base slab covered an area of 31,500m², demanding a robust reinforcement strategy to withstand long-term hydraulic loading. Traditional bar reinforcement would have required significant on-site labour, tying, and placement, so instead, Coffey implemented the BAMTEC® Roll-out Reinforcement System, which provided prefabricated mats tailored to the slab design. A total of 1,725 tonnes of BAMTEC® reinforcement were installed in the base, with a further 198 tonnes in the perimeter and internal walls.



Early stage in development - Courtesy of Coffey



Saggart Reservoir Cell 1 under construction - Courtesy of Coffey



Lowering a precast floating roof section - Courtesy of Coffey



Laying geotextile on roof - Courtesy of Coffey

This approach reduced site labour requirements, improved safety, and delivered consistent quality. The reinforcement mats were unrolled rapidly, allowing for accelerated concrete placement while maintaining design tolerances. By minimising manual tying, the system also reduced the risk of errors and ensured uniform structural performance.

To address punching shear at column bases, Peikko shear rails were installed, supported by precast pedestals. This avoided the need for local slab thickening, optimising material use and maintaining a uniform slab profile. The combined reinforcement strategy demonstrated how innovative approaches can balance efficiency, safety, and structural performance in large-scale civil engineering.

Floating precast roof structure

The roof was constructed using 879 precast double-tee units, each up to 13m in length. These were supported by a network of 322 reinforced concrete columns and 280 precast spine beams. The modular nature of the roof enabled rapid installation, with Banagher Precast Concrete manufacturing units off-site and delivering them in a carefully sequenced programme.

Installation sequencing was critical. The confined site required precise scheduling of deliveries, crane operations, and installation teams. Each roof section was assembled bay-by-bay, with expansion joints incorporated to accommodate thermal movement. Above the roof deck, a fibre-reinforced screed was applied, followed by cold-applied waterproofing and a drainage layer. The final finish was a wildflower meadow roof, which not only provided biodiversity benefits but also reduced visual impact, helping the reservoir integrate into the local environment.

On-site electro-chlorination (OSEC) plant

The new OSEC plant from De Nora Water Technologies was designed to replace the aging chlorination system with a safer,

more efficient, and more sustainable technology. On-site electro-chlorination eliminates the need for bulk chemical deliveries by generating chlorine through the electrolysis of brine.

The plant achieved an energy efficiency of 5.3 kWh/kg of chlorine produced, surpassing industry benchmarks and reducing operational costs. The system's modular configuration allows for scalability, resilience, and simplified maintenance. In addition, it provides greater security of supply by reducing dependency on external chlorine deliveries, a factor that has become increasingly important in the context of supply chain disruptions.

Pipework connections & live integration

One of the most technically challenging aspects of the project was the integration of the new reservoir into existing trunk mains, which ranged from 600mm to 1600mm in diameter.

To prevent supply interruptions, under-pressure tapplings and live hot-taps were employed. This allowed new connections to be made while maintaining full service to the Greater Dublin Area.

Bespoke reinforced thrust blocks were constructed to support these live connections, ensuring long-term stability under variable hydraulic conditions. This part of the works showcased how innovative engineering methods can provide resilience while avoiding disruption to communities reliant on continuous water supply.

Lean & safe construction practices

Coffey applied Lean Construction methodologies to optimise programme delivery. The Last Planner System was used to coordinate tasks across disciplines, reducing downtime and eliminating rework. This collaborative planning approach also enhanced transparency across the project team, allowing risks to be identified and mitigated earlier.



On-site electro-chlorination (OSEC) facility at Saggart Reservoir - Courtesy of Coffey

BENEFITS OF THE SOLUTION: AT A GLANCE GUIDE

RESILIENCE & RELIABILITY

- Provision of 100,000m³ of additional treated water storage, protecting the Greater Dublin Area from service interruptions.
- Introduction of a modern OSEC plant, delivering safe, reliable disinfection with reduced operational risk.
- Long-term resilience secured through a 50-year design horizon for civil assets and 20–30 years for mechanical and electrical systems.

ENVIRONMENTAL SUSTAINABILITY

- Incorporation of 18,750m³ of GGBS concrete, substantially reducing embodied carbon compared to traditional mixes.
- Delivery of a wildflower meadow roof, supporting biodiversity, pollinators, and ecological resilience.
- Deployment of BAMTEC® reinforcement, which minimised steel off-cuts and waste while improving material efficiency.
- Adoption of trenchless live connection techniques, reducing ground disturbance and environmental impact.

INNOVATION & EFFICIENCY

- Prefabricated reinforcement and precast roof elements accelerated construction and ensured consistent quality.
- Live hot-tapping maintained uninterrupted supply, a major success factor given Dublin's dependence on a single treatment source.
- Lean Construction planning improved certainty, sequencing and productivity.
- Introduction of advanced mobile fall arrest systems enhanced worker safety and reduced risk exposure.
- Standardisation of reinforcements & roof design improved procurement efficiency & streamlined installation.

COMMUNITY & SOCIAL BENEFITS

- Creation of local employment and training opportunities, supporting regional skills development.
- Integration of the project with the Slade Valley Heritage Trail, enhancing recreational and cultural value for the community.
- Long-term assurance of water supply for households, businesses, and essential services across the Greater Dublin region.
- Delivery of biodiversity and environmental enhancements, reinforcing Uisce Éireann's role as a responsible and community-focused organisation.

Safety innovations included the deployment of GRP handrails, ladders, and platforms, selected for durability and corrosion resistance. The FreeFalcon mobile fall protection system was introduced, allowing workers to operate at height without the need for permanent anchor points. This significantly reduced fall risks while improving flexibility in sequencing roof construction. By embedding these safety systems into the project from the outset, Coffey and Uisce Éireann ensured that worker welfare remained a central priority.

Commissioning & integration

The final stage involved a 90-day Operations Period, during which the reservoir and OSEC facility were integrated into the live network. Comprehensive testing was undertaken, including hydraulic performance, water quality monitoring, and system resilience under varying demand conditions. This ensured that the new infrastructure operated seamlessly alongside existing assets before full handover.

Summary

The Saggart Reservoir Expansion and On-Site Electro-Chlorination Project expansion represents a landmark in Ireland's water

infrastructure. Delivered by Coffey on time and within its €59m budget, the project secures the Greater Dublin Area's water supply for decades to come.

By implementing advanced construction methods such as BAMTEC® reinforcement, precast floating roof systems, and an energy-efficient OSEC facility, the project achieved a balance of resilience, sustainability, and innovation. The successful delivery of live connections without service interruption demonstrated meticulous planning and technical excellence.

Through the collaboration of Uisce Éireann, Coffey, Ayesa, Banagher Precast Concrete, and Kilsaran, the Saggart Reservoir Project set new benchmarks for efficiency, safety, and sustainability in Irish water infrastructure.

It provides a model for how investment, innovation, and partnership can deliver infrastructure that is fit for the future, environmentally responsible, and socially valuable.

The editor and publishers would like to thank Coffey for providing the above article for publication.



Internal view of the intake works - Courtesy of Coffey



Internal view of the outlet works - Courtesy of Coffey