Anglian Water Strategic Resource Options

Lincolnshire Desalination Gate One Report

29 May 2026

Contents

Acronyms

ACWG	All Company Working Group
ALC	Agricultural Land Classification
AMP	Asset Management Period, current is AMP8
BMV	Best and Most Versatile
BNG	Biodiversity Net Gain
CAP	Competitively Appointed Provider
DBP	Disinfection by-product
DCO	Development Consent Order
Defra	Department for Environment, Food and Rural Affairs
DPC	Direct Procurement for Customers
DTP	Desalination Technical Partner
DWI	Drinking Water Inspectorate
DWSPs	Drinking Water Safety Plans
EA	Environment Agency
EIA	Environmental Impact Assessment
ESW	Essex and Suffolk Water
HE	Historic England
HRA	Habitats Regulation Assessment
INNS	Invasive Non-Native Species
IROPI	Imperative Reasons of Overriding Public Interest
MCZ	Marine Conservation Zone
Ml/d	Megalitres per day
MMO	Marine Management Organisation
NAU	National Appraisal Unit
NCA	Natural Capital Assessment
NE	Natural England
O&M	Operation and Maintenance
PR (Year)	Price Review (2024)
RAPID	Regulators' Alliance for Progressing Infrastructure Development
RO	Reverse Osmosis
SIPR	Specified Infrastructure Project Regulations
SQR	Seawater Quality Report
SRO	Strategic Resource Options
SSM	Site Selection Milestones
UK	United Kingdom
WFD	Water Framework Directive
WQ	Water Quality
WQRA	Water Quality Risk Assessment
WRMP (Year)	Water Resources Management Plan (2019), (2024), (2029)
WTW	Water Treatment Works

Executive summary

Background

Lincolnshire Desalination is identified in Anglian Water's Water Resources Management Plan 2024 (WRMP24)[1] as a critical future source of supply to help secure the region's long-term water needs. The project represents the potential development of a first-of-a-kind, large-scale seawater desalination plant in the UK, reflecting the scale of output being considered and its integration into the UK's regulated public water supply system.

Within WRMP24, an indicative location near Mablethorpe was used for high-level appraisal only; no preferred site has been identified, and a structured site selection process is underway. As traditional water sources become increasingly constrained, desalination provides a reliable, climate-independent option within a wider portfolio of strategic water resource solutions for the region.

Initial outline design

Early design has focused on validating WRMP24 assumptions and establishing a technical evidence base to develop for the project. A deployable output range of 25-110 Ml/d (Megalitres per day) is being assessed to maintain flexibility while further information is gathered. A structured site selection process is under way to determine the most suitable location along the Lincolnshire coastline, considering engineering feasibility, environmental and marine constraints, and local community factors. Associated infrastructure such as storage reservoirs, pipelines and additional treatment plants to get water into supply will be considered and developed in the next phase of the programme.

Seawater samples are being collected through a coastal monitoring programme to find out how suitable the water is for treatment. A pilot plant is being developed to validate the proposed treatment process and additional studies are advancing the understanding of intake design, treatment processes, brine management and blending. This will help build stronger evidence to support feasibility and programme planning.

Current delivery plan

Lincolnshire Desalination is positioned within the WRMP24 Adaptive Pathway with an indicative supply date of 2040. Through this development phase, Anglian Water has the flexibility to deliver earlier than this date if required. Although the schedule is still at an early stage of maturity, there may be opportunities to bring water into supply earlier as the project develops.

The next stage of development will involve further design, refinement of deployable outputs, progression of environmental appraisal, and confirmation in principle of the consenting and procurement strategies.

Engagement with regulators, stakeholders, landowners and communities will continue throughout the whole project, ensuring transparency and shaping the design of the solution.

Cost estimates and deployable output benefit

The cost information presented at Gate One is indicative only and is aligned with what has been stated in the WRMP24 plan and Ofwat's PR24 Final Determination. This ensures consistency with figures already published and assured through those processes. The estimate relates to the desalination plant and associated marine intake and outfall infrastructure only – it excludes wider system infrastructure required to get water into supply, and represents an early stage, high uncertainty strategic estimate presented as a broad range and not an assured cost or investment baseline.

Consenting route and secondary consents

The consenting strategy remains in development, with all planning pathways being considered. The final decision will depend on which site is chosen and its environmental and engineering considerations, so picking the site is vital.

1 Anglian Water, (2025). Our Water Resources Management Plan 2024.

Procurement strategy

The current procurement approach for the desalination plant is Direct Procurement for Customers (DPC), reflecting the project's scale and complexity at this early stage of development.

A late model for DPC is currently assumed to be the preferred route to market as market feedback suggests it is best to wait until planning and consenting risks are determined before starting the procurement process.

As the project progresses, procurement options will remain under review. This will include consideration of emerging changes to the Specified Infrastructure Project Regulations (SIPR) and any opportunities these may provide as a preferred alternative model. This will be assessed alongside reviewing the suitability of DPC for the desalination plant.

Identification of risk and potential barriers

Key risks at this stage include Regulation 31 product approvals, public acceptability, raw water quality uncertainty, intake/outfall feasibility and programme dependencies linked to consenting and procurement timelines. Mitigations are in place and will be developed further as evidence builds. Examples of mitigations include studies being carried out by Cranfield and Sheffield Universities, establishing and chairing an All Company Working Group on desalination and an early ongoing coastal monitoring campaign.

Efficiency of expenditure

To date, £1.5 million has been invested in early development, consistent with expectations for this stage of programme maturity and within the development allowance set out in Ofwat's PR24 Final Determinations, Major Projects Development annex (published February 2025), which provides a £72.37 million allowance for development of the Lincolnshire desalination programme[2].

Benefits

Anglian Water is confident that this project will deliver significant long-term benefits to the region as part of its WRMP. These include a more reliable water supply for customers, a new source of supply that relieves pressure on sensitive environments by enabling reduced abstraction from traditional sources, enhanced drought resilience, support for regional economic growth, and contribution to a more robust and adaptive water resources system.

Drinking water quality

At this stage, drinking water quality considerations have been assessed through a Strategic Water Quality Risk Assessment (WQRA), identifying key hazards and appropriate mitigations, with further risk assessment planned throughout the next stage of project development.

Environment

Environmental considerations have been embedded from the outset through high-level, proportionate consideration and early engagement with regulators. Key environmental constraints and risks have been considered along the Lincolnshire coastline to support the site selection process. Additional surveys, modelling, and assessments are scheduled for the next project phase which will inform impact analysis and help develop mitigation measures, as well as provide opportunities for environmental enhancement.

Conclusion

Lincolnshire Desalination is a WRMP24 identified strategic option to strengthen long term water supply resilience, with early work focused on building a proportionate evidence base rather than committing to a defined solution.

The project is at an early stage, with flexible assumptions on output, site and delivery, indicative costs aligned to WRMP24 and PR24, and clear plans to resolve key uncertainties through the next stage of development.

At this stage, Anglian Water is confident that desalination represents a viable opportunity to enhance water resilience across the region.

2 Ofwat, (2024). PR24 Final Determination: Major Projects – Development and Delivery.
Ofwat PR24 Final Determinations – Major Projects

1. Recommendations

Anglian Water is confident that desalination represents a viable and credible solution to secure future water supplies for the region, supporting long-term resilience and ensuring sustainable provision for customers. Desalination is an internationally established and well-understood technology, with extensive global operational experience, providing confidence in its technical effectiveness and reliability. Work carried out so far, supported by this global experience, indicates that desalination has the potential to play an important role in meeting long-term demand as the climate changes and rainfall becomes less predictable.

Desalination needs to progress at pace, as reductions in water abstraction licences and the increasing risk of drought could mean that extra, climate-independent water supplies are needed sooner than expected. Given the East of England's coastal geography and increasing constraints on traditional sources, desalination represents a particularly appropriate option for the region. At this stage, it is important that the project remains flexible, so it can adapt as new information becomes available. Looking at options early helps reduce risks, avoids unnecessary costs for customers, and ensures future investment decisions are based on clear, well-evidenced information.

Building on the evidence gathered and the strong progress to date, Anglian Water is confident that the Lincolnshire Desalination solution offers a credible pathway to enhance regional water resilience. It is therefore recommended that the project transitions to the new gated process and progresses to the next stage for further development and assessment.

The next stage of development will focus on completing site selection, engaging with landowners and the local community, undertaking site-specific surveys, progressing the design, and developing cost estimates with improved schedule certainty. This reflects the early stage of project maturity, with a focus on proportionate evidence-building rather than commitment to a final solution. In parallel, strategies will be developed to support informed decisions on procurement, consenting, and delivery. Together, this work will provide the evidence needed to demonstrate project feasibility, manage delivery and regulatory risk, and increase confidence in costs, programme and value for money. This will support alignment with environmental, planning and delivery requirements, ensuring the project is suitably developed to support the midpoint review and progress to Gate B within the combined gated process. While this document refers to Gate B, a midpoint review is required and will be undertaken at a time agreed with RAPID.

A signed declaration from the Regulation Director is attached, confirming that the water company internal Security and Emergency Measures Direction and Networks and Information Systems teams have been engaged during the development of this submission. In addition, a letter signed by an Executive Director is provided, confirming that the Anglian Water Board have received updates on the progress of the Lincolnshire desalination project and the Gate One submission to RAPID.

2. Initial outline design

Significant water resource challenges have been identified for the East of England in WRMP24, with forecasts indicating that by 2050 up to 38% less water may be available to supply customers. This shortfall is driven by increasing environmental requirements, climate change, population growth, enhanced drought-resilience expectations and reductions to abstraction licences. Consequently, access to conventional groundwater or river resources is increasingly limited.

To tackle the forecast deficit, WRMP24 has identified a combination of demand management, water transfers, two new strategic reservoirs, advanced water recycling and desalination – including the Lincolnshire desalination plant. Together, these measures are expected to provide 593 Ml/d of additional supply by 2050, with desalination plants in Norfolk and Lincolnshire being key solutions, depicted in Figure 1. Adaptive plan analysis shows that desalination delivery must progress at pace within the current Asset Management Period (AMP8). This requires early development of technical knowledge, application of lessons learned from established international practice, and progression of early design work.

This section builds on the WRMP24 Supply Side Options Report and sets out the work underway to strengthen the technical evidence base, assess WRMP24 assumptions, support site selection, and develop a forward plan for project feasibility and concept design. An All Company Working Group (ACWG) for desalination has been established, bringing together representatives from across the water industry to share learning and collaborate on risk mitigation. Anglian Water is playing a leading role in this work, including chairing the ACWG for desalination.

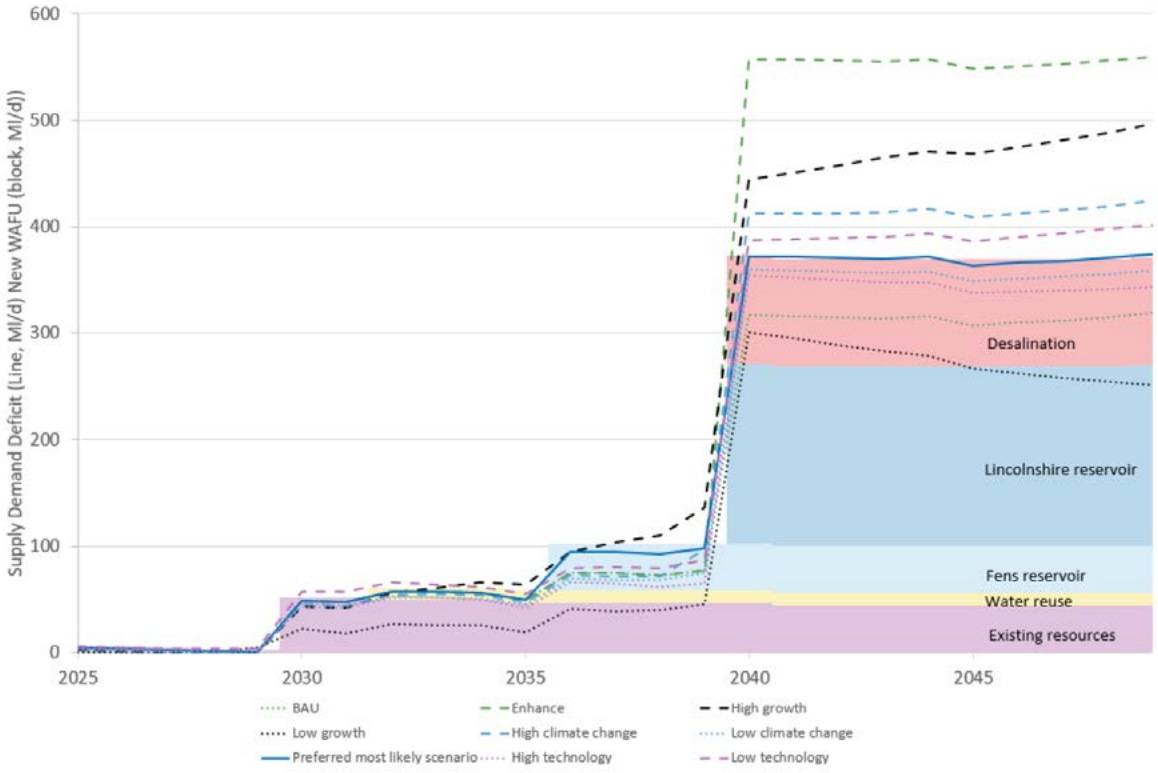

Figure 1: Anglian Water's solutions to address the supply-demand deficit[3]

3 Anglian Water Services, (2024). Revised Draft Water Resources Management Plan 2024: Decision Making Technical Supporting Document, Figure 99, p.107.

Overview of desalination

Desalination is the process of removing salts from seawater to produce potable water. In WRMP24, Seawater Reverse Osmosis (RO) was identified as the most appropriate and proven technology for large-scale seawater desalination, and this is the assumed method of treatment for the Lincolnshire Desalination Plant. The treatment process, illustrated in Figure 2 and Figure 3, is expected to comprise three main stages:

- Pre-treatment – removal of particles and materials that could damage or foul the membranes
- Reverse Osmosis – removal of dissolved salts to produce fresh water
- Post-treatment – conditioning and disinfection to make the water suitable for supply

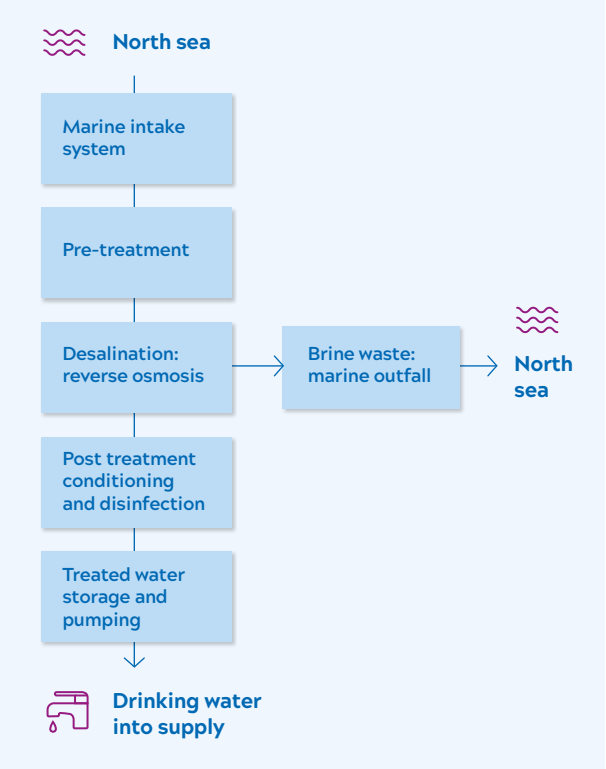

Figure 2: The Process of Desalination

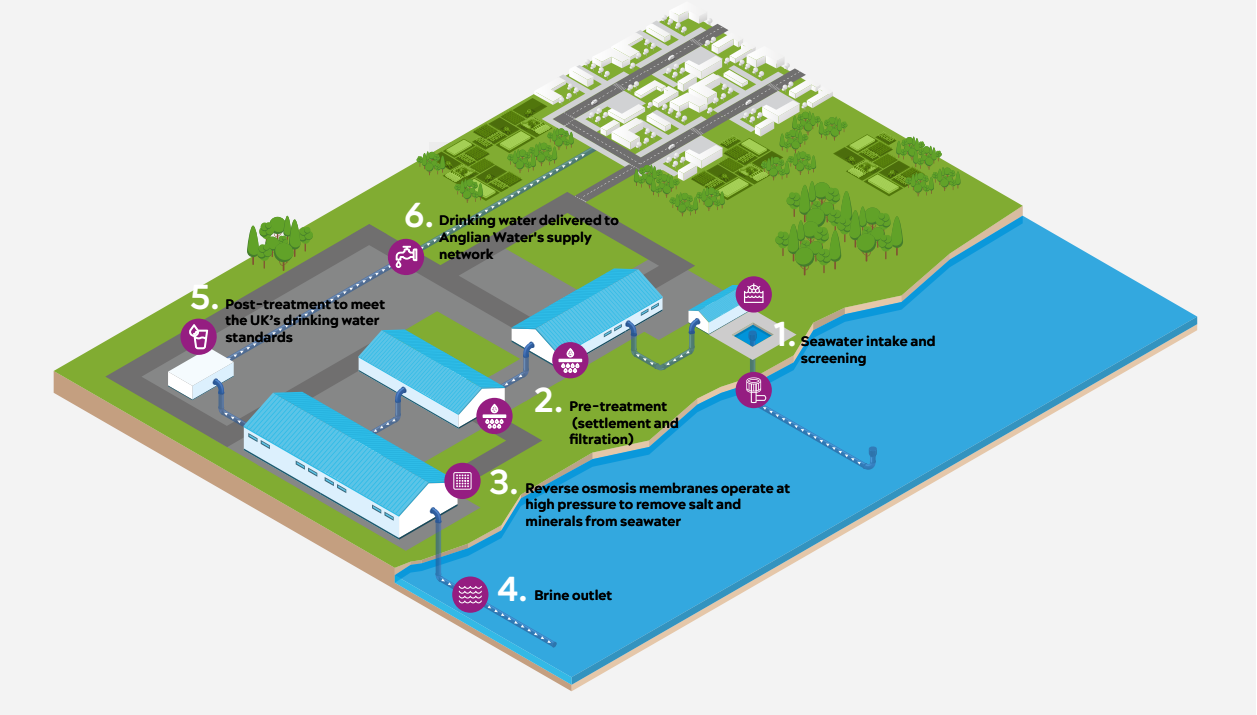

Figure 3: Desalination Process Overview

Seawater will be abstracted via a marine intake system designed to draw in the best available quality water while minimising impacts on marine ecology, the seabed, navigation, and existing infrastructure.

Pre-treatment is critical to the overall performance of the plant. It protects the RO membranes, improves energy efficiency, and extends asset life by reducing solids and fouling. The pre-treatment design will be informed by site-specific and seasonal seawater quality data.

Following pre-treatment, the RO process separates seawater into:

- Permeate – clean filtered water which will go on to become drinking water
- Brine – concentrated seawater which will be discharged to the North Sea via a marine outfall

Finally, the permeate will undergo post-treatment conditioning to ensure it is compatible with the distribution network and acceptable to customers. This is expected to include remineralisation, disinfection, and blending.

WRMP24 Feasibility study

As part of defining desalination in the adaptive plan, WRMP24 assessed a range of capacities and undertook a high-level spatial screening of the east coast of England. The aim was to review approximately 500 kilometres of coastline to identify locations with potential to accommodate desalination plants. The outputs were cross-referenced against options previously identified for WRMP19[4] and were assessed again for continued suitability. This resulted in an updated longlist, which were then classified into three types for further evaluation:

- Coastal – Seawater desalination plants with marine intake and outfall.
- Estuarine (brackish) – Plants located within estuarine environments, with intake and outfall to the estuary system. WRMP24 concluded that, although estuarine desalination is technically feasible, it presents additional risks compared to seawater desalination. These options were therefore discounted and do not form part of the development of the Lincolnshire Desalination project. This conclusion remains valid for the deployable output range and scalability being considered for the Lincolnshire plant.
- Floating – Desalination plants located on offshore barge vessels, with treated water piped inland. These options were also discounted. While technically feasible, they were assessed as carrying residual risks that would be complex to mitigate and were found to offer no material advantage over equivalent onshore solutions.

Further assessment of the resulting refined list was carried out, and a coastal onshore seawater desalination plant in the vicinity of Mablethorpe, Lincolnshire, was selected as a viable option to be included within the adaptive pathway.

Desalination plant sizing

The quantity of drinking water that a source can reliably supply is referred to in terms of deployable output. This is its volumetric output, taking account of limiting factors such as abstraction licences, water quality and environmental supply system capacities. A broad range of deployable outputs are under consideration for Lincolnshire desalination. This range reflects the early stage of project development and the need to accommodate evolving technical, demand and regulatory requirements.

WRMP24 identified a 50 Ml/d desalination plant to support supply to the Lincolnshire Area, however, subsequent engagement with Department for Environment, Food and Rural Affairs (Defra) and the Environment Agency (EA) indicates that the demand for water in Lincolnshire may be more significant than originally anticipated for the following reasons:

- Work on environmental destination remains an important factor. The EA has advised that water companies should prepare for further abstraction reductions across the region. The outputs of this assessment, expected in 2027, may influence the ultimate deployable output requirements from the desalination plant.
- WRMP24 also included a separate 60 Ml/d desalination option to support future industrial growth. Current funding covers only the household supply element of the solution, but

4 Anglian Water, (2019). Water Resources Management Plan 2019.

emerging forecasts show that industrial demand in Lincolnshire could increase significantly, including to support decarbonised power and other major developments. Anglian Water is working with local authorities and key sectors to refine these projections and ensure that long term capacity planning remains aligned with the region's economic trajectory.

While the current funding allocated through the Price Review (PR24) is based on the development of a 50 Ml/d option, the final deployable output requirement will not be confirmed until WRMP29 supply and demand modelling is completed.

To retain enough flexibility during initial design, site assessment and cost estimation, a deployable output range of 25-110 Ml/d is being considered. The upper limit reflects the potential future needs identified through abstraction license reviews, expected water demand from the energy and industrial sectors.

This range will be refined through the next phase of development and updated ahead of publication of the final WRMP29.

The concept design will consider the scalability of desalination technology and possible adjustments in output as the project evolves. Intake and outfall designs will accommodate capacities up to the maximum feasible flow.

Site selection

The location at Mablethorpe, Lincolnshire was identified in WRMP24 solely for the purposes of preliminary costing and environmental assessment. A multistage site selection process is now underway to determine the actual preferred location along the Lincolnshire coastline. This process considers the unique needs of the project, including geophysical, engineering, environmental, and socioeconomic aspects, as well as compliance with national planning and marine policies.

Figure 4: The location of the Lincolnshire Desalination plant has yet to be confirmed and could be anywhere along this coastline.

The site selection approach draws on lessons from comparable projects and is integrated with environmental and consenting strategies. This ensures the preferred option is supported by evidence-based justification for why alternative sites are not suitable. A critical friend panel has been established to assure the methodology and outputs, and a stakeholder working group provides regular engagement with statutory stakeholders throughout the process.

The site selection staged process with Site Selection Milestones (SSM) is illustrated in Figure 5. The process is divided into separate stages, each culminating in a SSM. At each SSM, outputs including any assumptions and recommendations are presented to Anglian Water and reviewed by an appointed Critical Friend Panel before progressing to the next stage. Outputs are also shared with a Stakeholder Working Group (see Table 3) for information and feedback. By the conclusion of Stage 3, the methodology will deliver a shortlist of proposed seawater desalination site options for the Lincolnshire Desalination plant.

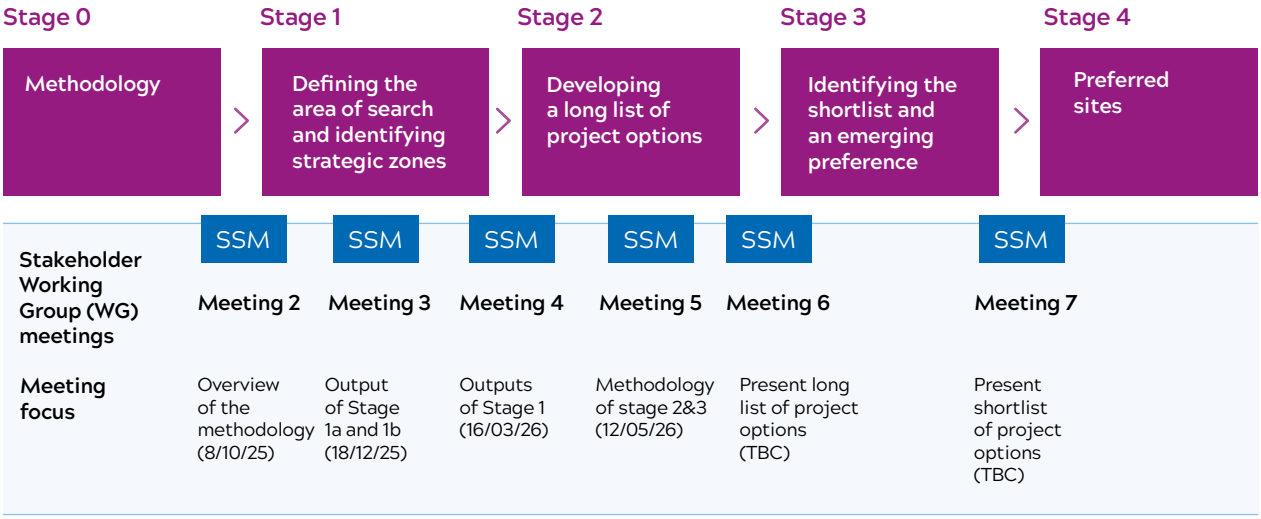

Figure 5: Multi-stage Site Selection Process

Coastal monitoring

A seasonal coastal seawater monitoring programme has been established. This involves seawater sampling at two locations off the Lincolnshire coast. Seawater is collected at various depths, tidal states and positions using a vessel like the one shown in Figure 6.

The results are used to produce an initial indicative raw water quality envelope. Analysis has included physical, chemical and microbiological parameters, alongside metals, hydrocarbons, algae and Silt Density Index. The data collected to date shows variability in turbidity and suspended solids consistent with published Centre for Environment, Fisheries and Aquaculture Science (CEFAS) data for the UK coastline. This reinforces the need for a multi-stage pre-treatment process tailored to local and seasonal conditions. Initial analysis of soluble parameters, including salinity, total dissolved solids, dissolved organic carbon, boron and bromide, indicates that feedwater quality is within the range assumed in WRMP24. Additional work has included seabed stability and bathymetry assessments, jar testing and particle size analysis to better understand treatment variables such as solids behaviour and settling characteristics.

Since the initial Spring 2025 sampling campaign, the scope of analysis has expanded and continues to be refined to inform the Water Quality Risk Assessment (WQRA), treatment design requirements and future environmental consents. Data capture to date has, at times, been hindered by adverse sea conditions. This has impacted the number of samples obtained and highlights the difficulty of capturing source-water quality.

Despite this, valuable data has been collected, and further improvements to monitoring methods are being explored. This will inform the approach to sampling at the future preferred site and if required, other shortlisted sites. The monitoring programme includes deployment of sondes (floating monitoring buoys) capable of the continuous monitoring of key parameters.

To support the sampling programme, a complementary seawater characterisation study is underway with Cranfield University. This includes bench-scale testing of samples from each sampling campaign to improve understanding of pre-treatment and RO performance under the specific source-water conditions.

Following treatment, the remineralised desalinated water will need to be blended with existing potable water supplies. Work is underway to understand the implications of blending, including appropriate blend ratios and any operational considerations. This work is informed by expert workshops, cross-industry learning and academic research, including a PhD study with Sheffield University examining the impacts of introducing desalinated water into existing distribution systems.

Figure 6: Vessel used for coastal monitoring off the Lincolnshire Coast

Intake and outfall considerations

The intake and outfall infrastructure are expected to be some of the most technically challenging aspects of the project. This is because of the complexities involved in marine engineering. The design must balance environmental needs alongside reliable hydraulic performance, constructability and long-term operation and maintenance in a dynamic coastal setting. These challenges underline the importance of early specialist input to understand the specific shoreline and inshore marine conditions along the Lincolnshire coast.

A study on intake and outfall design good practice is underway with support from an international desalination expert. This work is applying global lessons to the specific conditions of the UK east coast. It considers currents, wave climate, tidal range, sediment dynamics and stability, shoreline morphology and marine traffic. The findings will provide a technical foundation for detailed hydrodynamic and engineering modelling once a shortlist of sites has been identified.

Figure 7 illustrates typical intake and outfall infrastructure[5] which is required for a desalination plant to convey seawater from offshore to the land and to return the brine stream back to the sea.

Typically, seawater desalination plants worldwide achieve approximately 40% yield of potable water. Approximately 60% of the abstracted seawater will be discharged back to the sea as brine. The design and management of the brine discharge, including the outfall location, configuration and dispersion characteristics, are key considerations in site selection and subsequent design development. Specialist advice on brine discharge behaviour and management options is being provided by an international desalination expert, ensuring that emerging proposals reflect established global best practice and are appropriately tailored to the conditions of the East Anglian coastline.

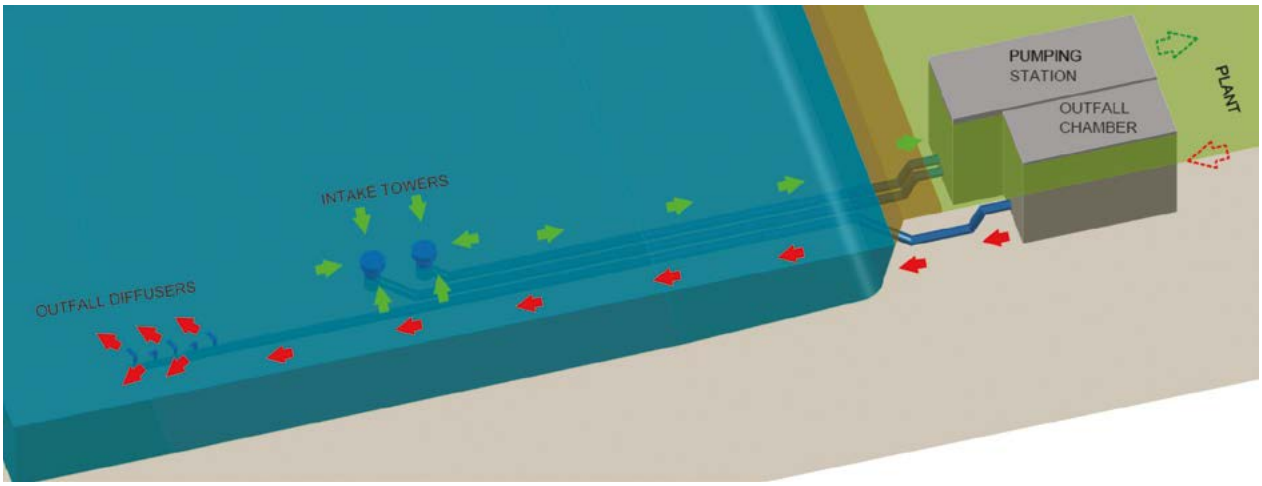

Figure 7: Intake and Outfall Illustration

5 HR Wallingford, (2026). Technical illustration. Used with permission.

Operational, energy and waste considerations

Efficient and sustainable operation of the Lincolnshire desalination plant will be central to ensuring reliable year-round supply while supporting Anglian Water's wider strategic objectives for resilience, energy efficiency and environmental performance. The operational approach aims to set up a reliable baseload, allowing RO processes to function optimally and consistently maintain blend ratios throughout the network. At the same time, it will keep enough flexibility to respond to daily and seasonal fluctuations in demand. Options for integrating treated water storage and coordinating with current groundwater and surface water supplies will be considered to enhance system efficiency.

Energy use will be minimised through selection of high-efficiency equipment, energy-recovery devices and optimised control. The potential to operate in alignment with periods of higher renewable energy availability will also be assessed alongside wider investigations into the provision of power. As the design progresses, emerging technologies and best-available techniques will be reviewed to inform the operational efficiency requirements and reduce environmental impact.

The desalination process will generate liquid and solid waste streams alongside the main brine discharge. Standard industry approaches will be applied to ensure all waste streams are managed safely and in line with environmental regulatory requirements.

Pilot plant

A pilot plant is being built as part of the seawater desalination programme to provide evidence for technical, operational, environmental, and regulatory requirements, supporting confidence in a full-scale facility. Its purpose is to demonstrate that desalination can reliably produce drinking water under local seawater conditions and identify materials and supply chains able to meet the requirements of Regulation 31 of The Water Supply (Water Quality) Regulations 2016.

The pilot plant will also help refine the operational approach to energy and chemical use to reduce long-term costs and carbon, and provide trusted data to support scheme procurement, planning, permitting and regulatory approvals. The pilot plant is an important enabler for future investment and a source of assurance for regulators, stakeholders, customers, and the supply chain involved in the procurement process. The intention is for the pilot plant to be operational by around 2029 to enable sufficient testing to support the procurement and the detailed design processes.

3. Current delivery plan including milestones

The development of the Lincolnshire desalination project will be guided by Anglian Water's overarching objectives for major project development as seen below in Table 1.

Customer value and social impact	Deliver measurable value for customers by ensuring cost-effective solutions that enhance service quality, while also generating environmental and societal benefits.
Sustainability and environment	Achieve net environmental enhancements at both local and regional levels by considering best available techniques, collaborating with stakeholders, offsetting carbon impacts as far as practicable, and ensuring the solution remains adaptable to future needs.
Organisational capability	Adopt innovative and forward-thinking approaches to project delivery – across commercial, procurement and operational areas – to implement scalable, adaptable technologies and establish a repeatable model that positions Anglian Water as the client of choice.
Excellence in programme delivery	Deliver first-of-a-kind water infrastructure projects that deliver against stakeholder expectations through efficient processes, strong communication, and continuous improvement – ensuring reliable, high-quality water services that integrate seamlessly within the existing network.
Effective risk management	Establish a dynamic, programme-wide risk and opportunity framework that considers all stakeholders, incorporates global best practices, and evolves throughout the project lifecycle to support informed decision-making and drives a balanced allocation of risk to the parties best able to manage them.

Table 1: Desalination Programme Overarching Objectives

Lincolnshire Desalination is identified within the WRMP24 Adaptive Plan with a high-level indicative supply date of around 2040, with flexibility for earlier delivery if required. This timing reflects WRMP planning assumptions only and does not represent an assured programme or delivery baseline; the exact required date will be confirmed through WRMP29, while current activity focuses on progressing development to maintain delivery flexibility. The roadmap as presented in Figure 8, shows the progress needed to have water into supply by 2040. This timeline assumes that a Development Consent Order (DCO) consenting route may be followed, though this has not yet been confirmed and is further discussed in Section 5. The programme also assumes a late DPC model as the preferred procurement approach and this is summarised in Section 6. At this early stage of development, a level of uncertainty is expected and will reduce once a site is selected, a concept design is developed, and the intake and outfall parameters are confirmed. Table 2 presents the key dependencies aligned with the milestones required to achieve the programme timeframe.

2026	· Preferred site identified: Q1 2027 **(Milestone)** · Refinement of deployable output range completed by end of 2026 to avoid redesign, rework, and misalignment with upstream system assumptions · Preferred consenting strategy following site selection.
2027	· Finalisation of deployable output requirement by mid-2027 to lock in treatment design parameters and procurement strategy · Finalisation of consenting strategy by mid-2027, following confirmation of deployable output
2028-2030	· The programme relies on the external availability of a Regulation 31-compliant RO membrane. Ideally this would be secured by 2028 for pilot plant operation and by 2030 to support main works delivery and procurement certainty.
2031-2033	· DCO application submitted – 2031 **(Milestone)** · Competitively Appointed Provider (CAP) award – 2033 **(Milestone)**

Table 2: Key Dependencies with Linked Milestones

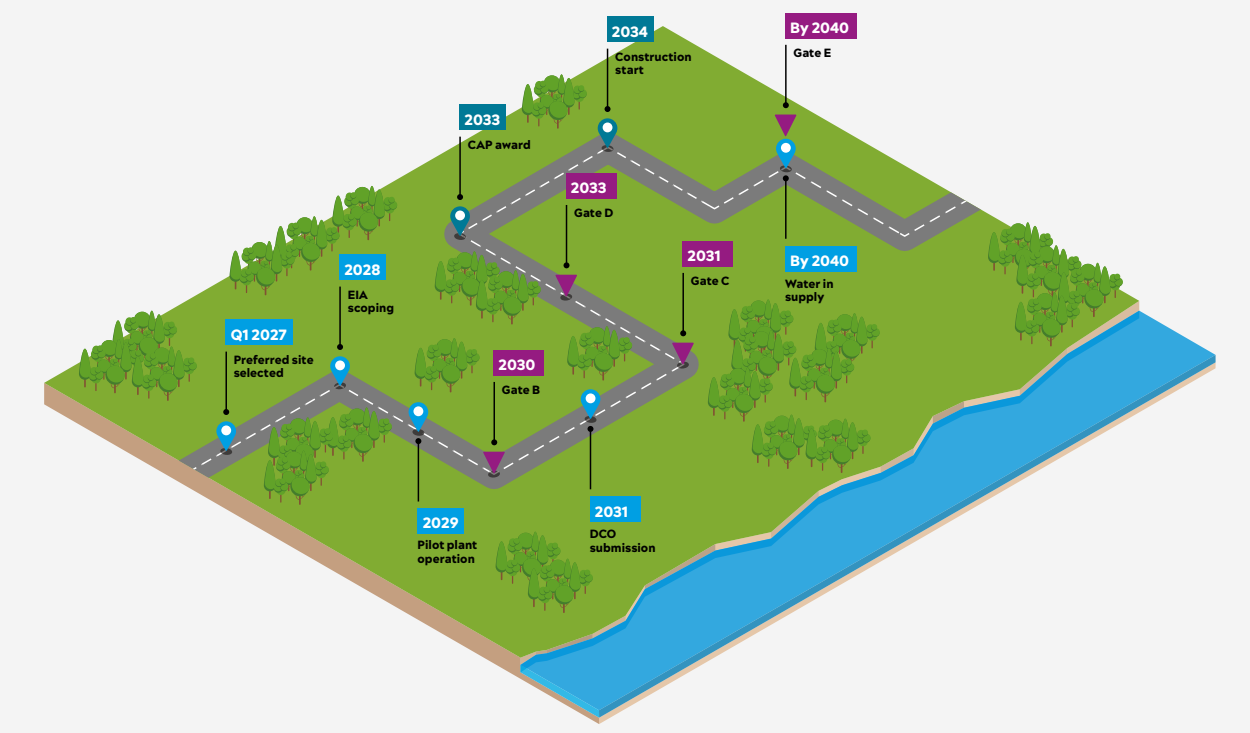

Figure 8: Roadmap to desalination (based on the DCO Route)

Planned engagement with regulators, government and wider stakeholders

Engagement to date has been structured, proactive and evidence-led and will continue throughout project development. Anglian Water meet regularly with RAPID, the EA and its National Appraisal Unit (NAU), Natural England (NE), Historic England (HE), and the Marine Management Organisation (MMO) to discuss technical and environmental issues. Anglian Water will continue to engage with these bodies regularly to coordinate required surveys including Habitats Regulations Assessments (HRA) and Water Framework Directive (WFD) considerations and agree on data requirements and schedules. DEFRA and other government bodies are briefed to maintain alignment with national water resources policy and Environmental Destination work.

A cross-organisation Site Selection Stakeholder Working Group provides advisory input during early site selection as per the stages in Figure 5. Attendees of the working group are shown in Table 3. Meetings in 2025 established terms of reference, reviewed the methodology and considered early outputs; future sessions will be held to support the ongoing site selection process. The purpose of the forum is to ensure transparency and capture statutory, technical and local insight.

Statutory	Local Planning Authority	Non-statutory
EA	Lincolnshire County Council	Water Resources East
MMO	North East Lincolnshire Council	
NE	East Lindsey District Council	
HE		
The Crown Estate		

Table 3: Site Selection Stakeholder Working Group Attendees

Public and Customer engagement will be informed by Cranfield University research into perceptions of desalination, with quantitative community research from Spring 2026 shaping consultation materials and providing insight into customer acceptability. Anglian Water will communicate any future change of source water with customers in line with the Drinking Water Inspectorate (DWI) expectations. Insights gained from previous major projects will be used to enhance engagement to gain public confidence.

As site selection progresses, early engagement will be undertaken with affected landowners to support access for surveys, understand local constraints and build constructive relationships. Public consultation will be held before the next submission to guide programme development and provide clear, accessible information to local communities about the proposals.

Dependencies with other solutions

Dependencies for the Lincolnshire Desalination Project are outlined in Section 2 and include changes to anticipated abstraction licence reductions and the potential industrial supply requirement. While these do not all represent direct project dependencies, they will influence the final deployable output, programme scheduling, and integration of the desalination plant within the wider system.

These factors will continue to be monitored throughout the programme, alongside ongoing work to inform WRMP29 and the Water Resources East Regional Plan, to ensure that the desalination solution remains appropriately sized, strategically aligned, and deliverable within an evolving regional water resources context.

Forward plan

Gate B is a stage in the project where regulators check that a preferred approach has been identified and that there is enough evidence to show it is a realistic and sensible way to meet future water needs. At this point, the aim is to be confident that the option being taken forward is technically workable, environmentally responsible, and offers good value for customers, with known risks being actively managed.

To reach this stage, the project needs to move beyond early high-level studies and build a clearer picture of how the solution could work in practice. This includes developing an initial design, narrowing down and confirming the preferred option, improving understanding of the water supply benefits, carrying out early environmental work, and developing more reliable estimates of cost and programme timescales. This work is being progressed in line with the ACWG Design Principles[6], which promote good practice across areas such as sustainability, resilience, environmental protection, and value for customers. While some uncertainty is expected at this stage, the intention is to reduce it as the evidence base strengthens.

During the next phase of the programme, a preferred site for the desalination plant will be identified. The choice of site is important, as it influences how the intake and outfall could operate, the type of treatment needed, potential environmental effects, land requirements, and overall cost and schedule. Once a preferred site is known, work can continue to refine the early design, improve cost estimates, and better understand any environmental or operational considerations. Early engagement with landowners and local communities will also take place to ensure openness and to help shape how the project could be taken forward.

Gate B is currently expected to be reached in 2030, with a mid-point review to take place before then at a date to be agreed with RAPID. The proposed timeframe is intended to allow the technical, environmental, planning and engagement activities to be progressed in a proportionate way, helping to maintain flexibility as the project continues to develop. Work on associated infrastructure such as the transfer pipelines, storage and additional treatment, will be progressed alongside this activity.

Overall, these steps are designed to gradually reduce uncertainty, build a stronger and more balanced evidence base, and support informed decisions about whether and how the project should move forward to the next stage of development.

6 Water Resources South East, (2023). Water Resources: Design Principles & User Guidance.

4. Cost estimates and deployable output benefit

While cost estimates for Lincolnshire Desalination will continue to be refined as the design matures, the cost basis at Gate One is unchanged from the assumptions presented in WRMP24 and remains consistent with the allowances established through Ofwat's PR24 Final Determination for major projects development. At this stage, Anglian Water is setting out the cost-estimating approach and the associated uncertainty.

Cost and deployable output assumptions are being actively benchmarked against lessons from UK desalination schemes (including experience of standby or under utilisation, operating costs and maintenance performance), alongside a structured review of international projects to understand the causes of cost overruns, energy impacts and operational reliability issues. These insights are being incorporated into cost estimation, utilisation assumptions and risk allowances to ensure the submission reflects realistic performance across all operating modes.

Despite the inherent uncertainty at this stage, the Gate One assessment continues to support desalination as the best-value proposition within Anglian Water's adaptive plan: it is climate-independent, scalable, and performs strongly across a wide range of future scenarios. Progression to Gate B will increase design maturity and assurance, enabling a more robust estimate to be submitted to regulators once key decisions on solution definition, delivery approach, and the consenting route are confirmed.

Deployable output benefit

The Lincolnshire desalination project would provide a reliable, climate-independent source of supply, with a deployable output range of 25 - 110 Ml/d under consideration at this early stage of development. As a seawater-based solution, its yield is resilient to the climate-driven pressures that affect surface water and groundwater sources, offering a stable contribution even during prolonged drought conditions. This strengthens regional drought resilience by reducing reliance on abstraction licences that are vulnerable during dry periods and by providing a controllable, flexible supply that can be scaled or adjusted as needed to address future water shortages. The project plays an important role within the WRMP24 adaptive plan, supporting long-term water availability for customers and the transition to a more resilient regional supply system. Figure 9 illustrates an example scenario where demand management is less effective than planned; in that case, the Lincolnshire desalination project would be required sooner and at a higher deployable output.

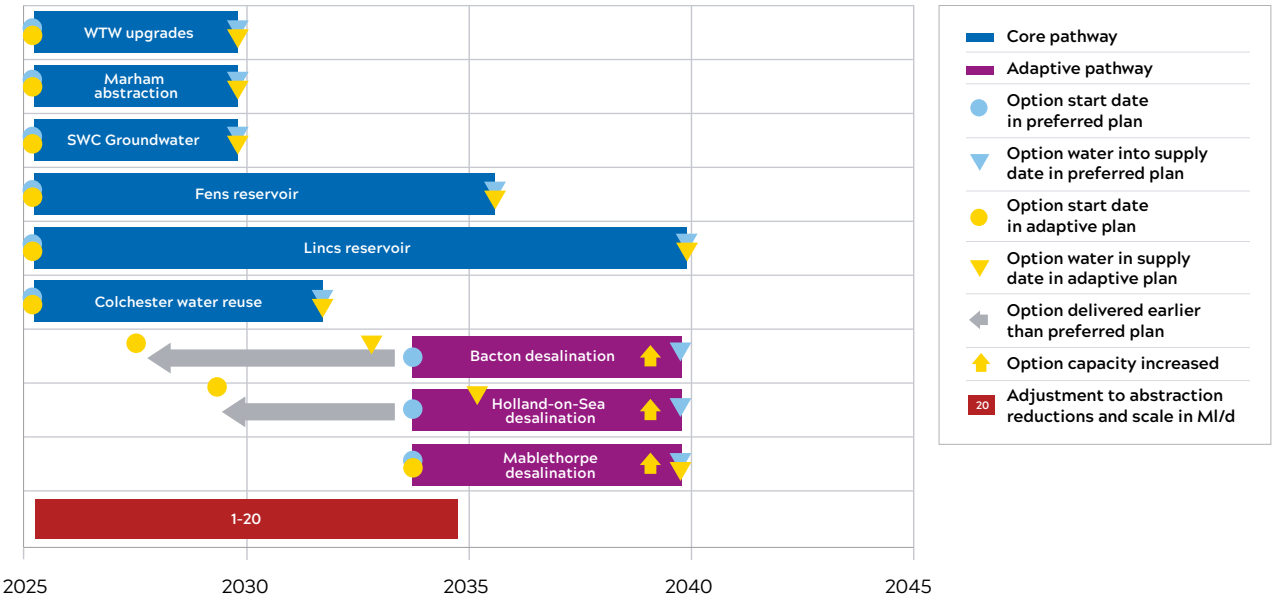

Figure 9: An Adaptive Plan scenario showing the outcome if demand management is less effective

Cost estimate

The Lincolnshire desalination project is at an early stage of development, and the cost estimate is therefore subject to significant uncertainty. At Gate One, the estimate is an early, strategic estimate used to support option confirmation and value-for-money assessment, rather than an investment decision or budgeting baseline.

There has been no change to the cost estimate since WRMP24 and Ofwat's PR24 Final Determination for major projects development. This reflects the current level of design maturity: a preferred site has not yet been selected and the concept design, intake and outfall parameters, and system integration requirements are still being defined.

WRMP24 cost information was developed to enable consistent comparison between feasible options in the adaptive plan (i.e., to understand relative cost and performance across scenarios). These comparative estimates support option selection and sequencing; they are not intended to set delivery budgets or serve as an approved investment baseline.

Ofwat's PR24 Final Determination (including the Major Projects Development decision) provides the regulatory basis for the programme's development funding in AMP8. Anglian Water is using that determination as the reference point for the current development-phase cost allowances and for consistency of reporting at Gate One. As the programme progresses through the RAPID gated process, updated estimates will be produced in line with the required level of definition and assurance for each gate.

Estimate class and expected maturity

Major infrastructure programmes typically use different classes of estimate as definition improves. At Gate One, the project is at feasibility / option-confirmation stage with limited design definition and significant scope/cost uncertainty. By Gate B, Anglian Water expects materially greater definition (preferred solution defined, initial concept design developed, environmental assessments undertaken and a clearer delivery strategy), allowing the estimate to be developed and classified (e.g. comparable to a "Class 5 / concept" or a "Class 4 / outline concept" type estimate). The final estimate class requirement for Gate B will be confirmed against Ofwat's updated guidance for the gated process.

In summary, estimate maturity is expected to develop as follows:

- Gate One (current): early feasibility estimate (high uncertainty; used for option confirmation and comparative assessment).
- Gate B: more developed concept estimate (with uncertainty clearly explained and proportionate for this stage).
- Later gates / pre-procurement: pre-tender / pre-construction estimate aligned to a defined scope and consenting envelope.
- Post-procurement: estimate based on contracted prices and agreed risk allocation.

Cost breakdown and key assumptions

Current cost assumptions reflect an onshore seawater desalination facility delivering approximately 50 Ml/d of deployable output, including marine intake and outfall infrastructure. Capital expenditure dominates the overall cost envelope, and operating expenditure remains sensitive to energy pricing, operational regime and final process configuration. Development of transfer pipeline and wider system infrastructure (to get water into supply) will be progressed in future stages and is not included in the Gate One desalination plant estimate.

Overall Cost Breakdown

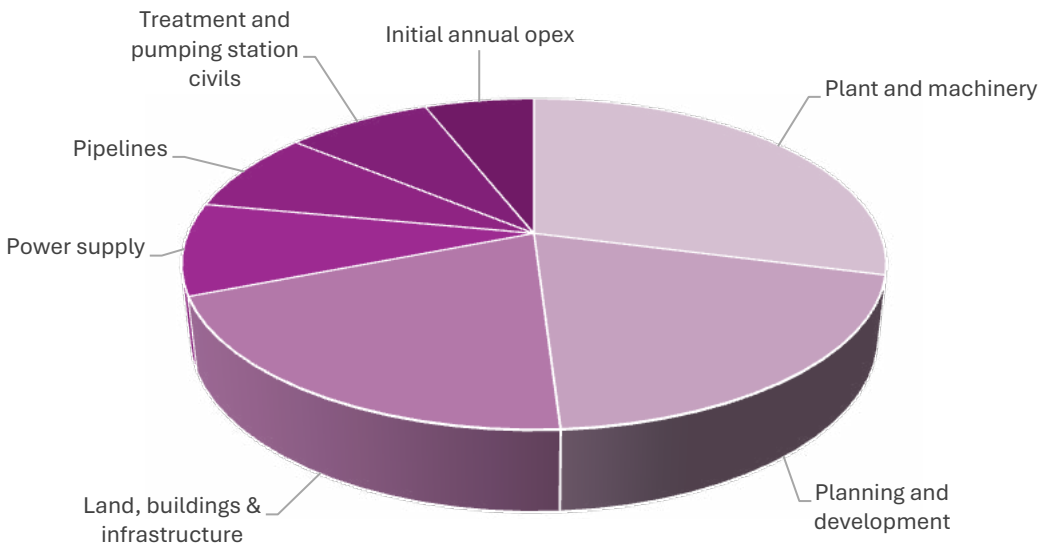

Figure 10: An Overall Cost Breakdown for Lincolnshire Desalination Option

Changes since WRMP24 and next steps

There have been no changes to the material scope since WRMP24, because the design remains at the initial feasibility stage and cannot advance further until a site is chosen.

5. Consenting route and secondary consents

The consenting approach has been informed by learning from comparable schemes and Anglian Water's experience of major infrastructure consenting, alongside early consideration of the project's scale, location and environmental context. As stated in Section 3, the programme currently assumes that a DCO consenting route will be used (a cautious approach to support programming of the project), though this has not yet been confirmed, two potential consenting pathways are currently under consideration:

- A DCO under the Planning Act 2008, incorporating a deemed marine licence; and
- A multi-consent route coordinated under the coastal concordat, involving planning permissions under the Town and Country Planning Act 1990 and a separate Marine Licence under the Marine and Coastal Access Act 2009.

The Special Development Order (SDO) route was considered but discounted at this stage, as it would be atypical for a single, non-urgent and non-nationally significant project and would rely heavily on political intervention without the policy certainty, statutory decision timescales and established frameworks provided by the NSIP process. An SDO approach could be revisited in future should circumstances change, for example if delivery urgency materially increased or if significant local planning barriers emerged for a sub DCO threshold scheme.

The project is presently considering a deployable output in the range of 25-110 Ml/d. Under existing legislation, any scheme delivering more than 80 Ml/d must be authorised through a DCO. For projects with outputs below this threshold but involving significant complexity, Anglian Water may still seek to utilise the DCO regime by applying for a direction under Section 35 of the Planning Act 2008.

The key advantages and disadvantages of both consenting routes being considered are summarised within Table 4.

Consideration	Development Consent Order with deemed marine licence	Planning Permission(s) and separate marine license
Single consent ("one stop shop")	Incorporation of a deemed marine licence, reducing programme risk associated with MMO decision-making	Water Resources East
Consultation requirements	Potentially more stringent however Planning and Infrastructure Bill mitigates for this.	Less stringent requirements.
Programme certainty	Statutory timeframes for decision making, however Secretary of State timeframes can be extended for DCO.	Uncertainty on time frame for Local authority and MMO decision making.
Clear policy framework	National Policy Statements are the principal policy documents for DCO decisions	There are multiple policy documents including the National Planning Policy Framework and multiple different local plans. There are no water resource specific policies. The Marine Planning Framework is complex and the integration with onshore planning will be challenging.
Flexibility in design	DCO relatively inflexible post-consent. DCO risk can be significantly reduced with management of consenting envelope	Planning permission relatively easy to amend.
Compulsory acquisition powers (only if required)	Requires additional resources for management / land referencing	Programme highly uncertain. Relationship between planning permission and compulsory acquisition powers is largely sequential.

Table 4: Consenting Route Considerations

A multi-consent route would require coordination across multiple authorities and typically involves longer MMO decision periods, creating greater programme uncertainty than a DCO's defined statutory timescales. However, this route may be better for building and maintaining a relationship with the Local Planning Authorities. An Environmental Impact Assessment (EIA)[7] will be required under either route. Although the DCO process has historically been more resource-intensive, recent reforms under the Planning and Infrastructure Act 2025[8] have streamlined elements of the regime, increasing its attractiveness for nationally significant infrastructure.

Rights of access for surveys and compulsory acquisition can be secured under either pathway; however, relying on Anglian Water's existing statutory powers and separate compulsory acquisition under a planning-permission route could introduce additional delay where landowner objections arise. A thorough site selection and concept design process is essential to minimise consenting risk, and will ensure that alternative sites, environmental effects and land requirements are comprehensively assessed.

The consenting route will be determined once a preferred site is identified, enabling a more comprehensive assessment of the associated risks and benefits. Alongside the primary planning consent, a number of secondary consents will be required, the most significant being the environmental permit for brine discharge, which will require close coordination with the Environment Agency. The planning and consenting strategy is confirmed at Gate B, with Gate C providing regulatory approval to commit to the delivery approach and progress procurement and statutory planning.

7 Ofwat, (2024). Environmental Impact Assessment.
8 Gov, (2025). Planning and Infrastructure Act 2025.

6. Procurement strategy

The Procurement Strategy considers the potential procurement routes and identifies the likely optimum route for the Lincolnshire desalination project.

The PR24 final determination indicated that the Lincolnshire Desalination Project would be procured via the Direct Procurement for Customers (DPC) approach that will appoint a Competitively Appointed Provider (CAP) to deliver the final asset. At this stage of development DPC is still considered the most optimal delivery route due to the current size and complexity of project.

Project	DPC		SIPR		Other	
	Size	Complexity	Size	Complexity	Size	Complexity
Lincolnshire Desalination	Yes	Yes	No	Yes	No	Yes

Table 5: Procurement Route Eligibility Assessment

However, if there are changes to the scope, scale, timing or other material aspects of the project as it develops, Anglian Water will review the ongoing suitability of the DPC approach. In addition, any changes to the criteria for DPC or SIPR during project development will be considered as part of this review.

7. Identification of risk and potential barriers

Strategic Risk	Risk Description	Potential Impact	Mitigation / Response
Regulatory approvals	Approvals needed to build and operate a desalination scheme (such as Reg 15 and Reg 31) may take longer than expected based on current understanding.	Delays to the programme, higher costs, or limits on what solutions are possible.	Early regulator engagement, industry collaboration, evidence led studies and trials.
Water quality responsibilities	It may be unclear how legal responsibility for drinking water quality should be shared or managed under new delivery and commercial models.	Limits the delivery options available, reduces market interest, or leaves more risk with Anglian Water.	Robust assurance and monitoring arrangements; evidence to support fair risk allocation.
Planning, Marine and environmental constraints	Environmental, Marine protections and planning policy requirements could rule out some locations or require significant additional mitigation.	Fewer suitable sites, longer planning times, higher costs, or challenges to delivering the scheme at all.	Early integration of environmental and marine risk into site selection and engagement with regulators.
Future water demand	Future water demand may be different from current assumptions, affecting the size or design of the desalination solution.	Redesign work, changes to planning or procurement, and delays or extra cost.	Regularly updated modelling and flexible solution design.
Delivery model and market interest	Any proposed commercial and delivery model may not be attractive to some of the market, reducing supplier competition and innovation.	Fewer bidders, reduced competition, or difficulty securing suitable delivery partners.	Development and deployment of a clear market engagement strategy to define commercial model arrangements, contracts and procurement plans.
Cost and affordability	Costs could increase for customers as a result of external pressures.	Concerns about customer bills, reduced confidence in the programme, or difficulty securing approvals.	Development of cost plans and commercial models, instigation of cost control measures and transparent affordability assessment.
Power and other infrastructure	Power supply or other supporting infrastructure may be delayed, more complex, costly or slower to deliver than expected.	Delays to the programme, increased costs, or exclusion of otherwise suitable sites.	Early engagement with providers and integration into site selection.
External stakeholder support	Stakeholders may have concerns about desalination and its associated impacts.	Delays to approvals, reputational impacts, or additional mitigation requirements.	Early engagement and clear, evidence based communication.
Policy and regulatory change	Changes in government policy or how regulators work together could affect programme requirements.	New or changed requirements, duplicated effort, or delays to key decisions.	Ongoing horizon scanning and coordinated regulator engagement.

Table 6: Key Risks for Lincolnshire Desalination

8. Efficiency of expenditure

£1.5m has been spent to date as detailed in the attached Efficiency of Expenditure template and summarised in Table 8.

Category	Activity	Total expenditure £, 2022-2023 prices	Activity % of Total Expenditure
Programme and Project Management	· Project Management and Project Management Office to lead and manage the projects	£347,233.53	15.5%
Feasibility Assessment and Concept Design	· Blending studies to inform blending ratio for draft WRMP29 · Intake/Outfall study · Reg 31 mitigation · Pilot plant feasibility study	£491,703.45	21.9%
Option benefits development and appraisal	· WRMP29 environmental destination	£228,914.65	10.2%
Environmental Assessment	· Desktop studies · Marine planning support · Coastal modelling · Environmental literature review	£203,951.94	9.1%
Data Collection, Sampling, and Pilot Trials	· Coastal monitoring sampling programme · Buoy deployment	£490,538.97	21.9%
Commercial and Procurement Strategy	· Procurement model strategy development · Market Engagement	£311,289.96	13.9%
Planning and Land	· Consenting strategy development	£7,375.56	0.3%
Stakeholder Engagement	· Site working group · Early stakeholder engagement	£128,517.93	5.7%
Legal	· DPC/Ofwat legal advice	£30,908.33	1.4%
Other			
Total		£2,240,434.33	
Gate One Allowance		£7,237,107.42	
Gate Under/ Overspend		£4,996,673.09	

Table 7: Summary of Gate One Expenditure

The current level of expenditure is lower than the initial 10% Gate One development allowance primarily due to the early stage of programme maturity. Rather than being driven by a pre-set gate allocation, spend is determined by the actual progress and timing of activities within the programme. This approach ensures that investment is aligned with the true requirements of the work completed to date, avoiding premature or unnecessary expenditure. Importantly, the percentage of spend at this stage is consistent with other (SRO) Gate One submissions, reflecting industry norms for programmes at a similar point in their lifecycle. As the programme develops and matures, future expenditure will naturally increase in line with the planned activities and milestones, ensuring resources are deployed efficiently and appropriately.

9. Benefits

The primary objective of the project is to deliver public water supplies via a best-value and publicly accepted desalination plant in Lincolnshire. This forms a key part of Anglian Water's long-term water resource strategy and adaptive plan. Realising this objective is expected to unlock wider consequential benefits, including creating a more sustainable and reliable long-term water supply for the region, supporting a thriving environment whilst improving environmental outcomes such as leaving more water in the environment, enabling growth, and contributing to enhanced organisational reputation and public trust.

Figure 11 presents a benefits map that outlines the advantages of the Lincolnshire Desalination Plant. Each benefit is measured at intermediate, end, and consequential stages, and is connected to the project's defined objectives. The outcomes show positive effects for the local environment, economy, community and other water users. These are an early stage reflection of benefits which will be much further developed throughout the project.

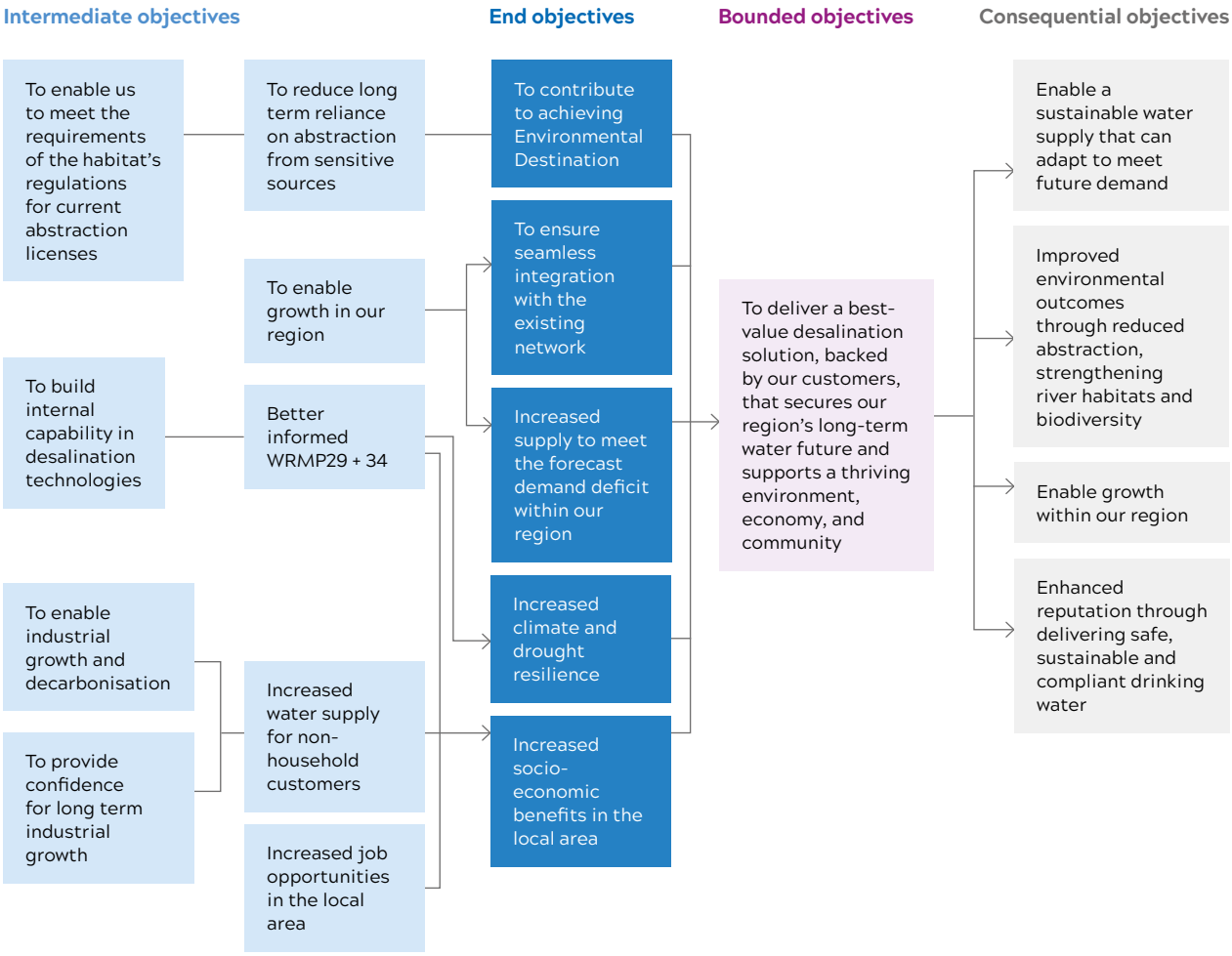

Figure 11: The Benefits Map for the Lincolnshire Desalination Project

10. Drinking water quality

This section covers the drinking water quality considerations of the Lincolnshire desalination project. Figure 12 illustrates the process flow from source to consumer, which provides the basis for identifying limiting hazards and their associated risk scores through a WQRA that follows the drinking water safety risk framework developed for the ACWG.

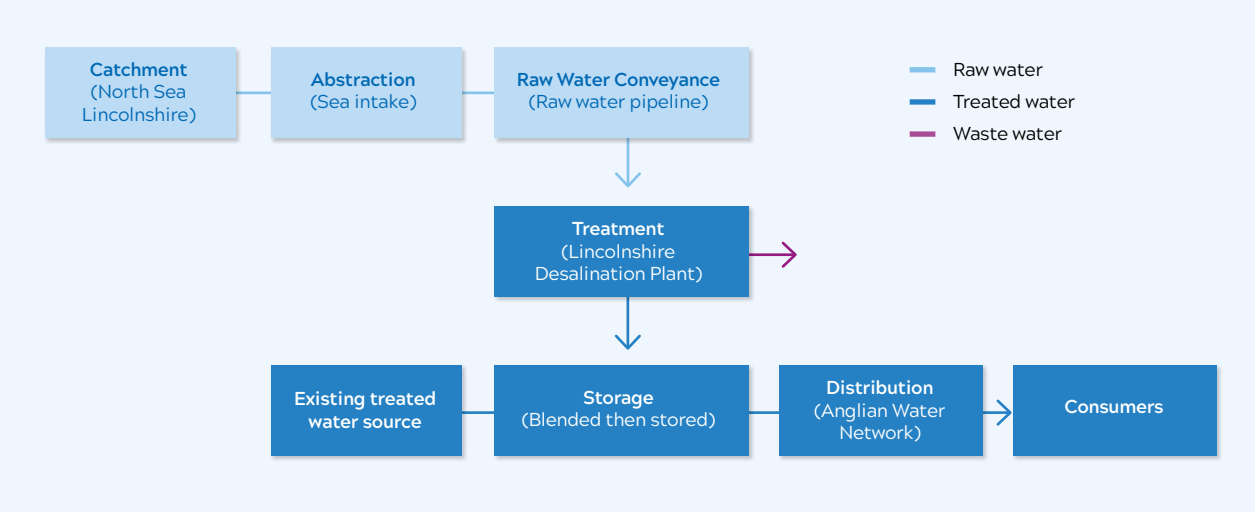

Figure 12: Block diagram of Lincolnshire Desalination Option

WQRA overview

The purpose of WQRA at Gate One is to provide a high-level review of the assessment and mitigation of risks to drinking water quality associated with the project. The WQRA was carried out based on guidance developed for the ACWG by Jacobs, detailed in the Strategic WQ Risk Framework[9]. The ACWG guidance was based primarily on the Water Supply (Water Quality) Regulations (2016) – (S.I 2016/614)[10] as amended by the 2018 Amendment Regulations (S.I 2018/706) for England and the Water Supply (Water Quality) Regulations (Wales) (S.I 2018/647 (W.121)) for Wales[11] including DWI Guidance on their implementation[12].

9 Jacobs, (2021). Strategic WQ Risk Framework, Final Report. Internal report (not publicly available)
10 HM Government. The Water Supply (Water Quality) Regulations 2016.
11 HM Government. Water Supply (Water Quality) Regulations 2018.
12 DWI. Guidance on implementing the Water Supply (Water Quality) Regulations.

The ACWG guidance describes a five-step methodology, as shown in Figure 13, described in further detail below.

Figure 13: Overall ACWG Five-Step Methodology for Strategic WQRA

a) Collate Data

To inform the WQRA and support option design, relevant data on the catchment, abstraction location, distribution network, and consumer region were collected where available.

The preferred data sources would have been existing DWSPs (Drinking Water Safety Plans), but because the option involves a new abstraction point with the location still to be confirmed, the DWSP for this location has not yet been developed. Consequently, preliminary coastal monitoring programme data was used for upstream WQRA stages to inform risk ratings and identify limiting hazards.

The data collected as part of the monitoring programme after the initial WQRA, current and future, will be used to reassess drinking water quality risks during the next stage of development.

b) Develop Assessment Team

The ACWG Risk Framework requires an assessment team to be convened to include representatives from any water company affected by the major project. The team should include experts with capabilities in water quality risk assessment, water quality regulation, process engineering and process development, and knowledge of the existing water treatment works and associated distribution systems within the region and knowledge of the drinking water safety planning approach.

c) Undertake Strategic WQRA

The WQRA was carried out at a workshop in September 2025. Attendance was based upon expert knowledge and included representatives from the water quality and scheme development project teams with relevant engineering expertise as listed below;

Attendee Role	Organisation
Senior Process Engineer (Workshop Lead)	Lead Technical Author (Consultant)
Water Quality Policy and Strategy Manager	Anglian Water
Water Quality Risk Manager	Anglian Water
Principal Strategic Scientist	Anglian Water
Senior Programme Manager	Anglian Water
Project Manager	Anglian Water
Senior Design Manager	Anglian Water
Project Manager	Lead Technical Author (Consultant)
Project Technical Lead	Lead Technical Author (Consultant)
Process Engineer	Lead Technical Author (Consultant)

Table 8: WQRA Workshop Attendees

To ensure valuable insights are provided going forwards, full engagement of all stakeholders including regulatory bodies will be undertaken in line with the ACWG requirements.

The following steps were undertaken to develop the strategic WQRA:

1. Identification of limiting hazards,
2. Assigning pre-mitigated risk scores (likelihood and consequence),
3. Identifying the recommended mitigations,
4. Assigning post-mitigated risk scores (likelihood and consequence), and
5. Detailing any residual risk considerations.

The ACWG template for the WQRA includes different stages, comprising Catchment, Abstraction, Raw Water Conveyance, Treatment, Storage, Distribution and Consumer. These stages are aligned to those used in the development of DWSPs.

The risk scores (mentioned in the above WQRA steps) assigned at the workshop were applied using the risk ranking matrix developed for the ACWG, shown in Figure 14.

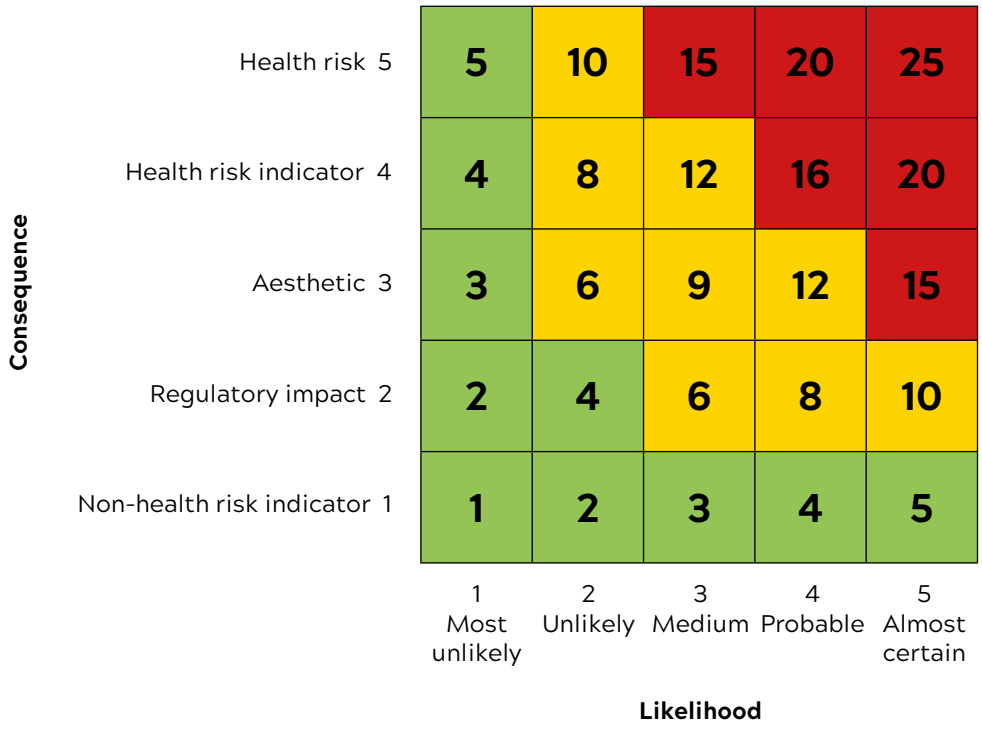

Figure 14: WQRA Risk Matrix

d) Check Outputs

Agreeing on data sources during the strategic WQRA workshop assumes all relevant water quality risk information has been identified. If there are areas where data has not yet been included in the assessment, the goal is to address those gaps by Gate B. These data gaps will be considered for inclusion in the future water quality monitoring programme and the outputs of the WQRA inform updates to treatment designs.

Tailored aspects of WQRA methodology

A list was created to standardise consequence ratings for each hazardous parameter at all stages. The ratings were based on information sourced from the World Health Organisation Guidelines for Drinking Water Quality[13] and followed the 5x5 risk matrix system of grading consequences. The ratings were built on the assumption that the hazards were present above the limits set by the Water Supply (WQ) Regulations 2016. The consequences would therefore range from "non-health risk indicator" to "aesthetic" impacts to "health impacts". Where no limits were available, the consequence ratings were chosen assuming the hazard was present at a concentration high enough to attain the most severe consequence category possible.

Limiting hazards

A limiting hazard is defined within the framework as "hazards and hazardous events which are most likely to drive the development and/or acceptability and/or viability of the SRO or water supply project". In summary they are the key hazards for the SRO.

Establishing water quality hazards in the source water (typically referred to as raw water), is part of the normal risk assessment process to determine the steps required, including treatment, to produce safe wholesome drinking water. The raw or source water for the Lincolnshire Desalination plant will be seawater, abstracted off the Lincolnshire coast.

The philosophy behind defining limiting hazards is that it is not necessary to perform a risk assessment on every water quality parameter, because multiple parameters would be removed through the same type of treatment process. For instance, both coliform bacteria and E. coli are present in the raw water, both are indicator bacteria, both require a disinfection stage to treat so it is only necessary to risk assess one of them.

An initial list of limiting hazards was identified based on available data which was reviewed and further developed using the expert opinion of those at the workshop. The following final list of limiting hazards were identified and analysed in Table 9.

Escherichia Coli	Change in source type (e.g. surface – groundwater)
Cryptosporidium	Pathogens – Bacteria, Viruses, Protozoa
Boron	N-Nitrosodimethylamine (NDMA)
Iron	Temperature
Bromide	Total Organic Carbon (TOC)
Sulphate	Chloride
Bromate	Radioactivity (Alpha, Beta Tritium)
Lead	Beta – Estradiol
Trihalomethanes (THM) / THM Formation Potential	Total PFAS
Nitrite	Turbidity
Pesticides: Total	Algae
Benzo(a)pyrene	Disinfection by-products (DBPs)
Corrosivity	Haloacetic Acids (HAAs)
Dirty/Discoloured water	Iodinated DBPs
Odour	3rd party activity e.g. Oil Spill
Taste	Differences in operation due to challenging coastal weather conditions
Impact of operational changes	Change in hardness/alkalinity

Table 9: List of Limiting Hazards

13 World Health Organisation, (2017). Guidelines for Drinking Water Quality.

Data assumptions

The raw water quality data for the WQRA was from the 2025 Lincolnshire Spring coastal monitoring campaign. The abstraction location for the desalination plant has not been finalised at this stage of development, but the Seawater Quality Report (SQR) provides a suitable representation at Gate One for water quality in the North Sea off the Lincolnshire coast. The list of parameters sampled as part of the 2025 Lincolnshire Spring coastal monitoring campaign is included in Table 10.

Onsite sample temperature	Chromium	Phosphorus
Onsite pH	Copper	Boron
Turbidity	Nickel	Aluminium
Suspended solids	Lead	Total hardness
Colour (apparent and true)	Zinc	Total alkalinity
Ammoniacal Nitrogen	Mercury	Oil content
Ammonia	Sodium	Salinity
Fluoride	Calcium	Total Dissolved Solids
Bromide	Strontium	Silt Density Index
Nitrite	Barium	Total Carbon (total and dissolved)
Nitrate	Magnesium	Dissolved Inorganic Nitrogen
Sulphate	Potassium	Algae – total
Phosphate	Lithium	E. coli
Chloride	Manganese	Total coliforms
Arsenic	Iron (total and soluble)	Enterococci
Cadmium	Silicon	Total Viable Count
(PFAS added after Spring Campaign)		

Table 10: List of parameters sampled during 2025 Lincolnshire Spring coastal monitoring campaign

To progress the WQRA through Gate One, it was assumed that the SQR data is a suitable representation of water quality for the proposed project.

Given the early stage of development, and to meet the requirements for the Gate One submission, assumptions were made that the SQR data provides an appropriate representation of water quality for the proposed project.

Where appropriate the available water quality risk data was merged to ensure a coherent flow in risks from catchment through to consumer. As data was not available for all stages, expert judgement was used to review how risks might change through the system, taking risks from upstream to downstream stages as appropriate.

The raw water sample data supplied for this SQR had some analytical challenges. Further development of analytical methods and capabilities is necessary for a small number of compounds that are currently being sampled. Consultations with the laboratory are in progress to enhance analytical capabilities. Additionally, there are a limited number of samples gathered from the Spring coastal monitoring campaign to characterise the source water. Further monitoring will develop the characterisation of the source water and improvements in data collection and analysis will continue post Gate One.

Where no data was available for a particular stage of the WQRA, it was agreed to gather further data during the next stage of development. This includes algae, PFAS compounds, pesticides and emerging contaminants (for example beta-estradiol and nonylphenol). The results of the water quality monitoring programme post-Gate One will be used to refine the list of limiting hazards and risk ratings as required. This area is in very early development and significant future work is required to gather data to inform the risk assessment process.

Workshop results

The key conclusions of the workshop were as follows:

- Customer engagement and blending will be key in reducing the risk of consumer acceptability concerns. A plan will be developed to engage with impacted customers on change of source to ensure transparency ahead of water into supply date.
- Further water quality data is required to steer design.
- Careful consideration must be given to DBP formation, with changes to the treatment proposals potentially required post-Gate One.
- Consideration should be given to the potential for meeting Prescribed Concentration Values standards for some parameters through blending with other treated water sources.
- The design should recognise that existing treated water is supplied from a blend of groundwater and surface water sources and may be fluorinated.
- Algal blooms may be a problem in the Lincolnshire coastal area with the potential for biofouling of the raw water intake structures and/or release of algal toxins. Therefore, adequate pre-treatment is required to protect the RO membranes for varying algal conditions throughout the year.
- Marine life may also be an issue in the Lincolnshire coastal area with the potential to obstruct the intake structures and downstream operations, and as such screening on the raw water abstraction should be carefully considered to minimise harm to marine life.

The strategic WQRA workshop identified several considerations that would need to be made as the project develops through the RAPID Gated process, including the potential need for changes to the concept treatment design.

- Boron was identified as a known issue for seawater desalination plants to remove which could be mitigated through multistage reverse osmosis or through blending the permeate with a source that has lower boron concentrations.
- Consideration is required for microbiological hazards such as E. coli and Cryptosporidium, where disinfection must be achieved to the required standard at the desalination plant.
- The presence of iron within the catchment could lead to the fouling of RO membranes. Initial data shows the possible presence of iron in seawater, which might require removal through pretreatment. However, salt present in seawater affects the measurement limits of iron compared to drinking water. Investigations are ongoing, including a review of analytical methods, to confirm whether the concentration of iron in seawater is significant.
- The change in water source could lead to a change in corrosivity of the product water, which may require tailored conditioning to mitigate the risk of increased corrosion of pipes (such as galvanised or unlined iron, cement lined and asbestos cement pipes) in the distribution network.
- Anglian Water's policy is that chloraminated water will not be blended with chlorinated water. This is to reduce the risk of taste complaints. As treated water from the existing WTWs that this water is expected to blend with is chlorinated, water from the new Lincolnshire desalination plant will also need to be chlorinated.
- Endocrine disrupting compounds for example beta-estradiol and total PFAS compounds were identified as emerging hazards potentially present within the catchment area. The concentrations of these contaminants are expected to be significantly reduced by reverse osmosis filtration.

11. Environment

In line with RAPID Gate One guidance, the environmental assessments presented in this report are high-level and based primarily on desk-based review of publicly available online data. Where relevant, the assessment builds on the conclusions of the Strategic Environmental Assessment (SEA), HRA and WFD Assessment undertaken for WRMP24.

The WRMP24 assessments were developed at a plan level including a seawater desalination plant from 25Ml/d to 60Ml/d. The location and deployable output of the project are yet to be confirmed therefore the environmental assessment, proposed mitigation measures and forward programme set out in this report are applicable across all options. These will be refined as site selection and design development progress.

Limitations and assumptions

- Given the early stage of option development, the environmental assessment presented in this report is high-level and focuses only on key issues.
- The assessment is based on desk-based review of publicly available online information current at the time of reporting.
- Environmental risks and benefits relate to the construction and operation of the desalination plant itself and do not yet consider impacts associated with any wider supporting infrastructure, such as long-distance transfer pipelines.
- Assessments have been undertaken for the Lincolnshire coastline only, reflecting that a preferred site is yet to be selected.

Engagement

Table 11 summarises the engagement undertaken with environmental regulators to date. Regular engagement has been undertaken with the Environment Agency and Natural England, including discussion of the approach to assessing environmental constraints across the wider Lincolnshire coastline. Environmental regulators also participate in the site selection stakeholder working group, which meets bimonthly to review the site selection methodology and outputs. Ongoing and targeted engagement with regulators and other stakeholders will continue as the project progresses.

Stakeholder	Role	Activity to date
Environment Agency	Regulation of water resources (quantity and quality), environmental and hydrological monitoring and assessment, and environmental permitting. Delivery of wider environmental ambitions and objectives.	• Engaged via the NAU in regular meetings • RAPID monthly checkpoint meetings • Active member of site selection stakeholder working group (bi-monthly meetings) • Reviewed outputs of environmental work packages, including the Sea Water Sampling Programme
Natural England	Legal and regulatory requirements with respect to the natural environment, plus landscape and environmental benefits and opportunities for enhancement.	
Historic England	Ensure the historic environment is protected but to reconcile that with the economic and social needs and aspirations of the people who live and use the area.	• Engaged initially via individual meetings to onboard onto the programme • Active member of site selection stakeholder working group (bi-monthly meetings)
Marine Management Organisation	Regulate and license marine activities in English Waters, ensuring they are sustainable, protecting the marine environment and supporting responsible economic development.	

Table 11: Summary of Engagement with Environmental Regulators to Date

Review of environmental risks and opportunities

Figure 15 and Figure 16 provide an overview of the environmental constraints along the Lincolnshire Coastline and the WFD waterbodies in Lincolnshire respectively.

Table 12 shows potential environmental pathways and receptors that could be impacted during construction and operation of the project, along with presenting potential mitigation.

Further steps to assess potential impacts are shown in Table 12. It should be emphasised that, whilst a comprehensive range of receptors and potential impacts have been identified for further assessment, this does not imply that all such impacts will necessarily materialise, nor does it confirm that mitigation measures will ultimately be required. The identification at this stage is intended to support a thorough and precautionary evaluation, with any future mitigation to be determined based on the outcomes of detailed assessments.

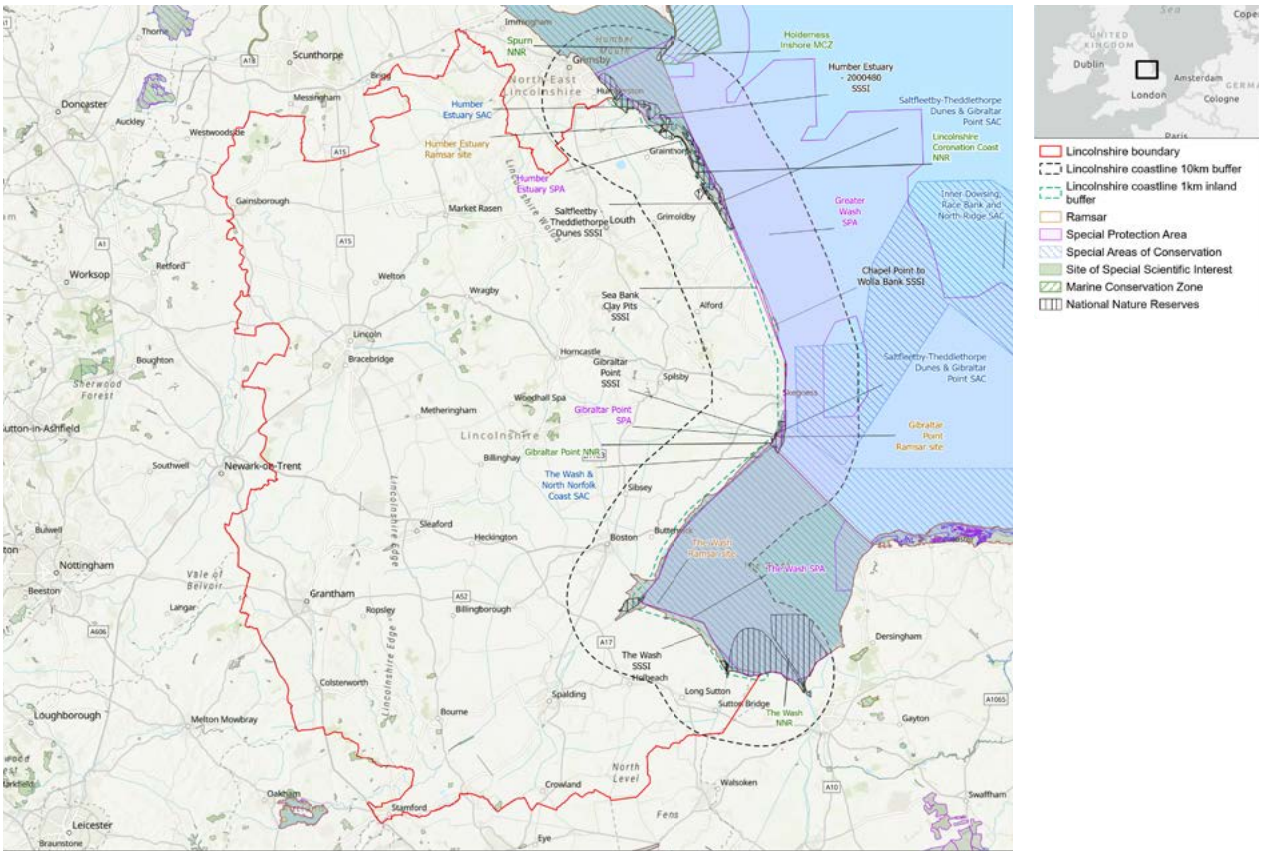

Figure 15: Environmental Constraints – Lincolnshire Coastline

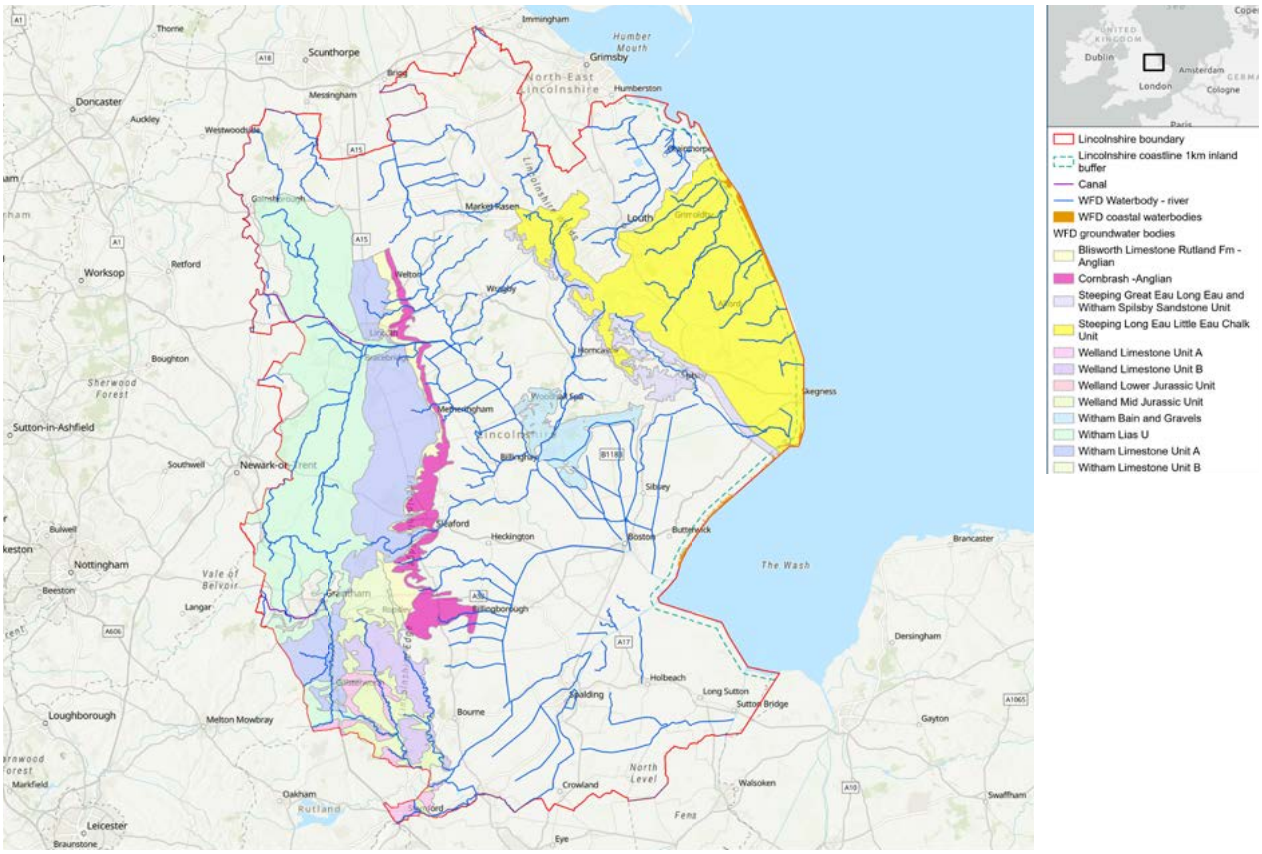

Figure 16: WFD Waterbodies in Lincolnshire

Pathway/receptor	Next steps
Biodiversity, flora and fauna:	
Designated sites	
The construction of the project could lead to impacts that affect the qualifying features of ecologically designated sites. The operation of the project will involve the intake of seawater and the release of brine into the marine environment. These activities have the potential to influence coastal processes, including changes in total suspended solids, turbidity, nutrient concentrations, salinity, and water temperature. Such alterations may, in turn, affect designated coastal and marine habitats. This could lead to changes in the foraging and breeding grounds of qualifying species, potentially impacting their distribution, abundance, and the availability of key prey items that are integral to the conservation objectives of designated sites. During construction and operation non-physical disturbances such as baseline underwater noise levels and vessels movements from the offshore pipeline construction and brine discharge may impact upon habitat and marine fauna. There may also be impacts during construction on terrestrial locally designated sites (Local Nature Reserves, Local Wildlife Sites) because of dust, noise, pollution and other temporary impacts. Where temporary construction phase effects are not significant, it is assumed that they will be appropriately mitigated through measures set out in a Construction Environmental Management Plan.	A seawater sampling programme has been developed to capture water quality data periodically across a full year, including tailored investigations in each of the four seasons. In April 2025, Anglian Water undertook the first round of coastal monitoring to understand seawater quality at two locations off the Lincolnshire coast. Once a shortlist of options for site selection is confirmed, the locations for sampling will be refined and sampling parameters potentially expanded. Once a preferred site has been selected, environmental modelling will be undertaken to understand the impacts of the option(s) on coastal processes and the marine environment, including the effects of brine discharge and its effect on baseline water quality, salinity and temperature. HRA and marine environmental specialists will inform the design of the modelling and review the outputs to confirm the potential for likely significant effects and inform mitigation. During the next stage of development, the HRA assessment undertaken for WRMP24 will be revised in respect to scope and spatial extent, to identify which designated sites need to be assessed. An initial HRA screening will be completed, supported by an HRA evidence plan.

Flora and fauna	
The construction of the project could lead to impacts upon terrestrial habitats which would be represented as BNG Units under the BNG Framework[14]. This could result in localised losses of BNG units. Depending on its location, the construction of the project could also result in the permanent loss of priority habitats and reduction of habitat for protected species and disturbance of breeding colonies (birds and other fauna). The construction and operation of the intake and outfall structures from the desalination plant are likely to affect areas supporting marine fisheries and sensitive marine habitats which support marine invertebrates, fish, mammals, and birds (e.g. within the coastal Special Area of Conservation and MCZ).	Flora: The site selection process will incorporate criteria relating to impacts on priority habitats. Surveys will be undertaken during the next stage of development which will target identifying and understanding the condition of priority/ sensitive habitats to inform site selection. Once a site has been selected, UK Habitat Classification surveys and condition assessments will be undertaken to inform Net Gain requirements. Depending on the potential for constraints, the preparation of an initial Natural Capital Assessment (NCA) and BNG Feasibility Assessment will be undertaken. Fauna: A programme of terrestrial and marine ecological surveys will be developed during the next stage of development. As part of this work, engagement with key stakeholders will continue to identify priority surveys needed to inform assessments.
Invasive-non-native species (INNS)	
The transfer of raw water to the desalination plant presents a potential pathway for INNS transfer during commissioning and operation.	During the next stage of development, aquatic and marine ecology specialists will inform the design of the treatment process, advising on measures to prevent the transfer of INNS and on appropriate control measures during construction.
Population, communities and human health	
Some localised temporary negative effects may occur through disturbance to communities during construction. Once operational, there may be disturbance (i.e. noise and odour) to communities, associated with the desalination facility. The potential for job creation and supply chain benefits is expected to benefit the local economy. During construction temporary local disturbance to recreational resources such as footpaths and cycle routes could occur along with disturbance to marine users. Potential impacts on community assets: including but not limited to educational facilities, places of worship, community services, leisure facilities, development land and businesses, agricultural land holdings, walkers, cyclists and horse rider and green/open spaces. Once operational there may also be impacts to marine users, including recreational marine users, associated with the outfall pipe.	The site selection process will include assessment of potential impacts on communities, land and assets, including marine assets. Once a site is selected, opportunities to mitigate any anticipated community impacts will be explored. As the project develops, further detail on how the scheme would be operated will become available. This information will be used to determine whether baseline surveys, such as noise or odour monitoring, are required and to identify any mitigation measures needed to minimise disturbance to local communities.

14 Gov, (2024). Guidance Biodiversity Net Gain.

Water	
As per Figure 16, Transitional and Coastal WFD waterbodies include: GB640402492000L Lincolnshire, GB530503200200: Nene, GB530503016300: Steeping, GB530503100400: Welland, GB530503000100: Witham, GB640523160000: Wash Outer, GB530503311300: Wash Inner. There are also other WFD bodies, river and groundwater within Lincolnshire County. Discharge of brine could adversely impact biological, ecological, and chemical quality elements, including locally designated marine protected areas, which are monitored under the WFD. New intake and discharge outfall structures could potentially increase the physical modification pressures on WFD water bodies. Changes in flow velocity and flow volume around the outfall structures could produce negative impacts on the local sedimentation patterns, which in turn may affect geomorphological and ecological quality elements.	The site selection process will incorporate criteria relating to water. Once a shortlist of options for site selection is confirmed, the location of seawater sampling will be refined and sampling parameters expanded. This information will then be reviewed to confirm potential for impacts, including consideration of WFD. During the next stages of development, further information on how the project could be constructed and operated will be available. With that information, potential hydrodynamic modelling of abstraction and discharges will also be undertaken. Collectively, the data and outputs will be reviewed to inform design and the identification of appropriate mitigation measures. The WFD assessment undertaken for WRMP24 will be revaluated in respect to scope and spatial extent, to identify which WFD water bodies (including transitional and coastal, river and groundwater) need to be assessed. A WFD Screening will then be undertaken, including comparison of design options in terms of WFD objectives, water quality monitoring plan, identifying mitigation that could be utilised to reduce impacts and gathering evidence to meet Regulation 19 criteria if applicable. The water environment monitoring and approach to assessment will evolve through sustained technical engagement.
Soil	
Natural England Agricultural Land Classification (ALC) mapping indicates that sections of the Lincolnshire coastline comprise land in agricultural use. Sections between approximately Sandilands and Skegness and Wainfleet All Saints and Guy's Head is mapped as Grades 1, 2 and 3 ALC. Grades 1 and 2 are considered best and most versatile (BMV) agricultural land. Grade 3 is potentially BMV agricultural land. There may therefore be impacts on agricultural land of Grade 3 and above associated with the construction footprint of the Project, which could lead to permanent loss or temporary disturbance of soils.	The site selection process will include consideration of soil conditions, including ALC, to understand any potential impacts on BMV agricultural land. Once a shortlist of potential sites is confirmed, site-specific ALC surveys will be considered where there is a likelihood of significant ALC constraints. The findings from these surveys will inform further development of the project, including the identification of appropriate mitigation measures to address potential construction impacts.

Air	
At this stage, significant air quality impacts associated with operation of the desalination plant are not anticipated. However, this will be assessed and refined as the project design progresses. There may be minor, temporary impacts in relation to local air quality during construction associated with construction vehicle and vessel movements and dust generation from earthworks.	The site selection process will include consideration of air quality. A review will be undertaken to determine whether air quality should be scoped into the EIA, including the need for baseline air quality surveys to inform assessment of potential construction-phase effects.
Climatic factors	
Potential future flood risk effects on the location of the project and areas in proximity to the project. Potential future climate effects on the marine environment, including sea surface temperature rise, sea level rise, ocean acidification and changes to source water. Climate change poses risk to the project through impacts on asset resilience and water quality impacts affecting the desalination process.	The site selection process will include consideration of climatic factors. At this stage, climate resilience will be considered at a high-level, including opportunities for renewable energy use during construction and operation and options to reduce embodied carbon. Initial, high-level carbon calculations for shortlisted option(s) may be provided to inform future design development. Flood risk constraints will also be reviewed at a high-level including early consideration of whether sequential test requirements may apply.
Historic environment	
Potential for impacts on Listed Buildings, non-designated Heritage assets, Spurn Head Heritage Coast and non-designated marine heritage assets during construction and operation. There is potential for impacts during construction as a result of direct impacts on the historic features and/or unknown buried archaeology. Potential impacts during operation may result in relation to permanent impacts on the setting of the historic features.	The site selection process will incorporate criteria relating to the historic environment, including proximity of designated and non-designated heritage assets. Once a site shortlist is confirmed, depending on the potential historic environment constraints, completion of a desk-based assessment (supported where necessary by field surveys) will be considered. If potential historic environment constraints include marine heritage, then engagement with Historic England will be required in relation to marine licence requirements.

Landscape and seascape	
Potential for temporary localised impacts at specific locations during construction from temporary structures, including associated lighting. Potential for longer terms impacts associated with the introduction of a new industrial facility into the local landscape and seascape for operation. Potential for visual impacts on coastal landscapes and seascapes as a result of the Project.	The site selection process will incorporate consideration of landscape constraints. Once a shortlist of options for site selection is confirmed, depending on the potential landscape constraints, completion during Gate Two of concept landscape design(s) and the identification of sensitive receptors (supported where necessary by field surveys) will be considered. Following site selection opportunities for landscaping (such as tree planting for screening or bunding) will be considered.
Material assets	
During construction there is likely to be a need for large resource and material use. Once operational there will be consumption of materials to carry out the desalination process. This will include ongoing consumables including chemicals for the treatment process as well as other requirements – replacement membranes, pre-treatment filters and replacement pumps.	The site selection process will include consideration of material assets. During subsequent stages of development, opportunities will be explored to incorporate sustainable design measures, such as reducing embodied carbon, re-use of excavated materials, and the use of nature-based solutions.

Table 12 – Environmental Assessment and Mitigation

In summary, this environmental assessment has considered the key constraints along the Lincolnshire coastline, identifying potential impact pathways and the receptors that may be affected. Potential impacts differ between the construction and operational phases, and because a preferred site has not been selected, receptors have been assessed at a countywide scale. The site selection process will apply agreed criteria across the environmental topics set out in Table 12, following a methodology developed in collaboration with environmental regulators. Several terrestrial and marine environmental designations are present along the coastline and may pose risks depending on the final site location; these will be central to the site selection process. Alongside these potential risks, the project also presents opportunities for biodiversity enhancement and wider social benefits during operation, supporting Anglian Water's Sustainability and Environment objectives for major project development.

Next steps

The immediate core activities and associated next steps are summarised in Table 13. A detailed environment and consenting programme will be developed as the project progresses. Environmental criteria will be incorporated into all stages of site selection, including defining search areas, options appraisal and identification of a preferred site. Once a preferred site has been confirmed, the project will progress detailed environmental assessments including EIA, WFD, HRA, BNG and Natural Capital Assessment (NCA) as appropriate. These assessments will be supported by the collection of baseline environmental data. Environmental activities will inform the iterative design development undertaken through the RAPID gated process and will support future consenting requirements.

Core activity	Approximate start date	Next steps
Site selection	Input on-going Shortlist: Q3 2026 Preferred site: Q1 2027	· Exclusionary environmental criteria will be used in Stage 1 of site selection to define areas of search. The criteria include biodiversity (designated sites and irreplaceable habitats), heritage, landscape and land-use. · Wider environmental assessment will be applied in Stages 2 and 3 to inform options appraisal and the development of a shortlist.
Desk based data collection, survey planning and land access	Q1 2027	· Following identification of a preferred site, preparatory work to support environmental surveys will commence. This includes desk-based data collection, agreement of survey methodologies with stakeholders, securing land access and obtaining a Marine License.
Environmental surveys	Q3 2027	· Environmental surveys will be undertaken to establish baseline conditions at the preferred site. This will include marine and terrestrial ecology surveys and water quality surveys. The scope and type of surveys required are dependent on the site location.
Screening level assessments	Q4 2027	· Screening-level assessments will be progressed following confirmation of the preferred site and commencement of surveys. These will include HRA, WFD, Marine Conservation Zone (MCZ) assessment, Navigation Risk Assessment and Commercial Fisheries Assessment where applicable.
Environmental Impact Assessment scoping	Q4 2027	· EIA scoping will run in parallel to screening assessments.
Biodiversity Net Gain and Natural Capital	Q2 2028	· Using baseline information, BNG and Natural Capital feasibility assessments will be undertaken to inform early project decisions, particularly opportunities to avoid or minimise habitat loss.

Table 13: Next steps

12. Conclusion

This Gate One report demonstrates that Lincolnshire Desalination is a credible SRO within Anglian Water's WRMP24 adaptive plan, providing a climate independent supply that can be scaled to meet future need. Early work has focused on building proportionate evidence base and establishing a clear development pathway, while retaining flexibility on deployable output, site selection and delivery approach.

- Technical basis: initial design assumptions have been validated, and key technical uncertainties are being reduced through coastal monitoring, pilot plant development and targeted studies (including intake/outfall and blending considerations).
- Deliverability: a structured delivery plan and stakeholder engagement approach is in place, with a clear programme of work to increase design maturity and achieve the next milestone.
- Consenting and procurement: consenting pathways are being progressed in parallel pending preferred site confirmation, and a DPC-led approach remains the assumed procurement route, subject to ongoing market and regulatory engagement.
- Costs and efficiency: cost estimates remain early stage and are presented as indicative and subject to refinement; the basis is unchanged from WRMP24 and aligned with Ofwat's PR24 Final Determination development allowances, with spend to date evidenced and proportionate to maturity.
- Risks and mitigation: key risks have been identified (including water quality, consenting, marine design and acceptability) with mitigations in train and a clear plan to strengthen assurance through the next phase.

On this basis, Anglian Water considers Lincolnshire Desalination to be a credible SRO and recommends progression to the next phase of development. The upcoming phase of the development will confirm the preferred site and concept design, develop the consenting and procurement strategies in principle, and mature the cost estimate in line with the required level of definition and assurance for the next stage of the RAPID gated process.

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