

# CRU Regulatory Support

**RC4 Look Forward – Capex Investment**

November 2025

# Version Control

Version	Report Status	Issue Date	Reviewed By	Issued By
1	Draft	2 <sup>nd</sup> May 2025	M Van Den Bergh	M Van Den Bergh
1.1	Revised draft	30 <sup>th</sup> May 2025	M Van Den Bergh	M Van Den Bergh
1.2	Revised draft	3 <sup>rd</sup> July 2025	M Van Den Bergh	M Szczyrba
1.3	Revised draft	21 <sup>st</sup> July 2025	M Van Den Bergh	M Szczyrba
1.4	Revised draft	15 <sup>th</sup> August 2025	M Van Den Bergh	M Szczyrba
2	Final report	3 <sup>rd</sup> November 2025	M Van Den Bergh	M Szczyrba

# Disclaimer

This report is not intended to be a complete review of Uisce Éireann proposed capital investment during the regulatory period in 2025-2029. It is intended to highlight certain material issues identified by Arcadis within the limitations of time and information which were made available to us.

This is a technical assessment report dealing with only specific relevant aspects of Uisce Éireann's capital investment and performance assessment. Whilst comments are made throughout the report, these are by their nature selective and should not be taken as identifying the only areas with risk.

Our report and opinions presented herewith are subject to the following conditions and limitations:

- In our review and analysis, and in arriving at our conclusions, we have assumed and relied upon the accuracy and completeness of all the information provided to us (both written and oral) by the business and its advisors and on information which is publicly available. We have neither attempted independently to verify, nor assumed responsibility for verifying, such information.
- All estimates and projections in our report are based on our experience and judgment and upon a review of information provided to us and other publicly available reports and information. Our estimates and projections are not necessarily indicative of actual values or predictive of future results, which may ultimately be more or less favourable than those suggested by our report and are therefore subject to variations depending on the approach and implementation.
- This report is necessarily based upon information made available to us as of the date of our report. It should be understood that subsequent developments may affect the estimates or projections expressed in the report and cannot be predicted with certainty. We specifically do not guarantee or warrant any estimate or projections contained in our report.
- Certain statements made in the report that are not historical facts may constitute estimates, projections or other forward-looking statements and even though we believe that such forward-looking statements are reasonable and are based on reasonable assumptions as of the date in the report, such forward-looking statements by their nature involve risks and uncertainties that could cause actual results to differ materially from the results predicted.
- Where appropriate, we have used our best endeavours to assess the material impact of condition, gaps and deficiencies in the information provided, and incomplete responses to issues raised.
- We disclaim any undertaking or obligation to advise any person of any change in any matter affecting this report, which may come or be brought to our attention after the date of this report.

# Glossary

Acronym	Description
AACEi	Association for the Advancement of Cost Engineering International
ABP	An Bord Pleanála
AG	Approval Gates
ALARP	As Low As Reasonably Possible
BWN	Boil Water Notice
CBA	Cost Benefit Analysis
CEPA	A UK Based Costing Organisation
CFC	Coagulation/Flocculation/Clarification
CIP	Capital Investment Plan
CKBS	ChandlerKBS
CM	Capital Maintenance
CO2	Carbon Dioxide
CRU	Commission for Regulation of Utilities
DMA	District Metered Area
DWSP	Drinking Water Safety Plan
E&W	England and Wales
EAAT	Estimate Assumptions and Allowances Tracker
ECI	Early Contractor Involvement

Acronym	Description
ECJ	European Union Courts of Justice
ELL	Economic Level of Leakage
EPA	Environment Protection Agency
ETC	Estimated Total Cost
FTE	Full Time Equivalent
GDA	Greater Dublin Area
GDD	Greater Dublin Drainage
GIS	Geographic Information System
HICP	Harmonised Index for Consumer Prices
HRW	HR Wallingford
I2O	Investment to Outcome
IDD	Infrastructure Delivery Department
IPA	Infrastructure and Projects Authority
ISO	International Organisation for Standardisation
IT	Information Technology
KPI	Key Performance Indicators
MCA	Multi-Criteria Analysis
MEICA	Mechanical, Electrical, Instrumentational, Control and Automation
NATS	National Air Traffic Services

# Glossary

Acronym	Description
NERA	National Economic Research Associates
NIS-D	Network and Information Systems Directive
NWRP	National Water Resource Plan
O&O	Outcomes and Outputs
ORCA	Originator, Reviewer, Contributor, Approver
PAF	Performance Assessment Framework
PAL	Priority Urban Area Action List
PCT	Project Costing Tool
PE	Population Equivalent
PV	Photovoltaic
QRA	Quantitative Risk Assessment
RAL	Remedial Action List
RBMP	River Basin Management Plan
RC	Regulatory Control Period
RCV	Regulatory Capital Value
RPE	Real Price Effects
SDB	Supply Demand Balance
SELL	Sustainable Economic Level of Leakage
SFP	Strategic Funding Plan

Acronym	Description
SME	Subject Matter Expert
SOP	Standard Operation Procedure
SoS	Security of Supply Index
SWI	Scottish Water International
SWO	Stormwater Overflows
THM	Trihalomethane
UCBD	Unit Cost Database
UÉ	Uisce Éireann
UÉT	UÉ Transformation Programme
UWWTD	Urban Wastewater Treatment Directive
WCO	Water Conservation Order
WDA	Wastewater Discharge Authorisations
WFD	Water Framework Directive
WNSW	Water and Wastewater Networks Service and Works
WRZ	Water Resource Zone
WS	Workshops
WSAG	Water Service Above Ground
WSBG	Water Service Below Ground
WSP	Water Supply Project

# Glossary

<b>Acronym</b>	<b>Description</b>
WSPS	Water Services Policy Statement
WSSP	Water Services Strategic Plan
WTP	Water treatment plant
WWAG	Wastewater Above Ground
WWBG	Wastewater Below Ground
WWPS	Wastewater pumping stations
WWTP	Wastewater treatment plant

# Report context

## Context

- Uisce Éireann (UÉ) is a commercial semi-state company delivering water and wastewater services for Ireland.
- Historically, these services have been provided in a fragmented way by local authorities.
- UÉ has been undergoing an extended transformation process (UÉT) as part of a consolidation process to incorporate the staff and assets previously associated with the local authority water departments. It should be noted that in order to provide affected employees with maximum flexibility, this process has been an extended one and UÉ should be seen in that context. The process continues into the first two years of RC4.
- The fact that UÉT has been extended has had a material impact on UÉ management's ability to build asset knowledge, which Arcadis considers essential for the future.
- It should be noted that UÉ's capital programme has already been cut from its original size as part of the SFP process, particularly in the wastewater below ground category.

## Our report

- Arcadis and NERA carried out a review of the planned capital expenditure for the RC4 regulatory period between 2025-2029 on behalf of the CRU.
- Arcadis completed this assessment via a combination of Top-Down and Bottom-Up assessment.
- In terms of the depth of review and scope of data shared this engagement constitutes the most in-depth review carried out on UÉ to date. UÉ has provided substantially more evidence as part of this process than in any previous price control.
- It is Arcadis' view that UÉ provided all the data and documents it was able to and management was highly co-operative in answering questions.
- The deep dive covered 67% of the network capex programme (excluding WSP, 54% of the network capex programme including WSP) and Arcadis therefore has a high confidence that the assessment is genuinely representative of the entire programme.

# Key recommendations: summary

## Key recommendations

1. On the basis of applying a 1% pa. ongoing efficiency assumption, a 0.8% pa. Real Price Effect uplift, and the reductions from the Arcadis deep dives, the total capital programme by RC4 should be reduced by 6% or 8%. This can be achieved by UÉ delivering 6% or 8% of additional outputs / outcomes instead of budget reduction.
2. Substantial changes are required to the allocation of Outputs and Outcomes to capital projects – only half of total network capex is associated with O&O currently, we have made detailed recommendations on how this gap can be closed.
3. A change management process must be established, documenting and justifying changes over time from the agreed RC4 plan.
4. The proposal on security of supply measurement requires substantial revision, it is not reasonable for there to be no reporting at all on security of supply during RC4.
5. While most of the capital plan has established reasonable needs cases, the domestic component of the metering replacement should be revisited as the volume of work is not justified on the basis of water balance estimation.
6. UÉ and CRU should agree a way forward for asset condition data and asset management planning and find ways to accelerate data collection.

# Key Recommendations

## 1. Proposed Cost Challenge & View on Deliverability

Arcadis proposes to adjust UÉ’s Capex submission using the following four elements:

1. Targeted efficiency challenge applied to €2,168m network Capex value related to 15 projects/programmes identified as part of deep dive assessment (see [Section 4.1 Deep Dive Assessments](#) for details).
2. Overall cost challenge to the €1,011m remaining network Capex (excluding WSP major project and the remainder of capital maintenance) extrapolating proportionately from deep dive findings.
3. After subtracting the deep dive-based cost challenge from the overall Capex (0-1-2), Arcadis proposes applying an overall RPE assumption of 0.8 percent increase per annum based on historical hybrid index inflation.
4. Applying an overall Capex ongoing efficiency (OE) assumption of 1 percent per annum based on recent regulatory precedent .

The effects of the proposed challenge are shown in the table, right.

**Option 1 suggests overall 6% efficiency to UÉ’s Capex, whilst Option 2 suggests overall 8% efficiency to UÉ’s Capex. This can be achieved by UÉ delivering 6% or 8% of additional outputs / outcomes instead of a budget reduction.**

	Option 1	Option 2
<b>Overall RC4 Capex request (0)</b>	<b>8,561</b>	<b>8,561</b>
<b>Cost Challenge – Network Capex Deep Dives (1)</b>	108	217
<b>Cost Challenge – Remaining Network Capex (2)</b>	51	101
<b>RC4 Capex post Arcadis’ cost challenge (0-1-2)</b>	8,402	8,243
<b>Capex after Arcadis 0.8% RPE (€m) (3)</b>	8,319	8,162
<b>Overall Capex after Arcadis 0.8% RPE and 1% OE (€m) (4)</b>	<b>8,040</b>	<b>7,888</b>

# Deliverability

## Key findings

UÉ is well positioned to deliver the capital portfolio of works in RC4. UÉ has identified the primary risks around successful delivery of its RC4 Capital Programme and has taken steps to create and maintain a steady and diverse supply of contractors, underpinned by a robust set of contracts and frameworks. It has correctly identified the need to support the development and scaling of its suppliers and contractors if it is to meet the delivery challenges of RC4 and understands the importance of a long-term and transparent pipeline of works in doing so.

UÉ has a robust set of contracts and frameworks in place to enable RC4 Capex delivery. Based on examples available, Arcadis confirmed that projects and programmes have in general adequate delivery mechanisms under a number of frameworks which shows that UÉ understands the needs and nature of work required, seeking to optimize delivery mechanisms where possible.

There remains a risk of how quickly the supply chain can be mobilised within the framework which is not fully within UÉ's control. However, supplier feedback to UÉ's early engagement has been positive and contractors indicate readiness to meet initial and growing demand over RC4. UÉ is undertaking market engagement and embedding its new contracting strategy, and both will support UÉ's Capex delivery in RC4.

## Next steps and key recommendations

- UÉ is in the process of updating its core capital framework in line with the four guiding principles of its contracting strategy. These principles are reasonable and support UÉ's ambition to deliver an increased capital programme over RC4. UÉ is also assessing its contract KPIs as part of a larger programme to improve and regularize its performance assessment across all functions.
- The deep dive assessments have shown pockets of projects with potential deliverability issues where Arcadis recommended improvements such as more structured stakeholder management, review of timelines for optimism bias and providing more robust risk mitigations for resource gaps. However, the remainder of projects analysed (over €3bn in value) have shown sufficient consideration for deliverability aspects. The mixed picture reflects a maturing utility organisation.
- Arcadis also recommends an increased focus on interrogating and challenging the procured costs to avoid contractor's proposals over and above the required scope to deliver on UÉ's strategic objectives. This usually becomes less of a challenge as the utility organization matures and gains expertise. UÉ is on the path in the right direction, however, the progress may be slow as UÉ gains experience and develops its approach to monitoring and driving contractors' performance.

# Key recommendations

Based on the Capex review and assessment, apart from the cost challenge, Arcadis recommends the following actions and improvements:

<b>2. Measuring Performance</b>	<ul style="list-style-type: none"> <li>Arcadis recommends that UÉ provides supplemental outcomes and outputs for those parts of the capex programmes which don't currently have them assigned (see section for details).</li> <li>Arcadis recommends that capital maintenance programmes are measured using the existing serviceability metrics within the PAF framework. For projects yielding O&amp;Os beyond RC4 - the related RC5 O&amp;O should still be reported separately to CRU for visibility and progress tracking. This would help to outline clear definition of value to customers.</li> </ul>
<b>3. Managing Change</b>	<ul style="list-style-type: none"> <li>Arcadis recommends that UÉ is required to document any changes to its RC4 capital programme through an annual change control process which should also indicate which external driver has led to the programme change.</li> <li>Arcadis recommends that capex efficiency is improved by avoiding making changes to the programme unless required through external drivers.</li> <li>Arcadis recommends that the current overall process of setting priorities and funding is reviewed by UÉ, the CRU, and other stakeholders, so that late changes to funding envelope and to priorities do not lead to inefficiencies in capex delivery.</li> </ul>
<b>4. Improving asset intelligence</b>	<ul style="list-style-type: none"> <li>Arcadis recommends that UÉ improves its asset intelligence over RC4</li> <li>Arcadis recommends that the governance of the structured stakeholder engagement for capturing asset condition and asset risk is improved.</li> <li>Arcadis recommends that UÉ develops a plan, with timelines, to reach desired asset condition data state. This can be over multiple RC periods.</li> </ul>
<b>5. Estimating Costs</b>	<ul style="list-style-type: none"> <li>Arcadis recommends that UÉ checks uncertainty allowances. Stage 1 allowances are currently set at less than 30% and industry norms are 50% to 60%.</li> </ul>

# Key recommendations

Based on the Capex review and assessment, apart from the cost challenge, Arcadis recommends the following actions and improvements:

<b>6. Shortening project development timelines</b>	<ul style="list-style-type: none"> <li>Arcadis recommends that UÉ develops standardised solutions where known and standard solutions are available to simplify capital project optioneering. This could take the form of a simple matrix of solutions with key criteria.</li> <li>Arcadis recommends that UÉ adapts the current standard durations approach, with more frequent updates such as quarterly or semi-annually.</li> <li>Arcadis recommends that UÉ develops separate duration benchmarking focused on risks such as judicial challenges.</li> </ul>
<b>7. Managing Risk</b>	<ul style="list-style-type: none"> <li>Arcadis recommends that UÉ develops a stakeholder and community engagement framework as part of UÉ's governance of capital projects. It may be worth considering if there are lessons from Eirgrid and ESNB approaches as well as finding internal best practice.</li> </ul>
<b>8. Procurement processes</b>	<ul style="list-style-type: none"> <li>Arcadis recommends that UÉ ensures that contractor proposals which lead to scope and cost escalations are being appropriately challenged.</li> </ul>
<b>9. Capex Projects and Programmes</b>	<ul style="list-style-type: none"> <li>Arcadis recommends that UÉ continues current good work on consistency in capital decision making.</li> <li>Arcadis challenges the need definition and scope of the current metering programme as the value for money of the large domestic component is unclear. Arcadis' view is that the programme should be significantly revised and reduced, with a focus on maintaining billing, and minimum number of replacements to support water balance and leakage calculations. Arcadis recommends that UÉ reviews the need case for this investment.</li> <li>Arcadis recommends that UÉ investigates opportunities to drive cost efficiencies and innovation within the lead replacement programme to mitigate further cost increases during RC4.</li> <li>Arcadis recommends that UÉ implement a process to carry out internal project reviews for projects which have substantial cost increases between stage gates.</li> </ul>
<b>10. Resilience of water supplies</b>	<ul style="list-style-type: none"> <li>Arcadis recommends a significant acceleration of the proposed development of the alternative metrics for security of supply.</li> <li>Arcadis recommends that UÉ develop and annually report one or more metrics of total system security of supply risk, this could be the existing SoSI metric which UÉ was required to report on in RC3 or an alternative proposed by UÉ.</li> </ul>

# Key recommendations

Based on the Capex review and assessment, apart from the cost challenge, Arcadis recommends the following actions and improvements:

<b>11. Asset Health and Capital Maintenance</b>	<ul style="list-style-type: none"> <li>Arcadis recommends an increase in ambition and accelerating of the asset strategies development and asset data understanding to improve asset management and the resulting asset performance within RC4.</li> <li>Arcadis recommends that UÉ set out a clear timeline for achieving ISO 55001 Asset Management Certification to drive ambition and focus on most relevant data-based development in its capital maintenance and asset management practices. The approach and timelines should enable the CRU to track progress throughout RC4.</li> </ul>
<b>12. Funding Major Projects</b>	<ul style="list-style-type: none"> <li>Both major projects were funded via ringfenced funding in RC3, and Arcadis opines it reasonable to use a similar funding mechanism for RC4, however UÉ should provide updates on progress for each project as part of annual performance reporting.</li> <li>Arcadis recommends that UÉ build on the existing delivery plan to include detailed and structured stakeholder engagement map and plan to manage various interested parties to limit potential further delays.</li> <li>Arcadis recommends regular reviews by UÉ of innovation and efficiencies to drive collaborative and efficient approaches throughout WSP and GDD delivery and identify efficiencies that lead to cost and time savings.</li> </ul>
<b>13. Complying with environmental regulations</b>	<ul style="list-style-type: none"> <li>Arcadis recommends early discussion between UÉ and CRU on implications of the recast UWWTD to understand the additional work and funding required. Whilst UÉ is currently assessing the details, early engagement with CRU can help with early visibility and understanding of any potential impact on the RC4 portfolio. A balance will need to be struck between maintaining regulatory oversight and keeping administrative overheads to a minimum.</li> <li>As it is unlikely all RBMP will become compliant by 2027, Arcadis recommends discussion on accelerating assessments as well as completion of Drainage Area Plans to enable informed decision making on future investment needs.</li> <li>Arcadis recommends UÉ maintain communication with the EPA to align reporting on agglomeration compliance with reporting in the business plan</li> </ul>
<b>14. IT</b>	<ul style="list-style-type: none"> <li>Arcadis recommends further investigation into cost saving opportunities in the IT Run Maintain category.</li> </ul>
<b>15. Connections</b>	<ul style="list-style-type: none"> <li>Arcadis recommends developing metrics to measure how UÉ contributes to housing growth through new connections. Other regulators of water companies have done this through a mixture of time-to-quote, time-to-connect targets, strategic connections planning for large developments (where standard time targets may not be appropriate), and developer experience measures.</li> <li>Arcadis recommends developing suitable metrics for housing developers and for non-domestic connections such as time-to-quote, time-to-connect</li> <li>Arcadis recommends developing a measure of developer experience of housing developers which could be based on the DMEX metric used by Ofwat for England and Wales.</li> </ul>

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<p><b>RC4 Capex Submission</b>  <a href="#">(Section 2.1 RC4 Capex Submission)</a></p>	<ul style="list-style-type: none"> <li>As part of its Capex submission, UÉ has not provided or identified any ongoing Capex cost efficiencies. Arcadis sets out proposed efficiency challenge of 1% per annum.</li> <li>The capital programme is focused on compliance (although less so than in RC3) and security of supply, there is a risk that placing additional compliance requirements on UÉ (e.g. through recast UWWTD) will lead to projects required for growth of housing being delayed, decision makers should be aware of this.</li> </ul>
<p><b>Outcomes and Outputs</b>  <a href="#">(Section 2.2 Outcomes and Outputs)</a></p>	<ul style="list-style-type: none"> <li>The O&amp;O are split into three categories: water, wastewater and sustainability. Some of the O&amp;Os continue from RC3 whilst others are new. Arcadis notes that keeping comparable O&amp;O metrics between regulatory periods is important and can help in tracking overall performance and it should be considered in the future O&amp;O discussions for RC5.</li> <li>All sustainability metrics are newly introduced in RC4, to comply with energy efficiency, emissions and climate directives</li> <li>50% of Capex investment value have O&amp;O assigned, making it possible to track performance over the RC4. UÉ has provided reasoning for not having O&amp;Os in place for half of the value of RC4 Capex. In many categories, Arcadis recommends that UÉ provide O&amp;Os for projects that do not currently have them assigned.</li> </ul>
<p><b>Project Lifecycle Framework</b>  <a href="#">(Section 3.1 Project Lifecycle Framework)</a></p>	<ul style="list-style-type: none"> <li>UÉ has continued to develop its project lifecycle in line with the recommendations of the SWI review and HRW assessment. The use of clearly defined workshops and approval gates provides a structured and joined up process whereby projects can be scoped, developed and governed.</li> <li>The lifecycle provides a clear path for project development along with cost estimates, risk analyses and technical scope, with clear requirements for documenting the process from inception to delivery to review.</li> <li>Arcadis notes positively that UÉ uses the approval gates to review the projects' progress and delivery performance and feed back the lessons learnt into the future planning, demonstrating the culture of continuous improvement. However, it is noted that these processes take time and improvements are gradual.</li> </ul>
<p><b>Investment Planning Process</b>  <a href="#">(Section 3.2 Investment Planning Processes)</a></p>	<ul style="list-style-type: none"> <li>UÉ's Investment Planning Process provides a reasonable and structured response to the SWI assessment's recommendations and implements many procedures and methods which are generally recognised as being best in class.</li> <li>The process is reliant on a largely immature asset understanding which limits its ability to deliver a clear and stable portfolio and drive value for money across the RC period. Arcadis notes positively that UÉ recognises current challenges facing its Asset intelligence and has an improvement plan which sets reasonable and credible paths to improvement. While Arcadis is concerned that maturity in this space will develop slowly in believes that the direction of travel is positive and understands that the current state of UÉ's asset intelligence is a result of being a newly forming organisation which faces considerable integration challenges as it develops its centralised systems.</li> <li>It is Arcadis' view that the current system of balancing and prioritisation is fit for purpose as UÉ is currently requiring investment to address largely critical needs. As its asset intelligence matures, and its capital investment moves away from responding to essential/critical works there may be a need to refine this process to increase long term stability of projects within programmes.</li> </ul>

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<p><b>Capex Portfolio Governance</b>  <a href="#">(Section 3.3 Capex Portfolio Governance)</a></p>	<ul style="list-style-type: none"> <li>• It is clear that UÉ is improving its processes using lessons learnt from RC3 to streamline some of the work reducing typical durations. Arcadis recommends moving from annual to quarterly or semi-annual updates of these durations and developing a benchmarking process which integrates schedule risks from Judicial challenges.</li> <li>• Based on Arcadis experience, UÉ's standard durations are in places larger than for peers in England and Wales. There is an opportunity to seek further efficiencies to drive timeline reduction and improve deliverability of projects. A number of related recommendations are discussed throughout the report and include:             <ul style="list-style-type: none"> <li>• Frequent changes to portfolios through re-prioritising and shifting focus between projects affects the delivery durations. We note that in many cases, this is driven by external factors such as changes to legislation and DHLGH priorities which are not within UÉ's control.</li> <li>• Arcadis SMEs found that for interventions which are well-established in the industry, there is no need for prolonged optioneering and solution selection and UÉ should instead select a set of preferred technology options on a category basis.</li> <li>• Through deep dives, Arcadis also recommended for UÉ to improve on its stakeholder engagement to mitigate against delays arising from policy, consent and planning challenges.</li> </ul> </li> </ul>
<p><b>Risk Management</b>  <a href="#">(Section 3.4 Risk Management)</a></p>	<ul style="list-style-type: none"> <li>• Arcadis recognises UÉ's position that it operates within a challenging consents environment. It is positive to see the ongoing UÉ's high-level engagement with government in the development of policies and law that affect how complex it is to gain planning, and consent permits in the future.</li> <li>• Arcadis believes that there are a number of potential improvements that can help UÉ in managing and assessing planning and consent risks.             <ul style="list-style-type: none"> <li>• UÉ's project budgets contain cost allowances for planning and consents but these have been at times underestimated the real costs and time involved. UÉ's historic experience of consent delays and court challenges should inform improved and more robust estimates going forward.</li> <li>• Arcadis notes lack of consistent stakeholder engagement as part of the projects and programmes discussed with UÉ. Whilst pockets of good practice and wider engagement were seen, there appears to be no structured stakeholder management system in place.</li> </ul> </li> </ul>
<p><b>Costing Methods</b>  <a href="#">(Section 3.5 Costing Methods)</a></p>	<ul style="list-style-type: none"> <li>• UÉ has redeveloped its cost estimating SOPs and adopted appropriate cost estimating procedures as recommended by SWI. Arcadis finds UÉ's cost estimation methods reasonable and in line with common practices in other utility organisations and the recommendations of leading costing organisations.</li> <li>• UÉ is in the process of updating its enterprise level IT in order to improve the integration of its costing and risk systems. They have selected a well-known industry package in relation to updating their Project Costing Tool and will retain the use of the underlying dataset to drive consistency.</li> <li>• Arcadis notes positively UÉ's the use of allowances for risk contingencies and the clear path set out to better manage contingencies at portfolio level in the coming years.</li> <li>• In terms of allowances for uncertainty, Arcadis recommends review of early Stage 1 allowances and bringing them in line with industry benchmarks from less than 30% to 50-60% to better reflect the optimism bias in early stages of project definition. Optimism bias is a common industry challenge and needs to be managed carefully. Increasing allowance for optimism bias at Stage 1 can help improve UÉ's future cost estimations.</li> <li>• The bottom-up projects assessments undertaken by Arcadis have shown that the cost estimate PCT data as well as EAAT assumptions data recording varies in granularity indicating that processes are still in development and reflecting a maturing organisation.</li> </ul>

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<p><b>Procurement &amp; Delivery</b>  <a href="#">(Section 3.6 Procurement &amp; Delivery)</a></p>	<ul style="list-style-type: none"> <li>• UÉ has identified the primary risks around successful delivery of its RC4 Capital Programme and has taken steps to create and maintain a robust and diverse supply of contractors.</li> <li>• UÉ has a robust set of contracts and frameworks in place to enable RC4 Capex delivery. There remains a risk to how quickly the supply chain can be mobilised within the framework which is not fully within UÉ's control.</li> <li>• Based on discussions with UÉ, the organization has engaged extensively with the market to understand the resources available and use market feedback to make contracts more attractive. Arcadis recommends continuous focus on supply chain engagement to support successful RC4 Capex delivery and for UÉ to identify any key market trends/risks which may impact on its deliverability.</li> <li>• UÉ is in the process of updating its core capital framework in line with the four guiding principles of its contracting strategy (Equitable Balance of Risk and Reward, Collaboration, Driving Performance and Client of Choice). These principles are reasonable and support UÉ's ambition to deliver an increased capital programme over RC4.</li> <li>• Based on Q&amp;A, UÉ confirmed that supplier feedback to its early engagement has been positive and that its contractors indicate readiness to meet initial and growing demand over RC4.</li> <li>• Arcadis recommends an increased focus on interrogating and challenging the procured costs to avoid contractor's proposals over and above the required scope to deliver on UÉ's strategic objectives. UÉ is on the path in the right direction, however, the progress may be slow, and improvements may be seen from RC5 onwards as UÉ gains experience and develops its approach to monitoring and driving contractors' performance.</li> </ul>
<p><b>Managing Change</b>  <a href="#">(Section 3.7 Managing Change)</a></p>	<ul style="list-style-type: none"> <li>• It is Arcadis' understanding that the RC4 investment plan addresses the current growth requirements but that in case of significant shift in the government's housing ambition there will be a requirement for UÉ to obtain further funding to deliver on the new objectives.</li> <li>• UÉ prioritises regulatory and safety considerations in the balancing of its capital investment portfolio. As capacity and growth is generally a third-tier priority there is a risk that pressure on completing higher priority projects will push out non-ringfenced projects in the Accelerated Housing Demand Programme to later regulatory cycles.</li> <li>• Increased housing targets across the Greater Dublin Area will be closely linked with UÉ's ability to deliver on its two major projects – Water Supply Project and Greater Dublin Drainage which aim to provide further resilience and system capacity in the region enabling further growth.</li> <li>• Arcadis recommends close collaboration between UÉ and CRU on that matter, in order fully understand the potential impacts of added targets on the existing portfolio and discuss any potential changes to RC4 portfolio to accommodate new growth-focused interventions. It will also be important to assess the supply chain availability and readiness for the potentially increased workload.</li> </ul>
<p><b>SWI Recommendations</b>  <a href="#">(Section 3.8 SWI Recommendations)</a></p>	<ul style="list-style-type: none"> <li>• UÉ continues to make good progress against SWI and HRW recommendations. While a number of measures have progressed more slowly than initially intended, UÉ has developed reasonable roadmaps for continuing to improve its capabilities, processes, training and documentation.</li> <li>• UÉ is a maturing infrastructure company which has recently undergone substantial changes as it develops into a more centralised organisation with increasingly unified and integrated systems. While embedding updated and improved processes will take time, UÉ has demonstrated an understanding of its current maturity, developed sensible roadmaps for further improvement, and shown active progress against its targets.</li> </ul>

# Executive Summary

## Deep Dive Assessments

[\(Section 4.1. Deep Dive Assessments\)](#)

- Not including WSP, 67% of the RC4 network capex programme was deep-dive reviewed (54% including WSP).
- Out of 34 reviewed projects/programmes, 15 had incomplete information to enable full cost justification or major issues were found. The most common areas of challenge relate to poor governance, accounting for risk and project costing estimates.
- In Arcadis' view, this is indicative of a maturing organisation with mixed implementation of consistent processes. It is noted positively that needs are clearly stated for the majority of the assessed projects, giving confidence in UÉ focusing its RC4 funding on areas where genuine improvements are required.
- Arcadis notes positively that both risk contingencies and uncertainties are applied consistently across projects, following UÉ's cost approaches guidance.
- Where PCT data was available, the majority of projects are built up from cost curves showing reasonable level of cost data robustness in deriving overall base cost estimates.
- Arcadis notes that whilst UÉ has been implementing standardised cost estimation procedures across its organisation which are generally in line with industry practice, it will take time for these practices to be fully embedded and reflected on a project-by-project basis. This may be one of the reasons why project cost estimates have been changing over the time. Arcadis would expect for the project cost estimates to stabilise as the organisation matures and improved processes are fully embedded.
- Deep dive analysis have shown that there is an opportunity for cost efficiencies across the portfolio, including programmes of work marked as Stage 4 as projects within these programmes have been found to be at various stages of development, with some being dropped and others re-prioritised as the regulatory cycle progresses. This means that whilst framework contracts might already be in place for the ongoing roll-on programmes (Stage 4), opportunity for cost efficiencies remains based on the deep dive insights.
- Based on deep dive analysis, there is a number of deliverability issues with projects and programmes worth over €1bn in value. Arcadis notes potential areas of improvement such as more structured stakeholder management (closer consultation, particularly ahead of time, with those affected), review of timelines for optimism bias (assuming a best case scenario, so underestimating risk and contingencies) and providing more robust risk mitigations (measures to reduce impact or likelihood of risks) for resource gaps. However, the remainder of projects analysed (over €3bn in value) have shown sufficient consideration for deliverability aspects. The mixed picture reflects a maturing utility organisation.

## Security of Supply and Leakage

[\(Section 4.2 Security of Supply and Leakage\)](#)

- Arcadis notes that there is a significant number of water resource zones in Ireland that experience water supply deficit. Arcadis believes the risk should be better quantified and discussed with CRU to understand the severity and scale of the supply demand challenges across various water resource zones.
- In general, UÉ's approach to managing the existing deficit and security future water supplies is adequate and is developing in the right direction. However, it is important to note that there is significant amount of work required to build data and asset understanding which will support further decision making. This is visible in cases such as Drought Action Plans or further detailed and interim measures for developing the NWRP v2.
- Similarly, the leakage reductions are key to achieving supply security, however, there are concerns over the deliverability of the leakage reduction programme in the expected timelines. This will have an impact on the short, and medium-term supply demand balance and mitigations should be further detailed by UÉ to manage potential risk of under-delivery.

# Executive Summary

## **Capital Maintenance** (Section 4.3 Capital Maintenance)

- The UÉ team is in early stages of transitioning from reactive to planned CM. UÉ has a long route towards a data driven proactive, planned capital maintenance. UÉ has an ambition to reach a steady state in asset condition by RC5, however this seems challenging, considering the limited knowledge of their assets' current state.
- Arcadis notes that UÉT may further impact the timelines of transitioning from reactive to proactive maintenance and recommends a continuous focus from UÉ on developing and embedding its planned CM strategies.
- In line with NERA analysis, Arcadis opines positively that UÉ's level of proposed spending on capital maintenance aligns with its peers in England and Wales.
- At the same time, Arcadis notes that based on the deep dives findings, the above ground programme of capital maintenance requires further definition and improvement on cost data, thus a cost challenge is proposed to that specific element of the overall capital maintenance portfolio of works.
- The approach to delivery of capital maintenance portfolio looks reasonable and in line with industry practice. However, Arcadis notes that the UÉT process may impact negatively timelines and ambitions for CM programmes delivery over the RC4 as discussed on the page above. Clear risk mitigations along with active management of projects and will be required to support level of delivery required in RC4.
- Arcadis notes that costing is at early stages of development reflecting scarce and incomplete data which may result in cost increases throughout RC4. Close monitoring and driving efficiencies in delivery will be necessary to avoid significant overspend.

## **Major Projects** (Section 4.4 Major Projects)

- GDD and WSP are essential programmes of work to satisfy long term needs and strengthen resilience of the overall Greater Dublin and Midlands areas. Without these projects in place, there is a material risk to future growth in the region and supply challenges. Arcadis believes there is a clear need identified and justified by UÉ in a robust way for both projects to progress at pace.
- The major projects have been significantly delayed due to and planning consents and, for the GDD specifically, legal challenges and judicial reviews which is a common challenge for national-scale projects across the industry.
- Arcadis aligns its views with HR Wallingford and opines it reasonable to progress the proposed WSP solution.
- It is noted positively that UÉ considers enabling works in delivery of GDD and closely monitors risks to deliver project as soon as reasonably practicable. However, Arcadis notes that as the project is in early stages, there remains significant risk of works being delayed at various stages prior to GDD going live and structured early stakeholder engagement will be key to limit potential delays. Whilst GDD is costed in line with best industry practice, further cost increases are likely with UÉ planning significant cost updates in 2025 and once available, the potential impact on RC4 budget should be discussed with CRU.

# Executive Summary

## Environmental Compliance and Sustainability

[\(Section 4.5 Environmental Compliance\)](#)

- Arcadis is satisfied that UÉ has planned interventions and allocated relevant budgets for the needed intervention across all requirements of RAL, PAL, UWWTD and RBMPs.
- RBMP assessments requirements are extensive and whilst UÉ has a reasonable plan in place, it is unlikely that UÉ will complete these in time for sites to become compliant by 2027.
- UÉ is positively looking to future-proof existing designs where possible to account for future UWWTD recast requirements. The recast will likely require significant amount of work and additional funding and UÉ is currently assessing the potential impact of the recast directive which may affect the current CIP towards the end of RC4.
- UÉ appears to be actively addressing key sustainability policy and statutory requirements with plans and objectives in place, with embedded initiatives across the portfolio. As projects develop, it will be important to seek continuous improvement and driving cost efficiencies forward.

## Non – Network Capex

[\(Section 5 Non-network Capex\)](#)

- Arcadis notes that the non-network capex budget is a small proportion (6.1%) of the total funding UÉ receives. No major issues were found across the category and thus Arcadis does not recommend any non-network specific cost challenge apart from the overall Capex ongoing efficiency and RPE reductions.
- Arcadis understands that UÉ is at an early stage of development in terms of unifying and improving IT systems (and cyber security) to ensure complete robustness and security of supply in line with updated requirements. Asset understanding was identified as an area for improvement in the SWI report, so it is encouraging to see this focus on collecting, analysing and managing data has been continued in RC4.
- The adoption of new software (ArcGIS, BIM (Building Information Management), Primavera P6 and Maximo Application Suite) supports UÉ in integrating its systems into a common data environment, allows for a more efficient allocation of resources and supports bringing UÉ in line with best practices in the construction industry. The updates to UÉ's BIM are in part required to bring UÉ in line with ISO 19650 as required by CRU mandate. However, since capex has been allocated for the transition to new or upgraded software, Arcadis recommends investigation of cost savings that could be made in the IT Run Maintain category.
- There is evidence of overspend across two deep dive examples provided. However, in IT capital projects this is a common occurrence. The cost management approach and governance shown exceeds best practice from other industry examples, experience gained to date provides confidence to improve performance in RC4. In IT, lessons learnt, and experience gained are key factors for improving efficient delivery of IT capital projects.
- UÉ has recognised the core processes and investments required to complete the UÉT and achieve the target of combining previously disparate local authorities within a new national authority. While some integration and streamlining will need to occur over RC4 Arcadis has not identified any major risks relating to the UÉT and believes UÉ is maturing reasonably given the complexity of the task.

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# 1 Introduction

- 1 Introduction
- 2 UÉ's RC4 Capital Investment Plan
- 3 Capital Investment – Processes and Governance
- 4 Capex Programme & Projects Review
- 5 Non – network Capex
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# Context

## Scope & Background

- Arcadis and NERA are working with the Commission for Regulation of Utilities (CRU) in assessing Uisce Éireann’s (UÉ) planned expenditure for the RC4 regulatory period between 2025-2029. Previously, we completed a review of the RC3 performance which supports the understanding and analysis of the proposed RC4 Capex submission.
- Arcadis completed this assessment via a combination of Top-Down and Bottom-Up assessment.

Approach	Arcadis has assessed and reported against:
Top Down	Investment Decision Making Processes (I2O and IPP)
	Costing Methods
	Risk Assessment and Management
	Timelines and Schedules
	Procurement Strategy and Deliverability
	Planning and Consent Challenges
	Embedding SWI Recommendations

Approach	Arcadis has assessed and reported against:
Bottom Up (Deep Dives)	Understanding of Investment Need, Outcomes and Benefits of Projects
	Optioneering, Risk Assessment & Management, and Preferred Solution Selection
	Project Costing
	Delivery Route
	Relevance of Technical Assessment

# Regulatory Overview

## Key Regulatory Bodies and Plans

- Uisce Éireann (UÉ) is a commercial semi-state company delivering water and wastewater services for Ireland.
- The Commission for Regulation of Utilities (CRU) is the independent economic regulator of UÉ. The Water Services Act sets out the functions and powers of the CRU.
- The Water Services Act requires the CRU shall in the performance of its functions, have regard to the need to ensure that water services are provided by UÉ in an economical and efficient manner. Based on this, the CRU is responsible for setting the total level of revenue that only allows UÉ to recover a utility's efficiently incurred costs.
- The revenue control process involves reviewing UÉ's submissions, engaging with the utility, benchmarking its proposed costs against comparator companies, completing a public consultation process, and thereafter setting appropriate revenue allowances for operating costs, capital costs and other items.

## Key Regulatory Bodies and Plans

- The funding model for UÉ is set in the context of the EU Water Framework Directive (WFD), and under the Water Services Act 2017, UÉ is required to submit a Strategic Funding Plan (SFP) to the Minister for Housing, Local Government and Heritage within three months of the publication of the Water Services Policy Statement (WSPS).
- The WSPS identifies policy objectives set across the three thematic areas of availability & reliability, safety & quality and sustainability, covering the period 2025-2030. The intention of the WSPS is to give clear direction to strategic planning and decision making. Each WSPS theme is further categorised by strategic objectives that were set out in the Water Services Strategic Plan (WSSP) in 2015. The WSSP is updated every 5 years. UÉ is in the process of developing an updated WSSP to run from 2025 to 2050.
- UÉ submitted their SFP following the publication of the WSPS, setting out the arrangements that UÉ plan to implement to achieve the objectives of the WSPS. The SFP sets out the capital and operating costs expected to be incurred by UÉ in RC4 and how these costs are expected to be recovered. UÉ's RC4 SFP was approved in November 2024.
- UÉ applies for funding from the CRU by submitting a costed list of projects with timelines that are planned to be undertaken in the regulatory period. UÉ submitted this CR4 Capital Investment Plan to CRU in December 2024.
- UÉ's requested total expenditure for RC4 is €8.56 bn (2022 prices, excluding k-factor adjustments). This is a 77% increase over RC3's total expenditure.

# Arcadis Engagement

## Data collection

- In terms of the depth of review and scope of data shared this engagement constitutes the most in-depth review carried out on UÉ to date.
- Arcadis has undertaken **14 online workshops** of 1-2 hours together **with two full days of workshops** in UÉ offices in Dublin. These workshops provided an opportunity for Arcadis and UÉ Subject Matter Experts (SMEs) to explore the subjects of this report.
- Almost **140 questions** were asked and answered via a weekly Q&A process. This process provided Arcadis opportunities to clarify and expand upon topics of interest and importance and allowed UÉ the opportunity to fully deliver their view on developing programmes and initiatives.
- More than **300 documents** have been reviewed. UÉ has provided broad access to its process documentation and prepared numerous briefing packages. Additional documents and briefings were made available in response to questions posed via the Q&A process.
- Arcadis selected a representative sample of projects from RC4 to be assessed via a Bottom-Up “deep dive” process. In aggregate the samples constitute approximately a third of the total RC4 Capex and were selected on the basis of:
  - Project Size
  - Project Stage
  - Programme/Standalone Projects
  - Project Complexity
  - Sub Portfolio
  - Significant Shifts from RC3
  - New Works / Upgrades
  - Treatment Plants / Networks

	Workshops Undertaken	Date
1	Introduction to Governance	16 <sup>th</sup> Jan
2	2-days workshop in Dublin on Governance, Water and Wastewater Portfolios	21-22 <sup>nd</sup> Jan
3	Non-network Capex	27 <sup>th</sup> Jan
4	Incentives	27 <sup>th</sup> Jan
5	Capital Maintenance and Asset Health	7 <sup>th</sup> Feb
6	Risk quantification, costing and management	10 <sup>th</sup> Feb
7	Greater Dublin Drainage Major Programme	10 <sup>th</sup> Feb
8	Security of Supply and leakage	11 <sup>th</sup> Feb
9	Outcomes and Outputs	12 <sup>th</sup> Feb
10	Follow up on 10-steps Investment Decision Making Process	12 <sup>th</sup> Feb
11	Follow up on IT	17 <sup>th</sup> Feb
12	Follow up on Multicriteria Analysis	27 <sup>th</sup> Feb
13	Deep Dive Wastewater	31 <sup>st</sup> March
14	Deep Dive Water	2 <sup>nd</sup> April

# Arcadis Engagement

## Arcadis Deep Dive SMEs

Arcadis was able to deploy highly experienced and knowledgeable SMEs from its engineering capability to contribute to the analysis and assessment of the projects considered in the Bottom-Up Deep Dive Assessment.

### Senior Technical Director D&B, Civils

A qualified chartered civil engineer with over 28 years experience across all areas of civil engineering within the water, wastewater and energy sectors. Undertaken various roles operating as project director, project manager and framework manager. Possesses additional wide – ranging expertise in bidding, contract administration, design management, conceptual and detailed design, tender preparation and appraisal.

Notable previous experience includes senior advisory positions for both HS2 and Thames Tideway Tunnel projects.

### Technical Director D&E, Process

Possesses 27 years of extensive experience within water and wastewater process engineering, including broad knowledge spanning both the municipal and industrial sectors.

Deep understanding across all aspects of process engineering with a proven track record of working with multiple leading UK water companies.

### Technical Director D&E, MEICA

Brings 25 years of experience working in the water industry, featuring in senior technical roles across several major UK water companies.

Offers wide-ranging expertise in programme efficiency, end to end process mapping, design risk assessment, and driving improvement to asset standards. Has deep proficiency in securing stage gated funding for key improvement schemes.

Highlighted experience includes significant contributions to improving the early-stage risk evaluation and mitigation for a major UK water company.

# Arcadis Engagement | Deep Dive Projects / Programmes

Deep Dive Projects			
1	Capital Maintenance Programme - Water Above Ground Assets	18	Water Connections Programme
2	Find & Fix	19	Capital Maintenance Programme - Wastewater Above Ground Assets
3	CFC Filtration & Sludge	20	Capital Maintenance Programme - Wastewater Below Ground Assets
4	Supply Demand Balance Programme	21	Early-Stage Projects - Wastewater (Safety and Quality)
5	Lough Tait WTP New	22	Early-Stage Projects - Wastewater (Availability and Reliability)
6	Adamstown WTP Upgrade	23	Small Towns and Villages Growth Programme
7	Lough Mask WTP Upgrade	24	Ringsend WW treatment plant upgrade
8	Staleen to Duleek Water Network Upgrade	25	Nenagh WWTP upgrade
9	Galtee Regional WTP Upgrade	26	Fenit WWTP upgrade
10	Early-Stage Projects - Water (Safety and Quality)	27	Arklow WWTP New
11	Early-Stage Projects - Water (Availability and Reliability)	28	Ballinspittle WWTP Upgrade
12	Mains Rehabilitation	29	Drogheda Wastewater Network Upgrade
13	Metering Programme	30	Midleton WW Network Upgrade
14	Pressure Management Programme	31	Roundstone WWTP New
15	National Lead Programme	32	Regional Biosolids Storage Facility
16	WW Pumping Station Programme Capital Maintenance and WW Pumping Station Programme Growth	33	Greater Dublin Drainage
17	Wastewater Connections Programme	34	Windmill Hill Reservoir and Trunk Main to Ratoath

# Assessing Capex Efficiency | Introduction

## Overview

All regulators of public utilities are concerned with value for money and cost efficiency. In this report Arcadis has addressed itself to this concern. The question of what constitutes efficient use of funds is a difficult one in part because there is no perfect, mechanical, and unambiguous way to determine utility efficiency in the real world.

There are generally two aspects of Capex efficiency evaluated by regulators:

- Assessment of the needs case for the proposed investment. The need is usually measured against a national strategy goal which is informed by public demand and the input of expert bodies and advisors.
  - While the existence of a need within the context of a National Strategy may be clear, the prioritisation between such needs within limited resources is more complex.
- Assessment of the efficient cost of the proposed investment (given acceptance of the needs case). Efficiency here is measured as the actual output vs optimal output for a set input level. The challenge therefore is to establish a reasonable definition of optimal for a given company. If a €1m investment reduced the number of houses which are flooded in a given year by 1,000, how many *should* that investment have reduced it by?

## Methods of Assessment

What constitutes a reasonable output per input can be estimated in a number of ways, depending on the available data:

- Based on a peer group (regional utilities in the same country)
- Based on a wider peer group (utilities in similar countries)
- Compared to a notional efficient company carrying out the same activity in a different way
- Efficiency can be defined based on the whole capital programme, a particular sub-programme, or specific projects, down to the level of unit costs. Each level of comparison has trade-offs associated with data availability and representativeness.
- Efficiency can be defined as relative to the “frontier” company which is the most efficient, relative to the upper quartile of comparator companies or relative to the median company.
- The efficient level of performance may be considered statically or dynamically by applying a year-on-year efficiency improvement rate to reflect sector-specific or economy-wide productivity trends.

Efficiency is not a static target and economic regulators often set efficiency requirements for companies in two stages: A catch up to get to the current target level and by a progressive frontier shift to reflect expected improvement over time in the target.

# Assessing Capex Efficiency | Challenge of Comparability

## The Challenge

Even within a peer group there will be substantial differences between companies. Directly comparing a company which serves a small number of properties across a large area to one serving a larger number of properties in a smaller area can be misleading.

There are a range of approaches to dealing with these differences, for example fitting econometric models on the most important explanatory variables to calculate a “should cost” for the entire capital programme or for certain defined parts of it.

- This approach works best where there are a wide range of comparator companies which are relatively similar and have differences which can be quantified using continuous variables and which are undertaking relatively similar activities.
- Generally, this approach works well for Opex and less well for Capex on growth or replacement schemes since in the latter case the variation between companies will be large and not well explained by any variable in an econometric model.
- While econometric models can be used to comment on the efficiency of UÉ’s Opex and Capital Maintenance costs, these are not likely to provide valuable insights on the Capex programme.

Other regulators face similar issues, the table opposite shows a number of European examples and whether they are:

- A set of regional monopolies (comparative regulation highly effective) or single national operators (comparative regulation more challenging).
- Privately owned (high risk of allowing excessive capex as benefits accrue to shareholders), private concessionaires (complex and specific relationship between capex and concessionaire returns), or owned by the state.

	Private ownership	Private concessions	Municipal or State ownership (managed arms length)
Single national operator	GB Gas T GB Electricity T <sup>1</sup> Heathrow <sup>4</sup> NATS <sup>3</sup>		UÉ Scottish Water Schiphol airport <sup>5</sup>
Multiple regional operators	Germany Gas T Germany Electricity T GB Electricity D E&W Water <sup>2</sup>	Italian Water Italian Gas D French Water (some)	Dutch Water

- 1) Three operators but one is much larger than the others and comparative regulation very difficult.
- 2) Welsh Water does not have private shareholders but is regulated as if it did.
- 3) UK state is largest owner with golden share, other private sector owners are airlines.
- 4) Only economically regulated airport in UK at present.
- 5) Dual till, only aeronautical activity economically regulated.

# Assessing Capex Efficiency | Known Regulator Approaches

- Regulatory approaches to evaluating Capex expenditure vary and range from simply accepting all capital expenditure onto the Regulated Capital Value (RCV) / Regulated Asset Base (RAB) / Regulated Asset Value (RAV) without any regulatory approval, approving needs cases but not costs, allowing all capital expenditure except for that which is obviously wasteful, to the use of econometric models that aim to capture all Capex and Opex expenditure (Totex).
- Approaches can be top-down, middle-out, or bottom-up based on the level of granularity.
- We have RAG rated each approach by whether it generally requires: ● a set of narrowly comparable companies (i.e. in same country), ● broadly comparable companies (other utilities in similar countries, with adjustments), or ● does not require comparator companies.
- Arcadis View** is that the most appropriate way to evaluate the UÉ capital programme is to combine a multi-stage evaluation of a wide range of projects (the deep dives) with a review of their overall processes for capital planning, budgeting, and delivery. Elements of capital maintenance were benchmarked against E&W comparators.

	Top down	Middle	Bottom up / project specific
None, accept all capital expenditure	Dutch water companies		
Ex-ante needs case evaluation only, all incurred costs added to RCV			German Gas T, German Electricity T, Schiphol
Disallowance of “Demonstrably Inefficient and Wasteful” capital expenditure from RCV			CAA review of NATS
Multi-stage evaluation (needs case, solution, delivery/costing) by technical experts		Ofwat E&W enhancement deep dives by programme	Ofgem GB GT, ET Ofwat E&W enhancement deep dives by project
Overall business process review	Ofgem GB GT, ET		
Unit cost review		Ofwat E&W enhancement deep dives Ofgem GB GT, ET	
Comparative econometric top-down or middle-down	Ofwat / Ofgem Totex models	Ofwat E&W capital maintenance Ofwat E&W Opex Ofgem ED LRE and NLRE models	

# Assessing Capex Efficiency | Report Structure

## Arcadis Approach

- Arcadis has identified that its assessment is best served by carrying out a combined Top-Down and Bottom-Up assessment.
- This allows for a balanced view to be formed on the basis of processes, systems, roadmaps and direction of travel underpinned by a robust assessment of how those processes and systems are being applied to specific projects and programmes.

<p style="text-align: center;">Top Down Business Process Review</p>	<a href="#">Section 2.1 RC4 Capex Submission</a>
	<a href="#">Section 2.2 Outcomes and Outputs</a>
	<a href="#">Section 3.1 Project Lifecycle Framework</a>
	<a href="#">Section 3.2 Investment Planning Processes</a>
	<a href="#">Section 3.3 Capex Portfolio Governance</a>
	<a href="#">Section 3.4 Risk Management</a>
	<a href="#">Section 3.5 Costing Methods</a>
	<a href="#">Section 3.6 Procurement &amp; Delivery</a>
	<a href="#">Section 3.7 Managing Change</a>
	<a href="#">Section 3.8 SWI Recommendations</a>
<a href="#">Section 5 Non-network Capex</a>	

<p style="text-align: center;">Bottom Up Multistage Evaluation by Technical experts using case studies</p>	<a href="#">Section 4.1. Deep Dive Assessments</a>
	<a href="#">Section 4.2 Security of Supply and Leakage</a>
	<a href="#">Section 4.3 Capital Maintenance</a>
	<a href="#">Section 4.4 Major Projects</a>
	<a href="#">Section 4.5 Environmental Compliance</a>
	<a href="#">Section 6 Proposed Cost Challenges</a>

# Introduction | Key Sources Reviewed

A non-exhaustive list detailing the key documents and sources reviewed when producing this review.

Source Title	Document / Q&A / Workshop
Q&A responses	Q&A sheet
20241202 Uisce Éireann Revenue Control 4 (2025-2029) Network Capital Expenditure Look Forward FINAL	UÉ Document
20241202 Uisce Éireann Revenue Control 4 (2025-2029) BPQ FINAL	UÉ Document

# 2 RC4 Network Capital Investment Plan

- 1 Introduction
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- 5 Non – network Capex
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## **2.1 RC4 Capex Submission**

# RC4 Capex Submission | Overview

## Overview

- UÉ has submitted its Capital Investment Plan to CRU as part of the Regulatory Control Period 4 (RC4) 2025-2029 on 2<sup>nd</sup> December 2024.
- This followed the approval of the Strategic Funding Plan by the Government as discussed in [Section 1. Introduction](#).
- The Capital Investment Plan has two parts of submission – network and non-network. Non network Capex is discussed separately in [Section 5 Non-Network Capex](#).
- The Capex submission sets out the budgetary plan for capital investment in the water and wastewater services network for the given period of 5 years.
- The submission should indicate how investment decisions were made and prioritised to meet a set of established Outcomes, delivering value for money within the funding allocation. This section of the report sets out how UÉ links its investment decisions to outcomes and network needs based on its RC4 Capex submission.
- To define the Capex proposal, UÉ uses a number of key policies and plans that align with the Government's Policy Objectives and UÉ's Strategic Objectives. UÉ is bounded by the government policies which give clear direction on strategic planning and priorities for water and wastewater services in Ireland.
- There is also a number of other compliance challenges and policies that impact UÉ's Capex portfolio, but the key focus is on the capital investment addressing government-lead strategic priorities.

# RC4 Capex Submission | Policy and Strategic Objectives

## Water Services Policy Statement

- The Water Services Policy Statement (WSPS) is a key Government document produced in line with the 2017 Water Services Act to give clear direction to strategic planning and decision making on water and wastewater services in Ireland.
- The 2025 to 2030 WSPS was published in February 2024 and the key themes are:
  - **Availability & Reliability:** water services to support regionally balanced economic and social development through accessible, reliable water services.
  - **Safety & Quality:** water services to be safe and protect human health.
  - **Sustainability:** water services to be efficient, resilient and sustainable.
- These represent a subtle change in naming from the 2018 to 2025 WSPS that had the themes: Quality, Conservation, and Future Proofing but the focus remains the same.
- UÉ is developing a new WSSP 2050 which looks at longer term water needs and will cover the period of 2025-2050.
- UÉ confirmed through Q&A process, that the RC4 Capex Investment Plan's objectives align with both, the current WWSP from 2015 and the new WSSP 2050 which is in development, covering short medium- and long-term needs.
- The draft WSSP 2050 has yet to be approved by the minister or adopted by UÉ, In case of any changes to the Capex plan, UÉ and the CRU will agree change control processes specifically for this.

## Water Services Strategic Plan

- The Water Services Strategic Plan (WSSP) is UÉ's overarching long term strategic plan that was developed in accordance with the Water Services Act 2013 that covers the period from 2015 to 2040. The WSSP details current and future challenges that affect the provision of water services and identifies the priorities to be tackled in the short and medium term.
- The WSSP is reviewed every 5 years to ensure that it is relevant and up to date. WSPS informs this review.
- **Asset / Service Needs and Investment Cases**
- Through extensive stakeholder engagement, UÉ has established a list of known asset and service needs that require investment. These needs have been categorised and aligned with the policy and strategic objectives to identify high-risk needs that are prioritised in the RC4 investment. The following page shows how the objectives align with asset and service needs, showing a thorough planning process undertaken by UÉ.
- UÉ bundles asset needs into investment cases to better prioritise and allocate available funding based on similar interventions across different assets. Table on the next page shows the alignment of asset needs and investment cases, whilst table on following page shows the budget split between each investment case across RC4 portfolio.
- Investment cases are assigned to specific WSSP objectives to align UÉ's investment needs to government policy.

# RC4 Capex Submission | Aligning Needs to Objectives

Table below shows how policy (WSPS) and strategic (WSSP) objectives align with asset and service needs. The final column shows how the needs were bundled into investment cases to help prioritise and allocate funding. Based on the below, UÉ has sufficiently mapped out government priorities into its RC4 Capex Investment Plan with a clear link to asset needs.

WSPS Theme	WSSP Strategic Objective	Need for Investment	Investment Case
Availability and Reliability	Ensure a Safe and Reliable Water Supply	Reduce supply demand deficit focusing on areas with largest gains in deficit reduction.	Water Quantity (Water)
	Invest in Our Future	Maintain current levels of service in wastewater treatment plants and wastewater networks.	Service Resilience (Wastewater)
		Reduce unplanned interruptions to water supply and address areas of the network suffering from low pressures where possible.	Service Resilience (Water)
	Support Social and Economic Growth	Ensure adequate treatment & network capacity to cater for social and economic development in line with the National Planning Framework.	Treatment / Network Capacity (Water and Wastewater)
Safety and Quality	Ensure a Safe and Reliable Water Supply	<ul style="list-style-type: none"> <li>Improve drinking water quality through improved measures to remove lead and trihalomethane (THM) contamination; treating microbiological contamination; and addressing schemes on the EPA Remedial Action List.</li> <li>Reduce the number of properties at risk of chemical non-compliance.</li> </ul>	Water Quality (Water)
	Provide Effective Management of Wastewater	<ul style="list-style-type: none"> <li>Bring wastewater treatment plants into compliance with UWWTD, including untreated agglomerations.</li> <li>Address the legacy issues of non-compliance with Wastewater Discharge Authorisations, taking account of the priority environmental areas as identified by the EPA through the Priority Areas List.</li> </ul>	Treated Wastewater
		Reduce urban wastewater significant pressures identified in the 3rd Cycle River Basin Management Plan through understanding the nature of the pressures and progressing interventions to address these.	Water Body Impact
		Address the legacy issues of non-compliance with Wastewater Discharge Authorisations. Identify and target frequent flooding areas for improvement works to reduce the frequency of sewer flooding.	Wastewater Network Environmental Compliance & Sewer Flooding
Sustainability	Ensure a Safe and Reliable Water Supply	Reduce leakage and progress towards Sustainable Economic Level of Leakage.	Leakage (Water)
	Protect and Enhance the Environment	Increase and accelerate efforts to halt the decline of biodiversity and ensure that infrastructure is built and managed responsibly so that ecosystems are protected, and where possible enhanced.	Sustainability

# RC4 Capex Submission | Allocating Budget to Objectives

Below is a breakdown of the proposed RC4 investment plan across the WSPS Themes, WSSP Objectives and Investment Cases. The table shows the estimated investment values for each of the Investment Cases and how this has been used to build the estimated investment values for the WSSP objectives and WSPS themes. More than half (53%) of overall RC4 budget seeks to satisfy the WSSP objective of ensuring safe and reliable water supply in Ireland.

WSPS Theme	Budget (m€)	WSSP Strategic Objective	Budget (m€)	Investment Case	Budget (m€)
Availability and Reliability	4,336	Ensure a Safe and Reliable Water Supply (including WSP)	1,997	Water Quantity	1,815
				Early-Stage Projects*	181
		Invest in our Future	1,542	Service Resilience (Wastewater)	789
				Service Resilience (Water)	715
				Early-Stage Projects*	38
		Support Social and Economic Growth	572	Treatment Capacity (Water and Wastewater)	324
				Network Capacity (water and wastewater)	167
				Early-Stage Projects*	80
		Provide Effective Management of Wastewater (including GDD)	227	Treated Wastewater	168
				Early-Stage Projects*	59
Safety and Quality	2,216	Ensuring a Safe and Reliable Water Supply	948	Water Quality	771
				Early-Stage Projects*	177
		Provide Effective Management of Wastewater	1,267	Water Body Impact	734
				Wastewater Network Environmental Compliance and Sewer Flooding	363
				Early-Stage Projects*	170
Sustainability	1,518	Ensuring a Safe and Reliable Water Supply	1,368	Leakage Reduction	1,368
		Protect and Enhance the Environment	150	Sustainability	121
				Early-Stage Projects*	29

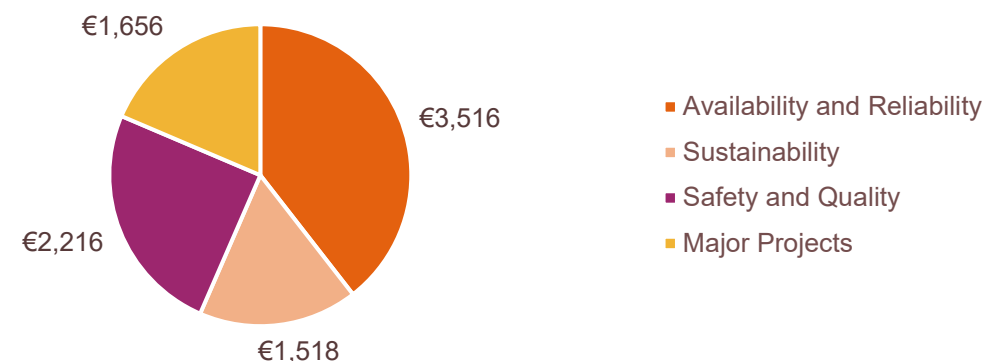
\* Early-stage projects are early strategic and feasibility studies within each theme which haven't been allocated to a specific Investment Case.

# RC4 Capex Submission | Overall Budget Allocations

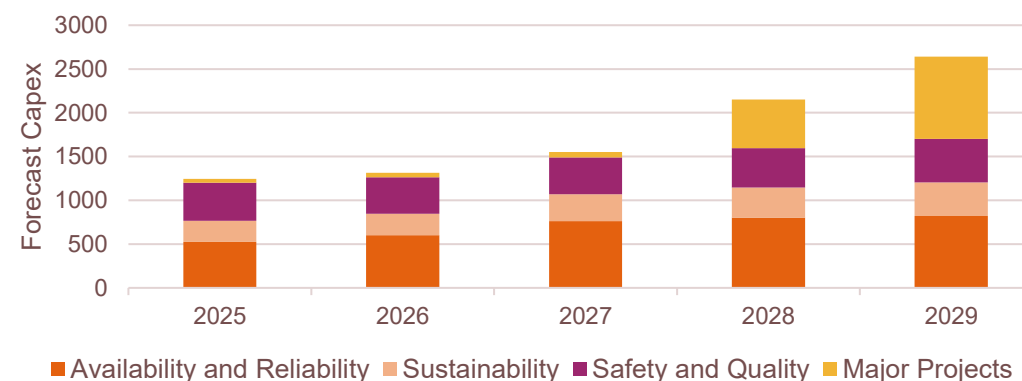
## RC4 Investment per WSPS Theme

- The graph to the top right shows that in RC4, UÉ plans to invest most in the Availability and Reliability theme, followed by Safety and Quality and Sustainability themes.
- The major projects (Greater Dublin Drainage GDD and Water Supply Project WSP) have been separated due to their size and complexity however, both fall into the Availability and Reliability theme. The total investment proposed in RC4 for major projects can be seen in the pie chart, accounting for a significant 19% of overall RC4 Capex portfolio.
- It can be seen from the graph on the bottom right that forecasted expenditure increases slightly each year throughout RC4 in line with expected profile of work ramp up. Major projects show little spend in the first three years with a significant step change in expenditure set for years 2028-29. This is in line with projects development and achieving consents to carry out works. [Section 4.4 Major Projects](#) provides further detail.
- Revenues generated by new water and wastewater connections (€835.1m) are also listed under the Availability and Reliability theme. They have been removed to show only gross expenditure in both charts.

Overall Forecast Expenditure by WSPS Policy Theme (€m)



Forecast Expenditure Profile by WSPS Policy Theme (€m)

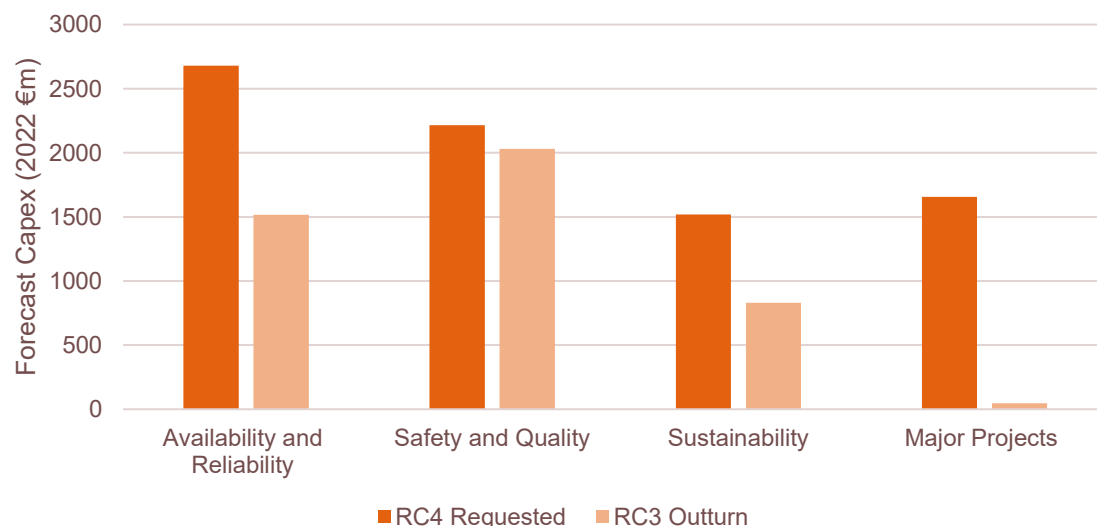


# RC4 Capex Submission | RC4 vs RC3 Budget Allocations

## RC3 and RC4 Budget Allocations Comparison

- The total network capex requested for RC4 is 82% more than was in RC3 (from €4.4bn to €8.1bn in 2022 prices). This is a significant investment increase, largely contributing to increased focus on resilience of UÉ’s networks and services through the Availability and Reliability theme which also accounts for the Major Projects.
- Whilst the WSPS themes from RC3 share some similarities with those of RC4, they cannot be completely matched up. Major projects were significantly delayed and underspent in RC3 with RC4 setting new allowance for progressing them into delivery stage towards end of the regulatory period.
- In relative terms, the RC3 capital programme was heavily focused on Safety and Quality as many urgent historical issues were addressed in RC3 and therefore in RC4 the company is now able to focus on additional priorities around system availability / reliability and sustainability.

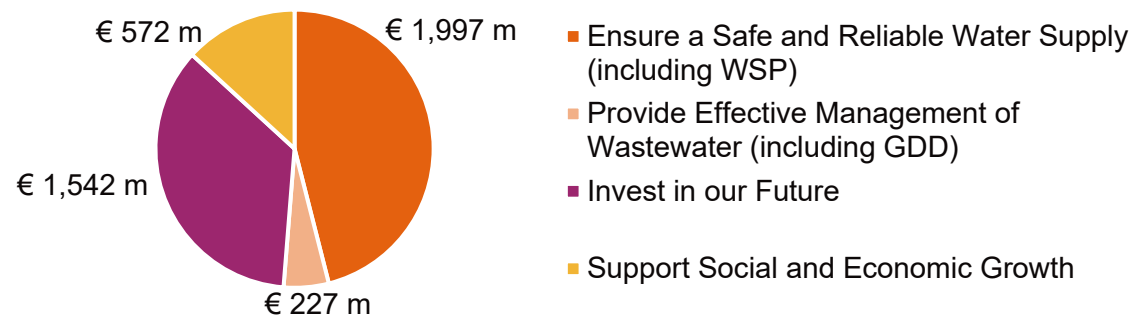
RC3 vs RC4 Capex Investment Plan per WSPS Policy Theme



# RC4 Capex Submission | Availability and Reliability Theme

## Introduction

- The Availability and Reliability WSPS theme aims to improve public water services through continued investment in infrastructure. This will allow water services to support regionally balanced economic and social development through accessible, dependable and reliable water services.
- The theme consists of the four WSSP objectives:
  - **Ensure a Safe and Reliable Water Supply** (including WSP)
  - **Provide Effective Management of Wastewater** (including GDD)
  - **Invest in our Future**
  - **Support Social and Economic Growth**
- Each objective contains a range of investment cases that in turn have associated programmes and stand-alone projects. These are further explained in this section.
- The chart below shows the proposed RC4 budget split for the Availability and Reliability theme.



## Ensure a Safe and Reliable Water Supply (including WSP)

- Strategic aim:** Manage the availability, sustainability and reliability of water supply now and into the future.
- Water Quantity Investment Case** – UÉ has prepared a National Water Resource Plan (NWRP) that has identified a national Supply Demand deficit of 685MLD. The water supplies with the greatest level of deficit in the short term are prioritised for investment. Most of the investment work is indicated to be delivered through standalone projects; however, a preferred solution might have a national or regional aspect across multiple locations, and as such could be delivered as a programme of works.
- It is worth noting that an estimated €1,504m of investment is designated for the Water Supply Project (WSP). The WSP is an intergenerational infrastructure project that has the capacity to ensure secure sustainable water supplies for up to 50% of the population. See [Section 4.4 Major Projects](#) for further detail.

## Provide Effective Management of Wastewater (including GDD)

- Strategic aim:** Manage the availability and resilience of wastewater services now and into the future in a safe and economic manner.
- €151m of investment is designated for the Greater Dublin Drainage project (GDD). This is one of the two major projects planned to be progressed in RC4, representing the largest wastewater project of the regulatory period. The GDD will enable future growth of housing and industry in several strategic areas. See [Section 4.4 Major Projects](#) for more detail.

# RC4 Capex Submission | Availability and Reliability Theme

## Invest in our Future

- **Strategic aim:** Manage assets and investments in accordance with best practice asset management principles to deliver a high quality secure and sustainable service at lowest cost.
- **Service Resilience (Water) Investment Case** - To minimise supply interruptions to over 1.7m customers and to ensure that quality water is constantly supplied, UÉ must provide a resilient service. UÉ seeks to achieve this through the leakage reduction programme and a series of capital maintenance programmes.
- The Leakage Reduction Programme plans to address the resilience issues in the network. This consists of Find and Fix and Pressure management initiatives to address public side leakage as well as Mains Rehabilitation, lead pipes replacements, metering and DMA works.
- Maintaining current levels of service in Water treatment plants is achieved through the effective delivery of a range of capital maintenance programmes.
- **Service Resilience (Wastewater) Investment Case** – UÉ is planning the continued investment into several programmes targeting the delivery of maintenance and service resilience works across the portfolio’s 1,000 WWTPs, 2,600 wastewater pumping station, 2,600 storm water overflows and 26,000km of wastewater network.
- Key programmes aim to address the assets that present the greatest risks to service and health and safety as well as funding the replacement of those that have failed or are failing. RC4 is prioritising investment into wastewater networks on a risk-based approach. The planned maintenance work is also being supported by a range of investigative programmes across the sewer network, WWTPs and Storm Water Overflows (SWOs) to ensure that investment is targeted at critical assets.

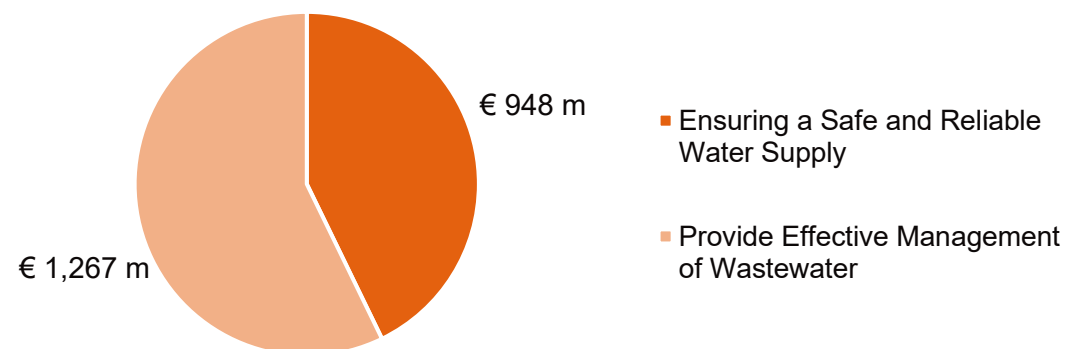
## Supporting Social and Economic Growth

- **Strategic aim:** Support national, regional and local economic and spatial planning policy; Facilitate growth in line with national and regional economic and spatial planning policy.
- **Treatment Capacity for Growth Investment Case (Water)** – The NWRP and the annually reviewed Water Treatment Capacity Register provide a national view on the available water treatment capacity and changes required for a growing population. Where a WTP is shown to be the limiting factor, investment will be focused on improving that WTP’s capacity. These investments will be provided through the Water Treatment Programme (that has the scope to address capacity issues at smaller plants), standalone projects for larger plants, and UE’s growth and development programme that seeks to deliver strategic water infrastructure upgrades to facilitate future growth and development.
- **Treatment Capacity for Growth Investment Case (Wastewater)** – The Wastewater Treatment Capacity Register is used to understand where capacity upgrade projects and new network connections are needed. Two programmes of work are suggested to focus on WWTP capacity growth: the Small Towns and Villages Growth Programme that focusses on WWTPs that have a load of less than 2,000 Population equivalent (PE), and the Large Towns and Cities Growth Programme that will be established in RC4 to address WWTPs with capacity greater than 2,000 PE.
- **Network Capacity for Growth Investment Case** – Previous assessments have identified a large deficit in network capacity, both for water and wastewater networks. Most network growth is expected to be driven by projects progressed under RC3, continuing into RC4. These include: the Network Extension Programme, Local Infrastructure Housing Activation Fund / Major Urban Housing Delivery Sites Programme, and the Local Network Reinforcement Programme.

# RC4 Capex Submission | Quality and Safety Theme

## Introduction

- The Quality and Safety WSPS theme aims to prioritise the protection of drinking water sources, minimising contamination, and provide for robust, effective oversight by regulatory authorities that will help to deliver on the theme.
- The theme consists of two WSSP objectives:
  - **Ensure a Safe and Reliable Water Supply**
  - **Provide Effective Management of Wastewater**
- Each objective contains a range of investment cases that in turn have associated programmes and stand-alone projects. These are further explained in this section.
- The chart below shows the proposed RC4 budget split for the Quality and Safety theme.



## Ensure a Safe and Reliable Water Supply

**Strategic aim:** Manage the sustainability and quality of drinking water from source to tap to protect human health.

**Drinking Water Safety and Quality Investment Case** – The RC4 approach includes investments in catchment interventions to protect drinking water sources and the Water Treatment Programme to mitigate risks across the entire treatment process nationwide. It includes one-off upgrades for larger WTPs. Key programmes addressing water quality issues on the network include lead replacement and mains rehabilitation programmes.

## Provide Effective Management of Wastewater

**Strategic aims:** Manage the operation of wastewater facilities in a manner that protects environmental quality; Manage the availability and resilience of wastewater services now and into the future; Manage wastewater services in an effective and economic manner.

**Treated Wastewater Investment Case** – RC4 investment focuses on capital interventions required to bring WWTPs into compliance with the Urban Wastewater Treatment Directive. Wastewater Discharge Authorisations will still take place however, work will be done to keep the amount of discharge below Emission Limit Values.

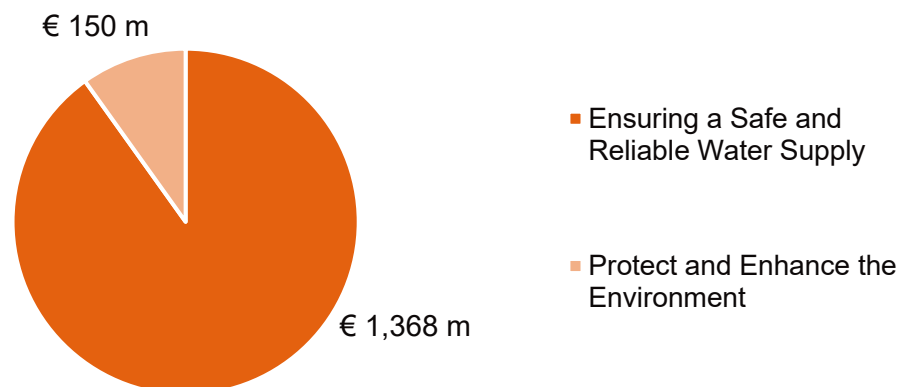
**Water Body Impact Investment Case** - Under the 3rd Cycle of the River Basin Management Plan, UÉ aims to address significant pressures from WWTPs and SWOs by completing assessments, progressing designs and construction, and prioritizing additional projects, while also deploying monitors to improve data on SWO performance.

**Wastewater Network Environmental Compliance & Sewer Flooding Investment Case** - The RC4 Drainage Area Plan programme aims to address urban flood risk, reduce sewer flooding, implement Local Flood Protection Measures, promote Sustainable Drainage systems, and collaborate with stakeholders for societal and environmental benefits.

# RC4 Capex Submission | Sustainability Theme

## Introduction

- The Sustainability WSPS theme aims to ensure that public water services are sustainable, that climate targets are met for the sector, and that water conservation forms a cornerstone of water policy.
- The theme consists of two WSSP objectives:
  - **Ensure a Safe and Reliable Water Supply**
  - **Protect and Enhance the Environment.**
- Each objective contains a range of investment cases that in turn have associated programmes and stand-alone projects. These are further explained in this section.
- The chart below shows the proposed RC4 budget split for the Sustainability theme.



## Ensure a Safe and Reliable Water Supply

**Strategic aim:** Manage water supplies in an efficient and economic manner

**Leakage Investment Case** - The NWRP focuses on reducing water loss through leakage, promoting water conservation, and improving water supply capacity. Uisce Éireann's leakage strategy specifically targets leakage reduction in the Greater Dublin Area through coordinated activities. The strategy aims to achieve an economically viable level of leakage that supports growth, meets stakeholders' requirements, and is environmentally sustainable. Uisce Éireann aims to reduce net leakage by 120 MLD during RC4, involving activities such as finding and fixing leaks, rehabilitating water mains, and maintaining metering systems.

## Protect and Enhance the Environment

**Strategic aim:** Ensure that UÉ services are delivered in a sustainable manner which contributes to the protection of the environment; Operate water services infrastructure to support the achievement of water body objectives under the Water Framework Directive and UÉ's obligations under the Birds and Habitats Directives; Manage all residual waste in a sustainable manner.

**Sustainability Investment Case** – UÉ is committed to protecting ecosystems and biodiversity through responsible infrastructure management. They aim to enhance biodiversity, adopt circular economy practices for waste management, ensure climate resilience in water services, and improve energy efficiency. UÉ also strives to reduce carbon emissions and achieve Net Zero Carbon by 2040. They have developed tools and initiatives to assess and prioritize low carbon solutions, measure whole life cycle carbon emissions, and implement carbon management processes. These efforts align with national targets and contribute to sustainable operations and the preservation of the environment.

## **2.2 Outcomes and Outputs**

## Outcomes and Outputs | RC4 O&O: Water

UÉ have proposed a total of 39 outputs and outcomes (O&O) for RC4 as seen in the tables below. The O&O are split into three categories: water, wastewater and sustainability. Some of the O&Os continue from RC3 whilst others are new (new ones are highlighted in the tables below). The precise Capex/outcome cannot be specified as many projects contribute to more than one outcome, However, the table shows an indicative Capex – a sum of any project investment that contributes to a given outcome.

Asset Category	RC4 O&O	RC4 Target	Unit	RC4 Capex (2022 €m)
Water	Water treatment plants new and upgraded	163	No.	667.99
Water	Provide additional water treatment capacity	43	MLD	295.44
Water	Provide additional water network capacity	126	km	226.98
Water	Length of water main laid (rehabilitated)	663	km	617.81
Water	Water treatment Plants with orthophosphate treatment facilities installed	32	No.	68.76
Water	Number of lead services replaced	31,283	No.	83.84
Water	Provide treated water storage support Security of Supply	10.7	ML	37.24
Water	Rationalise water treatment plants	26	No.	50.23
Water	Number of safety upgrades water storage facilities (Impounding Reservoirs)	24	No.	33.44
Water	Metering replacements and new meters installed	280,994	No.	210.43
Water	District Meter Area (DMA) works completed	654	No.	8.22
Water	Completed works at water treatment plants to facilitate the removal from Remedial Action List (RAL)	33	No.	631.7
Water	Completed works at water treatment plants to resolve specific high risk water quality issues	163	No.	667.99
Water	Improving the capacity of the GDA supply network	28	MLD	21.12
Water	Net water savings	120	MLD	598.18

# Outcomes and Outputs | RC4 O&O: Wastewater

Thirteen new water and wastewater O&O have been included for RC4. Several of the new O&O continue themes from RC3 but the measurement, focus or scope has been changed, hence they cannot be compared directly. UÉ explained that the emergence of new pressures and improved asset knowledge has led to the creation on new O&O. Seven O&O from RC3 have been discontinued but general themes and categories have been kept through other O&O in RC4. As before, O&O without similar targets in RC3 ('new O&O') are shaded.

Asset Category	RC4 O&O	RC4 Target	Unit	RC4 Capex (2022 €m)
Wastewater	Wastewater treatment plants new and upgraded	61	No.	931.14
Wastewater	Provide additional wastewater treatment capacity.	57	No.	663.09
Wastewater	Provide additional wastewater network capacity	112.7	Km	558.72
Wastewater	Sewer Network Rehabilitation	34.1	km	202.85
Wastewater	Wastewater New and Upgraded Pumping Stations	118	No.	308
Wastewater	Drainage Area Plan Programme	8	No.	39.31
Wastewater	Storm Water Overflows Monitoring & Assessments	590	No.	11.95
Wastewater	Major Capital Maintenance Site Refurbishments	3	No.	319.09
Wastewater	National Wastewater Sludge Management sites installed	4	No.	73.46
Wastewater	Works completed to comply with the UWWTD and address ECJ judgement	4	No.	85.22
Wastewater	Works completed at agglomerations with no treatment or preliminary treatment only	11	No.	116.79
Wastewater	Complete works at agglomerations to facilitate removal from EPA's Priority Urban Area Action List (PAL)	23	No.	558.26
Wastewater	Complete works to comply with WWDA	48	No.	505.66
Wastewater	Complete works to address significant pressures in third cycle River Basin Management Plan (RBMP 2022-2027)	25	No.	506.97
Wastewater	Completed works to reduce the risk of Sewer flooding	17	No. of Projects	168.32

# Outcomes and Outputs | RC4 O&O: Sustainability

All sustainability metrics are newly introduced in RC4, to comply with energy efficiency, emissions and climate directives. The sustainability O&O are measured on a Capex portfolio basis as opposed to specific projects and thus, the targets are estimated at an organisation-wide basis.

Asset Category	RC4 O&O	RC4 Target	Unit
Sustainability	Energy Efficiency Improvement	25.4	GWh
Sustainability	Renewable Energy - Generation (Installed Capacity)	4.7	GWh/yr
Sustainability	Greenhouse Gas Emissions	49	% of Baseline year carbon emissions
Sustainability	Greenhouse Gas Emissions - Thermal and Transport Energy Sources	TBC*	tCO2e
Sustainability	Biodiversity – Net Gain Across new Projects by 2030	>0	% Net Gain from the Baseline
Sustainability	Circular Economy - Construction Waste (2030)	0	% Recoverable Waste to Landfill
Sustainability	Circular Economy - Sludge (New & Upgraded)	100	% Sludge to Circular Economy Outlets
Sustainability	Nature Based Solutions	22	No. of Nature based solutions adopted
Sustainability	Climate Change Resilience	100	% of Projects

\*Ongoing projects are being evaluated to determine progress that can be made in RC4.

# Outcomes and Outputs | O&O Continued from RC3

## Significant target changes between RC3 and RC4

17 out of 39 O&O in RC4 can be directly compared with RC3 O&O. Of the 17 comparable O&O, six showed a significant change in scale.

Two O&O showed an increase since RC3:

- **Water treatment plants new and upgraded (288%)** – this target is based on the number of plants as opposed to the treatment capacity. Through the Q&A, UÉ stated that the definition of a water treatment plant upgrade has been broadened for RC4 and reflects the RC4 priorities and budget, thus the % increase in target.
- **Metering replacements and new meters installed (269%)** – UÉ have estimated most of this target will be achieved through replacing existing meters. Arcadis' view and further insights on metering programme review can be found in [Section 4.1 Deep Dive Assessments - Overview for cost reduction justification](#).

Four O&O showed a decrease from RC3:

- **Provide additional wastewater network capacity (-54%)** – The reduction reflects the changes to priorities for RC4 with an increased focus on environmental compliance needs and thus reduced scope and budget for wastewater network capacity increases. UÉ further explained the reduction in outcomes set due to inflation impacting cost run rates.
- **Provide additional water network capacity (-75%)** – UÉ allocated a higher proportion of funding to water quality improvements in RC4, prioritising it over water network capacity increases. Through the Q&A, UÉ also highlighted the ongoing WTP rationalisation which will require new watermains to be built. Since the exact quantity is not known, these have not been included in the I&O sheet and will be reported through the Change Control Reports through the period, contributing to the increased outcomes.

O&Os with significant target changes between RC3 and RC4	Unit	RC3 Delivered	RC4 Target	Change
Water treatment plants new and upgraded	No.	42	163	288%
Metering replacements and new meters installed	No.	76,173	280,994	269%
Provide additional wastewater network capacity	km	245	112.7	-54%
Provide additional water network capacity	km	500	126	-75%
Complete works at agglomerations to facilitate removal from EPA's Priority Urban Area Action List (PAL)	No.	75	23	-69%
Sewer Network Rehabilitation	km	234	34.1	-85%

- **Complete works at agglomerations to facilitate removal from EPA's Priority Urban Area Action List (PAL) (-69%)** – The PAL is decided by the EPA, an environmental regulator. Currently, there are only 23 entries on the PAL for RC4. However, the PAL is a live document, and sites are likely to be added through the RC4 period, hence this number is likely to vary as UÉ prioritises the interventions.
- **Sewer network rehabilitation (-85%)** – RC3 reporting figure included 102.4 km of sewers rehabilitated before RC3. Removing this, however, still leaves a 74% decrease in quantity. UÉ has shifted the focus from sewer rehab in RC3 to wastewater pumping stations and rising mains upgrades in RC4 which is reflected in the outcomes and RC4 investment plan.

### Arcadis view

Arcadis notes that keeping comparable O&O metrics between regulatory periods is important and can help in tracking overall performance and it should be considered in the future O&O discussions for RC5.

# Outcomes and Outputs | Projects without O&O Assigned

- UÉ have requested €8.1bn in network Capex for 269 projects/programmes recorded in the I&O sheet of the business plan.
- 50.25% of Capex investment value have O&O assigned, making it possible to track performance over the RC4. UÉ has provided the following table with reasoning for not having O&Os in place for half of the value of RC4 Capex. Arcadis' review is provided on the next page.

Category	%	Rationale	Comments
O&Os yielding in RC4	50.25%	-	-
Major Projects – WSP and GDD	20.52%	Significant infrastructure projects, with a separate auditing process	Given the need and desired outcomes have already been established, direct assignment to O&O is not needed. However, some metrics are required to monitor progress through the period. This should be in the form of milestones regarding physical infrastructure or the completion of works, not just expenditure.
Reactive & Maintenance work	10.95%	Reactive response to asset failures – capital maintenance interventions	Whilst precise quantities are unlikely to be known, UE should have some understanding of the kind of works expected and the O&O to which they would contribute. Estimates, even just as an upper and lower bound for the whole period, should be used as a guide for the capital maintenance programmes to show if works are on schedule through the period.
Early-Stage Projects	9.14%	O&O cannot be fully identified at this stage in projects as in line with Infrastructure Guidelines	The full extent of these projects is unlikely to be determined at this stage, so contribution towards O&O will be imprecise. However, the O&O to which each project would contribute should be known as well as an estimate. The refining of this estimate can be used to show progress.
O&O's yielding post-RC4	5.63%	Projects that will deliver O&O post-RC4, to be included in RC5 models	Contribution to O&O is only realised once the project is complete, so projects finishing in RC5 do not progress RC4 O&O. However, these targets should still be recorded against the project to justify the expenditure request.

## Outcomes and Outputs | Projects without O&O Assigned

Category	%	Rationale	Comments
CRU Deemed Capex	5.04%	Primarily CIP Development Costs	Projects for regulatory procedures typically do not involve building new assets, hence do not contribute to O&O.
Regulatory Adjustments	-3.30%	Removing new connections revenue	This is an accounting adjustment to address the capex offset by connections fees.
Sustainability Initiatives	1.19%	Measured at organisational level & shared with CRU	Progress towards O&O has not been identified at the project level
O&O Captured under Programme	0.19%	Some projects moved out of programmes into standalone projects. O&O would have been captured under the original programme.	Above a certain value, UÉ will record interventions as standalone projects, not as part of the programme. O&O progress is not counted for the project to prevent double counting
Asset Management Data Improvement Projects	0.17%	Projects that do not yield O&Os but essential asset data improvements	At a high level, these have been justified, but do not contribute towards O&O. However, evidence of progress should be provided in the annual Change Control Reports.
Projects yielding Pre-RC4	0.12%	O&O are complete with minimal residual spend in RC4	It is reasonable for some capex to be used to close out of projects which have realised the O&O gain in RC3
Not yielding O&O Feasibility Studies	0.09%	Related to work pre-project selection and definition	These initial works would not produce infrastructure that could contribute to O&O

# Outcomes and Outputs | Projects without O&O Assigned

## Arcadis View

Defining clear outcomes and outputs is essential for tracking progress against investment objectives.

UÉ has provided justifications for why 49.75% of its Capex portfolio does not contain defined O&O. Arcadis has reviewed the reasoning and notes that four major groups of projects without O&O assigned contribute to 46% of overall portfolio:

1. **Major Projects – GDD and WSP (20.52%).** The projects are to be delivered in RC5 and follow a distinct review and audit process within the Irish Government due to their strategic importance and size of investment. Arcadis recommends that UÉ nonetheless provides milestones to be tracked as part of the O&O process.
2. **Reactive & maintenance work (10.95%).** These include capital maintenance programmes to upkeep the existing service levels and include replacements or upgrades of assets. Arcadis notes that currently the majority of UÉ’s capital maintenance works are reactive, with plans to shift towards more proactive and planned approach which would enable to set out more defined O&O in the future. Since it is reasonable to assume that the capital maintenance budget has been set based on certain assumptions of work volumes, these work volumes could form the basis for O&Os in this category. We recognise that assessment of performance against these O&Os would need to consider the reactive nature of the work.

The approach to asset health and capital maintenance is set out in [Section 4.3 Capital Maintenance](#) of this report. The section also shows NERA’s alternative way to assess if UÉ meets network asset health needs, by reviewing the overall level of budget provided for base maintenance in RC4 against industry benchmarks. This analysis found that UÉ seems to provide sufficient budget for capital maintenance/upgrades across its networks. Arcadis recommends assessing UÉ’s capital maintenance programmes of work through RC4 budget spend and the existing serviceability measures which are part of PAF framework.

3. **Early-stage projects (9.14%).** These are projects in very early stages of definition of need and potential optioneering of interventions thus making it difficult to define clear O&Os as the initial investigations and project definition takes place.

Whilst Arcadis understands that O&O may not be defined at this stage, the need case should be clearly set out from the onset. As shown earlier in this section, early-stage projects are clearly mapped with the high-level asset and service needs, addressing policy and strategic objectives.

Whilst the budget allowance for early-stage projects is essential to allow long-term planning, the budget is a significant proportion of the overall budget portfolio. For this reason, Arcadis recommends assessing UÉ’s spend against planned at the end of RC4. Arcadis notes that other regulators make explicit allowances for certain volumes of early stage studies, need cases etc, and that this could form the basis of O&O in this category.

Arcadis has also reviewed a set of project examples from early-stage projects, and these are discussed in [Section 4.1 Deep Dive Assessments | Overview for cost reduction justification](#).

4. **O&O’s yielding post-RC4 (5.63%).** These are projects that will be completed in significant part during RC4, but the final completion and delivery of O&Os will be in RC5, thus not included in **RC4** models. Arcadis sees this as reasonable, however, it is recommended that the related RC5 O&O are still reported but separately to CRU for visibility and progress tracking. This would help UÉ to further demonstrate a thought-through process of investment planning with clear definition of value to customers.

# Outcomes and Outputs | Measuring UÉ's RC4 Performance

## Measuring Progress throughout RC4

Due to lack of complete O&Os for all projects within the business plan I&O sheet, Arcadis recommends for CRU to consider the following approach to measure UÉ's performance over RC4:

1. Projects and programmes with assigned O&Os to be assessed against the O&Os. This is in line with RC3 approach.
2. Projects and programmes without assigned O&Os to be assessed based on I&O project list – the specific projects with relevant budgets. Assessing UÉ's progress based on the committed list of projects and programmes as submitted in I&O and checking their status and spend at the end of RC4. It is understood that the project/programme make up can change throughout the RC4, but all changes should be recorded and explained through the agreed change management process.

For capital maintenance programmes specifically, Arcadis recommends for the performance to be measured using the existing serviceability metrics within the PAF framework. This will also help to understand the development of asset health across UÉ's networks.

For projects yielding O&Os beyond RC4, as discussed on the previous page, Arcadis recommends that the related RC5 O&O are still reported separately to CRU for visibility and progress tracking. This would help to outline clear definition of value to customers.

## **2.3 RC4 Capex Efficiencies**

# RC4 Capex efficiencies

## Overview

- As part of its Capex submission, UÉ has not provided or identified any ongoing Capex cost efficiencies.
- Through Q&A, UÉ explained the portfolio had already undergone an optimisation process as part of the Strategic Funding Plan approval by the Minister where the capex request was reduced from €10.1bn (real 2022) to €8.9bn (real 2022). Consequently, UÉ have stated there are no further opportunities to optimise the current portfolio. However, Arcadis cannot validate this statement since evidence of the optimisation process has not been provided.
- UÉ mentioned a number of processes used for bringing in efficiencies across the portfolio, such as innovation, new technologies to contracting strategies, standardisation and governance, and optimising scope of works.

## Arcadis View

Arcadis opines that cost efficiencies should be considered by UÉ for the overall Capex portfolio, to drive improvements across the investment plan and delivery. Arcadis would expect an ongoing efficiency of around 1 percent p.a. in line with regulatory benchmarks commonly set by other European regulators. The full recommendation and calculations can be found in [Section 6 Proposed Cost Challenge - Capex Efficiencies](#) of this report.

Furthermore, Arcadis recommends quantifying and tracking efficiencies achieved across all categories identified by UÉ throughout RC4 to improve transparency and future review processes.

## **2.4 RC4 Capex Submission Audit**

# RC4 Capex Submission Audit

## Overall RC4 Capex audit

Arcadis confirmed the total Capex request from UÉ’s Capital Investment Plan submission is the same as the total of all projects in the business plan I&O sheet.

### Shift towards programme-based approach

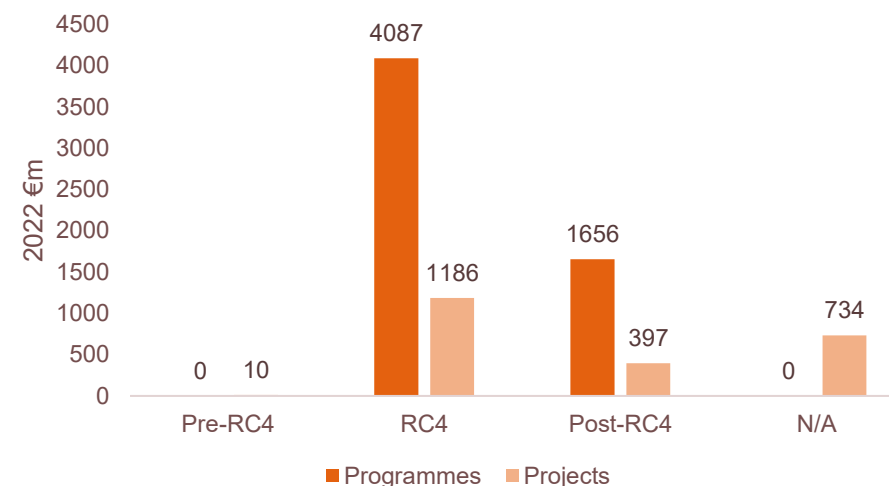
The CIP will be delivered via programmes and standalone projects. The proportion of Capex delivered via programmes has more than doubled since RC3 (see table below), suggesting a positive shift towards more efficient delivery of interventions as part of streamlined programmes. Arcadis notes positively UÉ’s more developed ability to bundle schemes of work, further benefiting from economies of scale and standardisation.

	Programme	Standalone Project
RC4	100	103
RC4 Capex (%)	71%	29%
RC3	95	740
RC3 Capex (%)	31%	69%

### Pre / Post RC4 Delivery

Based on the business plan I&O sheet, the majority of planned interventions will be delivered in RC4, with little residual Capex being used to close out projects that delivered results pre-RC4. Whilst there is significant RC4 Capex requested for projects that deliver results post-RC4 (RC5+), this seems as expected covering the development of longer-term projects which span over several regulatory cycles.

Interventions with RC4 Capex End Dates



### Projects in Flight

Within the RC4 portfolio there are 146 projects (87% of all standalone projects) worth €1384m (59%) that were in flight. Projects in flight are defined as having passed Stage 3, since at this stage the scope of the project is clearly defined and planned for delivery, thus the projects are more matured and there is less opportunity to significantly change costs or scope.

It is not possible to define a portion of programmes that are in flight since each project within a programme is at a different stage of development. Programmes are ongoing throughout the full regulatory period and often also span over several periods.

# RC4 Capex Submission | Key Sources Reviewed

A non-exhaustive list detailing the key documents and sources reviewed when producing this review.

Source Title	Document / Q&A / Workshop
Q&A responses	Q&A sheet
20241202 Uisce Éireann Revenue Control 4 (2025-2029) Network Capital Expenditure Look Forward FINAL	UÉ Document
20241202 Uisce Éireann Revenue Control 4 (2025-2029) BPQ FINAL	UÉ Document
12.02.2025 RC4 Network Capex - O&O and I&O	UÉ Document
12.02.2025 Q28 UET efficiencies	UÉ Document

# 3 Capital Investment – Processes and Governance

- 1 Introduction
- 2 UÉ's RC4 Capital Investment Plan
- 3 Capital Investment – Processes and Governance
- 4 Capex Programme & Projects Review
- 5 Non – network Capex
- 6 Proposed Cost Challenges

# Capital Investment | Introduction

## Overview

This section of the report is concerned with UÉ's processes for identifying, assessing, prioritising and governing its Capital Investments. Over RC3, UÉ and CRU identified a need for an independent review of UÉ's processes which was carried out by Scottish Water International (SWI) and later reviewed by HR Wallingford (HRW) and Chandler KBS (CKBS). In their review HRW noted that significant progress had been made in implementing SWI's recommendations but that a number of improvements around Cost Estimation and Risk Management remained. Progress against these measures is also discussed in this report.

Arcadis discusses the following over this section:

- **Project Lifecycle Framework:** The Invest 2 Outcome (I2O) Project Delivery Framework guides the technical governance and approvals processes from start of each project, through optioneering, detail design all the way through to contracting, execution and review.
- **Investment Frameworks:** The 10 step Investment Planning Process (IPP) serves to provides a codified and unified approach to Capital Investment from understanding the desired outcomes of investment to optioneering, prioritisation, and programme balancing.
- **Governance Structure:** The I2O framework includes Approval Gates where proposals, costs and changes are assessed and approved by well defined bodies at various levels of UÉ's Governance.
- **Risk Management:** UÉ has adopted a risk management framework to aid in identifying and managing risk.
- **Change Management:** UÉ has developed structures for monitoring and informing on changes to its programme over RC4 in response to recommendations from the SWI.

- **Cost Estimation:** Within the structure of the I2O framework UÉ has developed a standard operating procedure (SOP) for estimating and updating cost as projects and programmes proceed through their lifecycles.
- **Procurement and Delivery:** UÉ has developed new contracting frameworks to support the delivery of its projects based on four guiding principles intended to maintain and develop a robust procurement and delivery capability across RC4 and beyond.

## Arcadis View

Overall UÉ's approach to Capital Investment is developing well. Recommendations from the SWI review have been acted upon and are being integrated into business-as-usual process.

The I2O and Investment Planning Process are well defined with clear responsibilities, inputs and outputs for its workshops and approval gates. However, based on bottom-up assessments discussed further in the report, the application of these processes does not appear to be fully embedded, reflecting the early-maturity stage of UÉ as an organisation. While UÉ is taking reasonable steps to improve portfolio governance, it is likely that RC4 decisions will need to be made on limited information reflecting the current asset intelligence.

Reasonable governance processes are in place with well defined escalation criteria and an understanding of which material changes should lead to reconsideration and re-approval. Decisions are made at appropriate levels of the organisation.

The renewed cost estimation processes are well considered. There is some risk around the accuracy of underlying data as new frameworks are embedded and costs are updated.

# **3.1 Project Lifecycle Framework**

# Project Lifecycle Framework | Structure and Stages

## Invest To Outcome Lifecycle

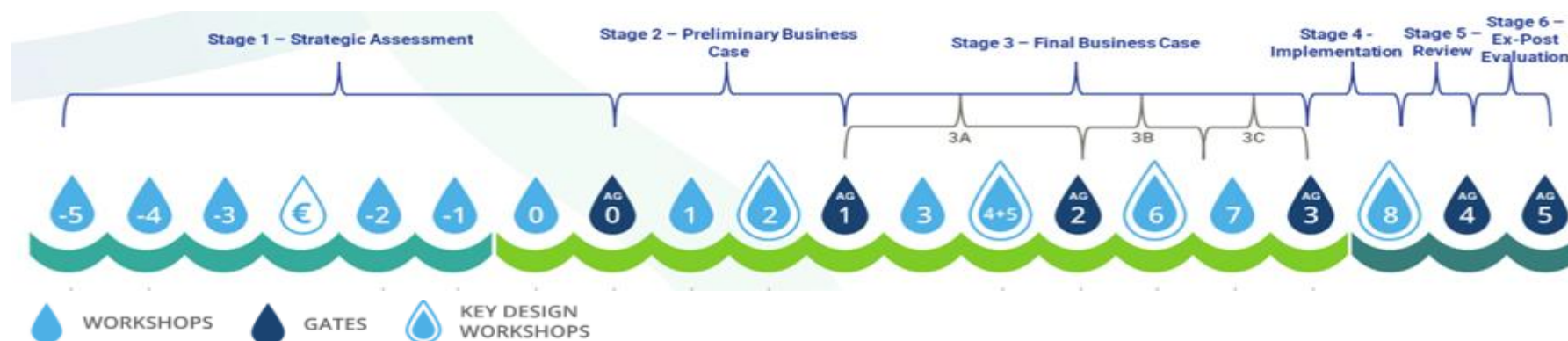
UÉ has established an investment delivery structure called “Invest To Outcome” (I2O) to guide investment towards achieving strategic objectives. This structure aims to address identified gaps and recommendations from UÉ’s internal Project Clarity and Scottish Water International’s independent review.

The Project Lifecycle framework is broken down into three phases, Investment Planning; Investment Delivery; and Investment Evaluation. Individual workshops and gates are subdivided into six different stages from strategic assessment to post evaluation, shown in the diagram below.

The process is structured around Workshops (WS) and Approval Gates (AG). These act to bring relevant stakeholders and specialists together at critical analysis and decision points and deliver a consistent, transparent and auditable process.

## I2O Stages

- In **Stage 1**, the scope, project outputs and outcomes, responsible team, and stakeholders are clearly defined, with early integration of asset-related information to enhance local considerations and collaboration. Risk and cost factors are identified and included in early cost estimates for various responses to the identified need.
- **Stage 2** involves surveys, key assessments, concept design, cost estimates, and financial/economic appraisals to identify a preferred option.
- **Stage 3** covers detailed design, cost estimates, land acquisition costs, and planning/consenting requirements, along with pre-tender approval and review of contracting documents.
- **Stage 4** focuses on project implementation.
- **Stages 5-6** involve reviewing project completion, capturing lessons learned, approving project closure, and conducting a post-investment review.



Invest 2 Outcome Lifecycle

# Project Lifecycle Framework | Key Features

## I2O Workshops

The workshops of the I2O investment process constitute the “Technical Governance” layer of UÉ’s governance structure. They are the primary tool for generating project options and developing the design and business case. The workshop process is intended to provide oversight and consistency across project scope, design and delivery approach.

These workshops are well described with each having clearly delineated objectives, inputs, outputs, attendees and requirements around information recording. There is a clear distribution of responsibility and sign off authority across relevant attendees.

### Key Workshops

- **Workshop -5:** Assess the identified project need and available data quality, carry out unconstrained optioneering to produce a long list of proposals for addressing the identified need.
- **Workshop -2:** Draft shortlist of options for use in Approval Gate 0 and refine Estimated Total Costs and risk assessment for use in the Shortlist assessment.
- **Workshop 2:** Select a preferred option and develop a scope of works for delivering it.
- **Workshop 4+5:** Detailed design workshops.
- **Workshop 6:** Review contracts prior to going to market. All project risks should have a mitigation strategy in place.

## I2O Approval Gates

UÉ makes use of six Approval Gates to carry out governance across its I2O lifecycle. This is a larger number of Approval Gates than the three recommended in the Infrastructure Guidelines upon which the process is based. Arcadis agrees with HRW’s review findings that this number should be retained to avoid disrupting the embedding of the process. It may be beneficial to review the number of gates at a later stage to streamline the process.

Governance occurs within the “Project & Programme” and “Portfolio” layers of UÉ’s governance structure. See [Section 3.3 Governance - Structure](#) for more information.

Which teams and specialists are involved in a given Approval Gate is well described and linked to a projects scale and maturity. There is a clear link between changes to a project’s key performance indicators and which governance bodies need to be included in responding to those changes.

Approval gates allow projects to proceed to next stages.

### Key Approval Gates

- **Approval Gate 1:** Confirm the need, begin commercial appraisal.
- **Approval Gate 2:** Update commercial appraisal, pre-procurement approval.
- **Approval Gate 3:** Update commercial appraisal, approval to tender.
- **Approval Gate 4:** Sign off on project completion.
- **Approval Gate 5:** Project review post-completion.

# Project Lifecycle Framework | Conclusion

## Arcadis View

UÉ has continued to develop its project lifecycle in line with the recommendations of the SWI review and HRW assessment. The use of clearly defined workshops and approval gates provides a structured and joined up process whereby projects can be scoped, developed and governed.

The lifecycle provides a clear path for project development along with cost estimates, risk analyses and technical scope, with clear requirements for documenting the process from inception to delivery to review.

Arcadis notes positively that UÉ uses the approval gates to review the projects' progress and delivery performance and feed back the lessons learnt into the future planning, demonstrating the culture of continuous improvement. However, it is noted that these processes take time and improvements are gradual.

# **3.2 Investment Planning Processes**

# Investment Planning Process | Introduction

## Overview

UÉ employs a ten-step Investment Planning Process to align its investments with delivering against its strategic objectives. This process should be understood to be a way of working which informs how steps within the I2O process are carried out and how information is prepared and fed into the I2O workshops and approval gates.

The process is rooted in the UK Water Industry Research Common Framework for Expenditure Decision Making which considers legislative, business, operational, and financial constraints. The approach is intended to strike a balance between many potential interventions, their impacts and financial, practical and legislative constraints.

It does so by providing a step-by-step process for understanding the goals of investment, identifying assets which present a risk against those goals, generating and assessing potential responses to those risks and deciding on asset specific projects and bundles of projects (programmes) which address UÉ's strategic goals and requirements.

The balancing of projects within programmes is an ongoing process which responds to developments both in UÉ's understanding of the costs and benefits of its projects and to input from stakeholders, suppliers and other investment priorities.

The SWI review highlighted the need for UÉ to develop its asset knowledge and increase the involvement of operational teams in its investment decision making. These needs have been reflected in the development of its investment planning process. The process is generally well structured and responds appropriately to the requirements for which it was developed. However, the process is reliant on a largely immature asset understanding which limits its ability to deliver a clear and stable portfolio and drive value for money across the RC period.

The following section discusses the processes and ways of working involved in this methodology.

## Investment planning process steps

1. **Define objectives.** Aligns the Investment Plan with WSPS policy initiatives and WSSP targets, mapping objectives to performance.
2. **Understand asset base.** Assesses asset performance to understand the current situation and determine how to meet objectives.
3. **Risk assessment.** Identifies assets at risk of failure for advancement in the process.
4. **Needs identification.** Analyses the reasons for asset risk or failure in performance, pinpointing individual asset-level solutions.
5. **Intervention generation.** Actions aimed at reducing service delivery risk and can include projects, programmes, maintenance, investigations, or operational measures. This process involves defining actions and estimating costs to achieve objectives and improve asset performance.
6. **Investment valuation.** Prioritises interventions considering legislative, business, operational, and financial constraints.
7. **Scenario analysis/ plan balancing.** Selects optimal solutions to meet UÉ's objectives by assessing business constraints, financial targets, service goals, and risk profiles.
8. **Stakeholder consultation.** Engages stakeholders by presenting an overview of the Draft Investment Plan from the Initial Plan Balancing step.
9. **Investment Constraints.** Ensure projected investment aligns with constraints like financeability, operability, deliverability, and stakeholder feedback.
10. **Final Plan Balancing.** Further iteration of step 9 across the whole portfolio to check WSSP and WSPS aims are met and the projected profile does not violate constraints.

# Investment Planning Process | Understanding Goals

## Defining Objectives (Step 1)

The Investment Planning Process begins by understanding what objectives Capital Investment is intended to achieve.

Objectives and priorities are assigned against each of UÉ's four sub-portfolios, shown to the right. Within each sub-portfolio its priority drivers are ordered, with compliance objectives given the highest priority.

These objectives are set with reference to the goals of the long-term (25 year) Water Services Strategic Plan (WSSP) and the Water Services Policy Statement (WSPS).

The budget allotted to addressing a given priority driver is set at the Portfolio level. It is based on the scale of improvement to be achieved against the driver, input from the asset planning team, stakeholder engagement, deliverability considerations and value for money assessments.

### Arcadis View

Creating a clear and direct link between the objectives to be achieved and the options for investment at an early stage is in line with industry best practice and supports UÉ in delivering value for money against the aims of the strategic plan.

## Priority Objective Drivers

### Water Service Above Ground (WSAG)

- |                              |                                      |
|------------------------------|--------------------------------------|
| 1. Drinking Water Compliance | 3. Facilitating Growth & Development |
| 2. GDA Resilience            | 4. Managing Asset & Service Risk     |

### Water Service Below Ground (WSBG)

- |                                     |                       |
|-------------------------------------|-----------------------|
| 1. Conservation (Leakage Reduction) | 3. Service Resilience |
| 2. Future Proofing                  | 4. Sustainability     |

### Wastewater Above Ground (WWAG)

- |                                      |                                  |
|--------------------------------------|----------------------------------|
| 1. Environmental Compliance          | 3. Managing Asset & Service Risk |
| 2. Facilitating Growth & Development |                                  |

### Wastewater Below Ground (WWBG)

- |                                      |                                  |
|--------------------------------------|----------------------------------|
| 1. Environmental Compliance          | 3. Managing Asset & Service Risk |
| 2. Facilitating Growth & Development |                                  |

# Investment Planning Process | Asset Intelligence

## Understand the asset base and asset risk (Step 2, 3 and 4)

Once the priority drivers for the RC4 have been identified the Investment Planning Process proceeds to consider which assets might be improved via Capital Investment in order to deliver against those priorities.

### Water Services

UÉ gathers asset intelligence around its Water Service assets primarily from its Drinking Water Safety Plan (DWSP) Surveys, audits and sampling results. Of particular importance is an asset's assessment against eight Barrier Scores. The Barrier Scores track the asset ability to deliver safe and secure drinking water across measures such as water purification (chlorination, UV treatment, etc.), supply availability, environmental measures and levels of regulated substances such as lead. These asset barrier scores are used to rate assets by the risk they pose to UÉ's ability to deliver against its strategic goals.

An investment need is generated on this basis and this need serves as the starting points for the I2O Lifecycle, feeding into Unconstrained Optioneering at Workshop -5.

The Asset Planning team responsible for these assessments is split into four geographical regions (East, Northwest, Southwest, Southeast). They cooperate with the regional operations and environmental regulation teams which feed risks and concerns to the Asset Planning team.

### Wastewater

The wastewater assets and risks are considered at an agglomerated level rather than on an asset-by-asset case and each agglomeration is monitored and flagged if it poses a risk against one of the relevant risk groups (such as flooding, or capacity of treatment plants). The level of risk posed is assessed against a metric, for example, by the historic number of internal and external. Similarly to water services, the metrics are used to rate assets by the risk they pose to UÉ's ability to deliver against its strategic goals.

An investment need is generated on this basis and this need serves as the starting points for the I2O Lifecycle, feeding into Unconstrained Optioneering at Workshop -5.

### Arcadis View

There is an opportunity for further improvement in structured stakeholder engagement when identifying and understanding the level of asset risk. Arcadis understands that regional and local operations, regulatory and environmental teams are consulted as part of understanding asset risk but believes that the input process is somewhat ad-hoc and could benefit from improved governance for consistency.

Differing approaches to understanding Water and Wastewater asset health makes it difficult to compare risks and opportunities between the asset groups across portfolio. Based on the review, it seems that UÉ is currently improving its asset risk understanding and prioritising processes within water and wastewater cluster. In Arcadis view, the next phase should look at consistent Capex-level metrics to optimise investment strategies.

As with any data-driven system its efficacy is dependent on the maturity of asset intelligence and the quality of the risk assessment. UÉ is enacting processes to improve on both counts.

# Investment Planning Process | Asset Intelligence

## Asset class and programme strategies

In response to the SWI recommendations UÉ is in the process of developing and implementing asset class and programme strategies to provide a consistent, joined up approach to need identification and investment planning which combines internal SME experience and industry best practice in developing its programmes. As of the writing of this report strategies have been developed for very few areas such as Impounding Reservoirs or Pressure Vessels Capital Maintenance programme as UÉ has good understanding of its asset needs in these domains. The development of the remaining strategies will proceed over RC4.

## Arcadis View

Asset strategies and underpinning asset data are essential tools to driving informed decision making, shifting from reactive to proactive portfolio management and driving efficiencies across the systems and the organisation.

The current state of UÉ asset knowledge is likely to mean that many strategies may not be fully developed until well into RC5 as the current plans for developing asset understanding across RC4 are largely targeted at understanding the As-Is case in order to develop a more mature asset knowledge over RC5.

# Investment Planning Process | Asset Intelligence

## Challenges to asset base understanding

UÉ's Investment Planning Process aims to embed a data driven approach to delivering high value for money investments. A good understanding of its asset base is foundational to this ambition.

UÉ currently faces a number of Asset Intelligence challenges. There is a lack of clear governance and consistency in the collection, organisation and use of data and insufficient understanding of the data requirements of users and stakeholders.

UÉ aims to address these issues against five strategic objectives.

- **Enhanced data governance:** Clearly define who owns what data. Develop and embed standards for how data should be collected, recorded and categorised. Accurately assess the current state of data and set metrics for improvement. Migrating away from multiple data stores to a single unified system.
- **Clearly defined career paths:** UÉ is currently heavily reliant on external service providers for digitisation and aims to bring more of this activity in house by supporting the development of in-house expertise.
- **Improve stakeholder access:** Make appropriate use of core enterprise systems to provide shared access to a single source of truth from which all parties can develop a shared understanding.
- **Improved efficacy:** Deploy visualization tools and analytics to drive data driven decision making on the basis of historical and real time data.
- **Enhanced reporting efficacy:** Implement appropriate tools to capture the right data in the right way.

UÉ believes that substantial improvement of the maturity of its asset knowledge will only be possible after the current state of its knowledge has been robustly characterised. Over RC4 UÉ will seek to develop a robust understanding of what they currently collect, who collects it, where it is stored and by whom it is used and why.

UÉ have budgeted €29m for this process in RC4, with €13m assigned to driving digitization and centralized repository of GIS data. €8m is assigned to improving UÉ's understanding of its above ground assets, processes and data arising from them. €7m is assigned to automating currently manual reporting process and €1m for improving data governance.

### Arcadis View

UÉ has correctly identified limitations in its current approach to asset data collection, analysis and distribution. It has outlined a plan for characterising the current state of its asset information and monitoring which will serve as a foundation for improvement. Arcadis is concerned that the RC4 timeline for this characterisation step means that UÉ will be operating with fragmented and limited asset information for the near future which poses a risk to its ability to accurately identify assets for investment and the scale of those investment early in its processes.

The iterative approach to refining and updating its options, plans and estimates for proposed projects over the I2O lifecycle provides some mitigation against this risk. However, incomplete or inaccurate data early in the process may result in many projects having a substantial difference between early cost estimates and later refined costs. This may lead to a high level of programme rebalancing where projects are deferred to later RCs where their costs are found to be higher than expected which would contribute to an unstable project pipeline and lower efficiency of delivery.

# Investment Planning Process | Investment Options

## Intervention Generation (Step 5)

Once UÉ has identified an asset level risk to its strategic objectives it begins a process of unconstrained optioneering where a broad range of potential responses to the risk are considered.

These responses are aimed at reducing service delivery risk and can include projects, programs, maintenance, investigations, or operational measures. The Asset Planning team works with a variety of relevant teams to consider if the risk may be better addressed by changes to operations or maintenance before proceeding to generate capital investment interventions. The early integration of operations insights into optioneering is in line with SWI recommendations.

It is at this stage that the 10 step Investment Planning Process begins to overlap with the I2O process, with unconstrained optioneering beginning at Workshop -5.

Further commentary on how optioneering has been seen applied in Capex project examples is discussed in [Section 4.1 Deep Dive Assessments - Needs and Optioneering](#).

The process of refining the options created in early optioneering occurs primarily at the level of Technical Governance over the early Workshops of the I2O lifecycle. Full workshops are carried out for larger projects and internal consultations are carried out for smaller and simpler projects as deemed necessary by the Asset Planning team.

The proposed options are developed as the lifecycle advances and the proposed scope, Estimated Total Cost, risks and outputs are refined. The potential cost and impact of an intervention against a Need is assessed through a Financial and Economic Appraisal process.

## Arcadis View

UÉ is following good industry practice by considering whether a capital, operational or maintenance intervention is most appropriate at an early stage. From discussion with UÉ teams, it seems that this process is somewhat ad-hoc and may benefit from a more structured approach to improve record keeping and consistency.

By carrying out a wide ranging unconstrained optioneering process UÉ is able to consider multiple options and encourage innovation at this stage. However, this broad view risks introducing inefficiencies where established, functional and affordable interventions exist. It is common industry practice to create guidance matrices where risk, likelihood and impact are marched to a standard short list interventions or single response which Arcadis believes should also be implemented by UÉ to reduce inefficiencies at early stages.

# Investment Planning Process | Valuation

## Financial Appraisal (Step 6)

The Investment Appraisal is first carried out prior to Workshop 2 of the I2O framework and consists of a Financial and Economic appraisal. It is updated prior to AG2 and AG3. A further update is triggered whenever the Estimated Total Cost (ETC) of a project is changed by more than 10%.

The Financial Appraisal uses a model to calculate the Net Present Value of different options being considered out to a thirty-year horizon (see example on the right, top table). The model includes considerations for discount rate, inflation index, Capex, Opex and the estimated life of assets. It is intended to reflect the whole life cost of the options under consideration.

Capex and Opex values are generally taken from the Project Costing Tool, but it is possible to enter overrides where needed to reflect a specific project particularities.

UÉ makes use of a “hybrid” inflation index made up of a weighted average of six inflation indices to reflect the pressures arising from various vectors such as building materials costs, energy price and employment. Further detail on inflation can be found in [Section 6 Proposed Cost Challenge - Inflation & RPE](#).

The model is able to generate various scenarios in order to carry out sensitivity testing (see example on the right, bottom table). In the current implementation a standard set of sensitivities are applied but UÉ is considering implementing custom sensitivities to improve the analysis of projects with a ETC of more than €50m.

The model can output its predicted spend on a by asset category basis which allows for spending to be monitored and analysed on this basis with greater ease.

€, Nominal	Gross Financial Net Present Value	Incremental Financial Net Present Value	Difference from preferred option
Counterfactual	0	0	7,260,881
Option 1	-7,133,906	-7,113,906	146,975
Option 2	-6,035,571	-6,034,571	1,225,311
Preferred Option	-12,996,916	-12,996,916	-

*Example Financial Analysis. Negative numbers represent lower expenditure (i.e. cost savings). The table shows the difference in the cost saving between the preferred option (final row), other considered options (rows 2 and 3) and the counterfactual or ‘do nothing’ scenario (top row)*

€, Nominal	Gross Financial Net Present Value	Incremental Financial Net Present Value	Difference from preferred option
Core Scenario	-7,260,881	-7,260,881	-
Increase Capex 10%	-8,582,464	-8,582,464	1,321,582
Increase Opex 10%	-7,265,502	-7,265,502	4,621

*Example Sensitivity Analysis. Completed to model the performance of the chosen option under less favourable scenarios, achieved through higher capex and opex costs.*

Arcadis believes that making use of comparative full life cost estimates and sensitivity analysis is a sensible approach to making a financial appraisal between options.

# Investment Planning Process | Valuation

## Economic Appraisal (Step 6)

UÉ carries out an Economic Appraisal using a Multi-Criteria Analysis (MCA) model.

The MCA is designed to aid in ranking options and facilitating informed discussion between stakeholders and Subject Matter Experts (SMEs) over the course of refining and prioritizing potential projects and programmes.

It combines qualitative and quantitative criteria and SME judgement and does not aim to provide an unambiguous “best” option. There are clearly specified value gates which determine which projects require an MCA to be carried out and which do not and where an escalation to a fuller Cost Benefit Analysis (CBA) is needed.

The MCA considers three categories of impact:

- Meeting the need
- Maximising Social Value and Sustainability
- Ensuring Successful Delivery

Each of these categories contains a number of criteria which are assigned a score between -3 and 3. For example a +3 Wastewater treatment capacity score might show an intervention which will increase treatment capacity in line with projected growth for 25 years whereas a -3 is assessed where the option fails to address current capacity needs.

These scores are used to generate a weighted average for each category where the weight adjusts for relative impact against strategic goals as determined by feedback and SME judgement across UÉ teams. These weightings are currently under review in response to updates to the WSSP.

A separate MCA model has been developed for each of Water Service, Wastewater and non-network strategic goals.

Objective	Business as Usual	Option 1	Option 2
Meeting the Need	-0.9	2.3	2.2
Max. Social Value	-1.0	1.5	0.8
Ensuring Successful Delivery	-1.2	0.4	-0.2
Financial Appraisal	-€19m	-€116m	-€109m

*Example MCA assessment*

This allows for various options to be compared in terms of risk mitigation and cost estimates for each proposed option.

The multicriteria analysis is only a guide to decision making with its insights being used to inform discussion within I2O workshops where SME knowledge and a big picture understanding of the need for addressing alternative strategic goals as a priority can be considered which is in line with good industry practice.

# Investment Planning Process | Prioritisation and Balancing

## Prioritisation (Step 7, 8 and 9)

UÉ's investment planning methodology is aligned to the key policies and objectives set out in the Government's WSPS and UÉ's WSSP. Prioritisation occurs across multiple levels from setting priority high level objectives, to selecting which projects to advance and which of the possible options within a project to pursue.

### High - level Capex budget prioritisation

UÉ allocates available funding against its key priorities based on the asset and service needs of its portfolios (determined through stakeholder engagement and asset intelligence) balanced against deliverability and supply chain challenges and the developing regulatory and economic environment.

At this level several investment scenarios are considered with input from the sub-portfolio levels.

Example Scenarios:

1. High WSAG compliance – In this scenario drinking water treatment compliance is prioritised at the cost of delaying wastewater treatment compliance projects until RC5.
2. High WWAG compliance – In this scenario WWAG compliance is prioritised at the cost of delaying WSAG compliance projects until RC5.
3. Medium WSAG and WWAG compliance – Neither sub-portfolio takes precedence over the other.

Scenarios are developed and presented to the business and stakeholders and the scenario that can give best mix of investments to meet objectives within the constraints is selected.

### Prioritisation at the sub-portfolio level

UÉ's manages its portfolio across four sub portfolios:

- Water Service Above Ground
- Water Service Below Ground
- Wastewater Above Ground
- Wastewater Below Ground.

UÉ maintains a hierarchy of drivers both across the business and within each sub-portfolio. Those projects and programmes which address more critical drivers such as regulatory or license compliance take precedence over those which address a driver such as capacity. Decisions to prioritise one standalone project over another within a sub-portfolio are made at the Project & Programme level of UÉ governance.

Prioritisation decisions made at the sub-portfolio level are assessed at the portfolio level so that a high-level business view can be applied and governance decisions made where one sub-portfolio is to be prioritised over another.

# Investment Planning Process | Prioritisation and Balancing

## Prioritisation (Step 7, 8 and 9)

### Prioritisation between projects within programmes

Projects within programmes are prioritized against a ranked list of strategic priorities. For example, wastewater projects which address compliance risks are prioritized over those which are required for further growth followed by sites which pose a capacity risk and so on.

Each programme has a budget assigned based on UÉ's key strategic goals. As the estimated costs and outputs of the projects which make up a programme develop individual projects that have an ETC of over €10m are treated as individual projects from the governance and approval perspective. Some projects may also be added to the programme as a result of stakeholder feedback, operational or deliverability constraints or other factors. The results of these consultations are fed back into the investment valuation process and used to further refine optioneering.

### Prioritisation within a project: selecting the preferred option

Once early optioneering is completed the proposed solutions are assessed on the basis of the Financial and Economic Appraisals, SME inputs from across UÉ teams, consultation with stakeholders and involved contractors in case of Early Contractor Involvement projects. There is a large degree of SME input into selecting the best option but there is a general push to selecting the option which provides the largest impact on the need for the lowest cost.

### Arcadis View

- Arcadis believes the general prioritisation process that UÉ uses to define its capital investment from portfolio to project level is reasonable. There is an opportunity for further transparency on how investment needs are prioritised, using a consistent set of metrics to enable comparing water and wastewater asset needs.
- Arcadis understands that whilst UÉ's portfolio addresses a range of investment needs, in general, UÉ chooses to prioritise compliance needs (safety and environment) over the growth, supply security and asset health in line with the objectives set by the government.
- Arcadis notes that while the ongoing updating of projects and programme priorities allows for agility to respond to changing needs, it introduces inefficiencies around an ever-updating process with a reduced long-term clarity.
- However, in Arcadis' view, as the organisation matures, the changes and shifts to project and programmes make up should become less significant, with majority of the portfolio remaining fixed for the regulatory cycle. Changes to the portfolio should be applicable for extenuating circumstances only.

# Investment Planning Process | Process Example

## Example of Application: Impounding Reservoirs

Arcadis has been provided with information around the Impounding Reservoirs Programme to allow it to comment on the implementation of the 10 step Investment Planning Process.

The Impounding Reservoirs Programme seeks to address the ‘Managing Asset and Service Risk’ priority driver of the Water Service Above Ground sub-portfolio.

Assets which pose a service risk are identified from yearly dam safety inspection reports and annual statements produced by supervising engineers.

UÉ’s Quantitative Risk Assessment process was used to determine the Risk each asset posed on the basis of the probability of failure (annual probability of failure) against the impact of failure (based on hydrological modelling). This allowed the assets to be grouped into bands where high likelihood/high impact assets are set as very high priority.

The QRA categorised dams per risk they pose and UÉ assigned a level of intervention appropriate to the UÉ’s statutory obligations and risk appetite, within the budgetary constraints of RC4 Capex. Thirteen very high-risk sites were identified with five prioritised for remediation over RC4 with the remainder of works spread over several future RC periods.

Risk Category	2025	2030	2035	2040	2045	2050
<b>Very High</b>	13	8	0	0	0	0
<b>High</b>	15	15	8	4	0	0
<b>Medium</b>	5	5	5	5	5	5
<b>Low</b>	16	16	16	16	16	16
<b>Very Low</b>	3	3	3	3	3	3

Dams rated High and Medium risk were reviewed to introduce maintenance and operational measures to reduce risk in line with As Low As Reasonably Possible (ALARP) thinking. Low and Very low risk Dams saw interim operational measures introduced to maintain acceptable levels of safety whilst awaiting capital improvements.

### Arcadis view

- A thorough risk-based assessment was carried out for all impounding reservoirs under UÉ’s QRA framework.
- This has allowed for prioritisation of investment need to be carried out in line with good industry practice.
- The statutory and regulatory inspection regime covers all sites and supports in identifying maintenance needs, with findings fed into Maximo central system.
- Risk based consequence modelling was completed for all sites.
- Of the 13 dams identified as needing urgent action, 5 will be addressed within RC4. Interim operational measures are in place in the remaining dams to manage risk pending remedial works in RC5+.
- The use of an ALARP framework for lower priority assets is inline with standard industry practice.

UÉ’s relatively high-quality asset data relating to its Dams allowed it to make good use of its data driven processes. This serves to highlight the importance of UÉ’s ongoing work to improve its asset intelligence across its asset classes and gives comfort that as the underlying data improves UÉ is positioned to make good use of it.

# Investment Planning Process | Conclusion

## Arcadis View

- UÉ's Investment Planning Process provides a reasonable and structured response to the SWI recommendations and implements many procedures and methods which are generally recognised as being best in class.
- The process is reliant on a largely immature asset understanding which limits its ability to deliver a clear and stable portfolio and drive value for money across the RC period. Arcadis notes positively that UÉ recognises current challenges facing its Asset intelligence and has an improvement plan which sets reasonable and credible paths to improvement. While Arcadis is concerned that maturity in this space will develop slowly in believes that the direction of travel is positive and understands that the current state of UÉ's asset intelligence is a result of being a newly forming organization which faces considerable integration challenges as it develops its centralized systems.
- The Investment Planning Process provides a flexible, ever updating, structure which can respond to how UÉ's understanding of a proposed project costs and impacts evolves over the I2O lifecycle. There is a risk that ongoing rebalancing within programmes gives rise to inefficiencies where the projects within a programme are not sufficiently stable to allow for effective contract bundling and long-term plan optimisation.
- It is Arcadis' view that the current system of balancing and prioritisation is fit for purpose as UÉ is currently requiring investment to address largely critical needs. As its asset intelligence matures, and its capital investment moves away from responding to essential/critical works there may be a need to refine this process to increase long term stability of projects within programmes.

## **3.3 Capex Portfolio Governance**

# Governance | Structure

## Introduction

Robust governance is essential to ensure that resources are allocated effectively, risks are managed proactively, and projects deliver maximum value to stakeholders.

An independent review carried out by HR Wallingford found that UÉ's governance procedures meet the requirements of the 2019 Public Spending Code, which was assessed as being best practice for the industry.

As projects proceed through the I2O lifecycle and Investment Planning Process the developing projects must pass through low level (close to the project) governance and high level (big picture) governance processes. UÉ's governance structure is split across three layers with clear lines of communication, authority and established flows of data between them.

There is a clear link between the Estimated Total Cost of a project being governed and the appropriate Sponsoring Agency (evaluating, planning and managing) and Approving Authority (ultimate responsibility and approval control).

## Technical Governance

Technical governance sits close to the project at the beginning of the governance structure and feeds information up into the Programme & Portfolio levels. It relates to project details, considering the design, health and safety, risks and costs particular to project being reviewed.

It is primarily organized around the Workshops and Approval Gates across the phases of the I2O lifecycle. These function to coordinate in the production, assessment, execution and post-evaluation of project, and to escalate information and reports to the higher governance levels.

## Project & Programme Governance

This level of governance sits between the Portfolio Governance and the Technical Governance level. It provides a structure to monitor, control and manage change at the project and programme level and to provide a formalised co-ordination between various functions to align ongoing works with UÉ strategy.

Prioritisation of investment decisions occurs primarily within this layer of governance, informed by the inputs of the Technical Layer and ultimately approved by the Portfolio Layer.

## Portfolio Governance

Portfolio Governance provides for senior management oversight on all UÉ investments. At this level of the governance structure investment and change proposals are challenged by relevant peer groups including cross-functional oversight from UÉ's senior leadership.

Governance is delivered through five monthly governance and review meetings which consider assets at the portfolio and sub-portfolio level. Outputs from the I2O Approval Gate meetings flow into the portfolio governance meetings with the requirement to inform or seek approval based on the projects stage of development, if material changes have occurred and on the level of financial implication.

## Arcadis View

UÉ has developed a structured process for assessing the progress of its projects involving review and analysis at appropriate organisational levels. The escalation pathway appears reasonable, enabling UÉ to filter and analyse changes and make necessary decisions. The current approach is in line with SWI recommendations.

# Governance | Monitoring Progress

## The Six Dials

The 6 dials act as a coherent shared set of KPIs which are used across all three levels of governance (technical, programme and portfolio) and were based on common practice in utilities industry and are in line with current regulatory reporting requirements.

As project progresses each dial is assessed against a baseline value which is set at an appropriate workshop within the I2O lifecycle. Deviation from these values trigger well defined escalations within the governance framework where re-baselining, approval of mitigating efforts, etc., may be approved. Material changes in any of the six dials triggers an escalation to the portfolio level governance where changes are discussed across senior stakeholders. A material change can relate to the need or delivery of the proposed investment.

### Dial 1: Outcome

The desired outcome of a project or programme against UÉ's strategic objectives, for example, microbiological compliance in drinking water quality.

### Dial 2: Output

The output is the tangible deliverable resulting from an investment which may include a physical output such as a new or rehabilitated sewer or a conceptual output such as a plan or network model.

### Dial 3: Cost Estimate

The total Capex cost of delivering the scope of works. This is tracked both year on year and within the larger context of the Investment Plan period. The baseline against which the cost estimate is measured depends on the scale of the works.

### Dial 4: Schedule

A measure of the current expected completion date of the project.

### Dial 5: Priority

Projects and Programmes are prioritised across three levels. The priority level of project reflects its impact on achieving UÉ's strategic goals and any change in priority triggers an escalation to governance. Projects which impact upon regulatory and legal compliance have the highest priority. For lower priority investments prioritisation is carried out between different potential spends within an asset class, with the potential benefit measured in an asset specific way. Those projects which deliver maximum benefit within the asset class are prioritised within the budget for interventions for that asset class.

### Dial 6: Delta Opex

This reflects any changes in annual operational expenditure arising as a result of delivering capital investment. The cost is calculated using the Pricing Cost Tool and the Investment Planning System.

### Arcadis View

Arcadis notes the Six Dials cover all key project indicators and appear to be well integrated across the I2O framework and help to provide consistency and tools for measuring success across projects, programmes and portfolios in line with good industry practice.

# Governance | Standard Project Durations

## Overview

- Standard project durations reflect the average time from start to end of a project, based on project type. These can be used within the organisation to standardise, plan investment and drive efficiencies in project delivery.
- There are differences between water and wastewater assets and the nature of their operation that are reflected in a typical time it takes to deliver a project. Wastewater projects take longer on average to deliver as there usually are more prone to requiring environmental consents and their asset condition is usually less understood (old buried assets etc). Projects complexity and size will also impact on the time required to complete.
- UÉ has worked on enhancing standard duration estimates by analysing historical data. Benchmarking has been established for water, wastewater, and early contractor involvement projects of various sizes. This assessment occurs annually in Q1 (see table below).
- It is important to note that the durations represent "normal" durations without risk and encompass activities outlined in UÉ standard practices and processes, statutory requirements, and external dependencies such as contracts. This means that any potential objections or legal challenges that may occur during a project are not included.

€m	Water	Wastewater	ECl
< 10	7.7	8.1	7.4
10 – 20	9.4	9.6	8.1
20 – 50	9.7	9.8	8.1
> 50	10.8	10.8	8.1

## Lessons learnt from RC3

- The UÉ team highlighted typical timelines for projects delivery based on lessons learnt from RC3:
  - Water main rehabilitation or minor water upgrades 1-2years.
  - New/ upgraded small to medium wastewater treatment plant – 5 to 7 years (due to planning and commissioning related requirements).
  - Large treatment plant (requires Ministerial approval) – up to 10 years.
  - National infrastructure projects – 10+ years.
- UÉ water team has shorten the standard duration for delivering treatment upgrades by moving from standalone projects (approx. 7.5 years) to programme delivery (3.8 years).
- Concept design development on average takes about 1-1.5 years.
- There is no significant reduction in duration from proposal approval to detail design (AG0-AG2) for lowest value water/wastewater projects.
- On average, it takes approx. 2 years for any project to move from AG1 to AG2, between approval in principle to developing a detail design for a pre-tender approval.
- Engaging ECl in the process shortens the average project durations, particularly for larger projects.

# Governance | Standard Project Durations

## Arcadis View

- Arcadis notes positively UÉ's recording of standard durations and using project data to update these regularly. This enables UÉ to establish realistic timelines in investment planning and enhancing resource planning and deliverability.
- It is clear that UÉ is improving its processes using lessons learnt from RC3 to streamline some of the work reducing typical durations.
- Based on Arcadis experience, UÉ's standard durations are, in places, longer than for peers in England and Wales. There is an opportunity to seek further efficiencies to drive timeline reduction and improve deliverability of projects. A number of related recommendations are discussed throughout the report and include:
  - Frequent changes to portfolios through re-prioritising and shifting focus between projects affects the delivery durations. UÉ's agile approach to managing Capex portfolio also risks introducing inefficiencies, increased costs and delays, affecting standard project duration. Arcadis' assessment found that more challenging projects are often pushed into the future and, in some cases, requiring re-work adding to further delays.
  - Arcadis SMEs found that for interventions which are well-established in the industry, there is no need for prolonged optioneering and solution selection, developing individual designs. Standard matrices of adequate interventions could be implemented to significantly fast-track standardised interventions in line with good industry practice. This would positively impact project durations by streamlining the delivery.
  - Through deep dives, Arcadis also recommended for UÉ to improve on its stakeholder engagement to provide structured proactive management that addresses more effectively policy, consent and planning challenges which significantly delay projects, in particular the wastewater portfolio.
- Arcadis recommends advancing the current standard durations approach deeper, with more frequent updates such as quarterly or semi-annually.
- Additionally, it would be beneficial to develop a separate duration benchmarking specifically focused on risks (such as judicial challenges) and explore methods of integrating it with the existing standard benchmarks.

## **3.4 Risk Management**

# Risk Management | Principles

## UÉ's Risk Management Principles

Risk management processes provide a systematic approach to identifying, assessing, mitigating, and monitoring risks that could impact a project's objectives, timeline, budget, or outcomes.

UÉ has adopted the following risk management principles.

- Project Risk Management to be carried out from the earliest phase of the project.
- All risks and opportunities are recorded, quantified and managed in a unified manner.
- Project Risk information is reviewed and updated at regular intervals.
- Up to date information is made available to relevant parties in easily digestible format.
- The level of project contingency is set with reference to the identified risks.

These principles have guided UÉ's implementation of the I2O lifecycle and are aligned with ISO31000, a recognised standard for risk management.

## Managing risk across project stages

- Risks to project delivery are initially understood by “setting the scene” in order to develop a high-level understanding of the inputs, outputs, risks, opportunities, assumptions and constraints. Key stakeholders and subject matter experts are engaged through workshops throughout the I2O lifecycle and risk records are updated as projects develop.
- After the high-level view has been established a more specific view of each short-listed risk is generated and recorded. A specific risk register is generated, and the risk categorise.
- Risks are assessed on a matrix by their severity of impact and likelihood of occurrence and considered in the context of at what project stages the risk might occur.
- UÉ has adopted as a general principle that a mitigation is cost effective if the cost associated with the unmitigated risk is higher than the costs associated with the mitigated risk plus the cost of mitigation.
- UÉ has identified the need to consider opportunities alongside risks identification and has formalised a need to do so within the early risk workshops. The full procedures and scope of opportunity management is under development and is currently at an early stage.

# Risk Management | Quantifying Risk

## Quantitative Risk Assessment

- UÉ follows industry good practice in risk assessment by identifying risks and assigning estimated costs at as early a stage as possible. This process begins as a qualitative process where SMEs identify project risks, and those risks are costed by applying the generic Reference Class Contingency for the sub portfolio.
- As the project develops through the I2O lifecycle, and the number of options being considered narrows down, UÉ carries out a Quantitative Risk Assessment (QRA). This generally occurs at pre-tender Stage 3C. Moving from an early qualitative assessment to a quantitative assessment as a project matures is in line with the requirements of ISO 31000 (a widely used standard for risk management) and recommended practice from the CEPA costing organisation.
- UÉ's QRA process is designed to refine the more generic ranges and categories of earlier assessment with project specific values on the basis of project specific details, and more precise risk estimations.
- UÉ has adopted CEPA and IPA costing organisations' recommended practices in increasing the sophistication of its QRA process.
  - A “three-point estimate” is carried out as part of the QRA process which generates estimated cost impact values which are considered the minimum, most likely and maximum. By requiring that these cost estimates use UÉ's established cost estimating methods UÉ drives consistency across its costing processes.
  - Monte Carlo and sensitivity analysis are undertaken to determine likely costs for each risk and assign confidence intervals to those costs. On this basis, UÉ assigns costs to its risks such that it can be more confident that the true cost will be less than the assigned cost for larger projects.
- Smaller projects (<€10m) use a confidence value of P60. This value is in line with industry good practice for estimating a likely outcome.
- Larger projects (>€10m) use a confidence value of P95. The IPA cost estimating organisation views P90 as a reasonable value for a “pessimistic view”. In this case, UÉ is being somewhat more conservative than the industry norm and assigning a slightly higher than usual cost to its risks.
- The outputs from the QRA are fed into the Risk and Contingency Management System (RCMS) to allow for easier consultation across stakeholders.
- UÉ has developed a roadmap to improving its risk contingency management system and moving towards portfolio level contingency management based on a company-wide integrated single source of data. See [Section 3.5 Costing Methods - Plans for Risk Contingency Management](#).

### Arcadis View

The QRA process is well formed and generally follows standard industry practices in how it considers risk and in its use of a sensitivity analysis.

UÉ's process for estimating the cost of its risks for larger projects (over €10m) results in it assigning a slightly higher cost than set out in industry standard, however the difference is not significant, and Arcadis opines positively on a more conservative approach to costing risk, considering UÉ's history of cost escalations.

UÉ follows industry best practice in developing its risk analysis from a qualitative to a quantitative one as its projects mature. This process is integrated into its I2O lifecycle process.

# Risk Management | Recording and Tracking Risks

## Risk & Contingency Management System

In response to the recommendations of SWI UÉ developed and implemented a Risk & Contingency Management System (RCMS) over RC3, a key element of I2O process.

The RCMS is a cloud-based system which consolidates all risk registers and allows early stage, design stage and construction stage information to be stored and available within a single source of truth. The RCMS is intended to bring a consistent approach to managing, mitigating and reporting on risk.

The RCMS stores both quantitative and qualitative risk information as well as the risk owners. Its project risk data is updated at each relevant workshop across the I2O process and captured using a set approach.

Information is fed back into the RCMS during the post project review process, capturing lessons learnt from the project in order to capture lessons learned within the RCMS Risk Library to be used in refining future risk assessments.

## Arcadis View

Arcadis notes positively that UÉ shifts to a streamlined cloud-based system of recording and monitoring risks across its projects and programmes which is in line with best industry practice.

The approach is currently being rolled out and deep dive analysis of some projects have shown examples of the RCMS being applied in the existing portfolio. Whilst some examples have shown insufficient detail of risk recording for projects, Arcadis recognises that this is a developing system and will continue improving as UÉ matures as an organization.

# Risk Management | Planning and Consents Risk

## Planning & Consent approvals are a major risk to deliverability

The delivery of any Capital Investment must carefully consider the impact of planning and consents on the cost, schedule and deliverability of the project. Securing the necessary consents, such as environmental permits, land-use approvals, and stakeholder agreements, minimizes legal and regulatory delays and ensures compliance with local laws and standards. Across an extensive and complex portfolio of works the importance of developing a well considered and mature approach to achieving sign-off from all relevant stakeholders is of even greater importance.

The risk of obtaining consents and planning permits impacts many of UÉ works but in particular, wastewater portfolio. Historically, for wastewater projects, it has taken UÉ 5 to 7 years to secure the required consents and in cases of complex or contested projects, this process may take a full decade.

Based on workshops and discussions with UÉ, the organization sees the consent and planning approval processes as complex, slow and difficult to navigate. Delays and difficulties around securing consents have been a leading reason for cost overruns in UÉ projects till date. UÉ identified a number of key planning and consent related issues:

- Overlapping consents processes.
- Uncertain timelines for consent approvals.
- Developing regulatory bodies and laws.

UÉ also noted an emerging risk with a fairly new regulatory body, the Maritime Area Regulatory Authority (MARA) where it is not yet clear how MARA operates and have already caused delays to UÉ's project approvals.

## Arcadis View

Arcadis recognises UÉ's position that it operates within a challenging consents environment. It is positive to see the ongoing UÉ's high-level engagement with government in the development of policies and law that affect how complex it is to gain planning, and consent permits in the future.

However, Arcadis believes that there are a number of potential improvements that can help UÉ in better managing and assessing planning and consent risks which is a key role for any utility company.

- UÉ's project budgets contain cost allowances for planning and consents but these have been at times underestimating the real costs and time involved. UÉ's historic experience of consent delays and court challenges should inform improved and more robust estimates going forward.
- Arcadis notes lack of consistent stakeholder engagement as part of the projects and programmes discussed with UÉ. Whilst pockets of good practice and wider engagement were seen, there appears to be no structured stakeholder management and planning at organization, portfolio, programme and project level to drive improved and early engagement and thus reduce risk of delays to consent and planning approvals.
- Arcadis recommends developing a stakeholder and community engagement framework as part of UÉ's governance to provide more robust management of key decision makers and potential opposers of projects at risk.

## **3.5 Costing Methods**

# Costing Methods | Overview

## Key Elements of Cost Estimate

Developing a robust understanding of the likely cost of proposed solutions is key to effective decision making, delivering value to customers and achieving the UÉ's strategic objectives. The cost estimating process is integrated into UÉ's I2O lifecycle. Cost estimates are revised as the project proposal develops from a qualitatively assessed general approach to a quantitatively assessed specific project.

A cost estimate for a capital programme generally consists of three elements. The Base Cost consisting of Direct Costs and Indirect Costs, a factor which recognises uncertainty in the scope of the project and a factor which reflects the need for float to deal with unexpected contingencies/risk. This general approach is consistent with Arcadis' view of cost estimating best practice and is widely used in capital programmes.

UÉ's buildup of the Estimated Total Cost (ETC) of its potential capital investments is in line with the standard industry approach and is built up of four sub-components. UÉ makes use of a variety of methodologies to estimate these costs across its investment decision making framework in response to SWI recommendations (Estimation, Risk and Uncertainty and Programme, Portfolio and Project Risk themes).

Base Construction Cost	Base Indirect Costs	Estimate Uncertainty	Contingency
Labour, material, plant and equipment	Design, management, approval, land, advance works	Uncertainty around the developing scope	A best practice value to cover developing cost risks

Cost Estimate Buildup

This section will consider UÉ's costing methods and the supporting processes which enable and assess the cost estimates. UÉ has developed internal Cost Estimation Standard Operating Procedure (SOP) which sets out all relevant cost estimating methods and processes.

### Total Cost Estimate Components

- **Base Cost (Construction Cost):** costs related to labour, material, plant and equipment.
- **Base Cost (Indirect Costs):** costs related to concept and detailed design, project management, approvals, certifications and land acquisitions.
- **Estimate Uncertainty:** A correction applied to reflect the uncertainty around the cost estimate which should reduce as the project progresses and its scope becomes more defined.
- **Risk Contingency:** A correction applied to provide a float of funds which can absorb risks and unexpected increases in costs.

### Supporting Processes and Structures

- **Estimate Assumptions and Allowances Tracker (EAAT):** This document captures what scope and driving assumptions have been included in the production of a cost estimate at any one time. It is updated whenever the Capex or Opex estimate is revised.
- **Cost Estimating Organisational Structure:** The cross functional teams involved in creating and refining cost estimates.

# Costing Methods | Base Cost Estimates

## Estimating Base and Indirect Costs

One of the key challenges that UÉ has faced over the past years was the escalation of costs in its investment programmes, which was partly caused by inaccurate or incomplete assumptions and cost estimates. UÉ has redeveloped its cost estimating procedures post Project Clarity and in response to recommendations made by SWI and HRW. As part of this redevelopment UÉ has adopted three main cost estimating methodologies:

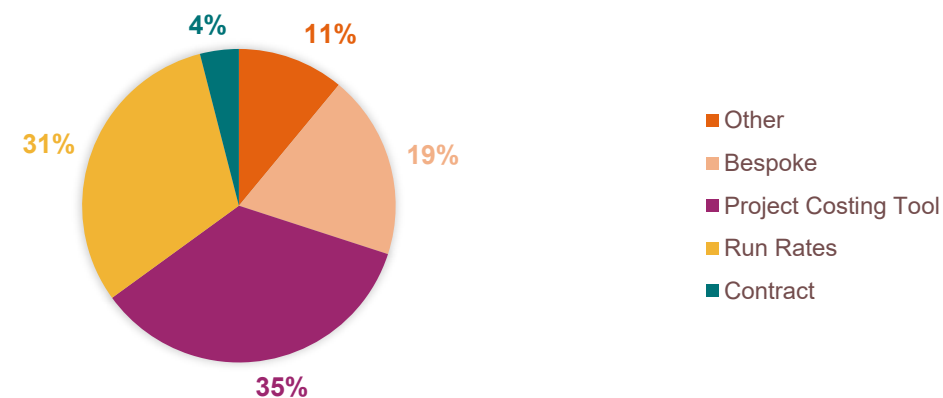
- **Project costing tool (PCT)** – estimating cost based on known and assumed scope. This method is primarily utilised for highly complex and low-volume investments, serving as the primary approach for both, standalone projects and those within programs.
- **Run rates** - € per agreed Output, ideal for high-volume and low-complexity programmes of work.
- **Post-tender estimate** – cost based on actual project contract, with narrower and precise cost ranges. Tendering contractors are responsible for providing all underlying assumptions, Capex estimates and Opex estimates. As this approach relies on having current contract rates, it can only be applied for projects which are post procurement (4% of all UÉ's RC4 standalone projects).

The cost estimating method is set in the early project stages but is reviewed as the project scope is refined before being locked in at an approval gate midway through the lifecycle.

Details of these methods will be further explored in the following pages.

## Capex Portfolio Costing Methods

The graph below shows the three costing methods applied across the network Capex portfolio. The 19% of non-standard costing relates to two major programmes of works that UÉ is undertaking over several regulatory cycles, which have much more granular and detailed costing methods applied, with third parties estimates and assessments undertaken.



### Arcadis View

Based on Arcadis' review, UÉ's costing methods are generally well applied to the appropriate types of work and projects within its Capex portfolio.

Developing standard cost estimating processes and methods is in line with good industry practice and SWI recommendations. UÉ has broadly implemented the recommended updates to its cost estimating procedures with only 11% of projects costed in a non-standard way. This proportion is in line with what Arcadis has seen in similar organisations.

# Costing Methods | Project Costing Tool

## Project Costing Tool and Unit Cost Database

The Project Costing Tool (PCT) is a cost estimating method primarily utilised for highly complex standalone projects. The PCT is based on cost data stored in the **Unit Cost Database** (UCBD).

- UCBD is the source of Capex cost data and comprises a large number of cost models. It is built up from historic project costs, framework rates, quotations, contractor estimates and industry data. As the cost curves contained within the UCBD are generic rather than project specific the user is responsible for considering any project specific adjustments where applicable.
- All UCBD cost models have an associated **confidence grade** which reflects the nature of the source data. For example, a cost curve based on first principles engineering estimates may be graded very low where a cost curve based on seven or more historical datapoints which are in strong agreement with the curve may be graded very high.
- The Estimation and Cost Intelligence team are responsible for updating and refining the UCBD during the feedback stages of the I2O process. The update loop is well categorised and integrated into the overall project framework.
- The UCBD is a critical piece of UÉ's cost estimating process and is the primary underlying source of data used to estimate base costs for the majority of UÉ projects.
- Where no appropriate cost model exists costs can be input on an **ad-hoc** basis. Ad-hoc costs are estimates based on best available knowledge but usually have lower confidence grade and do not undergo the same rigorous data review as the cost models. UÉ has procedures in place to trigger project review with the cost estimating team where project costs are based primarily on ad-hocs.

### *Indirect Costs*

The PCT includes cost curves for the project's indirect costs on the basis of required statutory approvals, site investigations, advanced works, land acquisition costs, site supervision costs, legal costs etc. As there can be a great deal of variation in the need for such works between projects, UÉ policy highlights the need to check all indirect costs generated by the PCT for applicability to the specific project scope and override them on the basis of SME knowledge where required.

### *Costing software development*

As part of its I2O digital strategy, UÉ are implementing the use of Copperleaf as its central asset management software. It aims to bring in a single enterprise management system to capture and manage organization wide investment with integration into the wider system of enterprise management software. Copperleaf is a well know and broadly used piece of industry software. As part of this shift, the PCT will be replaced with a module within Copperleaf but will remain based on the same underlying UCDB database. Initial rollout is expected across 2025 with wider systems integration across 2026.

### **Arcadis View**

In Arcadis' view the use of bottom-up cost estimates based on a cost database is in line with standard industry practice. UÉ has established transparent procedures and clear lines of responsibility for maintaining an up-to-date database from which to derive its cost estimates. The bottom-up projects assessments undertaken by Arcadis have shown that the cost estimate PCT data recording varies in granularity indicating that processes are still in development and reflecting a maturing organisation. Overall our view is that the PCT is fit for purpose.

# Costing Methods | Run rates

## Run-Rates cost estimates

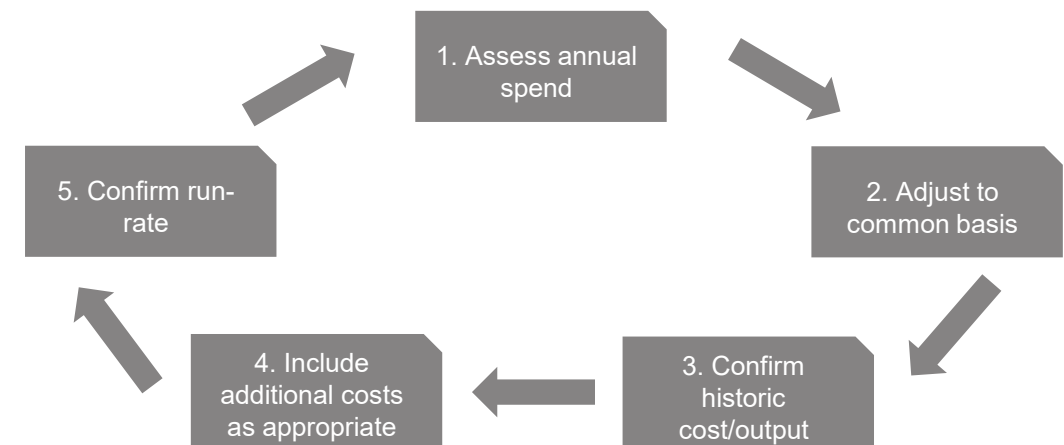
This estimation method employs run rates (€ per agreed Output) multiplied by the number of outputs. This approach is ideal for high-volume and low-complexity cases and is predominantly used for programs with repetitive works such as lead pipe replacement, meter replacement or sewer rehabilitation. UÉ makes wide use of this approach with 31% of its projects costed by Run-Rate.

UÉ uses historical data to define run rates of programmes. Historic cost for programme of works is used which are then brought up to common base date (year 2022 in case of RC4 Capex submission). A 15% contingency is added as on-costs, and the run rate is confirmed. UÉ aims to update its run rates on an annual basis by application of the loop shown to the right.

Setting the run rate allows UÉ to define the number of achievable outputs per given budget. Any changes to the agreed run rates will result in under or over delivery of the agreed outputs delivered within the same budget.

As part of the deep dives further described in [Section 4.1 Deep Dive Assessments](#), Arcadis has noted cases where historic run rates were overridden by a small sample of year 1 of new framework run rates (such as National Lead Replacement Programme) which resulted in a significant run rate increase and further uncertainty as the new framework progresses. In case of metering programme, UÉ did not have sufficient historical data to develop robust run rates which means that there is a high risk of cost changes throughout RC4 for this programme.

This shows that historic estimates may at times underestimate the actual cost, in particular where new contracting frameworks are replacing previous delivery partners.



*Run-Rate update loop*

### Arcadis View

It is positive to note that run rates are based on historical outturn costs giving a level of confidence in cost estimation. However, as seen in some deep dive programme examples, where new delivery frameworks are put in place or historic data is scarce and inconsistent, run rates may vary during RC4 resulting in potential risk of under-delivery on some of the outputs. This highlights the importance of innovating and driving efficiencies in delivering the programmes to balance any potential cost increases.

# Costing Methods | Managing Uncertainty

## Uncertainty

The cost estimates include an allowance for uncertainty around project scope definition and optimism bias. As projects are developed across the stages of the I2O lifecycle the degree of uncertainty falls.

The uncertainty allowance for each Stage is shown in the table below and was developed in line with Association for the Advancement of Cost Engineering International (AACEi) guidance. Where a project has an Estimated Total Cost greater than €200m an independent 3<sup>rd</sup> party must be engaged to develop a project specific forecast.

I2O Stage	UÉ Estimate Uncertainty	AACEi Guidance
Stage 1 – Strategic Assessment	28.1%	Low 50%, High 50%
Stage 2 – Preliminary Business Case	28.1%	Low 20%, High 30%
Stage 3 – Final Business Case	11.6%	Low 10%, High 15%

*Uncertainty allowances, based on UÉ's Cost Estimating SOP*

The table shows that UÉ provides lower allowance for uncertainty in early stages of shaping the projects than suggested by AACEi guidance. Stages 2 and 3 allowances align well.

Arcadis benchmarks of similar industrial players also indicate that UÉ levels of uncertainty in early stages are relatively low (~30% compared to industry's ~50-60% in Stage 1).

## Arcadis View

- Whilst providing uncertainty allowance for optimism bias follows industry practice, there is an opportunity for UÉ to better align with industry benchmarks and good practice in providing higher allowances at early stages of project definition.
- Currently at less than 30%, in Arcadis' view, the allowance should be reviewed and increased to approx. 50% at Stage 1.
- Deep dives into project examples have shown that UÉ does apply consistently the uncertainty allowance in its projects, however, there is a tendency to add slightly less uncertainty than indicated by cost estimating SOP in early stages 1 and 2 of project development, then aligning fully with SOP by Stage 3 during procurement of services. Further detail can be found in [Section 4.1 Deep Dive Assessments - Cost Review](#).
- This means that at times, less than 28% of uncertainty allowances is applied to projects at Stage 1. Optimism bias is a common industry challenge and needs to be managed carefully.
- Arcadis' analysis of UÉ's project cost increases (see [Section 4.1 Deep Dive Assessments - Cost Review](#)) show that the cost increases and scope changes tend to happen in early project stages. Increasing allowance for optimism bias at Stage 1 can help improve UÉ's future cost estimations and provide sufficient buffer for developing scope whilst providing more reliable delivery within cost and budget.

# Costing Methods | Risk Contingency

## Reference Class Contingencies

UÉ follows industry best practice by developing a risk contingency budget as part of their project cost estimate. The contingency budget serves as a financial reserve allocated to cover unforeseen costs that may arise over the course of the project.

In early stages of project development UÉ makes use of standardised **Reference Class Contingencies** in line with industry practice. There are percentage allowances defined for each of the sub-portfolio as shown in the table below.

The reference class contingencies were set based on historic data of completed projects, using certainty of P60 (P-mean) for cost actuals in line with industry practice. UÉ's historically derived reference class contingencies are plausible when compared to wider industry cost overrun data\*.

The risk contingencies allow to manage the costs at a programme level, assuming that any cost differences will even out at a programme level.

	Asset Group	Risk Contingency
Stage 1 – 3C	Water Service Above Ground (WSAG)	19.8%
	Water Service Below Ground (WSBG)	19.3%
	Wastewater Above Ground (WWAG)	21.2%
	Wastewater Below Ground (WWBG)	27.5%
Stage 3C onwards	Project Specific Quantitative Risk Assessment (QRA)	

Reference class contingencies, based on UÉ's Cost Estimating SOP

\* Oxford Global Projects (2019) Methodology Review Reference Class Forecasting

Similar to uncertainty allowances, where a project has an ETC greater than €200m an independent 3<sup>rd</sup> party must be engaged to develop a project specific reference class forecast.

Once a project has progressed to Stage 3C (pre-contract award) in the I2O lifecycle the project is sufficiently developed that a Quantitative Risk Assessment (QRA) can be carried out and a project specific contingency value is calculated. This updated value can then be used to monitor spend as the project advances. QRA is further described in [Section 3.4 Risk Management - Quantifying Risk](#).

## Arcadis View

Arcadis notes that the reference class contingencies are generally in line with industry practice and in any case, best practice is to use actual company historical data as has been done in this case. Risk contingency is higher for wastewater assets where assets are likely less surveyed and actual condition can vary significantly from the assumed. This is particularly true for the below ground wastewater assets such as sewers and pumps.

Deep dives into project examples have shown that UÉ does apply consistently the risk contingency allowances in its projects which is positive to note the practice being embedded.

Arcadis notes that the sub-portfolio risk contingencies are high-level only and do not provide more detailed breakdown per programme/asset type. UÉ explained during the workshops that the reference classes will be updated with time to become more targeted, once more projects complete the I20 cycle and lessons learnt can be fed back to initial estimates.

# Costing Methods | Plans for Risk Contingency Management

## Plans for Short, Medium and Long-Term Contingency Management

UÉ is in the process of further developing its contingency management processes in response to SWI and HRW recommendations.

### Short Term Contingency Management (Current)

The RCMS Risk Register and Monthly Progress Reports are used to monitor current and residual risks as projects progress. Power BI dashboards are utilised for ease of review and cost estimates are updated based on any changes to the quantified risks.

The outcomes of these updates are assessed quarterly by the commercial team and feed back into the portfolio performance and management strategy.

Any change to contract is assessed by the IDD Contract Change Governance Process and considered against approved contingency.

### Medium Term Contingency Management (Developing, Q2 2025 – Q1 2026)

As part of its medium-term contingency management strategy UÉ plans to integrate the RCMS workflow with its Unifier (Oracle) system. By requiring all contingency spending to be tracked within Unifier a single source of truth can be established which will improve portfolio level analysis and reporting across a joined up contingency approach.

UÉ is actively engaged with its stakeholders to define project specific contingencies, to provide more granularity than at a programme-level only. UÉ commented that this is a challenging process due to a large number of stakeholders involved.

The full upgrading of UÉ's medium-term processes is at an early stage. UÉ aims to complete an As-Is analysis of its minor programmes (leakage, growth programme, mains rehabilitation, etc.) processes by Q3 2025 which will allow it to develop a consistent approach for applying its RCMS process at this scale and time-frame.

### Long Term Contingency Management (Developing, 2026)

UÉ intends to manage contingency at a Portfolio level by establishing a portfolio contingency fund for projects over €10m. Individual projects are to have contingency levels based around P60 certainty, with the portfolio-wide additional contingency bringing the overall certainty to P95 which is in line with good industry practice.

UÉ aims to achieve this by applying the tools and procedures developed for short and medium-term contingency management at scale and integrating risk data for all projects within I2O systems.

### Arcadis View

In Arcadis' view UÉ's approach to improving its medium and long-term contingency planning is reasonable and addresses the concerns raised in the SWI review. There is some risk to the proposed timeline as integration of these systems will occur while broader IT and personnel changes within the organisation are ongoing.

# Costing Methods | Cost estimating tools & tracking

## Estimate Assumptions and Allowances Tracker

UÉ uses the Estimate Assumptions and Allowances Tracker (EAAT) to record key assumptions used for cost estimates from earliest stages of project development. This is in line with good industry practice to cost and record underlying assumptions for investment options at earliest stages possible. Doing so allows for more accurate cost estimates to be produced from an early stage which reduces financial risk.

The cost of assumptions recorded in EAAT is also shown in PCT as ad-hoc costs.

The EAAT is embedded in business-as-usual and connected to risk and cost enterprise systems. Circumstances which require its updating are well described and integrated into the I2O lifecycle.

This procedure addresses concerns raised in SWI item 3 (Project Management Handbook) around understanding Programme, Portfolio and Project Risk.

### Arcadis View

Across RC3, UÉ experienced cost overruns due to a lack of clarity around the assumptions underlying its project scope and cost estimates. UÉ has adopted a reasonably robust process for recording these assumptions from an early project stage and integrated the process of renewing these documents as the project evolves.

In Arcadis' view this is a reasonable approach to monitoring assumptions. However, as seen as part of deep dives, the quality and quantity of information recorded within EAAT varied significantly across projects, indicating that processes are still being rolled out and there is an opportunity for improvements in consistency.

## Cost Estimates Review and Monitoring

### Update Frequency

As the scope, complexity, and degree of specification of a project or programme develops, it is critical that estimates are regularly updated and refined.

UÉ requires that Capex and Delta Opex estimates are updated via their appropriate costing methods in advance of every Workshop and Approvals Gate. This update also triggers a requirement to update the associated EAAT.

Should the period between Approval Gates exceed 6 months the estimator is required to assess if the estimate requires updating in order to keep the documents current.

### Estimate Key Performance Indicators

The cost estimating process makes use of Key Performance Indicators (KPIs) to monitor the quality of the execution of its procedures and requirements. UÉ's KPIs track whether estimates are being created, updated and reviewed appropriately. They are generated and monitored by the Cost Estimating team and reported quarterly.

### Arcadis View

Arcadis believes that this approach to keeping estimates timely has been well integrated into business as usual and is in line with industry good practice, providing a level of confidence in data freshness.

It is Arcadis' view that the use of cost related KPIs to monitor adherence to processes and record keeping requirements is good industry practice.

# Costing Methods | Organisation

## UÉ's Cost Estimating Teams

Accurately estimating the cost of a programme across a diverse portfolio such as UÉ's involves the expertise of multiple UÉ teams, 3<sup>rd</sup> parties and other stakeholders. In general, key stakeholders engaged in developing and approving costs across the organization include Asset Planning, the Infrastructure Development project team, 3<sup>rd</sup> party cost consultants, 3<sup>rd</sup> party engineering service providers, and the Cost Estimation and Intelligence team.

The Cost Estimation and Intelligence team has overall responsibility for managing and maintaining the Project Costing Tool (PCT) and for providing expert guidance on estimation tools and methods. They also collate and analyse project and programme cost information to deliver continuous improvement to the accuracy of the unit cost database, indirect costs and run rates. The team currently has 12 FTE with an intention to expand to 19 FTE over RC4.

Throughout the organization, there is a clear responsibility assigned for internal auditing, including roles such as the Originator, Reviewer, Contributor and Approver (ORCA) following standard industry practice.

## Arcadis View

Arcadis believes that it is appropriate for UÉ to expand the cost estimating team over RC4 to reflect the increased portfolio of the projects it will be required to deliver. The development of a dedicated cost estimation and intelligence team is in line with the recommendations made by SWI. The team appears to be well structured with a clear role in business-as-usual project development and costing.

# Costing Methods | Conclusion

## Arcadis View

- One of the key challenges that UÉ has faced over the past years was the escalation of costs in its investment programmes, which was partly caused by inaccurate or incomplete assumptions and cost estimates.
- UÉ has redeveloped its cost estimating SOPs and adopted appropriate cost estimating procedures as recommended by SWI. Arcadis finds UÉ's three cost estimation methods reasonable and in line with common practices in other utility organisations.
- UÉ is in the process of updating its enterprise level IT in order to improve the integration of its costing and risk systems. They have selected a well-known industry package in relation to updating their Project Costing Tool and will retain the use of the underlying dataset to drive consistency.
- Arcadis notes positively UÉ's the use of allowances for risk contingencies and the clear path set out to better manage contingencies at portfolio level in the coming years.
- In terms of allowances for uncertainty, Arcadis recommends review of early Stage 1 allowances and bringing them in line with industry benchmarks from less than 30% to 50-60% to better reflect the optimism bias in early stages of project definition. Optimism bias is a common industry challenge and needs to be managed carefully. Increasing allowance for optimism bias at Stage 1 can help improve UÉ's future cost estimations and provide sufficient buffer for developing project scope and delivery.
- UÉ maintains a comprehensive unit cost database which is regularly updated based on project actuals and Arcadis was able to review the process for refreshing this cost data which meets good practice.–UÉ has established transparent procedures and clear lines of responsibility for maintaining an up-to-date database from which to derive its cost estimates.
- As UÉ is the only buyer for most of its capital spending in Ireland, it has by definition the most comprehensive unit cost database available and therefore it was not possible to benchmark individual cost items.
- The bottom-up projects assessments undertaken by Arcadis have shown that the cost estimate PCT data as well as EAAT assumptions data recording varies in granularity indicating that processes are still in development and reflecting a maturing organisation.
- Arcadis believes that it is appropriate for UÉ to expand the cost estimating team over RC4 to reflect the increased portfolio of the projects it will be required to deliver. The team appears to be well structured with a clear role in business-as-usual project development and costing.

## **3.6 Procurement & Delivery**

# Procurement & Delivery | Introduction

## Introduction

Procurement is a process of buying materials, works and expertise required to deliver scoped projects and programmes. Managing a complex supply chain requires a formal framework of strategies, policies and procedures to meet compliance and national policy objectives.

UÉ expects that its total network Capex for RC4 will be 57% greater than it was in RC3. This growth presents a challenge to its ability to deliver against its planned RC4 capital investment.

### Challenges to Procurement & Delivery over RC4

- **Funding Uncertainty:** Due to the current funding model the exact level of funding available annually is uncertain. The procurement processes must be flexible enough to address this uncertainty.
- **Constrained Market Capacity:** An increased scope of work will require additional contractor and material capacity. UÉ's contracting strategy must support the long-term health of relevant markets.
- **Evolving Regulatory Requirements:** UÉ's procurement processes must be sufficiently flexible to respond to potential changes in its delivery targets against evolving regulatory targets and requirements.

UÉ is carrying out a capacity analysis and gap analysis in order to evaluate its supply chain capacity against RC4 investment levels. This analysis will be driven by historic RC3 data, the expected RC4 scope, market engagement and supplier forums, and the Supplier Relationship Management system.

This section addresses the initiatives and processes (current and developing) which UÉ uses to support delivery over RC4. Many of these have been developed through lessons learned from RC3 and in response to SWI recommendations.

- **Contracting Principles:** UÉ has adopted four contracting principles to manage its contracts (existing and new). These principles have been adopted to address SWI recommendations around risk sharing, partnership and risk reduction.
- **Contract Types:** UÉ makes use of a number of different contract types designed for different types of projects, the scale of works, complexity, regionality and duration. By making broad use of callouts against Framework Agreements UÉ aims to deliver value for money, predictability of cost and to support long term partnerships with its suppliers.
- **Key RC4 Delivery Frameworks:** UÉ has developed and is developing new framework agreements to cover its core requirements over RC4.
- **Contract Packaging:** UÉ packages projects together where doing so delivers improved efficiency and streamlines delivery. These packages are put together with the capabilities of available contractors in mind and of particular value in delivering programmes of repetitive works across a region.
- **Approval and Performance:** UÉ has updated its contract approvals process as required for all public bodies in receipt of Exchequer capital funding. It monitors the performance of its contracts using Key Performance Indicators and is in the process of assessing them as part of a larger re-evaluation of its performance management systems.

# Procurement & Delivery | Contracting Principles

## Contracting Principles

UÉ has developed four guiding principles to support increased delivery across RC4 and beyond. They were developed with a focus on collaboration, risk management, performance outcomes and market engagement. UÉ seeks to act as an Expert Client in the procuring of its services by maintaining the internal expertise to specify project requirements and monitor delivery of outcomes. This approach allows UÉ to focus on strategic oversight, planning and compliance while making use of the contracted parties technical expertise.

### Client of Choice

In order to secure the availability of reputable and experienced 3<sup>rd</sup> parties across RC4 UÉ aims to be a client with whom other business wish to work. When both the client and the supplier benefit from a good relationship there may be more cooperation, initiative and willingness to be flexible to achieve improved outcomes for both parties. UÉ aims to achieve this by implementing new framework agreements to limit the complexity of tendering and by creating scopes of work with a reasonable margin and a transparent long-term pipeline.

### Driving Performance

UÉ will aim to keep the outcomes of its projects and the impacts they have on delivering against strategic objectives at the centre of its thinking.

### Equitable Balance of Risk and Reward

Contracted relationships are best able to deliver where both parties have a clear understanding of their risk exposure and reward potential. Equitable contracts where both parties bear appropriate risk are more likely to deliver flexible working relationships and deliver positive outcomes.

### Collaboration

Delivering a large and diverse project portfolio requires a collaborative approach. By working with stakeholders, a broader view can be achieved and more avenues to improvement discovered.

## Arcadis View

UÉ has adopted sensible principles to guide its updated Procurement frameworks and contracting practices. By seeking to generate contracts with a mutually beneficial spread of risk and value UÉ supports the development of a service market capable of delivering against its increased scope. A transparent long-term pipeline will support UÉ in securing reliable and cost predictable capacity. It will be important to monitor the embedding of these principles as they are being rolled out throughout the RC4.

# Procurement & Delivery | Contracting Types

## Contract Types

Due to the broad range of project sizes and complexities across which UÉ operates, the company utilises a range of delivery mechanisms set out below.

### Standalone Contracts

Standalone contracts are used where the project does not fall within an existing framework or contract type. Each project is individually tendered with bespoke requirements, criteria and Key Performance Indicators (KPIs).

### Framework Contracts

Where a prequalified contractor is to be used, UÉ makes use of existing Framework contracts to reduce unnecessary duplication of effort and drive consistent contracting practices across the business. The use of Framework Contracts is common across the industry and allows for efficient scaling of work and reduced procurement times.

UÉ makes use of a separate framework contract for Major and Minor Mechanical, Electrical, Instrumentational, Control and Automation (MEICA) projects. This allows for contracting terms of service to be tailored to the scale and risk of the works to be delivered.

Each framework contract has multiple appointed suppliers to provide access to a wide range of expertise, increase the scale of works which can be carried out and reduce dependency on any single supplier which allows for improved efficiency.

UÉ makes extensive use of Framework contracts and has established an internal Contract Utilisation Team to optimise the use of existing contracts and frameworks to drive efficiency across its portfolio.

### Term Contracts

These are fixed term contracts which may be either standalone or exist within a framework with established contractors. Work is directly instructed on the basis of tendered rates which allows for streamlined and continuous delivery. Such contracts are typically used for less complex, repetitive and known scope of works such as mains rehabilitation.

### Arcadis View

The use of various contracting types reflects the variety of works UÉ plans to carry out over RC4 and beyond and is in line with industry good practice.

Deep dive reviews of project sample have shown that UÉ uses contract types appropriately to the scale and type of works which is seen as positive.

The wide-ranging use of Framework contracts is in line with industry norms and supports UÉ in delivering an enlarged scope of works. By making use of callouts within framework contracts UÉ is able to maintain flexibility in its delivery which is required due to funding and target uncertainties.

# Procurement & Delivery | Key Frameworks

## Key RC4 Delivery Frameworks

UÉ has developed new Capital Frameworks in line with the four guiding principles of its contracting strategy. They serve as the primary tool for delivering works across RC4.

Most of UÉ's new Framework Agreements were in place before the start of RC4:

- Major Mechanical, Electrical, Instrumentational, Control and Automation (MEICA) Framework for works and services associated with the design and construction of treatment plants, pumping stations, etc.
- Minor Mechanical, Electrical, Instrumentational, Control and Automation (MEICA) Framework for works and services around the upgrading, replacing and provision of new MEICA elements
- Civils Qualification System for both Major and Minor projects. The system supports rapid assessment of potential partners for developing projects by providing access to all of UÉ's historic major and minor civils contractors. The system is intended to facilitate competitive tendering between qualified contractors and provide easy access to alternative contractors to spread increased delivery load. UÉ aims to use the centralised list of contractors to develop a good regional spread of contracts particular over the Minor Works portfolio.
- Water and Wastewater Networks Service and Works (WNSW) Framework. The new framework was developed with a greater scope to provide for efficient delivery of a large number of similar projects at a national scale.

Framework	Scale	Number of Contractors
<b>MEICA (Major)</b>	<b>National</b>	<b>10</b>
<b>MEICA Water (Minor)</b>	<b>National</b>	<b>15</b>
<b>MEICA Wastewater (Minor)</b>	<b>National</b>	<b>15</b>
<b>MEICA Telemetry (Minor)</b>	<b>National</b>	<b>8</b>
<b>Civils Qualification System (Major)</b>	<b>National</b>	<b>16</b>
<b>Civils Qualification System (Minor)</b>	<b>National</b>	<b>18</b>
<b>Growth and Development</b>	<b>Regional</b>	<b>3</b>
<b>Water &amp; Wastewater network Services</b>	<b>Regional</b>	<b>4</b>
<b>Water &amp; Wastewater network Services</b>	<b>National</b>	<b>4 + 2*</b>

\* 4 primary contractors and 2 reserve contractors

Both the Major MEICA Framework and the WNSW come to an end in 2027 (mid way through RC4). UÉ confirmed via Q&A process that there are contract extension options in place which will carry the frameworks till approximately end of 2030.

As seen from the table above, UÉ has a number of contractors within each framework, providing a robust set up for delivery of RC4 Capex delivery. Some Frameworks are organised nationally, and some are regional providing a good geographical spread.

# Procurement & Delivery | Key Frameworks

## Early Contractor Involvement

There is currently an Early Contractor Involvement (ECI) Framework in place. A new ECI framework is expected to be used from Q3 2025 to provide continuity.

The ECI framework is best industry practice where contractors are involved in early project shaping to avoid scope changes and reduce risks from the project onset. It also helps to reduce the delivery times and introduce efficiencies. The new contract framework will see an increase in approved contractors from three to five.

### Arcadis View

- Arcadis notes positively that UÉ seems to apply the type of frameworks correctly to the scale and type of works, with a range of frameworks available to cover its consulting and contractor needs. It is also reassuring to see that UÉ has planned for continuity of contracts and frameworks in place which cover full duration of RC4 for all works to be delivered in RC4.
- Early stakeholder engagement is a best industry practice and Arcadis sees it as positive that UÉ is extending and growing this programme, bringing on board further contractors to help in streamlining the RC4 delivery.
- It is worth noting that whilst UÉ seems to be well-prepared in terms of its supply chain for delivery of Capex investment, there remains a level of supply chain risk that is not within full control of the company, with market and economic volatilities. UÉ's focus on improved and structured engagement with the supply chain helps to mitigate this risk and will help the company recognise and respond to any changes should they occur during RC4.

## Bespoke Procurement

UÉ is developing bespoke procurement and contract strategies for delivering two particularly large capital programmes, the Water Supply Project (WSP) and the Greater Dublin Drainage (GDD) project. These two projects make up 19% of the RC4 Capex portfolio between them.

Whilst these projects are progressed in RC4 with planned to be completed in RC5, UÉ has conducted market engagement in winter 2024 to connect with the contractor base and test market interest in delivering this large scope of works. As a result of the exercise, UÉ has been reviewing work packaging and risk sharing to make the future tendering more attractive for the market and secure sufficient interest to run competitive process and relevant skills and expertise. The engagement with key market players also allows UÉ to align delivery timelines and mitigate risks around any workforce constraints and material availability.

### Arcadis View

- It is positive to see UÉ already engaging with the market as early engagement with key players and long-term visibility of project needs is critical to avoiding material, expertise and contractor availability constraints on large programmes of work.
- UÉ also evidenced how the contractors feedback is taken on board to develop more attractive contracts where risk and reward are equitably shared.
- Arcadis recommends continuous market engagement to continue building on this good practice and manage risk of potential resource constraints and delays to delivery of these two critical programmes for resilience of Greater Dublin Area.

# Procurement & Delivery | Contract Packaging

## Contract Packaging

UÉ packages projects together where doing so delivers improved efficiency and streamlines delivery. Recurring tasks where the nature of the work is broadly similar but occurs across multiple sites within a region, such as mains rehabilitation, are consolidated into regional Term Contracts. Packaged works over €50k are required to be competitively tendered.

UÉ aims to align work packages with the capabilities of available contractors in order to deliver good value for money, minimize lead times and maintain market engagement. By creating programmes of works to be carried out by a contractor over a period of time the contractor is able to optimize their resource deployments and support successful delivery of larger capital investment.

## Arcadis View

UÉ's contract packaging approach is in line with SWI recommendations in that creating packages of work aligned to a contractor's regional distribution, technical capabilities and scale of operations supports the formation of long-term equitable partnerships. It is Arcadis' view that this approach is a reasonable one and supports the development of required market scale to support the delivery of UÉ's increased RC4 scope.

Engaged partners involved in multiple projects are more likely to show the kind of programme flexibility which UÉ may require.

Requiring packages of work over €50k to be competitively tendered is a reasonable step to maintain value for money by driving competition.

# Procurement & Delivery | Approval and Performance

## Contract Approval

As of October 2024 UÉ has implemented a revised expenditure and contract approval policy in line with the requirements of the Infrastructure Guidelines which must be followed by all public bodies in receipt of Exchequer capital funding. The policy defines the roles and responsibilities of each key decision maker and there is a clear delineation of authority linked to project scale.

### Arcadis View

UÉ's contract approval policy seems reasonable and fit for purpose. Linking the required approval level to the type of contract and contract value is in line with industry good practice.

## Monitoring Performance

UÉ makes use of key performance indicators (KPIs) within its contracts to track performance and link outcomes to remuneration. The KPIs for works delivered via callouts under framework agreements are consistent within those agreements reducing duplication of effort.

Over the course of developing new contracts UÉ's aims to incorporate KPI such that these measures remain relevant, consistent and aligned with UÉ's overall approach to performance management.

Arcadis has been provided with the KPI approach in use in the WNSW framework. It clearly establishes the need for the contractor to develop a performance management system and report against its KPIs at a reasonable frequency. The process is driven by a collaborative approach to monitoring performance which includes annual shared reviews of KPI levels and a mechanism whereby the contractor may propose additional metrics against which delivery can be measured.

## Monitoring Performance

While UÉ's general approach to performance monitoring is reasonable the KPIs which Arcadis has assessed have generally been high level measures which may benefit from greater granularity. UÉ has identified the potential benefits around contracting work in such a way that under performing suppliers can be removed without greatly disrupting the overall project/programme. Clear and well monitored KPI's will play a role in the success of such a flexible approach.

The current KPI approach will be continued into RC4 to provide consistency and continuity. The approach will be assessed and revised as part of the 2025 Infrastructure Delivery Balanced Scorecard Programme as part of a broader assessment of UÉ's performance management processes.

### Arcadis View

As UÉ's approach to measuring contract performance is developing there is a risk of inconsistency between older and newer contracting frameworks. While UÉ is aware of this risk the approach of maintaining its current KPI strategy over RC4 may delay the adoption of improvements discovered through the Balanced Scorecard Programme.

UÉ has recognised the importance of measuring contract performance to drive value for money within its flexible approach to programme delivery. The WNSW approach to KPIs which Arcadis has reviewed shows a collaborative and flexible approach which is in line with UÉ's contracting principles. However, the initial KPIs are very high level and may benefit from more specificity.

The general direction of travel is positive but progress is likely to be slow with new recommendations not coming into full effect until the next refresh of framework agreements over the end of RC4 and RC5.

# Procurement & Delivery | Conclusion

## Arcadis View

- UÉ has identified the primary risks around successful delivery of its RC4 Capital Programme and has taken steps to create and maintain a robust and diverse supply of contractors. It has correctly identified the need to support the development and scaling of its suppliers and contractors if it is to meet the delivery challenges of RC4 and understands the importance of a long-term and transparent pipeline of works in doing so.
- UÉ has a robust set of contracts and frameworks in place to enable RC4 Capex delivery. Based on examples available, Arcadis confirmed that projects and programmes have in general adequate delivery mechanisms under a number of frameworks which shows that UÉ understands the needs and nature of work required, seeking to optimize delivery mechanisms where possible. There remains a risk of how quickly the supply chain can be mobilised within the framework which is not fully within UÉ's control. However, UÉ's ongoing engagement with the contractors, base enables it to mitigate the risk and be flexible in works delivery.
- UÉ is in the process of updating its core capital framework in line with the four guiding principles of its contracting strategy. These principles are reasonable and support UÉ's ambition to deliver an increased capital programme over RC4.
- Based on discussions with UÉ, the organization has engaged extensively with the market to understand the resources available and use market feedback to make contracts more attractive, considering risk appetite which is in line with best industry practice. UÉ is also expanding its use of Early Contractors Involvement bringing improved collaboration and potential efficiencies to project development. Arcadis recommends continuous focus on supply chain engagement to support successful RC4 Capex delivery and for UÉ to identify any key market trends/risks which may impact on its deliverability.
- Based on Q&A, UÉ confirmed that supplier feedback to its early engagement has been positive and that its contractors indicate readiness to meet initial and growing demand over RC4.
- Arcadis notes positively that UÉ has a dedicated team to manage contracts and develop improved contract performance management. UÉ is in the process of assessing its contract KPIs as part of a larger programme to improve and regularize its performance assessment across all functions.
- As UÉ's contract management team gains experience and set out improved performance monitoring of the supply chain, it will be important to develop UÉ's capability to manage target cost contracts and to challenge robustly the procured costs. Whilst target cost can include pain/gain share formula, based on industry experience, there is a high risk of cost overruns from the contractor side if not managed actively by an experienced team who can challenge any potential cost increases.
- Arcadis notes positively that UÉ is aware of the potential impact on its project deliverability of a number of significant infrastructure projects across Ireland which may compete for resource. UÉ appears to be taking appropriate measures to address these pressures via early market engagement and a visible long-term pipeline.
- Arcadis also recommends an increased focus on interrogating and challenging the procured costs to avoid contractor's proposals over and above the required scope to deliver on UÉ's strategic objectives. This usually becomes less of a challenge as the utility organization matures and gains expertise. UÉ is on the path in the right direction, however, the progress may be slow, and improvements may be seen from RC5 onwards as UÉ gains experience and develops its approach to monitoring and driving contractors' performance.

## **3.7 Managing Change**

# Managing Change | The Capital Investment Plan

## Introduction

Over the course of RC3, UÉ had to manage and respond to a number of changes, impacting its Capex programme of works. The changes were caused by external factors, such as macro-economic impacts and availability of funding as well as by internal factors, where scope or budget of projects changed significantly due to lack of appropriate data.

As of 2021, UÉ has a formal change control process in place and submits an annual Change Control Report to CRU detailing adjustments to the Capital Investment Plan (CIP), providing transparency to stakeholders on the impacts. UÉ submits a refresh of this to the Department of Public Expenditure and Reform each year through a 'Business and Finance Plan'. The plan extends to five years starting from the year of submission.

UÉ also monitors and records changes on projects using the 6 dials KPIs, Total Cost Estimates, risk registers and impact assessments within a well-defined governance framework UÉ.

## Funding Uncertainty

The nature of UÉ's funding model and the evolving regulatory, financial and needs landscape apply pressure to UÉ which may require changes in planned expenditure over the course of RC4. UÉ has recognised the need to have a robust governance process in place to approve, monitor, and report on key changes within planned expenditure.

UÉ's operations are impacted by a mix of regulation, legislation and market driven costs which impact on its ability to accurately forecast costs. The potential for miss alignment between the expected cost and regulatory environment create sources of uncertainty which UÉ views as occurring across four categories listed to the right.

## UÉ's categories of CIP uncertainty

### Macro Uncertainty

These are changes in the scale, scope or timing of regulations governing the industry. These include additional requirements under the Drinking Water Directive to increase testing and sampling, upward revision in the number of Developer Provided Infrastructure for which UÉ will incur costs, funding changes under the developing National Development Plan (particularly with regard to major projects) and an upward shift in the Housing for All new connection targets over RC4.

### Market and Economic Variability

Market conditions are currently difficult to predict and can lead to deviation both in cost estimates and in demand for service. Inflationary pressures on energy costs and design, build and operate contracts, uncertainty around commodity pricing and potential upward shifts in energy network costs may all drive up costs over RC4.

### Operational and Execution Risks

Resource constraints, contractor availability, workforce shortages and general supply chain disruptions may all effect the accuracy of current operating assumptions.

### Environmental and Social Risks

This category includes large scale factors beyond UÉ's direct control such as pandemics, major natural disasters or substantial shifts in planning priorities driven by shifts in public sentiment.

# Managing Change | The Capital Investment Plan

## Arcadis View - Changes to Capex Portfolio

- Across its project lifecycle and programme management process UÉ has emphasised taking a flexible approach with continual updating and rebalancing of its project portfolios against delivering its strategic objectives.
- This allows it to de-prioritise projects and bring new projects on stream in response to delivery challenges. However, this approach also leads to a potentially fluid and uncertain programme which gives rise to cost, efficiency and deliverability risks.
- As discussed later in the report, Arcadis has found this approach potentially impacting negatively on the efficient delivery of the overall Capex portfolio.
- In Arcadis view, the changes to the Capex Portfolio makeup should be supported by external shifts and extenuating circumstances that are mostly outside of UÉ's control. These could include policy and regulatory changes, political shifts or unexpected emergencies.
- Arcadis opines that UÉ could improve its Capex efficiency by locking in majority of its funding and project / programme list at the start of regulatory period with minor changes only throughout the RC4.
- Considering such approach, Arcadis recommends to enhance the existing change management process by providing further granularity on programme/project basis. This could for example be presented within an I&O sheet (or similar) and where changes to budget, timeline or scope occur, these can be logged in a separate column, linked to specific project/programme to allow transparency for audit. Arcadis recommends for such review to occur annually as part of the existing established process between CRU and UÉ.

## Improving data reporting

Similarly to RC3 Lookback review, Arcadis notes several areas of potential improvement in future data reporting, particularly in the Business Plan I&O sheet, for ease of comparison and change management in future reviews. These are discussed below:

- Completeness of project information, especially where lack of consistent data made comparison difficult:
  - Current state of progress for each project.
  - Updated timeline of project completion.
  - Each project to link with a specific outcome or output that it contributes to.

# Managing Change | Capex Uncertainty Mechanisms

## Arcadis View – Capex Uncertainty Mechanisms

- The previous page discussed recommended improvements to how Capital Investment change is managed, recorded and shared between UÉ and CRU.
- During the Capex review Arcadis also considered potentially using uncertainty mechanisms for managing elements of Capex portfolio that are less defined, require further development or are likely to involve significant cost increases (major projects).
- For Capex, this could include releasing partial funding on achieving milestones, providing additional funding due to material changes (targeted reopeners), allowing funding on providing improved project information, or ringfencing the funding for particular programmes/projects.
- However, such mechanisms will require extensive assessments of projects and programmes throughout RC4 to be able to approve required funding packages. This means that CRU would require additional technical expertise, either internally or from third party advisors on a regular basis, placing a significant burden on CRU.
- It is not seen as a desirable option, and Arcadis believes that the existing change management together with improvements suggested on the previous page will provide sufficient management of Capex portfolio throughout RC4.
- For two major projects (Water Supply Project and Greater Dublin Drainage) which require substantial investment, there is a separate Government-lead review process that provides sufficient analysis and oversight of the project development. In case of these two major project, Arcadis recommends a similar ringfencing mechanism as used in RC3, considering the importance of progressing the projects for resilience of Greater Dublin Area.

# Managing Change | Accelerated Housing Demand

## Meeting Increasing Housing Targets

- Like many nations Ireland has a need to substantially increase its housing stock over the coming years. These homes will require supporting infrastructure.
- The funding and requirements under the National Development Plan are known to 2027 when there will be a new National Development Plan with updated housing targets. The revised plan is expected to include an increased housing target of 45k to 50k homes per annum with the associated required infrastructural development.
- UÉ aims to create capacity for 300,000 additional houses by 2030 through its Accelerated Growth Programme at an additional cost of €1.7bn. UÉ plans to consider the impact on housing growth on its four sub-portfolios and is currently assessing options for bringing forward system improvement works to accelerate growth. This means that works planned for RC5 to enable further growth in RC5+ are now considered for RC4 to enable growth in RC5. The assessment is currently ongoing.
- Additionally, UÉ aims to create capacity for 3,000 additional rural homes through its ringfenced Rural Housing Support Programme at a cost of €300m. UÉ has identified a number of legislative changes and exemptions as key enablers of this programme.
- As the increased targets for housing in the updated National Development Plan have not yet been set there is a risk of a material increase over the expected figures which would require additional measures.

## Arcadis View

- It is Arcadis understanding that the RC4 investment plan addresses the current growth requirements and that UÉ is currently assessing the impacts of potential increases in the housing targets that will become clear in 2027.
- Arcadis believes, that in case of significant shift in the government's housing ambition, there will be a requirement for UÉ to obtain further funding to deliver on the new objectives.
- Both the Accelerated Growth Programme and the Rural Housing Support Programme list policy and legislative changes amongst their key enablers. Should such legislative change not materialise there may be a risk to UÉ's plan to fulfil its requirements.
- UÉ prioritises regulatory and safety considerations in the balancing of its capital investment portfolio. Therefore, there is a risk that pressure on completing higher priority projects will push out non-ringfenced projects in the Accelerated Housing Demand Programme to later regulatory cycles.
- Arcadis also notes that increased housing targets across the Greater Dublin Area will be closely linked with UÉ's ability to deliver on its two major projects – Water Supply Project and Greater Dublin Drainage which aim to provide further resilience and system capacity in the region enabling further growth. Further discussion on major projects can be found in [Section 4.4 Major Projects](#).
- Arcadis recommends close collaboration between UÉ and CRU on that matter, in order fully understand the potential impacts of added targets on the existing portfolio and discuss any potential changes to RC4 portfolio to accommodate new growth-focused interventions. It will also be important to assess the supply chain availability and readiness for the potentially increased workload.

## **3.8 SWI Recommendations**

# SWI Recommendations | Overview

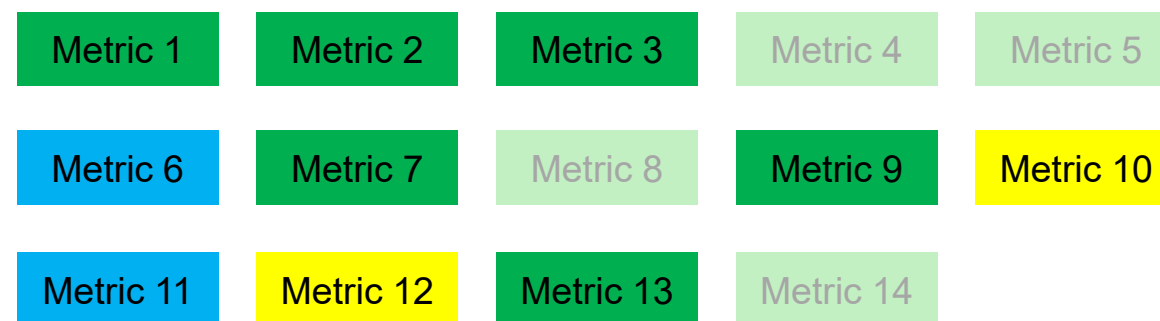
## Introduction

- Following UÉ revised 2019 RC3 submission UÉ and CRU identified the need for an independent review of internal UÉ processes.
- This review was carried out by Scottish Water International (SWI) and resulted in a number of recommendations for improving UÉ's processes and mechanisms for planning and delivering infrastructure investment.
- CRU engaged HR Wallingford (HRW) and ChandlerKBS (CKBS) to carry out a review of UÉ's implementation of the SWI report's recommendation and deliver additional recommendations based on UÉ's developing maturity.
- The HRW review determined that UÉ has made significant progress in implementing SWI recommendations, but a small number of improvements have not been fully implemented, particularly in relation to Cost Estimating Approach and Risk Management Methodology.
- HRW assessed UÉ's progress across 14 metrics. Arcadis has summarised UÉ's developing maturity against SWI recommendations which have not been fully implemented on the next page. Specific measures and their impact on SWI recommendations have been addressed throughout the report.
- HRW recommended four additional opportunities for UÉ to mature its processes. These include continuing to improve training procedures, further de-risking of projects with improved initial investigation processes, continued work towards ISO standards compliance and increased automation. UÉ has since continued to mature against all of these metrics. It has produced sensible roadmaps for continued improvement.

## Arcadis View

UÉ continues to make good progress against SWI and HRW recommendations. While a number of measures have progressed more slowly than initially intended, UÉ has developed reasonable roadmaps for continuing to improve its capabilities, processes, training and documentation.

UÉ is a maturing infrastructure company which has recently undergone substantial changes as it develops into a more centralised organisation with increasingly unified and integrated systems. While embedding updated and improved processes will take time, UÉ has demonstrated an understanding of its current maturity, developed sensible roadmaps for further improvement, and shown active progress against its targets.



*The metric implementation levels according to the HRW and CKBS reviews. Green shows implementation, blue is implemented as far as reasonably practical and yellow is no implementation with material consequence.*

*Metrics Arcadis deem to have been fully implemented have been greyed out. All the remaining have been implemented to some extent, which will be further explored on the following slide.*

# SWI Recommendations | Summary Table

SWI Metric	State as of HRW Analysis	Progress to date
1. Investment Process Manuals	Relevant manuals and processes would benefit from improved hot-links.	UÉ has made progress in incorporating hot-links into its I2O manual, SOPs and training materials. Further cross-linking of materials is planned as part of UÉ's continuous improvement process.
2. Governance & Change Management	A non-exhaustive list of typical investigative contracts should be created for use in WS3, I2O training should be expanded.	UÉ have developed the recommended list of investigative contracts to streamline its processes. UÉ has developed an I2O Grow e-learning module to expand I2O training in line with SWI recommendations.
3. Project Management Handbook	Handbook should be updated to include the pre WS0 workshops. A sitemap of the Handbook should be created.	UÉ has updated the handbook to include the pre-WS0 Workshops to create a consistent approach. A sitemap has been created to provide users access to relevant workshops, templates, forms and checklists.
6. Value Management	SOP to be complete by September 2024, Training to complete by end 2024.	The value management SOP and related training is under active development on the basis of existing value management and engineering initiatives.
7. Enhance Asset Planning Team	Develop toward ISO55000 Accreditation.	UÉ has completed an assessment against its current ISO 55000 maturity and is making progress in developing its asset management systems in line with its requirements. Arcadis builds on this recommendation for UÉ to set a clear timeline to achieve the accreditation.
9. Expenditure and Contract Governance	Process updates required in line with new guidance.	UÉ has adopted the updated size thresholds for major projects and updated its gate paper template. Further updates may be required as the guidance is finalised and UÉ's organisation matures.
10. Cost Estimation	Cost Estimating SOP to be updated with additional methods and details.	UÉ has implemented the suggested updates to its Cost Estimating SOP. It has adopted rigorous methods for estimating Uncertainty and Contingency within its Estimated Total Cost.
11. Cost Intelligence	Recruitment of key resources to begin early 2024 and complete end 2024.	UÉ is actively recruiting to meet the requirements of its enhanced cost intelligence team. 12 of the proposed 19 positions were filled in early 2025 with further recruitments ongoing.
12. Risk Management	Risk Management SOP and related documents and processes to be updated by end 2024.	UÉ has implemented the suggested updates to its Risk Management SOP and has matured its short-term risk management process. A roadmap for developing its medium and long-term process is in place and sets sensible goals for taking a portfolio wide view of contingency.
13. Streamlined Reporting	KPIs additional to the 6 dials should be considered, manual reporting reduced.	UÉ have incorporated additional KPIs into its reporting process. Development of the I2O digital programme is ongoing and will include enhanced reporting capabilities.

# Capital Investment | Key Sources Reviewed

A non-exhaustive list detailing the key documents and sources reviewed when producing this review.

Source Title	Document / Q&A / Workshop
Q&A responses	Q&A sheet
Approaches for Estimating and Benchmarking Costs for Large Scale Water Infrastructure Projects, CEPA	Public Document
20241202 Uisce Éireann Revenue Control 4 (2025-2029) Network Capital Expenditure Look Forward FINAL	UÉ Document
Cost Estimate Classification System, AACEi	Public Document
Cost Estimating Guidance, Infrastructure and Project Authority (UK)	Public Document
Asset Intelligence Strategy	UÉ Document
Capital Investment Governance & Change Management 6-Dials & Escalation Criteria, Thresholds & Approval Guidelines	UÉ Document
Cost Estimating Standard Operating Procedure	UÉ Document
Cost Estimation Classifications	UÉ Document
Expenditure and Contract Approval	UÉ Document
Governance & Change Management Guidance	UÉ Document
Progress Report SWI-HRW + Appendix	UÉ Document
Project Programme Workshop Procedure (I2O)	UÉ Document
Project Risk & Contingency Management Standard Operating Procedure	UÉ Document
Capital Maintenance and Asset Health, 7th Feb – presentation and meeting notes	Workshop
Follow up on 10-Steps Investment Decision Making Process, 12th Feb – presentation and meeting notes	Workshop
Follow up on Multicriteria Analysis, 27th Feb – presentation and meeting notes	Workshop
Risk Quantification, costing and Management, 10th Feb – presentation and meeting notes	Workshop

# 4 Capex Programme & Projects Review

- 1 Introduction
- 2 UÉ's RC4 Capital Investment Plan
- 3 Capital Investment – Processes and Governance
- 4 Capex Programme & Projects Review
- 5 Non – network Capex
- 6 Proposed Cost Challenges

# 4.1 Deep Dive Assessments

# Deep Dive Assessments | Methodology

## Objective of deep dives

- Deep dive assessments offer an opportunity for a more detailed look into how particular Capex projects and programmes are shaped and delivered providing a key element of the overall Capex portfolio review.
- Whilst it is not feasible to review each individual project and programme of Capex portfolio, reviewing a representative sample of projects helps to compare how the overarching governance and processes are applied across projects.
- The review aimed to identify if there are any major issues with particular areas of Capex portfolio and thus challenge the related costs.
- As the selected projects for deep dive assessment are a representative sample of the overall network Capex portfolio, this allows for extrapolating the findings and cost challenges and draw out key recommendations which are discussed in this section.

## Methodology

Arcadis structured the deep dive assessment accordingly:

1. Selecting a representative sample of projects from RC4 Capex. This is a stratified sample across different elements of the programme and across project maturity and size. About a third of overall network Capex value was under the review.
2. Requesting project information from UÉ. This included an extensive process from in person, online workshops, weekly written questions and answers and review of the sent deep dive packs of information. The process was finalised with further follow up written questions and online workshops. UÉ has been provided with ample opportunity to contribute to the process and to share available information.
3. Arcadis subject matter experts have reviewed each project/programme information against a set of criteria, using their technical expertise and industry benchmarks. The experts generated a set of questions to UÉ to help complete the assessment as explained above.
4. The review considered categories such as need, optioneering, cost and risk consideration, as explained further in this section. The assessment pointed to any
5. The projects/programmes challenged for cost reductions had major issues (such as inadequate costing, risk management or optioneering) and where there is insufficient evidence to justify the full expenditure.
6. The result of the deep dive assessment is a set of key recommendations to CRU on potential cost reductions and overarching Capex processes and governance.

# Deep Dive Assessments | Scope

## What is in scope

The deep dives assessments looked at how the projects and programmes are structured, developed and delivered by considering the following questions per each project/programme which is part of the deep dive assessment:

Category	Questions considered	Reasoning
<b>Need Outcomes/ Outputs Benefits</b>	Are the need, outcomes/outputs and benefits clearly understood and articulated?	To verify whether the proposed project/programme is required and how the success is measured.
<b>Optioneering</b>	Is option generating process appropriate?	To assess whether a wide range of options across Opex and Capex solutions were considered early on.
<b>Preferred Solution</b>	How was the preferred option chosen? Consider data used, hierarchy of solutions, stakeholders involved. Was the multi-criteria analysis used?	To assess whether an appropriate solution was selected and avoid significant scope changes as the project develops.
<b>Costing</b>	How was the project costed, what data supported the costing and do the key costing blocks look reasonable?	Robust cost estimates reduce the risks of significant cost overruns and help with more realistic project planning.
<b>Risk</b>	Are the project/commercial/technical risks clearly defined, and mitigations assigned/tracked throughout gates? Are the risks and uncertainty costed adequately to the project stage?	Risks should be identified, discussed and mitigated from earliest stages of project in a consistent way to reduce the risk of health and safety incidents, scope changes, cost overruns and project delays.
<b>Delivery</b>	Is the delivery timeline reasonable for the project stage, scope & risks? Are the delivery partners already appointed?	To assess whether deliverability was considered throughout the project development and planned for accordingly to mitigate risk of project delays.

# Deep Dive Assessments | Selected Projects & Programmes

## Deep Dives Selection Process

- **In total, 34 deep dives have been requested on projects and programmes worth €4,395m, 54% of the total network Capex requested for RC4.**
- To select a representative sample of projects for review, the following criteria was used:
  - Project size
  - Project stage
  - Programme/Standalone Project
  - Sub portfolio – WWAG,WWBG, WSAG,WSBG
  - Significant investment shifts from RC3
  - Treatment plants / networks
  - New / upgrades etc.
- WSP major project was excluded from the deep dive assessment because a separate, more in-depth analysis was completed specifically for this project by HR Wallingford towards the end of 2024. This is part of a separate audit process led by the Irish Government.
- **Excluding WSP from the network Capex portfolio, the deep dive assessments covered 67% of UÉ's network Capex proposal.**
- The three pages below set out all projects and programmes selected as part of the deep dives assessment, showing a considerable spread over sub-portfolios, types of solutions, budgets and project stages.
- The large percentage of the capital programme which was reviewed in the deep dives gives Arcadis a high degree of confidence that our conclusions from the reviews are robust and generalisable.

## Deep Dive Assessments | Selected Projects & Programmes

	Name	Project/ Programme	Asset Category	Stage	RC4 Budget (2022 €m)	Description
1	Capital Maintenance Programme - Water Above Ground Assets	Programme	WSAG	Stage 4	272.53	Replacement or refurbishment of assets to prevent deteriorating of existing levels of service that could impact customers and the environment.
2	Find & Fix	Programme	WSBG	Stage 4	530.62	Leakage reduction programme to reduce leaks across the networks and improve security of supply.
3	CFC, Filtration and Sludge	Programme	WSAG	Stage 4	179.73	Water treatment upgrade programme to overcome a number of treatment processes deficiencies.
4	Supply Demand Balance Programme	Programme	WSAG	Stage 4	46.88	Reducing supply demand deficit, focused on sites with critical headroom capacity. Feasibility studies and surveys for new groundwater resources. Although marked as Stage 4, the overall programme is at very early stages as confirmed by UÉ.
5	Lough Talt WTP New	Standalone Project	WSAG	Stage 3	102.78	Providing an alternative sustainable permanent water supply brought about by the requirement to cease, in the future, the abstraction and treatment at Lough Talt.
6	Adamstown WTP Upgrade	Standalone Project	WSAG	Stage 4	17.2	Upgrades to the plant to optimise filtration and sludge treatment and upgrading the infrastructure to improve water quality.
7	Lough Mask WTP Upgrade	Standalone Project	WSAG	Stage 3	24.79	An upgrade to increase capacity to supply an additional 20,000 properties.
8	Staleen to Duleek Water Network Upgrade	Standalone Project	WSBG	Stage 3	37.1	Replace 8km of existing trunk water main with larger diameter mains.
9	Galtee Regional WTP Upgrade	Standalone Project	WSAG	Stage 1/2	8.23	To remove the site from RAL register and reduce the risk of filter failure.
10	Early-Stage Projects - Water (Safety and Quality)	Standalone Project	Multiple	Stage 1/2	177.19	Although listed as a standalone project, this entry includes several very early-stage projects that were bundled together by UÉ for reporting purposes. A project example from the category was provided by UÉ for the assessment.

# Deep Dive Assessments | Selected Projects & Programmes

Name	Project/ Programme	Asset Category	Stage	RC4 Budget (2022 €m)	Description	
11	Early-Stage Projects - Water (Availability and Reliability)	Standalone Project	Multiple	Stage 1/2	187.06	Although listed as a standalone project, this entry includes several very early-stage projects that were bundled together by UÉ for reporting purposes. A project example from the category was provided by UÉ for the assessment.
12	Mains Rehabilitation	Programme	WSBG	Stage 4	514.83	Replacement and relining of mains to reduce leakage, burst mains and improve security of supply.
13	Metering Programme	Programme	WSBG	Stage 4	210.43	Meter replacement.
14	Pressure Management Programme	Programme	WSBG	Stage 4	67.56	Part of leakage programme – reducing pressures across the network.
15	National Lead Programme	Programme	WSBG	Stage 4	83.83	Replacement of public-side and front and private-side backyard service pipes.
16a	Wastewater Pumping Station Programme (Capital Maintenance)	Programme	WWAG	Stage 1/2	63.89	Replacing pumping stations that have failed or are at risk of failing.
16b	Wastewater Pumping Station Programme (Growth)	Programme	WWAG	Stage 4	63.17	Upgrades and new pumping stations to provide additional network capacity for future growth.
17	New Connections Programme - Wastewater Assets	Programme	WWBG	Stage 4	283.68	New wastewater connections to customers.
18	New Connections Programme - Water Assets	Programme	WSBG	Stage 4	283.68	New water connections to customers.
19	Capital Maintenance Programme - Wastewater Above Ground Assets	Programme	WWAG	Stage 4	289.96	Replacing assets that have failed or are at risk of failing.

## Deep Dive Assessments | Selected Projects & Programmes

Name	Project/ Programme	Asset Category	Stage	RC4 Budget (2022 €m)	Description	
20	Capital Maintenance Programme - Wastewater Below Ground Assets	Programme	WWBG	Stage 4	56.26	Sewer rehabilitation and below ground assets replacement that are at risk of failure.
21	Early-Stage Projects - Wastewater (Safety and Quality)	Standalone Project	Multiple	Stage 1/2	170.28	Although listed as a standalone project, these entries include several very early-stage projects that were bundled together by UÉ for reporting purposes. A project example from each category was provided by UÉ for the assessment.
22	Early-Stage Projects - Wastewater (Availability and Reliability)	Standalone Project	Multiple	Stage 1/2	170.61	
23	Small Towns and Villages Growth Programme	Programme	WWAG	Stage 4	111.36	This programme is focused on upgrading wastewater treatment plants serving smaller populations that are either non-compliant or overloaded, or are projected to become so, within the next 5-10 years.
24	Ringsend Wastewater Treatment Plant upgrade	Programme	WWAG	Stage 4	104.37	Significantly increasing wastewater treatment capacity. The project is critical to removing Ireland from the European Court of Justice compliance infringement case list.
25	Nenagh WWTP upgrade	Standalone Project	WWAG	Stage 3	42.53	Increasing the treatment (particularly secondary treatment) capacity of the plant which is currently biologically overloaded.
26	Fenit WWTP upgrade	Standalone Project	WWAG	Stage 1/2	17.39	Construction of a new screened surface water overflow and upgrades to increase treatment capacity.
27	Arklow WWTP New	Standalone Project	WWAG	Stage 4	12.39	New treatment plant including the connecting infrastructure.
28	Ballinaspittle WWTP Upgrade	Standalone Project	WWAG	Stage 1/2	8.9	New treatment plant including the connecting infrastructure and decommissioning of the old plant.
29	Drogheda Wastewater Network Upgrade	Standalone Project	WWBG	Stage 3	8.78	Increasing capacity and upgrading the wastewater pumping station along with an emergency storage tank, sewers and rising mains.

## Deep Dive Assessments | Selected Projects & Programmes

Name	Project/ Programme	Asset Category	Stage	RC4 Budget (2022 €m)	Description	
30	Midleton Wastewater Network Upgrade	Standalone Project	WWBG	Stage 1/2	39.63	Wastewater network rehabilitation and upgrades in Midleton to manage the availability and resilience of wastewater services.
31	Roundstone WWTP New	Standalone Project	WWAG	Stage 3	8.18	New treatment plant with connecting infrastructure in untreated agglomeration.
32	Regional Biosolids Storage Facility	Standalone Project	WWAG	Stage 4	48.26	The construction of two odour-controlled storage buildings to meet storage requirements for treated wastewater sludge (biosolids) in the Greater Dublin Area.
33	Greater Dublin Drainage	Programme	WWAG	Stage 3	151.35	Construction of a new large treatment plant in Clonshaugh, a 14km orbital sewer between Blanchardstown and Baldoyle and an 11km marine and land outfall pipeline discharging into marine environment off north county Dublin. Critical major programme to provide growth capacity and resilience to the wider Greater Dublin Area.
34	Windmill Hill Reservoir and Trunkmain to Ratoath Upgrade (linked to Staleen to Duleek Water Network Upgrade)	Not listed as an individual line item on the I&O sheet. Projects review at the request of CRU.				Building a new storage reservoir and replacing the remaining trunk main (connected to the Staleen to Duleek project).

# Deep Dive Assessments | Summary of Findings

## Overview

- The deep dive assessment was completed successfully, based on the information made available. Whilst data from deep dive packs was not fully complete or consistent, UÉ provided sufficient level of information for Arcadis to complete the review and draw key conclusions.
- It is worth noting that, till date, UÉ has shared an unprecedented amount of information with Arcadis, significantly more than in previous regulatory cycles. Arcadis believes that UÉ has shared all key information available at the time of the assessment.
- Data provided included gate approval papers, PCT extracts, EAATs, risk registers, feasibility reports.
- Arcadis was provided with one example of project from each large programme assessed, and such projects were taken as representative examples for programme level assessment.
- The quality and quantity of information available for each deep dive pack varied significantly. Arcadis also noted that, in general, the quality of information has improved in the more recent project reviews positively indicating gradual implementation of the improved governance in practice.
- From the deep dive assessment, it can be seen that the most common areas of challenge relate to poor governance, accounting for risk and project costing.
- It is noted positively that needs are clearly stated for the majority of the assessed projects, giving confidence in UÉ focusing its RC4 funding on areas where genuine improvements are required.
- There is an opportunity to improve the optioneering process by streamlining it where known standard industry solutions are available by using solution matrices and technical standards.
- The review has shown that risk management is an area where further development would be beneficial as data is often inconsistent. UÉ is transitioning to RCMS system which should aid central recording and managing of the risks going forward.
- It is evident that UÉ is a maturing organisation in early stages of implementation of its improved governance processes and policies. In Arcadis view, UÉ should continue updating and reviewing governance for projects in preparation for future approval gates, aiming to achieve consistent recording and governance of projects for RC5 submission.
- Cost increases are a common part of Capex programmes across water utilities, however, it is of concern that all of the 10 projects under review experienced between 18% up to over a 1000% increase, indicating challenges with cost estimations. Arcadis recommends additional internal project reviews to fully understand the root cases and seek future improvements.
- There is a number of deliverability issues with projects and programmes worth over €1bn in value. UÉ could benefit from more structured stakeholder management, review of timelines for optimism bias and providing more robust risk mitigations for resource gaps. However, the remainder of projects analysed (over €3bn in value) have shown sufficient consideration for deliverability aspects. The mixed picture reflects a maturing utility organisation.

## Deep Dive Assessments | Cost challenge

The table below provides an overview of the key areas of challenge identified which led to cost challenge recommendations as part of the deep dive review. The analysis was focused on three primary themes: need justification, requested capex and governance. This is to establish why the expenditure has been requested (this case must be laid out in detail), if it is the correct amount and if the information has been correctly recorded and procedures followed. Arcadis has evaluated governance based on how well the internal processes have been followed as well as the suitability of those processes. From the table, it can be seen that the most common areas of challenge/poor information relate to poor governance, accounting for risk and project costing. Further detailed commentary is provided on the following pages.

	Project / Programme Assessed	Investment Value (€m)	Key Areas of Challenge					
			Need	Optioneering	Preferred Solution	Cost	Risk	Governance
1	Wastewater Pumping Station Growth	63.2			X		X	X
2	Wastewater Pumping Station Capital Maintenance	63.9			X		X	X
3	Ballinaspittle WWTP Upgrade	8.9		X		X		X
4	Fenit WWTP Upgrade	17.4		X		X	X	X
5	Nenagh WWTP Upgrade	42.5			X		X	X
6	CFC, Filtration and Sludge	179.3	X	X		X	X	X
7	Supply Demand Balance	46.9	X	X		X	X	X
8	Adamstown WTP Upgrade	17.2		X		X	X	
9	Capital Maintenance – WWAG	290			X	X		X
10	Capital Maintenance – WSAG	272.5			X	X	X	X
11	National Lead Programme	83.8				X	X	
12	Metering Programme	210.4	X			X	X	X
13	Find & Fix Leakage	530.6		X	X		X	X
14	Early-stage Projects – Wastewater (Safety and Quality)	170.3				X	X	X
15	Early-stage Projects – Wastewater (Availability and Reliability)	170.6		X		X	X	X

# Deep Dive Assessments | Cost challenge

The table below shows the deep dive projects which were not challenged. Although there were areas where information could have been more complete, these were not deemed sufficiently major to warrant cost challenges.

	Project / Programme Assessed	Investment Value (€m)	Key Areas of Challenge					
			Need	Optioneering	Preferred Solution	Cost / Increase	Risk	Governance
1	Lough Talt WTP New	102.78				X		
2	Lough Mask WTP Upgrade	24.79				X		
3	Staleen to Duleek Water Network Upgrade	37.1						X
4	Galtee Regional WTP Upgrade	8.23		X			X	
5	Early Stage Projects - Water (Safety and Quality)	177.19						X
6	Early Stage Projects - Water (Availability and Reliability)	187.06						X
7	Mains Rehabilitation	514.83				X		
8	Pressure Management Programme	67.56				X		
9	New Connections Programme - Wastewater Assets	283.68			X			
10	New Connections Programme - Water Assets	283.68			X			
11	Capital Maintenance Programme - Wastewater Below Ground Assets	56.26		X				X
12	Small Towns and Villages Growth Programme	111.36						X
13	Ringsend Wastewater Treatment Plant upgrade	104.37		X	X			
14	Arklow WWTP New	12.39					X	X

## Deep Dive Assessments | Cost challenge

	Project / Programme Assessed	Investment Value (€m)	Key Areas of Challenge					
			Need	Optioneering	Preferred Solution	Cost / Increase	Risk	Governance
15	Drogheda Wastewater Network Upgrade	8.78						X
16	Midleton Wastewater Network Upgrade	39.63				X		X
17	Roundstone WWTP New	8.18				X	X	
18	Regional Biosolids Storage Facility	48.26				X		
19	Greater Dublin Drainage	151.35					X	
20	Windmill Hill Reservoir and Trunkmain to Ratoath Upgrade (linked to Staleen to Duleek Water Network Upgrade)	N/A		X	X			

- Challenge based on need case was rare i.e. UÉ has demonstrated the need case for almost all of its programme and most challenges were on other areas.
- The two most common areas for issues were cost / cost increase and governance. The causes of cost increases are explored in further, however one of the recurring drivers is inflation. To avoid double counting, inflation will not be challenged within the deep dives, since inflation will be examined and challenged in further detail separately.
- Governance issues centred around poor data recording or availability, such as missing information in packs. Whilst the data was often provided through workshops or in subsequent documents, the lack of consolidation would make fully informed decision making difficult. Additionally, Arcadis finds the governance process was, on occasion, too rigidly applied. Peer companies in England and Wales have set solutions for standard problems (i.e WWTPs have specific treatment solutions by size) and whilst UÉ are arriving at the best (as regarded by the industry) solution, this additional optioneering and governance adds both cost and time whilst delivering limited value to the customer. This could be indicative of the lower maturity of UÉ relative to the English and Welsh water companies and due to the difficulty to fairly measure the cost, a challenge has not been applied for this.
- Costs/uncertainties/contingencies were extracted from the gate papers provided for the deep dives. All these were written in 2023 or before, and most in 2020. The deadline for implementing the SWI recommendations was 31/12/22, hence the majority of deep dives were from before SWI recommendations were fully completed. Later gate papers were notably more consistent than earlier ones which indicates that SWI recommendations and standardisation of decision-making is being embedded.

# Deep Dive Assessments | Example assessment

Project name	Adamstown WTP upgrade
Staging	Stage 4
Outcomes / outputs	Complete works at water treatment plants to resolve specific high risk water quality issues(1) Water treatment plants new and upgraded(1)
Investment need	Reasonably justified in principle but flow from the original need to the selected solution is not clear.
Outcomes and outputs	Unclear how the scope identified will resolve the THM and DBP issue as the scope does not discuss organic removal (DBP precursors) or the disinfection
Optioneering	Options are limited and do not have sufficient breadth to look at alternative treatment techniques that could treat organics, DBP's or crypto. For instance, no mention of using GAC or UV or membranes. Discussion on Manganese removal is limited with discussion around using anthracite but nothing about looking at greensand or whether pH control will precipitate out the manganese to improve performance.
Preferred option selection	While there is evidence of a data driven decision process, full information was not provided. Options assessed were limited with a simple hierarchy of selection.
Cost build-up	Output of the financial appraisal model was provided but limited detail. NPV used to determine commercial factor but no details of the NPV model. Opex is stated Overstates benefits by stating it will deal with THMs and DBPs. Also, the impact on the manganese (and therefore colour) are not defined.
Risk & uncertainty management	Key risks identified in the paper, but the risk register is generic and provides little information of the project specific risks or the associated cost estimates. No evidence provided of planning or consenting challenges however given the project stage it should be available.
Governance	Using ECI which is good to mitigate risk to delivery timeline. Delivery partners appointed. Appropriate engagement with stakeholders.
Other	<ul style="list-style-type: none"> <li>• Little benefit of a mobile filter unit. Not clear why this is needed for manganese when the theoretical knowledge is well understood and tested. Would looking at pH and Redox potential be more appropriate for precipitating Manganese?</li> <li>• How does this project address the DBP &amp; THM issue identified?</li> <li>• What is the risk of crypto in the raw water and is RGF filtered water sufficient to meet the required log removal to protect the public?</li> <li>• Not clear why all cells need to be refurbished and not just the 6 in service now.</li> </ul>

# Deep Dive Assessments | Overview for cost reduction justification

## Wastewater Pumping Stations Programmes (Capital Maintenance and Growth)

The overarching programme appears to be reasonably built up and set up but there is insufficient technical information shared on projects to assess how it is applied in practice at a project level. Project scope and reasons for option selection, condition assessments, stage of development, risks and key MEICA assessments are all missing in the existing governance.

Needs and outcomes are well set out at a programme level, addressing growth, compliance and asset health issues. The programmes are built up on historical asset condition assessments results (and growth assessments for the Growth Programme).

For CM programme, selected projects are fast tracked to detail design and construction which is reasonable for CM programme of works, where it is mostly like for like replacement. Run rates are used based on average historical spend per output brought up to 2022 and 15% contingency added on top. This is high level generic costing which could benefit from further granularity but currently UÉ does not have better data.

For Growth programme standardised long and short list of options is used to generate feasibility study report and arrive at the proposed solution. Growth projects have a PCT generated using cost curves, but data freshness is unknown. Project-level detail very limited with no information on scope, technical assessments, with scarce data only on some costs or risks.

## Wastewater Treatment Plant Upgrades

**Ballinaspittle:** Need is clear, however, the optioneering shows a number of options which are not considered as adequate and carry a very high cost. UÉ shared an update on a call (31/03/2025) which shows a different option selected as preferred (which is seen as appropriate) but which has not been considered as part of the optioneering, indicating inconsistencies in governance processes and likely inflated initial project costs. Whilst this is early stage 1 / 2 project, the governance records in general are very limited. There is insufficient data on risks. Old and patchy data (from 2022) with significant gaps.

**Fenit:** Whilst this is early stage 1 / 2 project, there is a large number of outstanding technical and governance issues. Need is identified but some of its key elements seem contradictory. Inadequate & subjective option selection with no justification for option selection process recorded. Similar to Ballinaspittle, the recent UÉ update indicates an option selected as preferred which was not considered in the original long list of options. Incomplete and likely inflated costing. Significant gaps identified in risks register - missing constructability risks, salinity risks and other relevant ones. Significant consent and Local authority requirements but do not seem to be fully considered, with no further evidence provided. Old and patchy data (from 2021-22) with significant gaps.

**Nenagh:** Need, outcomes and benefits reasonably well defined. Evidence of optioneering and using MCA for option selection but no further detail recorded. Costs and scope significantly escalated from since Gate 0 and whilst some of it is well reasoned, other elements remain ambiguous. Risk register generic and not sufficient in level of detail. There is 8 years of delay to the programme delivery indicating inefficiencies. Currently detailed design is being developed by ECI contractor and there is a risk of further cost escalations. UÉ confirmed that the project expects to proceed to construction in Q4 2025.

# Deep Dive Assessments | Overview for cost reduction justification

## Water Services Above Ground Projects

### CFC, Filtration and Sludge

One sub-programme has needs identified. There is no definition for the remaining 60% of the programme. The sub-programme shows 2 out of 21 projects only. No optioneering visible (apart from site selection but not type of solution). Costs shown are high-level only, with large ad-hoc component. High level risks shown, no risks at project-level recorded. Majority of scope is unknown and project selection criteria unknown.

### Supply Demand Balance

UÉ provided one project example (Letterkenny/Ballymacool) from the whole programme, and this is taken as a representative sample of the programme. This is an early-stage investigation programme for new groundwater sources based on the areas where water scarcity is highest from the NWRP assessment. Insufficiently defined early-stage programme that has a risk of growing exponentially. The programme risks set out at high-level, but project-level detail not recorded. There is scarce cost information with no clarity on how the final programme costs were derived. Needs and optioneering unclear.

### Adamstown WTP Upgrade

Need clearly identified with limited/insufficient optioneering completed. Likely unnecessary piloting of a mobile filter unit with costs attached to this particular project, introducing cost inefficiencies. If really required, this should be a separate project with long term plans set out and clear benefits to the customer. Risks records are generic, not sufficient for a project at this stage. Contractors involved as part of the ECI and delivery partner in place which is seen as positive. Notes available are from 2024, indicating that the project should now be in construction.

## Capital Maintenance Water & Wastewater Above Ground Assets

Very limited information and governance available which reflects a majority reactive programme of works responding to failures and near failures.

Current cost run rates are based on old generic county level costs. New run-rates are being tested by UÉ, which will very likely result in cost changes throughout the RC4.

Full assessment of capital maintenance is provided in [Section 4.3 Capital Maintenance](#).

# Deep Dive Assessments | Overview for cost reduction justification

## Water Services Below Ground Programmes

### Find & Fix (Leakage)

Need and outcomes are reasonably defined. The target seem ambitious, and it is not fully clear how such increase will be achieved. It is positive to see prioritisation based on water deficit zones and highest leakage risk, but data-supported evidence is only being developed. Good ideas visible but no clear plan of action which integrates various interventions and how much related MLD reductions will be achieved. Cost run rate provided with no build up detail, however, it is based on the newly procured contract, meaning it is up to date and reflect current market. Key challenge is deliverability due to known UÉ resourcing issues for Leakage team that continue from RC3. It is positive to see project Optimum identifying a set of actions to improve leakage performance.

### National Lead Programme

Generally reasonable high-level information for the programme. Some level of prioritisation for interventions visible (vulnerable clients, leaking pipes etc.) but details unclear. Programme is required for compliance but also forms part of the Leakage Programme. The delivery is fully contracted out as part of the Water services framework reducing the risk of relying on constraint UÉ Leakage team resources. The programme is priced based on a small, year-1 sample of projects, so there is a risk of cost increases throughout RC4. There is potential for cost efficiencies, but currently not identified or planned for by UÉ.

### Metering Programme

Need and outcomes are insufficiently defined with no clear strategy in place (UÉ confirmed a strategy is being developed). Data gaps and no structured governance available. Some level of prioritisation shown indicating focus on non-domestic meters as highest risk and some positive direction of travel in terms of seeking a risk-based approach but not clearly developed yet. Arcadis recommends a challenge to the need definition and the large scope of this programme due to lack of data and robust strategy in place. Value for money is unclear.

122k of a total proposed 281k meters replaced are domestic meters which are not used for revenue purposes. It is noted that domestic metering feeds into Small Area Metering and as such is part of the leakage monitoring / water balance programme. However, this volume of domestic meters is not currently well-justified to achieve this objective.

Insufficiently defined generic blended cost run rate with plans to gain better data in RC4 and adjust the outcomes achieved for the budget. There is a high risk of under-delivery and/or overspend without clearly understanding the need and outcome (for example leakage savings).

Previously metering programme was under the Design Build Operate contract but now it is brought in-house. There are challenges with the supply chain for availability of materials and meters on the market.

Arcadis' view is that the programme should be significantly revised and reduced, with a focus on maintaining billing, and minimum number of replacements to support leakage and consumption patterns.

# Deep Dive Assessments | Overview for cost reduction justification

## Early-Stage Projects – Wastewater

UÉ clarified, that the early-stage projects show in I&O spreadsheet across four themes (Water/Wastewater, Safety and Quality/ Availability and reliability) are not packaged programmes of work but instead a collection of early-stage potential projects that are bundled together for the ease of reporting in the I&O.

As each of the themes considers a budget of approx. 170-190m EUR, for the purpose of the deep dive analysis, a project example provided by UÉ per each theme is taken as a representative sample of the given theme and cost efficiencies are assessed accordingly. Arcadis identified two themes for cost efficiency improvements:

### **Wastewater - Safety and Quality theme (Dungarvan Wastewater Network Upgrade project example)**

Only one project example, Dungarvan per theme was provided. The need and outcomes are clearly set out. The optioneering seems comprehensive, the highest cost option was selected to go forward in line with early phase governance. Costing and risk documentation are inconsistent with significant data gaps. Whilst some risks have been mentioned in the documentation shared with Arcadis, there is concern on no singular project-related source of data on project risks to manage, quantify and cost risks. The project is set out to be delivered over the next 9 years, with initial project considerations starting in 2023, preceded by three years of asset surveys and modelling. An approximate timeline of 10 years indicates potential for efficiency introduction.

### **Wastewater - Availability and reliability theme (Glenbeigh WWTP upgrade project example)**

Only one project example per programme provided. Glenbeigh has clearly specified need and outcomes as well as optioneering but there are several questions on chosen solution. In particular, significant assumptions are made on project success around moving the discharge point, obtaining a new consent and obtaining the land. These are all key risks and require extensive and planned stakeholder engagement which is not visible in the documents. Some risks are defined and an allowance in costing provided. However, there remains concern on costing - overall budget looks light considering the overall scope. The majority of data provided is from early 2021 and no further updates are available.

UÉ confirmed that Glenbeigh WWTP is part of Small Towns and Villages Growth Programme and was de-prioritised due to funding. It had never progressed past approval gate 2 (AG2), so there is no preferred option selected. Currently it remains unclear what are the next steps for the project. Change management documents for project de-prioritisation are not available indicating poor governance.

# Deep Dive Assessments | Needs and optioneering

## Clearly identified needs

- For the majority of projects assessed as part of the deep dives, UÉ has clearly set out the needs and needs justification. At a programme level, needs identification is provided at higher-level only which at times is lacking the necessary detail.
- Out of the assessed projects, there were four in the Water portfolio, where needs were not clearly identified, or it was not possible to fully justify the need stated.
- The projects include metering programme which, in Arcadis' view, should be significantly reduced and purely focused on the minimum needs to aid the leakage detection and customer billing purposes. The Supply and Demand Balance programme and the CFC, Filtration and Sludge programmes lack need definition, creating a potential risk of the programme growing exponentially in cost and scope. The Adamstown WTP upgrade has ad-hoc need added (technology testing) which in Arcadis' view cannot be fully justified.

## Arcadis View

In Arcadis view, the above findings are indicative of a maturing organisation with mixed implementation of consistent processes. It is noted positively that needs are clearly stated for the majority of the assessed projects, giving confidence in UÉ focusing its RC4 funding on areas where genuine improvements are required, looking to address deficiencies across its network and services. The localised findings on needs' gaps show that there is an opportunity for improving the UÉ's assessment process, which will require more robust and consistent data on asset performance and condition. Further commentary on UÉ's asset understanding can be found in [Section 3.2 Asset Intelligence](#).

## Optioneering

- Across the deep dives, there has been a mixed level of evidence on optioneering. The governance made available to Arcadis shows long-list and short list of options considered for majority of projects, but details vary. Some projects provide a list of options considered with no evidence of robust and structured consideration prior to option selection. Other examples provide thorough analysis undertaken, with clear reasoning for why some options are considered and others not, underpinned by relevant data.
- During the deep dive review, it also became clear that there is an opportunity for UÉ to streamline some of its early stage optioneering. As per Ballinaspittle WWTP upgrade example, the initial optioneering considered a range of unsuitable options which did not respond to the need in the most efficient way, as per established industry practice. However, once the project budget was set, an appropriate solution was brought in by the team and chosen as a preferred option. This shows that the initial optioneering was incomplete and bypassed to choose the adequate solutions, indicating inefficiencies. This was also observed for Fenit WWTP upgrade.

## Arcadis View

Based on the findings, Arcadis recommends for UÉ to review its optioneering processes and seek to establish streamlined standardised solution selection process where known industry solutions are available and appropriate. A simple matrix of solutions with key criteria set out, can result in more efficient and auditable process. Introducing efficiencies to the process will also reduce the project timescale, overhead costs and provide more accurate cost and risk assessments from the onset of the projects.

# Deep Dive Assessments | Governance and risks

## Identifying, tracking and recording risks

Risk identifying, tracking and recording varied significantly across the projects reviewed with majority of projects identified for cost challenge having significant gaps in this area.

Where deep dive issues were identified, the risks were often generic and not project specific, making auditing difficult when trying to understand how risks were accounted for in project cost and scope. In several cases a central risk register was missing or not relevant to the project, with unclear mitigations, indicating gaps in application of the newly developed governance.

### Arcadis View

Managing project related risks and having an oversight of how risks develop from earliest stages is essential for effective project delivery, health and safety management, managing costs and limiting unexpected changes to budget and scope.

UÉ has been transitioning into the RCMS system which should aid consistent and central recording and managing of risks going forward. However, the review has shown that risk management is an area where further development would be beneficial.

More in depth review of UÉ's risk management processes can be found in [Section 3.4 Risk Management](#).

## Implementing governance

- Throughout the deep dive assessment, it has become clear that the quality and quantity of governance applied across the projects and programmes varies significantly. Record of need, optioneering, solution scope, risks, costs, deliverability and project management are available to a varied degree, from detailed information to none available.
- Whilst it is expected that the level of detail increases as each project develops and progresses towards completion, this level of increasing detail was not clearly evident from the sample of projects and programmes reviewed as part of deep dives. Some projects had complete governance and relevant information early on, whilst others were at or near the delivery stage with very limited data recorded.
- There were examples where old data (2020-2022) was provided with no up-to-date information recorded, which raises concerns about the process for reviewing projects in preparation for RC4 investment plan. In several cases, UÉ has shown that further steps were taken but records are not available.

### Arcadis View

Clear and complete governance around project development is essential to efficient delivery of Capex programme. Sufficient and standardised format of data, allows for streamlining process, helps to make decisions and avoid potentially costly mistakes. It also enables easier auditing and increases transparency on how the organisation defines, develops and delivers its portfolio of works.

It is evident that UÉ is a maturing organisation in early stages of implementation of its improved governance processes and policies. In Arcadis' view, UÉ should continue updating and reviewing governance for projects in preparation for future approval gates, aiming to achieve consistent recording and governance of projects for RC5 submission.

# Deep Dive Assessments | Cost Review

## Deep Dive Cost Assessments

Cost information across the reviewed projects was in general difficult to audit due to data gaps, unknown data freshness and inconsistent format in which the data was presented. However, a number of analyses were undertaken by Arcadis to identify trends and understand UÉ's approach to costing projects in practice, based on information available.

The cost assessment sought to answer the following key questions:

1. How does UÉ apply the risk contingency and uncertainty across Capex projects?
2. What is the proportion of cost built up from cost curves versus ad-hoc estimates?
3. Cost tracking: Are the key building blocks for cost clearly set out? Are cost data sources and cost data freshness tracked and recorded to allow audit?
4. In case of cost run rates, for large volume low-cost programmes, how are these built up and can they be benchmarked against England and Wales run rates?
5. Are there any significant project cost estimate changes between key approval stages?

For UÉ's cost processes and governance refer to [Section 3.5 Costing Methods](#).

# Deep Dive Assessments | Cost Review

## Risk contingency and uncertainty

- This assessment looked to understand how UÉ's governance on risk contingency and uncertainty is applied in practice across the 25 projects where cost data was shared. Accounting for contingency and uncertainties was seen in all of the projects data provided.
- As shown in the tables to the right, uncertainty levels usually aligned closely to Cost Approaches SOP, with 20 projects being in line with SOP, and 5 projects providing lower than SOP uncertainty allowance (5-18 percentage points lower). It is noted that, in general, UÉ's projects tend to add slightly less uncertainty than indicated by SOP in early stages 1 and 2 of project development, then aligning fully with SOP by Stage 3 during procurement of services.
- As seen in the tables to the right, risk contingencies allowances tend to be slightly higher than in SOP (between 2 and 10 percentage points higher). However, in most cases the actual monetary difference in contingencies was less than €1,000 except in one case, which is not of concern.
- For Water services below ground sub-portfolio, the programmes assessed via deep dives did not contain PCTs due to their nature (high volume, lower cost). Run rates were provided instead and these had on average a general contingency allowance of 12% for non-construction costs.
- Further comments on general appropriateness of the levels of contingency and uncertainty can be found [Section 3.5 Costing Methods - Managing Uncertainty](#).

Asset Category	Uncertainty	Average Uncertainty from Deep Dives
Stage 1	28.1%	26.7%
Stage 2	28.1%	24.2%
Stage 3a	11.6%	11.6%
Stage 3b	11.6%	11.6%
Stage 3c	11.6%	11.6%
Stage 4	0%	-

Asset Category	Reference Class Contingency	Average Contingency from Deep Dives
WSAG	19.8%	22.4%
WSBG	19.3%	12%
WWAG	21.2%	26.2%
WWBG	27.5%	33.5%

Source: *Uncertainty and Reference Class Contingency allowances based on UÉ's Cost Estimating SOP. Deep Dive packs analysis.*

### Arcadis View

Arcadis notes positively that both risk contingencies and uncertainties are applied consistently across projects, following UÉ's cost approaches guidance. It is worth noting that as part of the governance review ([Section 3.5 Costing Methods - Managing Uncertainty](#)) Arcadis recommended considering higher uncertainty allowances in early stages of projects to align better with industry practice.

# Deep Dive Assessments | Cost Review

## Cost curves vs ad-hoc cost estimates

- The purpose of this assessment was to gauge the level of confidence in data used for deriving the final cost estimate. Data based on cost curves is typically based on several cost data points, with governance in place to review the costs and assess its freshness, providing further confidence to the estimate.
- Ad-hocs are additional costs that relate to site specific issues, for example ground conditions or necessary equipment. These are not based on long term historical data and so are typically lower confidence estimates. Whilst this is acceptable in the early stages of a project, it leaves more room for variance in the actual cost.
- The review of the available data found that, out of 25 PCT extracts available, in six projects, ad-hoc costs made up more than 50% of the overall base estimate. Five of these six projects included a sufficiently detailed breakdown of cost build up, either as part of PCT line items or referencing a separate Estimate Assumptions & Allowances Tracker (EAAT), in line with UÉ's governance procedures.
- It was noted, that three of the six projects with high level ad-hoc costs were part of the Wastewater Pumping Stations Capital Maintenance programme indicating localised reliance on high ad-hoc cost elements to build up the base cost estimates.
- BME Capital Maintenance project with 88% of overall cost built up from ad-hoc estimates is at a very early stage of strategic assessment, where EAAT is used as the primary source of costing, thus in line with UÉ's governance.

### Arcadis View

Where PCT data was available, the majority of projects are built up from cost curves showing reasonable level of cost data robustness in deriving overall base cost estimates.

## Cost tracking and recording

- In general, UÉ has a reasonable level of cost data for its projects, however, the quality and quantity of the detail varies significantly. Key building blocks were set out although the supporting data to arrive to the estimates was often missing which allowed for high-level review only.
- UÉ provided PCT extracts for 25 project examples. The PCT extracts show cost base estimate with an indicated proportion of costs which was derived by cost curves and ad-hoc. The PCT also shows how contingency and uncertainty were accounted for, with detailed lines for on-costs such as planning and consents, archaeological surveys and internal and external project management costs.
- The cost run rates for large volume low-cost programmes vary in detail – some provide regional cost rates, others are divided per size or scope of interventions. Cost rates usually include 12% non-construction cost. In some cases, UÉ pointed out via further Q&A that cost run rates were based on newly procured framework, as in examples of leakage or lead replacement pipes programmes. Others are not specified or are assumed to be based on historic RC3 run rates adjusted to 2022 cost base.

### Arcadis View

Arcadis found it difficult to assess data freshness as this information was not usually recorded or available on a project-by-project basis however we did review the overall process for refreshing data as part of our top-down assessment and found the process to be good. However, where projects were costed with cost curves, there is greater confidence in data freshness, with regular reviews of data points required, as per the UÉ's costing governance procedures.

# Deep Dive Assessments | Cost Review

## Cost run rates benchmarking

To assess UÉ's cost efficiency for low-cost high-volume programmes, Arcadis compared available cost run rates data from UÉ with the run rates from England and Wales where applicable. This is a high-level comparison, and results are just for indicative purposes.

The following run rates were compared between UÉ and data extracted from Ofwat Price Review 2024 final determination decision paper (see table to the right)

- **Metering programme:** UÉ's metering rate is substantially higher than Ofwat benchmark. These are blended rates over the whole of RC4, calculated by the total capex of the metering programme divided by the number of meters installed/replaced. This links to overall challenges identified by Arcadis with the metering programme definition and proposal, see [Section 3.1 Deep Dive Assessments - Overview for cost reduction justification](#) for further detail.
- **Water mains rehabilitation:** the run rates are within Ofwat range. The Ofwat's high estimate is for London city, where Ofwat acknowledges higher cost pressures. The UÉ data is not detailed enough to create separate estimates for rural and urban mains, however, the blended rate is in the expected range.
- **Leakage/Pressure management programme:** the run rate costs are within Ofwat range. The UÉ's run rate is for gross water savings, which are estimated to be double net savings. It is unclear whether Ofwat estimates are for gross or net leakage reduction thus this run rate comparison should be treated with caution.
- **Lead pipe replacement rates** definition differs between Ofwat and UÉ (different section of pipe being replaced) thus cannot be directly compared. However, based on other comparable data from English and Welsh water companies give an average cost of €1372 per lead service replaced. This is significantly lower than UÉ's recently procured new cost run rates which also carry a risk of potential cost increases throughout RC4 [Section 3.1 Deep Dive Assessments - Overview for cost reduction justification](#).

Area	UÉ	Ofwat (Low)	Ofwat (High)
Metering	789	149	149
Mains Rehabilitation	760,000	360,000	1,416,000
Pressure Management/leakage	1,929,000	1,692,000	2,520,000
Lead Removal	3,194	1,372	1,372

*All values expressed in the table are in real 2022 EUR. Ofwat values have been converted from GBP using an exchange rate of 1 GBP = 1.2 EUR. Please note if comparing to data with a different base year, the British and Irish values need to be inflated with different indices.*

### Arcadis View

Run rates benchmarking should be considered at high level only. Based on the available comparative data, water mains rehabilitation and leakage reduction programmes are comparable to England and Wales average costs which is a positive high-level indicator of cost efficiencies.

Significantly higher than benchmarks cost estimates for UÉ's metering programme are a further evidence of an insufficiently defined and inefficient programme, further supporting the case for Arcadis proposed cost challenge in this area. Similarly, Arcadis notes opportunities for cost efficiencies and innovations within the lead pipe replacement programme to drive down costs and, at least, avoid further cost increases during RC4.

# Deep Dive Assessments | Cost Review

## Escalating costs - Standalone projects review

- This review sought to understand how often and to what extent costs escalate as projects develop. The data for this assessment was limited and applies only to stand alone projects, excluding programmes due to data gaps.
- The analysis focused on reviewing estimated total cost changes between each approval gate, where more than one gate paper was available. Percentage change from earliest gate paper (Gate 0) to the most recent paper was calculated.
- From the 34 deep dives, 10 projects had more than one gate paper available, and all of them were affected by cost estimate increases.
- Table to the right shows projects with identified cost increases and main reasons provided by UÉ. Four main reasons for estimate increases were identified:
  - Inflation: where the real cost of the project has not changed but inflation was higher than past predictions. This includes inflation as indexed by the HICP and real price effects.
  - Scope Change: changes as a result of better project understanding or feedback, often resulting in further optioneering and consultation periods.
  - PCT Update: In Q1/Q2 2023, UÉ adjusted the baseline cost models and standard contingency used in the PCT for WWAG and WSAG projects.
  - Delay: Significant delays result in additional fees for project management and additional inflation amongst others.

Project	Value (€m)	Latest Gate Paper	Total Cost Estimate Increase	Inflation	Scope Change	PCT Update	Delay (years)
Adamstown WTP Upgrade	17.2	AG3	37%			X	0.5
Drogheda WW Network Upgrade	8.8	AG1 (Uplift)	309%	X	X		2.25
Lough Talt WTP New	102.8	AG1	57%	X	X	X	0
Lough Mask WTP Upgrade	24.8	AG1	178%		X		
Midleton WW Network Upgrade	39.6	AG1	30%	X	X		0.25
Nenagh WWTP Upgrade	42.5	AG1 (2nd Uplift)	1016%		X		8
Regional Biosolids Storage Facility	48.3	AG3 (Uplift)	175%	X			5.5
Roundstone WWTP New	8.2	AG1 (2nd Uplift)	226%				9.5
Staleen to Duleek Water Network Upgrade	37.1	AG2	18%	X	X	X	6
Greater Dublin Drainage (GDD)	151.4	AG1	49%	X			2*

\* This shows future delay but does not account for several years of historic delay that GDD project has experienced due to planning consents.

# Deep Dive Assessments | Cost Review

## Escalating Costs Risk – Programmes

Whilst gate papers do not reveal programme cost estimate changes, Arcadis was able to establish areas of potential cost risk escalations and historical programme cost increases based on Q&A and deep dives review.

Through the deep dive reviews, three programmes were identified by Arcadis with a risk of potential cost escalations throughout RC4 with reasoning shown in the table below. All of these are also subject to the proposed cost challenge as set out by Arcadis earlier in this section.

Project / Programme Assessed	Investment Value (€m)	Comment
Supply Demand Balance Programme	46.9	Insufficiently defined programme that has a risk of growing exponentially.
Metering Programme	210.4	
Capital Maintenance Programme – Wastewater Above Ground Assets	290	Cost run rates based on old generic county level costs. New run rates are tested thus cost changes likely.

Additionally, UÉ has commented on escalating cost run rates between RC3 and RC4 for mains rehabilitation programme (€514m), with 55% increase between the regulatory periods. UÉ associated the increase with newly procured framework which reflects market prices (previous framework was from 2016) and increased requirements for roads reinstatement on works completion, imposed by the local authorities.

## Arcadis View

- Cost increases are a common part of Capex programmes across water utilities, however, it is of concern that all of the 10 projects under review experienced between 18% up to over a 1000% increase, indicating challenges with cost estimations.
- Arcadis notes that whilst UÉ has been implementing standardised cost estimation procedures across its organisation which are generally in line with industry practice, it will take time for these practices to be fully embedded and reflected on a project-by-project basis. This may be one of the reasons why project cost estimates have been changing over the time. Arcadis would expect for the project cost estimates to stabilise as the organisation matures and improved processes are fully embedded.
- The projects' cost increases are mostly attributed to scope changes and inflation. The cost escalations are also closely linked to project delays, impacting deliverability which is further described on the following page.
- Arcadis notes that scope changes usually occurred early on in the projects reviewed (AG). Whilst early on changes to project definition are more likely, the cost increases could have several root causes, such as poor project definition at the start with low quality data on assets shaping the decisions or optimism bias in early cost estimations.
- In case of significant cost changes, Arcadis would recommend additional project reviews to be undertaken by UÉ internally, to fully understand the cost drivers, and interrogate cost curves and other data to learn lessons and improve as part of the process. Arcadis notes that such reviews are planned by UÉ at the very end of each project, but there may be further benefit to provide additional review at each gate where costs have increased significantly.

# Deep Dive Assessments | Deliverability Challenge

## Deliverability challenges across portfolio

As part of the deep dive review, twelve projects/programmes were identified with potential deliverability challenge, including three which had historic challenges and delays (see table to the right)

- Within the 12 projects, Arcadis identified projects with likely overly optimistic timelines, considering the scope of work required, the stage of the project completion and/or lack of delivery partner in place.
- In some cases, the main concern was the number of risks identified but not mitigated, such as land and consent risks, discharge licences or commissioning risks. Lack of structured stakeholder management is seen across several projects which results in risks to deliverability where decisions depend on 3<sup>rd</sup> parties.
- The leakage and pressure management programmes are likely at risk of delivery due to internal UÉ’s resource/staffing shortages. Metering programme may be at risk of delivery due to insufficiently defined need and outcomes.
- A number of projects have faced significant delays historically, increasing the costs and requiring additional work. Nenagh WWTP upgrade is a particular example where the project has been in development over the past 11 years, being severely delayed. UÉ now plans to proceed to construction by Q4 2025.
- Greater Dublin Drainage Major Project has faced significant planning challenges which resulted in severe delays to the project. There remains deliverability concern, but it is positive to see that UÉ has robust mitigations in place (proposing carrying out the advanced works).

Project / Programme Assessed	Investment Value (€m)	Deliverability Challenge
Laugh Talt WTP New	102.8	X
Galtee Regional WTP Upgrade	8.2	X
Staleen to Duleek Water Network Upgrade	37.1	X
Find and Fix (Leakage)	530.6	X
Metering Programme	210.4	X
Pressure Management Programme	67.6	X
Nenagh WWTP Upgrade	42.5	X
Roundstone WWTP New	8.2	Historic
Regional Biosolids Facility	48.3	Historic
Early-stage Projects – Wastewater (Availability and Reliability)	170.6	X
Drogheda Wastewater Network Upgrade	8.8	Historic
Greater Dublin Drainage (Major Programme)	151.4	X

### Arcadis view

Based on deep dive analysis, there are a number of deliverability issues with projects and programmes worth over €1bn in value. Arcadis notes potential areas of improvement such as more structured stakeholder management, review of timelines for optimism bias and providing more robust risk mitigations for resource gaps. However, the remainder of projects analysed (over €3bn in value) have shown sufficient consideration for deliverability aspects. The mixed picture reflects a maturing utility organisation.

# Deep Dive Assessments | Capex Portfolio Management

## Challenges of a dynamic approach to portfolio management

- As seen through some projects from the deep dive assessment, the more complex projects are more likely to face substantial cost increases and delays as they are de-prioritised and moved around the portfolio, without a consistent structure approach to managing its scope, budget and timelines. This reflects the wider context and some of the disadvantages of UÉ's overall approach to how portfolios and programmes are managed:
  - With continuously changing set of projects to be delivered, inefficiencies are likely to be introduced to the programmes. Gaps in governance, additional costs as seen in cost escalations related to additional inflation, potential additional scope, contracting costs, and significant overhead cost increases amongst others.
  - It also affects the UÉ resources, with the teams remaining focused on continuously re-prioritising a set of interventions instead of shifting the focus to delivery of a fixed set of projects once early-stage investment decision making is complete.
  - The current governance supports the dynamic adjustments but also may risk introducing inefficiencies and impacting the delivery of the programmes. This relates to the relatively convoluted interaction between the investment decision making process and the I2O process as discussed in [Section 3 Capital Investment Processes and Governance](#) of this report.
  - The deep dives have shown that projects within the programmes of work are at a mixed stage of development and often are not fully defined, supporting the flexible approach to portfolio but also introducing inefficiencies throughout the constant priority shifts.

## Way forward

Arcadis understands that the initial Capex portfolio is set based on understanding of network needs aligned to organisation's strategic priorities. UÉ has evidenced this approach throughout the review and has explained how interventions are then prioritised, to the best ability of UÉ's teams, based on asset data available and risk-based assessment where possible.

This means that, whilst UÉ's asset understanding and data remains relatively poor in some areas, there should be a reasonably consistent set of known priorities and related interventions that should reflect the overall portfolio needs. In this case, Arcadis would expect minor changes only to occur throughout the Capex, mainly driven by external factors, such as other regulatory bodies or political pressures.

## Arcadis View

- UÉ's dynamic approach to portfolio management does offer agility to respond to changing priorities. As seen in RC3, partly due to its flexible approach, UÉ was able to significantly progress and deliver on its outcomes and outputs.
- However, in Arcadis' view, as the organisation matures, the changes and shifts to project and programmes make up should become less significant, with majority of the portfolio remaining fixed for the regulatory cycle.
- Based on deep dives, it is clear that there is a scope for cost efficiencies within the proposed programmes of work, noting the projects within the programmes are often not fully defined and delivery priorities shift.
- Changes to the portfolio should be applicable for extenuating circumstances only. Arcadis recommends that UÉ reviews its Capex portfolio approach over the RC4 and seeks to stabilise its portfolio management in readiness for RC5.

# Deep Dive Assessments | Cost Challenge Proposal

## Proposed cost challenge

- This section sets out how Arcadis derived the cost challenge based on the deep dive assessments. The complete Capex cost challenge proposed by Arcadis (including inflation and efficiency review) is set out in [Section 6 Proposed Cost Challenge](#) of the report.
- Arcadis uses the findings from deep dive assessment for two routes to cost challenge:
  1. Project/Programme specific cost reductions based on the findings from deep dives. This relates to 15 projects (out of 34) reviewed that had either insufficient evidence available to fully justify the expenditure or major issues found. The full table of projects affected is shown earlier in this section along with discussion of evidence (see [Section 3.1 Deep Dive Assessments - Cost Challenge](#)).
  2. Cost reductions extrapolated proportionately from the deep dive assessment. As the 34 selected for review are a representative sample of the overall portfolio, Arcadis opines it to be adequate to extend the cost reductions proportionately to the remaining network Capex (row E in the table to the right). A few exceptions apply and these are explained in table (rows B and D).

Overview of the cost challenge categories based on the deep dive assessment		
Category	Capex (€m)	Assessment Comments
<b>A</b> Total Network Capex	<b>8070.1</b>	Overall UÉ's request for network capital investment
<b>B</b> Water Supply Project	1504.4	Assessed separately outside of the price control period
<b>C</b> Deep Dives	4395.4	Deep dive of 34 projects and programmes leading to overall view on the Capex programme. Cost challenge applied to specific projects and programmes reviewed.
<b>D</b> Capital Maintenance (excluding part assessed through deep dives)	119.7	A portion of Capital Maintenance not assessed as part of deep dives. Overall CM spend in RC4 was assessed as adequate based on the econometric benchmarking (see <a href="#">Section 4.3 Capital Maintenance</a> ) thus no further cost challenges are recommended apart from the specific deep dive findings.
<b>E</b> Remaining Capex susceptible to cost challenge (A-B-C-D)	<b>2050.6</b>	Capex suitable for overall cost challenge, proportionately extrapolated from the deep dive findings.

# Deep Dive Assessments | Cost Challenge Proposal

## Arcadis' analysis underpinning cost challenges

- Arcadis proposes two options for deep-dive based cost challenge for CRU's consideration. A minimum of 5% (Option 1) and a conservative 10% (Option 2) cost reduction in the specified areas.
- In comparison, Ofwat proposed a cost efficiency of 10% or 20% depending on the data quality provided and the reductions are made to the deep dive projects only (PR24 final determination: Expenditure allowances, p.60).
- In cases where need cases were found to be inadequate, regulators (including Ofgem for UK gas transmission and electricity transmission and the German regulator BNetzA for electricity and gas transmission) typically disallow expenditure entirely.
- In this case, we have applied a flat 5% or 10% to all deep dived projects which we found to have inadequacies in evidence base or substantial issues.
- Arcadis has proposed halving the 10%/20% used by Ofwat on the basis that Ofwat regulated companies have gone through substantially similar regulatory cycles many more times and can therefore be expected to provide better data.

## Cost efficiency vs committed expenditure

- As part of the early consultations with UÉ discussing the Arcadis Capex analysis, UÉ has noted that majority of the proposed business plan is already committed with the supply chain and thus no cost efficiencies can be made to projects and programmes marked as Stage 4+ (delivery mode).
- Whilst this is likely the case for Projects past Stage 4, Arcadis notes that there remains a significant scope for cost efficiencies within the Programmes of work. A large proportion of programmes are marked as Stage 4, however, the deep dives have indicated a mixed picture on projects development stage within the programmes.
- Programmes marked as Stage 4 delivery contain projects that are not necessarily at the same stage of development. The deep dive analysis have found that many projects are in early stages of definition within programmes marked as stage 4, with some projects being dropped and replaced within the programmes as the regulatory cycle progresses. This links to the flexible approach to managing change across Capex portfolio discussed a couple of pages above in this report, which in Arcadis' view introduces inefficiencies to the projects' delivery.
- Whilst framework agreements might be in place for a large part of proposed RC4 work, based on the deep dive evidence, Arcadis opines there to be further opportunities in efficiencies as the projects within the programmes are defined, designed and delivered and thus cost efficiencies are applied as suggested in the report.

# Deep Dive Assessments | Cost Challenge Proposal

## Arcadis' analysis underpinning cost challenges

- The table to the right shows the analysis undertaken to arrive at the proposed cost reductions.
- 15 specific projects (row F) are affected by cost challenges derived directly from deep dives. These have a total value of €2.2bn (row G) which is about half (row H) of all the projects/programmes assessed via deep dives. Two options of cost reduction (row J) were applied to the value of affected projects from deep dives. The resulting cost challenge is shown in row K.
- As shown on the previous page, the deep dive findings and cost reductions can be proportionately extrapolated to the remaining network capex, excluding a couple of exceptions – the WSP major project and the remainder of capital maintenance programmes (row E). The cost reductions to the remaining capex are applied in the same proportion as deep dive affected projects (row H). This results in a value of approx. €1bn affected by cost reductions with two potential options (row J). The resulting cost challenge is shown in row L.

Arcadis proposes a cost challenge to network Capex elements based on the deep dive assessments:

- Specific reductions to 15 projects/programmes assessed - €108.4m (5%, Option 1) or €216.8m (10%, Option 2) (row K).
- A 5% (Option 1) or 10% (Option 2) reduction to the remaining network capex proportionately extrapolated from deep dive findings (€50.6m or €101.1m) (row L).

Cost challenge analysis based on the deep dive assessment			
<b>C</b>	Deep Dives	€m	4,395.4
<b>F</b>	Number of specific deep dive projects/ programmes affected	No	15
<b>G</b>	Value of specific deep dive projects/ programmes affected	€m	2,168
<b>H</b>	Proportion affected (G/C)	%	49%
<b>E</b>	Remaining Capex susceptible to cost challenge	€m	2,050.6
<b>I</b>	Value of remaining Capex affected proportionately to deep dives (E*H)	€m	1,004.8
<b>J</b>	Cost challenge	%	<b>Option 1 (5%)</b> <b>Option 2 (10%)</b>
<b>K</b>	Cost Challenge – Deep Dives (G*J)	€m	108.4      216.8
<b>L</b>	Cost Challenge – Remaining Capex (I*J)	€m	50.6      101.1
<b>M</b>	<b>Total cost challenge from deep dives (K+L)</b>	<b>€m</b>	<b>159</b> <b>317.9</b>

# Deep Dive Assessments | Summary

## Arcadis View

- The deep dive assessment has supported cost challenge to Capex portfolio and generated a number of recommendations.
- Out of 34 reviewed projects/programmes, 15 had incomplete information to enable cost justification or major issues were found. The most common areas of challenge relate to poor governance, accounting for risk and project costing estimates.
- Metering programme stands out in terms of insufficiently defined needs, outcomes, costs and high risks of deliverability. Arcadis recommends a challenge to the need definition and the large scope of metering programme due to lack of data and robust strategy in place. Value for money is unclear. Arcadis' view is that the programme should be significantly revised and reduced, with a focus on maintaining billing, and minimum number of replacements to support leakage and consumption patterns.
- In Arcadis view, the above findings are indicative of a maturing organisation with mixed implementation of consistent processes. It is noted positively that needs are clearly stated for the majority of the assessed projects, giving confidence in UÉ focusing its RC4 funding on areas where genuine improvements are required, looking to address deficiencies across its network and services. Continuous improvement is recommended to achieve consistent recording and governance of projects for RC5 submission.
- Based on the findings, Arcadis recommends for UÉ to review its optioneering processes and seek to establish streamlined standardised solution selection process where known industry solutions are available and appropriate. A simple matrix of solutions with key criteria set out, can result in more efficient and auditable process.
- Arcadis notes positively that both risk contingencies and uncertainties are applied consistently across projects, following UÉ's cost approaches guidance. Arcadis recommended considering higher uncertainty allowances in early stages of projects to align better with industry practice (see [Section 3 Capital Investment - Processes and Governance](#)).
- Where PCT data was available, the majority of projects are built up from cost curves showing reasonable level of cost data robustness in deriving overall base cost estimates.
- Arcadis notes that whilst UÉ has been implementing standardised cost estimation procedures across its organisation which are generally in line with industry practice, it will take time for these practices to be fully embedded and reflected on a project-by-project basis. This may be one of the reasons why project cost estimates have been changing over the time. Arcadis would expect for the project cost estimates to stabilise as the organisation matures and improved processes are fully embedded.
- Based on deep dive analysis, there is a number of deliverability issues with projects and programmes worth over €1bn in value. Arcadis notes potential areas of improvement such as more structured stakeholder management, review of timelines for optimism bias and providing more robust risk mitigations for resource gaps. However, the remainder of projects analysed (over €3bn in value) have shown sufficient consideration for deliverability aspects. The mixed picture reflects a maturing utility organisation.
- Changes to the portfolio should be applicable for extenuating circumstances only. Arcadis recommends that UÉ reviews its Capex portfolio approach over the RC4 and seeks to stabilise its portfolio management in readiness for RC5.

# Deep Dive Assessments | Key Sources Reviewed

A non-exhaustive list detailing the key documents and sources reviewed when producing this review.

Source Title	Document / Q&A / Workshop
Q&A responses	Q&A sheet
20241202 Uisce Éireann Revenue Control 4 (2025-2029) Network Capital Expenditure Look Forward FINAL	UÉ Document
20241202 Uisce Éireann Revenue Control 4 (2025-2029) BPQ FINAL	UÉ Document
12.02.2025 RC4 Network Capex - O&O and I&O	UÉ Document
Deep Dive Packs for the 34 projects reviewed	UÉ Document
21 <sup>st</sup> -22 <sup>nd</sup> Jan - 2 days Workshop in Dublin on Governance, Water and Wastewater Portfolios – presentations and meeting notes	Workshop
11 <sup>th</sup> Feb Security of Supply and Leakage Workshop – presentation and meeting notes	Workshop
31 <sup>st</sup> March Deep Dive Water Workshop - presentation and meeting notes	Workshop
2 <sup>nd</sup> April Deep Dive Wastewater Workshop – presentation and meeting notes	Workshop
7 <sup>th</sup> Feb Capital Maintenance Workshop – presentation and meeting notes	Workshop
10.01.2025 Q35- UÉ RC4 - RC3 Lookback Presentation - May 2024 Arcadis	Arcadis Document
PR24 final determination: Expenditure allowances, p.60	Public Document

## **4.2 Security of Supply and Leakage**

# Security of Water Supply | Overview

## Current water supply demand balance

- According to UÉ, about 50% of Ireland experiences a varying degree of supply demand deficit, with only a small number of areas affected by a critical supply deficit.
- The supply deficit is chronic in the Greater Dublin Area (GDA) due to high growth and issues with the existing water supplies. GDA remains a challenge due to the large population (about a third of Irish population) and supply network (similarly, about a third of all Irish water supply).
- Smaller areas are easier to manage the water balance, through simpler interim measures such as tankering water to the affected population. This for example applies to small islands which are tinkered during summer periods.
- UÉ believes that the water supply profile is much closer to the water demand profile than in the UK which means there is less room for developing long term adaptive approaches and more urgency to provide interim measures to avoid further deteriorating the existing supply deficit. This is observed nationally, but particularly in GDA.

### Arcadis View

Arcadis notes that there are a significant number of water resource zones in Ireland that experience water supply deficit. Arcadis believes the risk should be better quantified and discussed with CRU to understand the severity and scale of the supply demand challenges across various water resource zones. Measuring security of supply can help in highlighting this risk to political decision makers and show the positive direction of travel. This is discussed further in this section.

## 25-year supply demand balance for Ireland

- UÉ has undertaken a significant amount of work and stakeholder engagement over the past regulatory cycles to assess and develop plans for managing the water supplies nationally.
- The company has modelled the next 25 years of supply demand balance and sought to protect the water supply capacity and availability through a range of interventions over short, medium and long-term:
  - Short term – (approx. 5-10 years), the delivery of interim upgrade projects to sustain the Operational Capacity.
  - Medium term (approx. 15-20 years), drought plans are being developed to manage the medium and long-term risk of water availability.
  - Long term (20-25 years), UÉ considers the development of new large supply sources.
- UÉ sees leakage reductions as a significant part of its supply demand balance in the near and medium-term future, with action focused on water stressed areas which is in line with good industry practice. The current supply demand balance accounts for minimum target leakage reductions of 90MLD by 2030, which is accounted for in the overall UÉ's target leakage reduction of 121MLD in RC4. Further comment on the National Leakage Reduction Programme is available [Section 3.1 Deep Dive Assessments](#).

### Arcadis View

Arcadis notes positively UÉ's efforts to develop short-, medium- and long-term plans for managing water supply balance, with leakage reductions being used as a key measure in reaching the balance.

# Security of Supply | Greater Dublin Area

## Supply demand balance for Greater Dublin Area

- To manage supply demand balance in the Greater Dublin Area (GDA), there is a number of upgrade projects being planned and delivered, such as upgrades to Leixlip WTP and Ballymore Eustace WTP. UÉ notes that these projects will increase the capacity but not address the raw water abstraction issues.
- UÉ is also looking at a temporary short-term solution, considered jointly with an energy supplier to increase potential water availability from the Poulaphuca Reservoir on River Liffy, which provides significant water supply to GDA. The region's supply depends on River Liffy which is dammed, and the dam is operated by an energy provider, thus, a collaborative approach is sought by UÉ.
- The Water Supply Project is planned to contribute a significant supply increase to the zone by approx. 2035 and is an essential project to secure water supply resilience in the region.

## Water Supply Project and GDA Supply Resilience

- Initially, UÉ looked at almost 100 options to address supply deficit. Due to the scale of existing deficit, two options were found viable:
  - a desalination plant – rejected due to significant lead-in times which would not allow UÉ to meet the supply deficit in time.
  - the Water Supply Project (WSP) – found as the most feasible option which was further confirmed by a number of detailed reviews and developed collaboratively with a number of key stakeholders. Further details on WSP can be found in [Section 4.1 Major Projects](#).
- UÉ progresses WSP as the main option to address supply deficits in GDA. The WSP forms an essential part of supply demand balance modelling.
- UÉ confirmed that the baseline delivery schedule for the WSP is 2032. UÉ stressed that if WSP is being delayed, UÉ will impose a stop/ban on new water connections in the GDA by 2027. Initially, UÉ will restrict the non-domestic growth and then resolve to limiting the domestic growth. This shows the importance and urgency of the WSP to be progressed and delivered on time.
- In the meantime, UÉ has interim solutions in place for GDA which help to satisfy the operational water demand.

### Arcadis View

Arcadis notes the importance of delivering WSP within timelines to avoid limiting growth in the Great Dublin Area and provide security of supply long term. It is positive that UÉ has interim measures in place to satisfy the operational demand in GDA short term.

# Security of Supply | Planning tools

## Drought Action Plans and Water Conservation Orders

UÉ has a range of measures at different stages of maturity to help manage the supply deficit and protect the water supplies.

- **Drought Action Plans** help water companies to manage water supplies and protect the environment during dry periods. The plans include a set of clear actions to manage droughts with escalation steps based on level of water supply risk. Currently, UÉ is in the process of developing such plans for a number of high-risk areas in Ireland. There is also ongoing work to develop better data and understanding of drought risk, by completing relevant modelling for surface water and ground water sources.
- **Water Conservation Orders (WCOs)** are legal rulings to recognise the value and protect the water bodies. As it is a legal process, UÉ needs to demonstrate the need for the Order and engage in a consultation process which impacts the timelines of implementing such orders. UÉ has developed a structured process to obtain WCOs, with UÉ having the authority to sign off on the proposal and notify the minister. GDA is an example where a water conservation order was used in 2018.

## National & Regional Water Resource Plans

### Current Plans

- As part of the National and Regional Water Resource Plans, UÉ developed a preferred approach to manage water quality and quantity in each water zone.
- Each NWRP preferred approach is a starting point which is further developed with potential alternatives and interim measures put in place as each project progresses through I2O Gated stage and Workshops.
- Arcadis views positively the strategic and comprehensive approach used as part of the National & Regional Water Resource Plans to increase supply resilience across UÉ's operations.

### New Plans in development

- As part of the next iteration of NWRP v2 which is planned for 2028 (towards end of RC4), UÉ wants to develop detailed plans for the key water resource zones. These would account for interim options which help manage resources in the short and medium term while long term solutions are being developed and implemented.
- NWRP is an ongoing process and there is a number of RC4 activities underpinning the final NWRP v2 proposals. These include developing capital asset plans, drought planning activities, modelling of water resources and updates based on most recent data and system understanding.
- The NWRP v2 process is similar to the first version of the plans, with UÉ engaging a wide range of stakeholders in the development of the more detailed plans.

# Security of Supply | RC4 Portfolio

## Overview of RC4 Security of Supply-Focused Investment

- RC4 Investment Portfolio indicates UÉ's focus on improving the resilience and security of supply across its operations. More than half (53%) of overall RC4 budget seeks to satisfy the WSSP objective of ensuring safe and reliable water supply in Ireland.
- Some of the key investment includes:
  - Supply Demand Balance Programme – focused on investigative work to identify new groundwater sources. Programme is a result of NWRP findings.
  - National Leakage Reduction Programme – which covers a range of programmes such as Find & Fix, Pressure Management, Mains Rehabilitation, Metering, First Fix.
  - Leixip WTP Upgrades,
  - BME Upgrades,
  - Galtee Regional WTP Upgrade,
  - Water Supply Project.

### Arcadis View

Based on UÉ's presentations and RC4 Business Plan data, Arcadis is satisfied that the UÉ's investments choices and scope of works for strengthening security of supply seems reasonable and will provide further resilience to the overall system.

# Security of Supply | Reporting metrics

## Security of Supply Metric

- Historically, UÉ has not reported on security of supply index metric (SoS) which highlights the issues with the supply demand balance across the operational area.
- For RC4, UÉ proposes abandoning SoS as a metric, because in UÉ's view it is not suitable to Irish water infrastructure context, and it does not support wider strategic upgrades of the network.
- It is UÉ's view that the SoSI was derived for UK water at a stage when those companies were long established. It consists of a single company-wide score which results in the potential for large deficits in large population centres dominating the index (due to population weighting). Using this methodology would lead to prioritisation of supply issues at the largest WRZs
- Arcadis agrees that the population weighted nature of the SoSI drives investment to the largest population centres: since the scores are combined linearly, this can lead to a moderate risk of water supply shortfalls in the largest population centres (i.e. the Greater Dublin Areas in this case) "outweighing" very high risk of water supply shortfalls in small towns and village systems. This is the challenge faced by any aggregate metric, i.e. that such a metric may not adequately incentivise improvements to service for small areas.
- UÉ notes that as part of the Dry Year Critical Period planning scenario **355 of its WRZs (66 per cent), supplying a total of 3.66 million customers are not providing a 1:50 level of service.**
- Instead, UÉ proposes developing a new more detailed Supply Demand Balance (SDB) metric for key water resource zones. The new SDB would be used as a baseline to track resilience improvements across the networks. The proposed metric will differentiate between:
  - Average operational capacity/average demand.
  - Capacity for a 1 in 50-year event compared to average demand.
  - Operational headroom compared to average demand.
- The SDB metric in general terms, looks at average capacity by average demand of a system (1/1). The Ofwat SoS metric focuses more on 1 in 20-year or 1 in 10-year events which is better suited for a more mature utility with greater system headroom.
- The proposal is to build capability to report these over the course of RC4 with the intention of reporting from the 2029 reporting year (first report in 2030) and to provide progress reports during RC4 on that capability building. They propose to report for the Category 1 (73 per cent of the population) and the 17 key towns within the Category 2A Water Resource Zones (WRZs)
- UÉ plans to complete data collection for a sample of five WRZs and use this to finalise the metric methodology.

# Security of Supply | Arcadis View

## Arcadis View

- There are several challenges with the approach proposed by UÉ.
- First, the targeting on Category 1 and 2A WRZs fails to solve the problem of the smallest communities not being sufficiently weighted in SoSI. In the UÉ proposal these communities simply will not be included at all.
- Second, an aggregate measure of supply adequacy, however flawed it might be in theory, has the advantage of providing a summary number for external stakeholders.
- Third, UÉ is proposing to replace a metric which it was already required to report in RC3 with a set of metrics which would not be reported until RC5, and with only reporting on progress towards the readiness of this reporting during the whole of RC4, leaving one of the most critical parameters of system performance without an outcome measurement during the whole of RC4. UÉ indicates that its focus during RC3 and RC4 has been and will be elsewhere which is why it is not in a position to report on these metrics earlier. This does not seem to be an adequate explanation since UÉ has been making representations for several years on the inadequacy of the existing SoSI measure. That being the case, it is incumbent on UÉ to be prepared with its new measures on a much faster time scale than end of the period (ideally from the beginning of the period).

## Arcadis View

Arcadis would propose that:

- Some form of aggregate metrics for security of supply are retained. Two of the three proposed metrics could form the basis for such metrics, for example the percentage of population served by WRZs which do not have adequate capacity in average years or 1:50 years can be calculated from the first two proposed metrics and would be easier for external stakeholder to understand. Keeping these as separate metrics rather than combining them as in SoSI would help resolving the issue with SoSI, which is that it may prioritise marginal improvements in very large WRZs at the expense of resolving critical issues in smaller WRZs.
- All WRZs should be covered, and not just Category 1 and Category 2a. While Arcadis accepts that it may be proportionate to model smaller WRZs in less detail and therefore accept greater uncertainty in the supply demand balance in these cases, it is not acceptable not to model them at all.
- UÉ should be required to accelerate its proposed programme for reporting on its security of supply metrics rather than taking all of RC4 as an implementation period for reporting in RC5. UÉ has proposed reporting progress towards the reporting in RC5 but without proposing a concrete programme for what it will do when in the period or offering interim reporting of some WRZs in-period. It is not acceptable for there to be no reporting on security of supply metrics during RC4.

# Security of Supply | Arcadis View

## Arcadis View – Security of Supply

- Arcadis notes that there are a significant number of water resource zones in Ireland that experience water supply deficit. Arcadis believes the risk should be better quantified and discussed with CRU to understand the severity and scale of the supply demand challenges across various water resource zones.
- Water supply resilience is not currently at the level that Arcadis would consider desirable nor at the level that UÉ considers desirable for the long term.
- In general, UÉ's approach to managing the existing deficit and secure future water supplies is reasonable given the historical situation and is developing in the right direction. Arcadis notes that delays to WSP could lead to connections restrictions in the GDA and that UÉ must proceed with the project at pace.
- However, it is important to note that there is significant amount of work required to build data and asset understanding which will support further decision making. This is visible in cases such as Drought Action Plans or further detailed and interim measures for developing the NWRP v2.
- Arcadis notes positively the focus on developing the short, medium and long-term solutions, particularly for the Greater Dublin Area. WSP forms a key part of this plan and future growth in the area is dependant on the successful delivery of this major project.
- Similarly, the leakage reductions are key to achieving supply security, however, as noted in [Section 3.1 Deep Dive Assessments - Overview for cost reduction justification](#), there are concerns over the deliverability of the leakage reduction programme in the expected timelines. This will have an impact on the short, and medium-term supply demand balance and mitigations should be further detailed by UÉ to manage potential risk of under-delivery.
- Going forward, Arcadis recommends increased visibility and transparency of the Supply Demand Strategy. A clearer, coherent strategy should be developed, showing all supply and demand side needs, projections, and relevant interventions with risk mitigations to allow for more structured and focused joined-up approach across the organisation. Regular updates to CRU on key milestones achieved and changes to existing or emerging risks should be reported as part of annual CIP reporting.
- Annual reporting should include any changes to the project cost and schedule forecast and progress made against the plan in the period. If UÉ is producing internal Quantitative Cost/Schedule Risk Assessments then it should share the outcome of these as part of this reporting in order to give the CRU a view of project risk at the P10/P50/P90 level.
- Additionally, Arcadis recommends reporting a Security of Supply metric with immediate effect for regulatory purposes, whilst UÉ develops a more suitable supply demand balance metric throughout RC4. It is essential to have a total risk metric shown for the overall system despite the existing caveats and assumptions.

# Leakage | Historical Performance

## Historical RC3 Leakage Performance

- The RC3 leakage reduction target was 177.5 MLD, with 162.5 MLD reductions on public side and 15 MLD leakage reductions on customer supply pipes.
- UÉ noted quick and successful start to achieving the output followed by slower period, where UÉ found it challenging to achieve significant net annual leakage savings. This was further exacerbated by limited UÉ internal staff resources on the programme related to the ongoing UÉT.
- UÉ did not meet its RC3 targets, however the scale of underperformance was unknown at the time of writing the report. This is due to the leakage calculation method being under review.

## Project Optimum – Operational leakage improvements

- Project Optimum was set up to improve leakage programme effectiveness, review potential for data improvement and explore other leakage reduction methods.
- Project Optimum supports the business as usual, operational leakage activities particularly in the Greater Dublin Area (GDA). This is in addition to large Capex programmes such as Find and Fix, Mains Rehabilitation, Pressure Management and Metering which seek to reduce overall system leakage.
- The project commenced in January 2024 and has had an independent oversight from the Water Research Centre in the UK.
- As a result, the project identified 13 priority initiatives such as addressing leak repair backlogs, proactive targeting of customer side leak repairs, trunk main repairs and addressing data issues with leakage reporting. Each initiative has a clear objective/output which UÉ plans to track throughout the programme.
- UÉ noted initial benefits from testing the initiatives from Project Optimum across the GDA, such as stabilising water volumes supplying the zone and achieving some localised point in time leakage reductions. Further pilots are ongoing and UÉ has plans to roll out the initiatives nationally once testing in GDA is completed.

### Arcadis View

UÉ has not met its leakage targets in RC3 and in Arcadis' view this will be an ongoing challenge in RC4 and beyond.

# Leakage | RC4 Leakage Reduction Programme

## RC4 Leakage Reduction Targets

- UÉ aims to reduce leakage by **121 MLD** in RC4. It is noted however, that these numbers might change following further requirements set at the European Union level which will become available later in the RC4.
- Targeted reductions are lower in year 2025 and 2026 followed by significant annual reduction increase for the remainder of RC4. This is to reflect the internal resourcing challenges related to UÉT which is planned to be completed by end of 2026.

The UÉ's **National Leakage Reduction Plan** is focused on both Opex and Capex initiatives, with Opex managing reactive works of burst repairs and Capex allowing for planned interventions as part of a set of programmes:

- **Find and Fix** – proactive leakage control by locating and repairing leaks on the public supply network.
- **First Fix** – repair of domestic customer side leaks.
- **Pressure Management** – managing water pressures throughout the networks to minimise the risk of leaks and pipe bursts.
- **Mains Rehabilitation** – renewing assets based on condition assessment and operational data to reduce risk of leakage and pipe bursts.
- **Metering** – improving data collection on network losses.

## Prioritising highest leakage areas

The Leakage Reduction Programme has some level of high-level planning and prioritising shown, with the following steps:

- Targets set at the local level (from district metered area to county level) and reviewed to achieve the overall national reduction target.
- Areas are categorised and prioritised based on highest leakage risk. Water-stressed areas are prioritised in line with good industry practice.
- Areas with highest leakage risk are then looked at in detail to develop a plan of interventions.

However, UÉ is only developing improved data and data auditing which underpins the prioritisation process. The company is moving in the right direction, but data quality is unknown and will evolve over the several regulatory cycles.

## Arcadis View

UÉ has ambitious reduction targets in place for RC4 underpinned by a number of programmes to enable the delivery. Some level of prioritisation is visible although existing network data is scarce. Arcadis notes that there may be deliverability challenges in achieving such leakage reductions which are further discussed on the next page.

# Leakage | RC4 Deliverability Key Challenges

## Resourcing & strategic challenges

Resource challenges within the Leakage team are still ongoing since RC3 and very likely to continue throughout RC4, with particular gaps in the Operational field leakage teams.

UÉ is aware of its staff shortages and has created a national leakage reduction team to focus the efforts of the programme which is seen as positive step in the right direction.

UÉ also plans to use a range of internal resources combined with external contractors to deliver the National Leakage Reduction Programme.

### Arcadis View

Whilst UÉ has made some steps in the right direction, it is highly likely that resourcing challenges will remain at least in early stages of RC4 and thus, there is a risk of deliverability of the ambitious leakage targets, despite of the phased increases.

Arcadis notes that through deep dives, it was found that UÉ has relatively ambiguous and not clearly defined mitigation plans in place for the key programme delivery risks, including resourcing challenges. This further increases the likelihood of potential deliverability challenges.

Furthermore, Arcadis notes that there is no clear central document or strategy available which shows and quantified how each programme and intervention contributes to and builds towards overall leakage reduction targets. The information currently available is high-level and appears to be lacking structure, with further developments undertaken by UÉ.

It is recommended that UÉ focuses its efforts in gathering relevant data, defining clear strategy underpinned by a robust action plan with measurable mitigations in place for managing potential resource shortages, to provide further confidence in how leakage targets will be achieved in RC4.

## Setting more ambitious leakage targets

Arcadis understands that there is an ongoing discussion on potential leakage target increases that could be set by the European Commission in order to drive action in leakage reduction.

In Arcadis view, given the current state of knowledge on leakage, increases in ambition are best targeted at improving the asset condition understanding and improving current leakage measured in order to set increasingly robust and measurable targets in future price controls.

If more ambitious targets are to be set, Arcadis recommends targeting water resource zones where further leakage reductions can defer or remove the need for new supply additions instead of providing a company-wide target. The latter would risk a leakage reduction programme overly focused on inefficient “target chasing” rather than maintaining focus on high yield investments.

# Leakage | Economic Leakage Reporting

## Sustainable Economic Level of Leakage Metric

- For the EU Drinking Water Directive, Ireland has to report on the 'potential for improvement' for leakage. UÉ is currently proposing to use Sustainable Economic Level of Leakage (SELL, and as an interim measure just ELL) to measure this potential.
- CRU has a new function in reviewing and assessing the economic criteria of leakage, whilst EPA is responsible for reporting on methodology.
- UÉ confirmed that leakage calculations are completed separately for supply and customer side, with the calculations for supply side reviewed by HR Wallingford.
- During the workshops, UÉ confirmed that as part of the new reporting requirements, it has identified areas that require leakage assessment in line with the new policy. As a result, UÉ identified 23 water resourcing zones (covering 72% of total population) that need to meet new reporting regime. UÉ scored these zones in terms of highest leakage risk and plans to prioritise works accordingly.

## Arcadis View

- Arcadis opines that SELL is a reasonable methodology and note that this assessment is per supply system and not a cumulative one. Arcadis opines that the SELL for UÉ can be built up through adding together per supply system calculations, however, there is not a cumulative cost/benefit trade-off curve for the whole company because leakage reduction has different costs and benefits in different systems. This means that a SELL in a water stressed system will not be the same as that in a rural area service a small community with water supply surplus.
- Using ELL as an interim measure is reasonable and helps to move UÉ towards a future use of SELL. Arcadis recommends that any systems and models that are set up for calculating ELL are future-proof for SELL through including the sustainability elements in the model (potentially set at value = 0 for now).
- UÉ shall also set out a clear path to transition from ELL to SELL, including any phasing (e.g. moving to SELL in known water-stressed areas first, or use of generic/non-site-specific interim values for the sustainability model).
- Finally, Arcadis notes that in practice, ELL and SELL levels are relatively close to each other based on other European systems and that the main purpose for (S)ELL is to drive efficient action on leakage reductions. For this reason, Arcadis notes that the focus should be on whether the tool drives the right operational and capital interventions in the systems, and, based on Arcadis experience, it is highly likely that, based on UÉ's current leakage levels, the programmes of interventions produces by ELL and SELL would be very similar.

## **4.3 Capital Maintenance**

# Capital Maintenance | Overview

## Capital Maintenance Overview

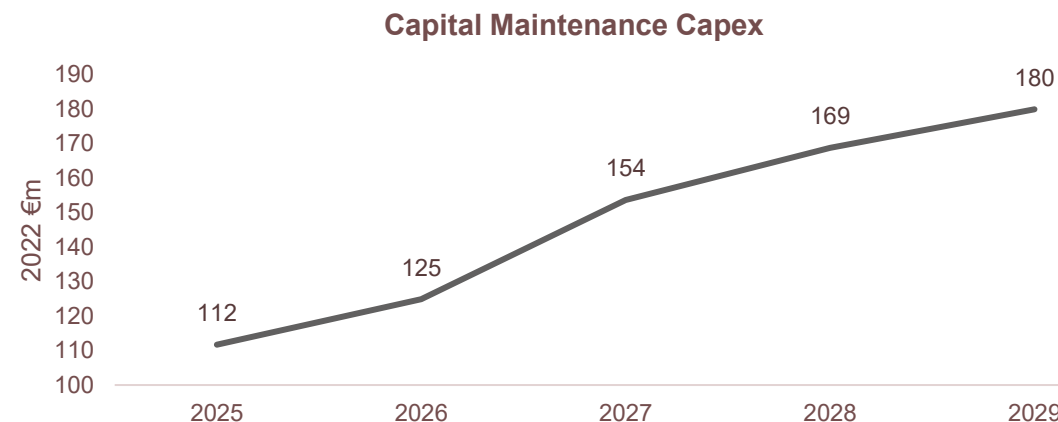
Capital maintenance programmes focus on asset interventions to upkeep the same level of service. This also includes asset compliance and reducing additional operational cost. The difference between operational maintenance and capital maintenance are shown in the table below.

Capital Maintenance	Operational Maintenance
Funded by Capex, higher cost	Funded by Opex, lower cost
Large and infrequent upgrades	Smaller and regular fixes
Upgrading and maintaining assets for long-term use	Day to day upkeep of infrastructure

UÉ manages its capital maintenance activities using enterprise system Maximo for approving the required asset interventions and Oracle for financial management.

## UÉ Capital Maintenance Programmes

UÉ's RC4 business plan I&O sheet, indicates investments focused on capital maintenance with a total value of €739m, an increase of 45% from the Capex spent in RC3.



# Capital Maintenance | Reactive maintenance

## Reactive capital maintenance and plans for proactive asset management

UÉ has been gradually developing its approach to capital maintenance. The organisation is in early stages of developing a planned approach to managing its assets maintenance, with majority of capital maintenance works being reactive response to failure or near failure, reported by the field Operations teams.

This means, that the organisation currently has a very limited understanding of its assets condition, and a significant amount of work and data gathering is required to optimise the performance and prioritise investment needs.

UÉ looks to complete site-level (high-level, low granularity) asset mapping for key sites by the end of RC4, with only some pilot sites looking to achieve asset level (detailed, high-granularity) mapping. At the workshops, UÉ confirmed that pilot sites selection process is currently at very early stages and support processes are being developed, with possibly only one pilot site planned in the coming year.

### Arcadis View

In Arcadis view, this shows that UÉ still has a long route towards a data driven proactive, planned capital maintenance. UÉ looks to reach a steady state in asset condition by RC5, however this seems challenging, considering the limited knowledge of their assets' current state.

## Pressure Vessels and Electrical Programmes – early adopters

- Both, the pressure vessel and electrical capital maintenance programmes are the first asset groups where UÉ is seeking to move towards risk-based approach.
- This means that interventions will be prioritised based on risk, which is the first step towards proactive maintenance.
- UÉ is finalising a regular inspection regime for both programmes which will help to collect quality asset data and condition information to inform future investment needs.
- Even though the programmes are most advanced in terms of moving towards proactive asset health management, there is still large data collection exercise required to manage assets at an individual asset-level that UÉ aims to complete by the end of RC4.

# Capital Maintenance | Planned development

## Teams and resources

- UÉ plans to consider preventative maintenance on critical sites once all Operations teams are within the UÉ, following the UÉT. UÉ defines critical sites through a critical asset register (at a site level) which is currently being reviewed.
- UÉT is seen by UÉ as one of the main bottlenecks in improving and standardising asset maintenance and data collection from across the networks. There is a risk to delivering the priority CM programmes during the transition period (end of 2026) as UÉ will rely on access to site and Operations team's data and asset understanding which may not be fully embedded in the UÉ structures.
- UÉ plans to develop a new asset operations structure where the frontline field staff will be supported by centralised specialist teams in water and wastewater. The approach is yet to be developed as part of the transformation phase once the UÉT is complete.

## Arcadis View

Arcadis recognises the challenges UÉ faces with transitioning staff and difficulties accessing the relevant data. Team changes will likely take time to complete and similarly, time will be required to embed a consistent approach throughout the operations. Arcadis notes that this may further impact the timelines of transitioning from reactive to proactive maintenance and recommends a continuous focus from UÉ on developing and embedding its planned CM strategies.

## Asset Management Plans and Certifications

- **ISO 55001 Asset Management Certification:** Overall, UÉ has set out a path for the organisation to shift from largely reactive to planned and proactive capital maintenance, with a long-term ambition to attain the industry ISO standard in asset management. However, no timeline was set to achieve such standard.
- **Asset class strategies:** planning for the 20-30 years horizon for each asset class. UÉ is at the start of the process of developing these. The short term, 1 to 2-year horizon programme strategies are developed for all assets, however, data varies based on asset groups and location.
- **Statutory programmes:** In RC3, there was a focus on statutory inspection programmes which resulted in setting up separate electrical and pressure vessels programmes to drive improvements. UÉ plans to expand statutory programmes in RC4 to include compliance requirements related to gas monitors, ATEX, fire and ladders.
- **Risk-based prioritisation:** UÉ plans to embed risk-based prioritisation of asset capital maintenance in RC4 (starting on spend above 50k EUR), supported by a centralised decision making and delivery model which is currently in development.

## Arcadis View

UÉ has a significant amount of groundwork to complete to improve its asset management and CM practices in line with good industry practice. Based on overall Capex portfolio, Arcadis notes that each UÉ team has its own way to assess and manage asset risk, without having a central asset management and CM system which UÉ is working towards. Arcadis notes a positive direction of travel and recommends UÉ to set out a clearly defined timeline for achieving ISO certification that the organisation can work towards to manage asset health long term.

# Capital Maintenance | Costing & Delivery Mechanism

## Delivery of CM programmes

Till recently, the majority of CM works have been delivered by the local authorities and their local contracts.

In RC4 UÉ plans to deliver CM works through a centralised delivery model (to be embedded in 2025), supported by two procurement models:

- Minor maintenance and like for like replacements (scoped by Technical Operations teams)
- Major maintenance for more complex works requiring design and consents (main Infrastructure Delivery mechanism).

UÉ has used lessons learnt from RC3 to improve the delivery of its CM programmes:

- Staged delivery: instead of procuring full scope of works at once (from feasibility study through detailed design to construction), UÉ now packages works separately per each stage, to give UÉ more control over work completed by the contractor at each stage and make more informed decisions on how to progress each intervention.
- Standardised processes from design development all the way to commissioning
- Creating a single centralised delivery team structure with regional delivery framework flexibility.

An example of a CM programme in delivery is the electrical programme which is divided into four regional contracts awarded from the existing Minor MEICA overarching framework. It's a 4-year period contract with a value up to €70m.

## Costing of CM programmes

The overall budget is split for two types of work linked to delivery streams (interventions above €50,000 and below €50,000).

The RC4 capital maintenance programme is based on 2020-2023 run rates. However, these run-rates were based on average spend per each county. UÉ has now moved to run rates that are based on asset type/process and these are derived centrally. However, old data is still used as the new run rates are being tested to understand if they reflect reality. This means likely changes to run rates and requirements throughout RC4.

## Arcadis View

It is positive to note UÉ's embedding lessons learnt from RC3 into its RC4 planned delivery. The approach to delivery looks reasonable and in line with industry practice. However, Arcadis notes that the UÉT process may impact negatively timelines and ambitions for CM programmes delivery over the RC4 as discussed on the page above. Clear risk mitigations along with active management of projects and will be required to support level of delivery required in RC4.

Arcadis notes that costing is at early stages of development reflecting scarce and incomplete data which may result in cost increases throughout the RC4. Close monitoring and driving efficiencies in delivery will be necessary to avoid significant overspend.

# Capital Maintenance | Wastewater Pumping Stations Programme

## Wastewater Pumping Stations (WWPS) Capital Maintenance Programme

### Programme overview

- The programme aims to manage assets and service risk of existing wastewater pumping stations. There has been a significant underinvestment in this asset based which means that all WWPS assets require capital maintenance interventions.

### Asset understanding

- So far, the WWPS team completed early-stage technical reviews of about 10% of all assets. This means that the team could assess these assets' condition and decide on interventions required in short medium and long term. It highlights the large scope of work still required to be completed to gain better asset base understanding and make informed investment choices.
- The WWPS programme is still reactive in nature, however the team has a strategy in place to move towards proactive maintenance.

### Data inputs

- Currently the WWPS relies heavily on Operations team to feed in data on the asset needs. Data is then logged in the Maximo database which serves as an inventory of all assets. The contractors are then engaged to develop detail design and deliver the improvements.
- The team has developed a consistent assessment form to capture better data and help in scope and cost estimation.

Further details on costing challenges are discussed in [Section 3.1. Deep Dive Assessments - Overview for cost reduction justification](#).

# Capital Maintenance | NERA Econometric Benchmarking

## Introduction

- This section of the report sets out analysis undertaken by NERA to assess the adequacy of overall level of UÉ’s spend on capital maintenance. The analysis looks at a wider definition of interventions that contribute to upkeeping existing level of service within UÉ’s business plan and compares this value to other English and Welsh water companies.
- The result of this econometric benchmarking helps to show that, when compared to England and Wales, UÉ proposes a reasonable level of overall funding to upkeep its assets throughout RC4.

## Overview of UÉ’s proposed RC4 capital maintenance expenditure

- UÉ’s proposed designated capital maintenance programmes have a total proposed investment of €739m over RC4, with €273m invested in water and €466m invested in wastewater.
- Table below shows the list of designated capital maintenance programmes at RC4. Most of the proposed programmes have an estimated completion time during RC4, except for “Drogheda WWTP Capital Maintenance” programme which is expected to finish post-RC4.

Programme	2025	2026	2027	2028	2029	Total RC4
Capital Maintenance Programme - Wastewater Above Ground Assets	46.79	45.57	59.21	68.5	69.89	289.96
Capital Maintenance Programme - Wastewater Below Ground Assets	12.41	13.86	7.63	10.96	11.39	56.25
Capital Maintenance Programme - Water Above Ground Assets	44.88	43.86	56.99	58.99	67.82	272.54
Wastewater Pumping Station Programme (Capital Maintenance)	6.69	10.48	16.22	14.33	16.17	63.89
Drogheda WWTP Capital Maintenance	0	3.14	8.07	10.56	12.49	34.26
Dundalk WWTP Capital Maintenance	0.83	7.93	5.47	5.37	2.1	21.7
Ringsend WWTP Capital Maintenance	0.09	0	0	0	0	0.09
<b>Total</b>	<b>111.69</b>	<b>124.84</b>	<b>153.59</b>	<b>168.71</b>	<b>179.86</b>	<b>738.69</b>

Source: UÉ (December 2024), Uisce Éireann Revenue Control 4 (2025-2029) BPQ FINAL.xlsx.

# Capital Maintenance | NERA Econometric Benchmarking

## Base maintenance cost allocation in the Business Plan

- However, the designated capital maintenance programmes are not UÉ’s total investment in capital investment, as the programmes do not cover the effective capital maintenance included across UÉ’s entire capital programme, such as the capital maintenance delivered as an element in UÉ’s quality programmes/projects.
- UÉ’s proposed expenditure in capital maintenance can better be identified from base maintenance cost allocation provided in the BPQ I&O worksheet, where UÉ has allocated its project costs by regulatory purpose (i.e. the QBEG allocation, which stands for quality, base maintenance, enhancement and growth).
- Table below summarises UÉ’s base capital projects/programmes grouped by asset type.
- NERA identified base maintenance investment totalling €1,511m, with 30 per cent allocated to water assets, 46 per cent allocated to wastewater assets, and the rest (24 per cent) grouped into non-asset investment.
- Among the €1,151m capital maintenance associated with water or wastewater assets, around 85 per cent is expected to be invested in above ground non-infrastructure assets, 12 per cent is expected to be invested in underground infrastructure assets, and the remaining 3 per cent serves multiple purposes.

Programme	2025	2026	2027	2028	2029	Total RC4
<b>Water</b>	77.99	81.47	91.37	98.75	107.36	456.94
<b>Wastewater</b>	94.94	112.92	150.37	166.97	168.89	694.09
<b>Non-Asset</b>	53.28	74.98	76.75	77.19	77.82	360.02
<b>Total</b>	226.21	269.37	318.49	342.91	354.07	1,511.05

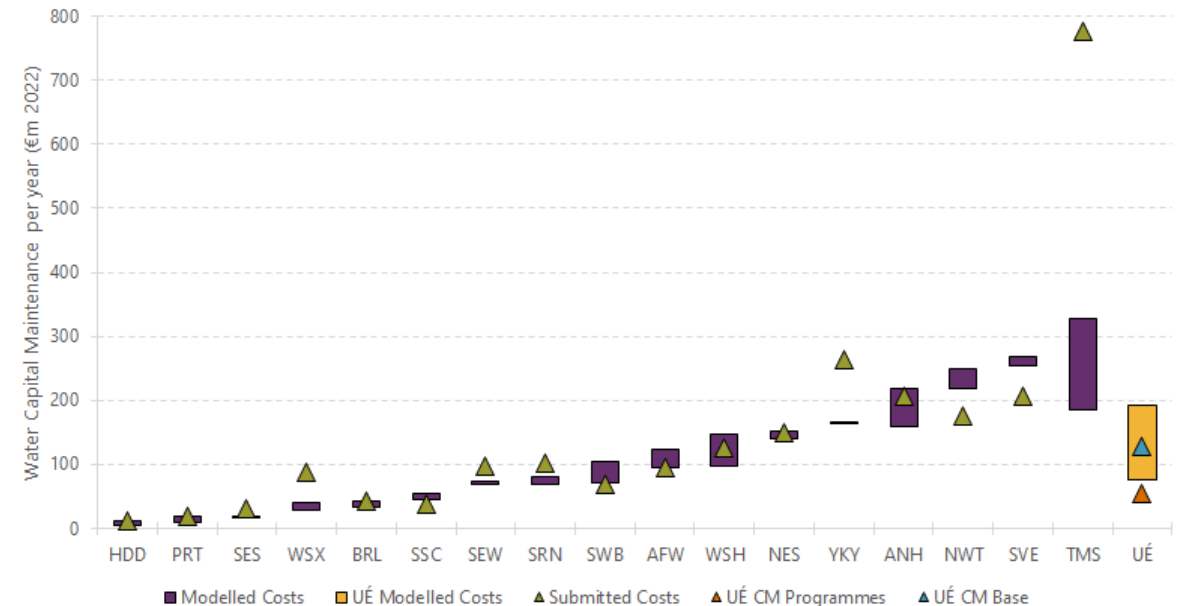
Source: UÉ (December 2024), Uisce Éireann Revenue Control 4 (2025-2029) BPQ FINAL.xlsx.

# Capital Maintenance | NERA Econometric Benchmarking

## Benchmarking capital maintenance with E&W peers

- NERA have also undertaken an econometric benchmarking exercise to assess whether UÉ's proposed level of capital maintenance of RC4 is reasonable to maintain the integrity of the network.
- NERA ran econometric models at service level (i.e. separate models for the water and the wastewater services respectively) to calculate "predicted" costs for each company, on the basis of the relationship between cost drivers and cost levels developed from the panel of England & Wales (E&W) companies.
- The drivers included are number of connected properties, weighted average complexity of treatment, length of mains, and total load. These modelled ranges do not represent an efficiency frontier but represent expected cost levels based on the average performance of the E&W companies over the period included in the panel (2012-2024 outturn).
- NERA included three models for water and two models for wastewater to develop the relationship between costs and cost drivers. We then apply the estimated coefficients of each model to the cost driver forecasts of E&W companies and UÉ to get the predicted capital maintenance costs over AMP8 and RC4.
- Figure to the right and on the following page present the per annum modelled cost ranges compared to submitted cost forecasts for water and wastewater separately, taking average across the years of AMP8 (2025-2030) for E&W companies and of RC4 for UÉ. The bars represent the modelled efficient costs as "predicted" by NERA models, while the triangles indicate the submitted costs forecasts.
- As discussed above, UÉ's RC4 proposed capital maintenance include non-asset investment; NERA reallocated the non-asset investment amount into water and wastewater by 50:50 for the purpose of comparison.

Water capital maintenance modelled ranges, annual average



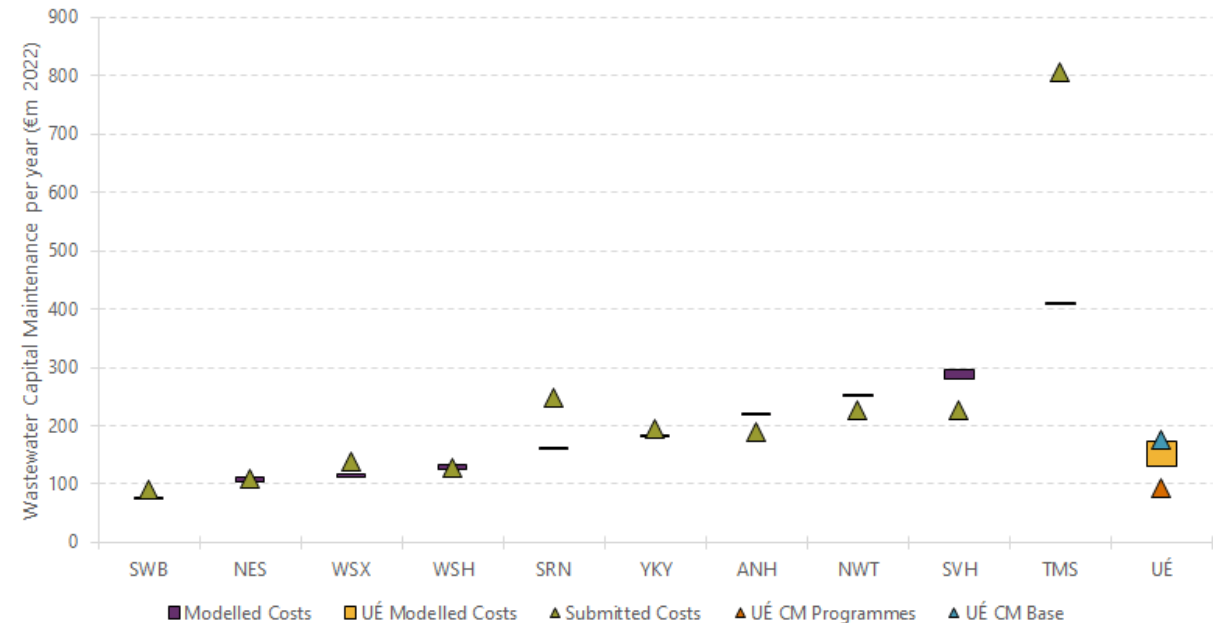
Source: NERA analysis of E&W 2012 to 2024 outturn capital maintenance costs and UÉ provided RC4 BPQ.

# Capital Maintenance | NERA Econometric Benchmarking

## Benchmarking capital maintenance with E&W peers continued

- Based on the models, NERA estimate an enduring capital maintenance requirement between €75m and €192m per annum for water and between €130m to €173m per annum for wastewater.
- UÉ's designated capital maintenance falls short of the RC4 enduring level for both water and wastewater.
- However, the water capital maintenance activities implied by the QBEG allocation are within modelled range for water, while the wastewater capital maintenance activities implied by the QBEG allocation are at the higher end of modelled range for wastewater.

Wastewater capital maintenance modelled ranges, annual average



Source: NERA analysis of E&W 2012 to 2024 outturn capital maintenance costs and UÉ provided RC4 BPQ.

# Capital Maintenance | NERA Econometric Benchmarking

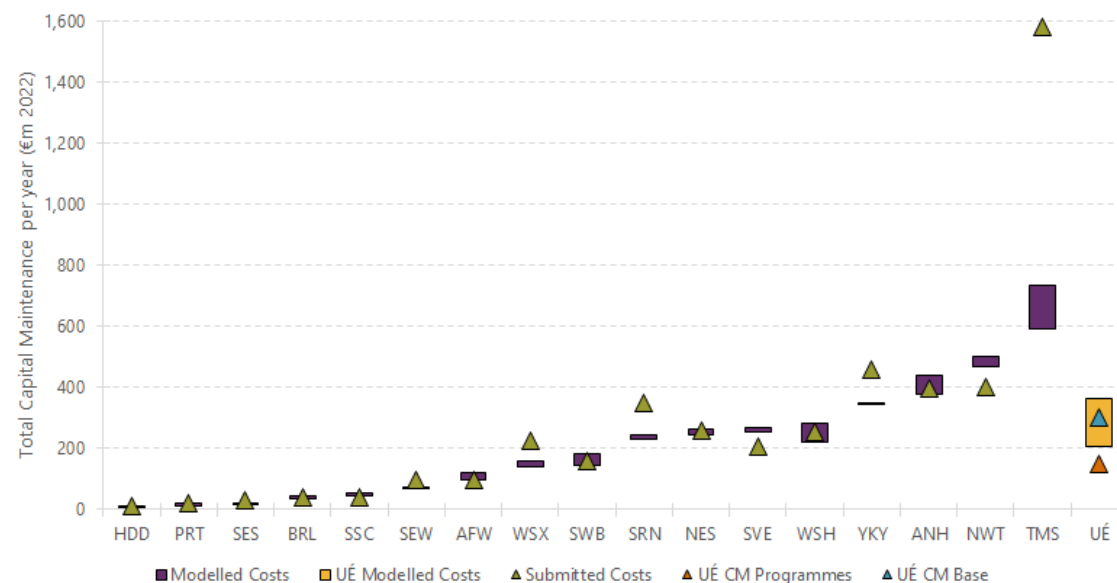
## UÉ has proposed a reasonable amount of capital maintenance budget

- Figure to the right illustrates the modelled range and submitted costs for the water and wastewater services combined.
- NERA estimated total RC4 capital maintenance requirement ranges between €205m and €365m.
- Whilst the UÉ’s total designated capital maintenance programmes fall short of the estimated level, the Capex allocated to overall base maintenance is within the modelled range.

### Arcadis View

In line with NERA analysis as set out in this section, Arcadis opines positively that UÉ’s level of proposed spending on capital maintenance aligns with its peers in England and Wales. This accounts for specific capital maintenance assigned projects as well as other investment that contributed to overall asset health base investment.

**Water and Wastewater combined capital maintenance modelled ranges, annual average**



Source: NERA analysis of E&W 2012 to 2024 outturn capital maintenance costs and UÉ provided RC4 BPQ.

# Capital Maintenance | Arcadis View

## Arcadis View Summary

- The Capital Maintenance programme is a large and important aspect of upkeeping service delivery. Strategic, planned and data-driven decision making is essential to maintain the infrastructure across the UÉ asset base.
- Based on the information available, the UÉ team is in early stages of transitioning from reactive to planned CM. This builds on the transition to a centralised database and decision-making process away from the fragmented LA-based framework that was previously in place.
- UÉ has a long route towards a data driven proactive, planned capital maintenance. UÉ looks to reach a steady state in asset condition by RC5, however this seems challenging, considering the limited knowledge of their assets' current state.
- Arcadis notes that UÉT may further impact the timelines of transitioning from reactive to proactive maintenance and recommends a continuous focus from UÉ on developing and embedding its planned CM strategies.
- In line with NERA analysis, Arcadis opines positively that UÉ's level of proposed spending on capital maintenance aligns with its peers in England and Wales.
- At the same time, Arcadis notes that based on the deep dives' findings, the above ground programme of capital maintenance requires further definition and improvement on cost data, thus a cost challenge is proposed to that specific element of the overall capital maintenance portfolio of works.
- Arcadis notes the positive direction of travel, however, there is an opportunity for further ambition and accelerating the asset strategies development and asset data understanding to improve asset management and the resulting asset performance.
- Additionally, Arcadis believes it to be beneficial for UÉ to set out a clear timeline for achieving ISO 55001 Asset Management Certification to drive ambition and focus on most relevant data-based development in its capital maintenance and asset management practices.
- This will enable UÉ to improve asset health across its services and reduce fluctuations in future budgets.

## **4.4 Major Projects**

# Major Projects | Water Supply Project - East and Midlands Region

## Water Supply Project - Overview

- The Water Supply Project (WSP) is one of two major projects, and it aims to create a second water supply for the Greater Dublin Area (GDA). Water will be taken from the Parteen Basin, treated at Birdhill and moved via underground pipeline to the GDA. The project will consist of 5 infrastructure sites including a water treatment plant and 172km of pipelines.
- The project has been significantly delayed. As WSP is a large generational project, the funding ask has needed political support and technical and financial rationale to progress through the Infrastructure Guidelines. In addition, UÉ has to align with the national and regional water resource planning plans. Legal and planning challenges remain significant risks.
- In 2022, the CRU released the ringfencing around the major projects funding (including WSP) to compensate for inflationary effects and contribute to UÉ’s meeting of outcomes and outputs. Of the original €704m allowance, only €83m was used across WSP and GDD.
- For RC4, UÉ plans to ramp up delivery of the WSP, with a budget of €1.5bn between 2025-2029 (see table below), with a significant investment ramp up in 2028-29 years. The WSP is planned to be delivered in 2032.
- HR Wallingford has undertaken a technical review of WSP at Gate 1 in June 2024. The report was prepared for CRU and provided a thorough review of WSP’ needs, optioneering, costs, delivery and risk management. The report findings supported the need for the project and recommended progression past Gate 1.

	2025	2026	2027	2028	2029	Total
RC4 WSP (€)	44.9	44.8	60.1	518.6	836	1,504

## Arcadis View

It is common for large national-scale projects to face delays due to political and financial alignment that are required for the major projects to progress.

Arcadis notes positively that WSP has by now undergone public and technical scrutiny with independent reviews of the project need and proposed solutions which is expected at this early stage of large programmes of works.

Arcadis aligns its views with HR Wallingford and opines it reasonable to progress the proposed WSP solution.

Future funding availability and mechanisms will be key to enable the delivery, however, Arcadis understands these are currently not in UÉ’s full control.

WSP was funded via ringfenced funding in RC3, and Arcadis opines it reasonable to use a similar funding mechanism for RC4.

# Major Projects | Greater Dublin Drainage: Timelines

## Greater Dublin Drainage - Overview

- Greater Dublin Drainage (GDD) consists of the development of a new regional wastewater treatment facility and related infrastructure to serve the population of Dublin and parts of Kildare and Meath.
- The major project responds to the projected 50% increase in wastewater volume up to 2050 due to increasing population and greater economic growth. It addresses the capacity limitations of the existing main treatment plant in Dublin - the Ringsend Wastewater Treatment Plant which provides over 40% of Ireland's wastewater treatment capacity and is situated in a very confined space, limiting future enhancement opportunities.
- UÉ looks to optimise the programme by proposing advanced and enabling works ahead of the main works to reduce the risk to construction. This aims to mitigate some of the delivery risks and start the construction of access roads to the new treatment site, diverting existing utilities, adjust timelines in line with other public projects in the area such as Metrolink.
- UÉ considers two scenarios for timelines:
  - Including enabling works and complete construction by end of 2032.
  - Package all construction works together and complete construction by end of 2033/34 (carries the risk of delays to programme).

## Timelines

- The GDD has been in the planning cycle for the past 6.5 years. Whilst there remain uncertainties to the timelines due to legal and judicial challenges, UÉ has a current working assumptions, based on historic timelines, that a decision from ABP will be made in mid-2025.
- The worst-case scenario considers that the project is taken to the European Court of Justice (ECJ) prolonging the delivery, however, this has not been considered by UÉ at this stage.
- AG3 gate is planned for mid-2029. UÉ plans to complete significant amount of design prior to AG3.
- UÉ started discussions with the Irish Government and communicated the proposed timelines but notes that infrastructure guidelines (sector specific ones are being developed) and ministerial approvals will be important to progress.

## Arcadis view

Arcadis views positively that UÉ considers early stage enabling works as the preferred option to optimise the delivery timelines.

However, Arcadis notes that the project is still in relatively early stages of development, which means there is a significant risk of works being delayed at various stages prior to GDD going live, particularly considering the large scale of the project and a number of stakeholders involved. Arcadis understands UÉ have not budgeted funding for RC5 in the I&O sheet, however this does not appear compatible with UÉ's two timeline scenarios. And it is therefore likely capex will be delayed into RC5. Arcadis recommends for UÉ to build on its timelines to include detailed and structured stakeholder engagement map and plan to proactively manage various interested parties to limit potential further delays.

# Major Projects | Greater Dublin Drainage: System Resilience

## Resilience of wastewater systems prior to GDD completion

- In case there are further delays to the programme (for e.g. ECJ case), UÉ has looked into the risk management for the Greater Dublin with a steering group in place to review how Dublin can process the increased wastewater load.
  - UÉ has short medium- and long-term plans for interventions in case of GDD delays, however, it relies significantly on GDD being in place by 2032. The interventions that support load management include:
    - Completion of Ringsend WWTP upgrades (2025).
    - Development and roll out of the Asset Management Plan to maintain compliant service at the Ringsend WWTP.
    - GDD WTP, outfall and orbital sewer projects - these are part of the previously ringfenced major programme allowance.
    - Regional Biosolids Storage Facility - to be completed by 2026 to support Ringsend operations.
    - Upgrades to Ringsend wastewater networks.
    - Other treatment plans in the GDA - capacity upgrades.
- The above interventions are progressing in RC4 with Capex assigned to them.
- It is important to note that should GDD be severely delayed, there is no other long-term alternative solution in place. This might impact on new housing connections in future with UÉ limiting no-domestic and then domestic growth in the area.

## Changing Water Quality Policies

- According to UÉ, the updated recast Urban Wastewater Treatment Directive (UWWTD) will likely impact the Ringsend capacity by 2039. A study has been started in early 2025 to look into Ringsend needs in light of the updated water directive - and it will conclude mid 2026. Further impacts of UWWTD are discussed in [Section 4.5 Environmental Compliance](#).

## Housing Growth Policies

In case of additional housing target requirements from the government, UÉ assumes that some wastewater projects would be accelerated, and GDD could be one of them to help meet the housing targets. However, it is noted that in Dublin, to provide additional network capacity, it would require projects which due to their complexity and scale will also qualify as strategic infrastructure projects. This means that similar challenges with planning and statutory approvals will be faced. Additionally, UÉ estimates that GDD will still be required as the best viable option for the GDA long-term needs.

## Arcadis View

It is positive to note that UÉ has considered resilience of the network in the short-, medium- and long-term planning accordingly. GDD is an essential programme of works to be delivered to satisfy long term catchment needs. UÉ has also considered an impact of policy changes and potential political shifts in increasing housing targets which shows that resilience of overall GDA wastewater systems has been considered adequately with a long-term view in mind.

# Major Projects | Greater Dublin Drainage: Risk Management

## Risk Management

UÉ is aware of a number of key risks and these along with general mitigations are listed below:

- Significant planning and licences work required, impacting the works schedule and delivery. Continuous engagement with the relevant stakeholders are ongoing.
- UÉ has faced challenges in obtaining approvals from the Maritime Regulator in other Capital projects thus it is expected similar challenges will be faces when seeking to obtain long sea outfall construction approval. UÉ is engaging the regulator to mitigate the risk.
- UÉ has engaged with the supply chain market and organised a market engagement day in November 2024. There has been previous engagement in 2020s and UÉ got feedback on procurement and risk sharing options that construction sector raised. This helps UÉ to mitigate future procurement risks related to finding suitable delivery partners, understanding their risk appetite.
- Since a lot of the project works will be tunnelled, UÉ has started early baseline ground investigation which will feed into the contractor delivery information to better inform risk sharing and decision making.

## Arcadis View

- UÉ has identified key risks to delivery of the programme, which span across statutory and funding approvals, procurement of works, resource availability, construction & commissioning risks as well as interfaces with other major projects in the area. For each of the key risks there is a mitigation plan in place and UÉ has been proactively progressing actions where possible despite of the slow progress of the project due to judiciary reviews.
- Arcadis notes positively that UÉ sought to address lessons learnt from RC3 in terms of risk sharing and rethinking of the procurement strategy to make this attractive to the construction market.
- Arcadis also notes that there is a robust governance in place within the UÉ regularly reviewing project developments, with steering committees and heads of functions being involved in key decision making.

# Major Projects | Greater Dublin Drainage: Costing

## Cost Estimates

- Whilst the core scope of the project remains the same, the inflationary effects since 2021 and significant delays to the project timeline resulted in the need to update the RC3 estimates.
- GDD has an updated project estimate (2023), based on a number of independent and external cost reviews undertaken by a range of experts. This included benchmarking for Ireland and UK projects, independent review of base estimate by AECOM, Quantitative Risk Analysis (QRA) reviewed by Turner and Townsend and the contingency risk (Reference Class Forecast) has been carried out by Oxford Global Projects.
- The current estimate ranges between **€1,117m and €1,422m** and assumes construction commencing in 2028, with early stage enabling works in place (the preferred option). The cost estimate range reflects early stages of the project and increased accounting for contingency and risk quantification which is in line with good industry practice.
- The business plan I&O sheet indicates a ramp up of spending starting in 2028 which aligns with planned project delivery. The largest portion of investment will be required in early RC5.

	2025	2026	2027	2028	2029	Total
RC4 GDD (€)	2.3	3.3	4.1	37.2	104.4	151.4

## Updates to the cost estimate

- UÉ confirmed via Q&A that there is a cost estimate update planned for May 2025. The planned estimate refresh for GDD will include an updated construction cost estimate from the Engineering Service Provider.
- In addition, an independent construction cost estimate will be developed by an independent cost consultant. The process will also entail a top-down cost estimate carried out by a separate cost consultant as a second benchmark for the ESP estimate. The Quantitative Risk Analysis and Reference Class Forecast will also be refreshed as part of the process. The updated cost estimate will be bridged back to the estimate from 2023 to understand any material cost variances.

## Arcadis view

Arcadis notes positively the project - specific cost estimates and the fact that UÉ engaged a number of independent bodies to review the figures and combine these with internal UÉ estimates. Noting the scale of GDD, this exercise allows for reduced bias in estimates and more robust forecasts in line with best industry knowledge.

Based on the Q&A response however, UÉ plans a significant update to the overall estimate which may bring further changes to the estimate and potentially result in increases to budget requirements as part of RC4 which should be considered once new estimates become available.

Arcadis recommends a similar rigorous due diligence of cost estimation is applied at each gate approval review to refine and adjust the estimates based on best available data and a number of independent inputs.

# Major Projects | Greater Dublin Drainage: Costing

## Impact of revised Urban Wastewater Treatment Directive (UWWTD)

- The current estimate does not account for meeting the recast Urban Wastewater Treatment Directive (as the application was submitted in 2018, prior to recast announcement).
- However, UÉ updated the project design to future proof the GDD site to allow for the site to meet the future requirements which will be delivered as part of a subsequent planning permission. Currently, no funding allowance in the GDD for the recast requirements (tertiary and quaternary treatment).
- Recast directive requirements are part of an early-stage process in I2O and the project has a separate process in terms of statutory approvals.
- UÉ expects the recast requirements will not significantly affect RC4 funding and will be covered mainly by RC5 budget.
- It is noted that there is a 15-year window to become compliant with the recast UWWTD which UÉ believes to be realistic considering the challenges of planning and statutory approvals. Construction is not seen as the challenging part of the process.

## Arcadis View Summary

- Noting the large scale of the programme, there are opportunities for efficiencies throughout the design and delivery stages of the project. Arcadis would expect a focus on innovation across processes to demonstrate potential time and cost savings to the project throughout its lifecycle. It would be beneficial to include regular internal reviews of innovation and efficiencies to drive collaborative and efficient approaches throughout GDD delivery.
- Arcadis notes, that whilst industry-wide practices have been employed to estimating the costs, projects of such large scale, involving a large number of stakeholders and potential challenges are often delivered at a higher cost than estimates. This may be a result of a number of risks materialising, new risks arising and potential volatilities in the markets that are external to UÉ's control. This should be kept in mind in the future reviews as the project develops.
- Arcadis would expect regular comprehensive reviews of cost variations presented to CRU for consideration and future funding approvals. It is also for this reason that UÉ driving cost efficiencies where possible is important to project delivery to limit significant overspend.
- Similarly to RC3 funding mechanism, Arcadis supports potential ringfencing of funds for the GDD and WSP as major projects, with funding released on reaching key Approval Gate Milestones with appropriate governance in place.

# **4.5 Environmental Compliance**

# Environmental Compliance | Key Requirements RAL / PAL

## Water - Remedial Action List (RAL)

- RAL is an EPA's register of public water supplies most at risk or with known deficiencies to be addressed by UÉ by a specified date. The register is updated by EPA twice a year, with some sites coming on or off the register depending on the data available.
- Currently, there are 33 sites on RAL list, and all are planned to be addressed in RC4.
- UÉ has over-delivered on its targets in RC3, initially planning for 48 sites to be removed from the register and eventually removing 57 sites by end of RC3. UÉ achieved this by bringing in efficiencies such as delivering interventions through programme-based approach which speeds up and streamlines delivery timelines.
- Whilst each site is different, the over-delivery in RC3 gives confidence that UÉ is set up to deliver the improvements to 33 sites during RC4.
- It is important to note that this is a live document, and EPA adds new sites regularly, meaning a continuous investment is required throughout future regulatory cycles.

## Wastewater - Priority Area List (PAL)

- The PAL is a list of priority area where wastewater treatment and networks must improve to resolve national environmental priorities.
- Similarly to RAL, the list is owned by EPA and updated regularly with agglomerations added or removed.
- UÉ has removed all 75 sites from PAL as planned during RC3. This shows UÉ's ability to deliver 23 sites currently on the register.
- However, a legacy of underinvestment in public sewers and wastewater treatment plants means that there remains agglomerations that will require investment beyond RC4.
- Through the 23 PAL sites, UÉ also plans to address some of its non-compliance with Wastewater Discharge Authorisations, which are statutory approvals issued by the EPA to regulate wastewater discharges to rivers and other water bodies.

# Environmental Compliance | Key Requirements UWWTD

## Wastewater - Urban Wastewater Treatment Directive (UWWTD)

- The UWWTD list was introduced as a result of a judgement by the European Courts of Justice (ECJ) against 28 agglomerations in Ireland. This is a fixed list, and no new agglomerations are expected to be added.
- Only four sites remain on ECJ list and all are forecast to be addressed by the end of RC4 through four standalone projects.
- However, sites are only approved after demonstrating a year of compliant effluent samples. If a sample fails, the year is restarted, hence whilst the interventions will be made in RC4, it is not guaranteed the sites will be free of the ECJ judgement by the end of the period.
- UÉ also plans to address majority of untreated agglomerations within the RC4 period.

### Arcadis View

Arcadis notes that projects under ECJ list have been historically severely delayed and over budget due to UÉ's challenges with sites, public opposition, obtaining consents and judicial cases. This should be considered and risks managed closely in delivering the improvements in RC4.

It is positive that UÉ is looking to future-proof existing designs where possible to account for future recast requirements. The recast will require a considerable amount of work and funding that might cause changes to the current CIP towards the end of RC4 when needs assessment is complete. Discussions between UÉ and CRU are recommended to help with early visibility and understanding any potential impact on the current RC4 portfolio.

## Recast UWWTD

- A proposed revised Urban Wastewater Treatment Directive was published by European Commission and is in force since start of 2025. Currently, the directive requires the sites to be compliant by 2035.
- The new changes include adding secondary treatment and to further remove nitrogen, phosphorus and micro-pollutants from wastewater. It also includes proposals for energy neutrality, tighter tertiary treatment standards and quaternary treatment (new process in Ireland for removal of micro-pollutants).
- One of the requirements under the recast of the UWWTD is the requirements for integrated urban wastewater management plans for agglomerations that meet certain criteria. The plans would need to consider separate surface water management, which is beyond UÉ's remit and require multiple stakeholders' involvement. The Drainage Area Plans that UÉ is currently developing will contribute to the future integrated plans.
- The recast UWWTD will require new and additional Capex investments to bring relevant sites into compliance. Through Q&A process, UÉ confirmed that there is no funding inclusion for the recast directive needs in RC4. The water treatment team in the Asset Planning is at the start of the process of defining needs for WWTP design and future upgrades to meet the recast.
- Whilst no funding is made available for the recast in RC4, UÉ has changed the site layout for the GDD major project treatment plant to allow for future site development to comply with recast requirements (quaternary treatment).

# Environmental Compliance | Key Requirements RBMP

## Wastewater - River Basin Management Plans (RBMPs)

- The 3<sup>rd</sup> Cycle River Basin Management Plans identify the negative impacts of wastewater discharges from WWTPs and networks on ecological status of a water body.
- The current RBMP list covers the period from 2022-2027. The 4<sup>th</sup> Cycle RBMP will be published in 2027 introducing a new list.
- The list identified an estimate of 158 WWTP and 33 wastewater networks having an impact on ecological status of water bodies.
- UÉ plans to undertake a range of assessments, surveys, feasibility studies, progressing detail designs and construction across all 158 WWTP to a varied extent with the goal of having all initial assessments completed by 2027. Following this, a plan of action will be developed.
- For the 33 wastewater networks UÉ plans to undertake assessments by end of RC4 to define a plan of action. This work is related to reducing spills from SWOs which are most significant pressures across the catchments. UÉ plans to expand permanent flow monitors at SWOs to support future planning on reducing the excessive spills.
- The sites and projects in many cases overlap with UWWTD and PAL compliance and such sites are progressed as part of the existing/ planned projects within RC4. For example, design solution for the entire Cork City wastewater network is being progressed.
- As part of the RC4 plan, UÉ identified 25 particular sites to address the priority RBMP compliance.

### Arcadis View

Arcadis notes that the scope of work for RBMP is extensive and UÉ has not fully completed an initial assessment of all sites to assess the impact and scale of the need. This means that it is unlikely that all sites will become compliant by 2027, with plans pushed back into future regulatory cycles.

UÉ has a reasonable plan in place and Arcadis acknowledges poor asset data understanding that needs to be addressed first in order to plan the future investment efficiently and seek integrated solutions across catchments, instead of reactive short term funding injections that may escalate into significant budgets in long term.

Arcadis recommends further monitoring of the progress and accelerating assessments as well as completion of Drainage Area Plans to enable informed decision making on future investment needs.

# Environmental Compliance | Capital Investment Plan

## RC4 Budget to address environmental compliance

The proposed RC4 projects and programmes to address EPA and ECJ compliance are not shown as part of the I&O business plan. Arcadis requested the data from UÉ and reviewed the records to check whether all sites which are planned to be addressed in RC4 have projects and budgets assigned to it.

### Remedial Action List (RAL)

The capex required to specifically address the 33 RAL sites cannot be accurately calculated since the programmes include other, unrelated interventions, but estimate budget can be seen in the table to the right (a significant €2.6bn). 6 out of 33 sites were completed in RC3 but sites will be removed from RAL in RC4.

### Priority Action List (PAL)

Similarly to RAL, UÉ have laid out plans to remove all of the 23 sites during RC4. In case of PAL, it was possible to identify total RC4 Capex of €409m (see table to the right).

### Urban Wastewater Treatment Directive (UWWTD)

A total of €85m is proposed to address the four ECJ sites. Three sites – Arklow, Athlone and Enfield are reaching completion by 2025/2026 thus the lower budget allowances in RC4. Middleton Wastewater Network Upgrade is the only project at Stage 1/ 2 to be delivered throughout RC4 by 2029. This project was also part of Arcadis deep dive assessment, and the review has shown project is well-defined with no major issues found.

### River Basin Management Plan (RBMP)

UÉ have planned interventions at all 25 sites through 11 projects and three programmes, proposing a budget of €507m.

	RAL	PAL	UWWTD	RBMP
No. of sites to be addressed in RC4	33	23	4	25
RC4 capex requested (2022 €m)	2,645	409	85	507

### Arcadis View

Arcadis is satisfied that UÉ has planned interventions and allocated relevant budgets for the needed intervention across all requirements of RAL, PAL, UWWTD and RBMPs.

Arcadis recommends further discussions on aligning EPA’s reporting at an agglomeration level with the UÉ’s reporting at a project level to enable tracking of the progress, funds and timelines within the same I&O sheet or other preferred method.

# Environmental Compliance | Sustainability

## Statutory Requirements and related Outcomes

- UÉ has a range of statutory requirements to comply with including the following:
  - The Climate Action Plan 2024 – follows the introduction of economy-wide Carbon Budgets and Sectoral Emission Ceilings.
  - The Climate Act 2021 require UÉ to achieve a 51% reduction in Carbon Dioxide equivalent emissions by 2030. 4<sup>th</sup> National Biodiversity Action Plan – sets the national biodiversity agenda for 2023-230.
  - Circular Economy and Miscellaneous Provisions Act 2022 – framework for transitioning to circular economy.
  - The Energy Efficiency Directive (2012/27/EU) – promoting energy efficiency.
- UÉ has set an ambition to reach Net Zero in 2040 and plans to generate 40% of electricity from renewables by 2035. UÉ has also developed a sustainable energy strategy to achieve 50% energy efficiency improvement and 51% CO2 emissions reduction target by 2030.
- To measure sustainability-based performance, UÉ have set out nine new sustainability outputs and outcomes in RC4. These centre around reducing waste and emissions and increasing biodiversity and energy efficiency in response to policy and statutory requirements. The performance is measured across all of the Capex portfolio rather than per project.
- The RC4 business plan in particular has two programmes focused specifically on sustainable energy for both, water and wastewater portfolio. These have a total capex requested of €40.7m: €39.2m for wastewater and €1.5m for water. Arcadis reviewed further information which was provided by UÉ on request.

## Sustainable energy programme

- The sustainable energy programme consists of installing solar PV (photovoltaic) on and around UÉ-owned sites. It directly targets two of the sustainability themed O&O, namely the Energy Efficiency Improvement and the Renewable Energy - Generation (Installed Capacity).
- The suitability for solar PV has been assessed for:
  - 700 sites at a high level.
  - 180 at a detailed level.
- 64 sites have planning permission applications submitted and 25 have been granted planning permission. There are 12 sites to be developed in 2025/26 (all have planning permission).
- The programme was costed using run rates of € per kW installed and the associated cost of any other upgrades required for the solar PV system to operate.
- UÉ also expressed the intention to create a solar PV framework for the next five years. This will formalise the appointing of contractors to install solar PV on existing facilities and allow for competitive tenders to be launched, refining cost estimates.

## Arcadis View

Throughout the Capex review, Arcadis has noted a number of sustainability initiatives applied across projects and programmes which is positive and shows the right direction of travel. UÉ appears to be actively addressing key policy and statutory requirements with plans and objectives in place, with embedded initiatives across the portfolio. As projects develop, it will be important to seek continuous improvement and driving cost efficiencies forward.

# Capex Projects and Programme Review | Key Sources Reviewed

A non-exhaustive list detailing the key documents and sources reviewed when producing this review.

Source Title	Document / Q&A / Workshop
Q&A responses	Q&A sheet
20241202 Uisce Éireann Revenue Control 4 (2025-2029) Network Capital Expenditure Look Forward FINAL	UÉ Document
20241202 Uisce Éireann Revenue Control 4 (2025-2029) BPQ FINAL	UÉ Document
12.02.2025 RC4 Network Capex - O&O and I&O	UÉ Document
Greater Dublin Drainage Deep Dive Information Pack	UÉ Document
Leakage Programme Deep Dive Information Pack	UÉ Document
Capital Maintenance Deep Dive Information Pack	UÉ Document
CRU202465a_-_CRUs_Final_Review_Report_on_Uisce_Éireanns_Proposed_Water_Supply_Project	UÉ Document
NERA Econometric Benchmarking Analysis	NERA Analysis
11 <sup>th</sup> Feb Security of Supply Workshop – presentation and meeting notes	Workshop
7 <sup>th</sup> Feb Asset Health Workshop – presentation and meeting notes	Workshop
10 <sup>th</sup> Feb Greater Dublin Drainage Workshop – presentation and meeting notes	Workshop

# 5 Non-network Capex

- 1 Introduction
- 2 UÉ's RC4 Capital Investment Plan
- 3 Capital Investment – Processes and Governance
- 4 Capex Programme & Projects Review
- 5 Non – network Capex
- 6 Proposed Cost Challenges

# Non-Network Capex | Overview

Non-Network Capex consists of all the expenditure not directly related to the provision of water or treatment of wastewater.

UÉ have focussed on four key themes:

- Cybersecurity
- Data collection, management and analysis
- Completing the UÉT
- Developing in line with the property strategy

Whilst network capex requested over RC4 has increased 82% in real terms relative to RC3, non-network capex has only increased by 16%. The expenditure profile has also changed. In RC3, non-network capex ramped up through the period. In RC4, it decreases, with nearly half the total spend in the first two years. This is due to the conclusion of the UÉT (which only has capex in 2025) and inflight projects from RC3. Whilst there is still a drop of over 19% between 2026 and 2027, this is due to Fleet & Facilities capex reducing in 2027. This is primarily due to the Operations Centres as well as a backlog of construction projects which were delayed from RC3.

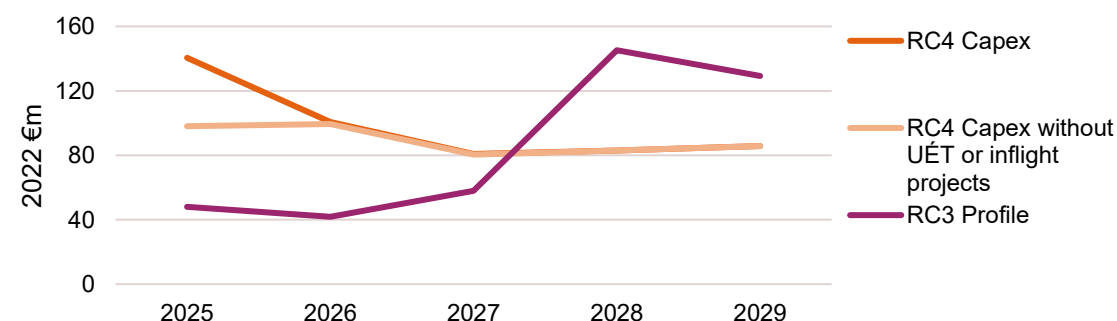
An Opening Balance Sheet was also introduced to support a cash-based regulated asset base addition to reduce fluctuations. This summarises the relevant liabilities, creditors and debtors acquired from local authorities when UÉ took control of the water services. Over RC4, the non-network capex part of this is predicted to have a total value of €3.4m.

## Arcadis View

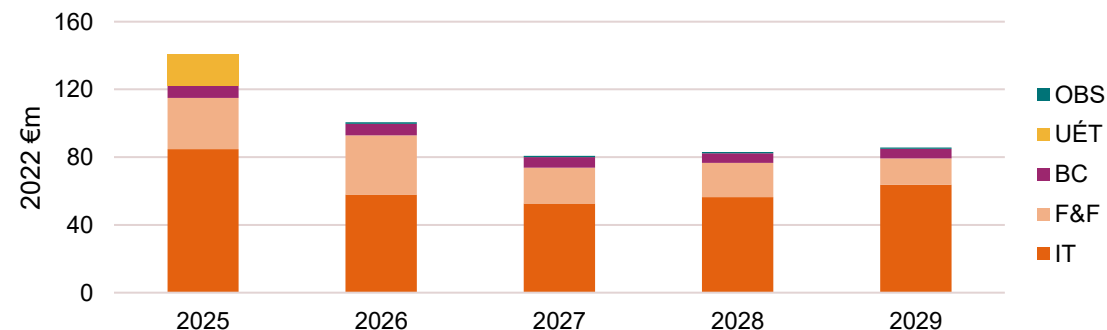
Arcadis notes that the non-network capex budget is a small proportion (6.1%) of the total funding UÉ receives, however, due to the profiling, it accounts for nearly 12% of the requested capex for 2025. However, this is reasonable since it is due to completing inflight projects, the UÉT and projects delayed from, but not started in, RC3.

Category	Forecast Expenditure (2022 €m)
IT	315.8
Fleet & Facilities	122.0
Business Change	31.2
UÉT	18.3
Opening Balance Sheet	3.4
<b>Total</b>	<b>490.7</b>

RC4 Non-Network Capex Profile without UÉT or RC3 Project Costs



UÉ Non-Network Capex Forecast over RC4



# Non-Network Capex | IT

IT capex covers the products and services to keep UÉ secure, optimally running and capable of growth. Over RC4, €315.8m has been requested with the majority of this expenditure in Business Growth and Development Projects and IT Water and Wastewater Projects (see table, right).

Based on the Non-Network Capex report, the IT capex is focussed around improving quality of service and asset understanding, both themes carried forward from RC3. Additionally, expenditure has been allocated to developing a customer strategy, focussed on improving customer experience.

The largest IT projects are:

- Investment in Applications and Infrastructure (€61.6m) – small software upgrades and maintenance of already implemented business-critical systems, e.g., Maximo, Oracle, SharePoint.
- Intelligent Control Centre Supporting Technology (€40.2m) – converting the National Operations Management Centre (NOMC) to run on a UÉ telemetry system, increasing resilience, data collection and efficiency. In a separate project the NOMC hardware will also be refreshed (€2m).
- Cyber Security Operation Technology (€32.5m) – Improving cybersecurity defences to comply with the Network and Information Systems Directive (NIS-D) and subsequent NIS-2. Capex was allocated to achieving compliance with the NIS-D in RC3, but the expanded scope of the NIS-2 will require further development.
- Customer Strategy (€22.5m) – Improving existing systems in response to customer feedback and optimising self-service solutions to reduce staff workload.

As can be seen, the most expensive projects have a focus on cybersecurity, data management and modernisation. These are key areas to facilitate growth and safe operation for UÉ in future revenue control periods.

## Arcadis View

Arcadis understands that UÉ is at an early stage of development in terms of unifying and improving IT systems (and cyber security) to ensure complete robustness and security of supply in line with updated requirements. Asset understanding was identified as an area for improvement in the SWI report, so it is encouraging to see this focus on collecting, analysing and managing data has been continued in RC4.

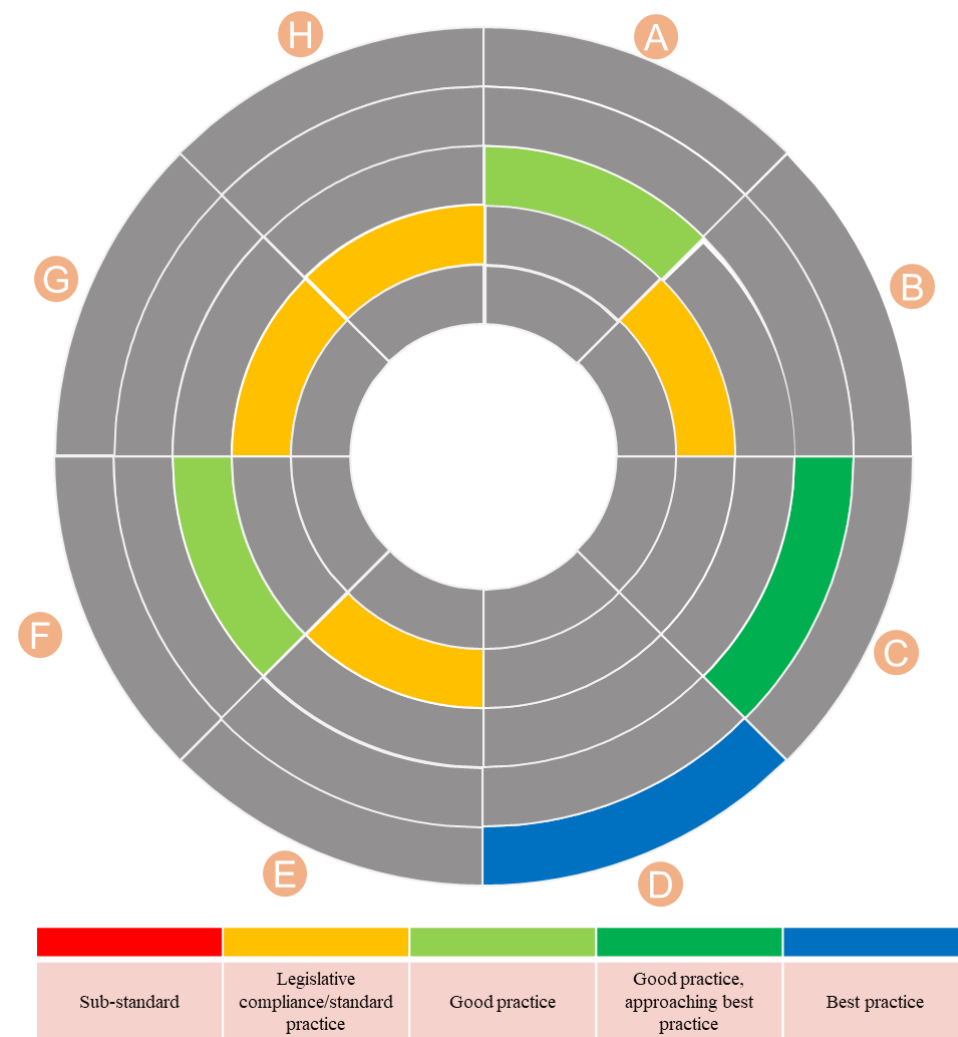
The adoption of new software (ArcGIS, BIM (Building Information Management), Primavera P6 and Maximo Application Suite) supports UÉ in integrating its systems into a common data environment, allows for a more efficient allocation of resources and supports bringing UÉ in line with best practices in the construction industry. The updates to UÉ's BIM are in part required to bring UÉ in line with ISO 19650 as required by CRU mandate. However, since capex has been allocated for the transition to new or upgraded software, Arcadis recommends investigation of cost savings that could be made in the IT Run Maintain category.

IT Cost Sub-Category	RC4 Request (2022 €m)	Sub-Category description
Business Growth and Development Projects	108.4	Incorporating new/upgraded technologies that allow the business to grow
IT Water and Wastewater projects	94.7	Improving cybersecurity and data quality and management
IT Run Maintain	66.0	Supporting and updating current IT infrastructure and applications
IT Environment / Regulation / Customer	46.8	Compliance with Irish and EU legislation and improve customer experience
<b>Total</b>	<b>315.8</b>	

# Non-Network Capex | IT

## Digital Readiness Assessment

- A. Overview:** “Uisce Éireann, RC4, (2025-2029), Non-Network Capital Expenditure Look Forward” Chapter 2 has been reviewed alongside responses to Q&A. UÉ is focusing on evolving the IT architecture to suitably align with best practices ensuring long term scalability (cloud capable solutions), the overall position of the IT system is average as compared with other infrastructure-based IT systems in the industry.
- B. Operational Model:** There is good and clear delineation of software packages and function across the OSS & BSS. There is evidence of an evolution of the IT system to align to industry practice moving forward.
- C. Suitability:** The business recognise the need for additional investment to meet regulatory requirements. Positively, recent upgrades (from RC3) have included: streamlining asset management processes, automating manual processes, new risk management systems, new contract management.
- D. Scalability:** Based on a line item in the BPQ-Final Model “Move to cloud-based services” license-based is a desire from the business to utilise cloud-based applications. This is a best practice industry approach which brings additional Opex efficiencies from the license-based approach and significantly reduces operational IT risk that is now managed via an SLA with the cloud service provider.
- E. Compliance:** UÉ have confirmed their IT asset and service management is aligned with ITIL industry standards, with ITIL being a body that provides IT service management guidelines. Service providers used are also ITIL aligned.
- F. Costs:** The key driver for IT cost is Business Growth & Development Projects. The largest expenditure is c. 84.8m EUR in 2025, the largest category of which is closing out projects from RC3.
- G. Cyber Security:** Additional investment into Cyber has been identified and forecasted in the provided cost model “BPQ-Final”. As a recent development in the IT sector, it is expected that some systems will require both physical transformation and the development of a cyber security culture that follows.
- H. Processes/Policies/Procedures:** UÉ stated IT uses the same governance process as network projects (i.e. the same approval gates, applied with the same level of rigour).



# Non-Network Capex | IT Deep Dives: Drinking Water Directive

## Background:

The EU Recast Drinking Water Directive 2020/2184 and introduced into Irish law in 2023. It will require more Drinking Water Safety Plan (DWSP) risk assessments to be created and stored. Additionally, more operational monitoring will need to be undertaken, leading to the need for processing and storing more samples and data.

## Problem Definition:

- UÉ currently uses manual Excel-based processes for risk assessments and monitoring. This cannot be scaled to meet the increased reporting requirements.
- The high proportion of manual work leads to a greater chance of errors when copying data.
- A storage and testing system for operational monitoring of drinking water samples needs to be created.

## Optioneering:

0. BAU case – continue using manual processes
1. Upgrade the Environmental Information Management System (EIMS) to accept DWSP risk assessments and build a database to store operational monitoring data.
2. Upgrade the EIMS to accept operational monitoring data and store existing DWSP spreadsheets on a temporary database.
3. Off-the-shelf water utility solution

Options 2 and 3 were discounted because the EIMS was descoped as the operational monitoring IT solution and a suitable off-the-shelf application could not be found. A financial appraisal was conducted on the BAU case and option 1 which found a net

present value of savings of €2.88m relative to the BAU scenario. Scenarios where capex and Opex increased by 10 and 30% were also modelled. Option 1 was selected due to the scalability provided.

## Proposed Solution:

- DWSP risk management
  - Store the risk assessments in a central, scalable database
  - Build modules for planning risk assessments and for potentially tracking their resulting corrective actions
  - Import legacy data and risk assessments
  - Improve data security through access controls and regular back-ups
- Operational Monitoring Drinking Water Data
  - Extract sampling data from Excel to upload and to an Operational Monitoring database. The database and uploading method must be capable of supporting increasing volumes of data.
  - Reduce human error through automation of data loading.

# Non-Network Capex | IT Deep Dives: Drinking Water Directive

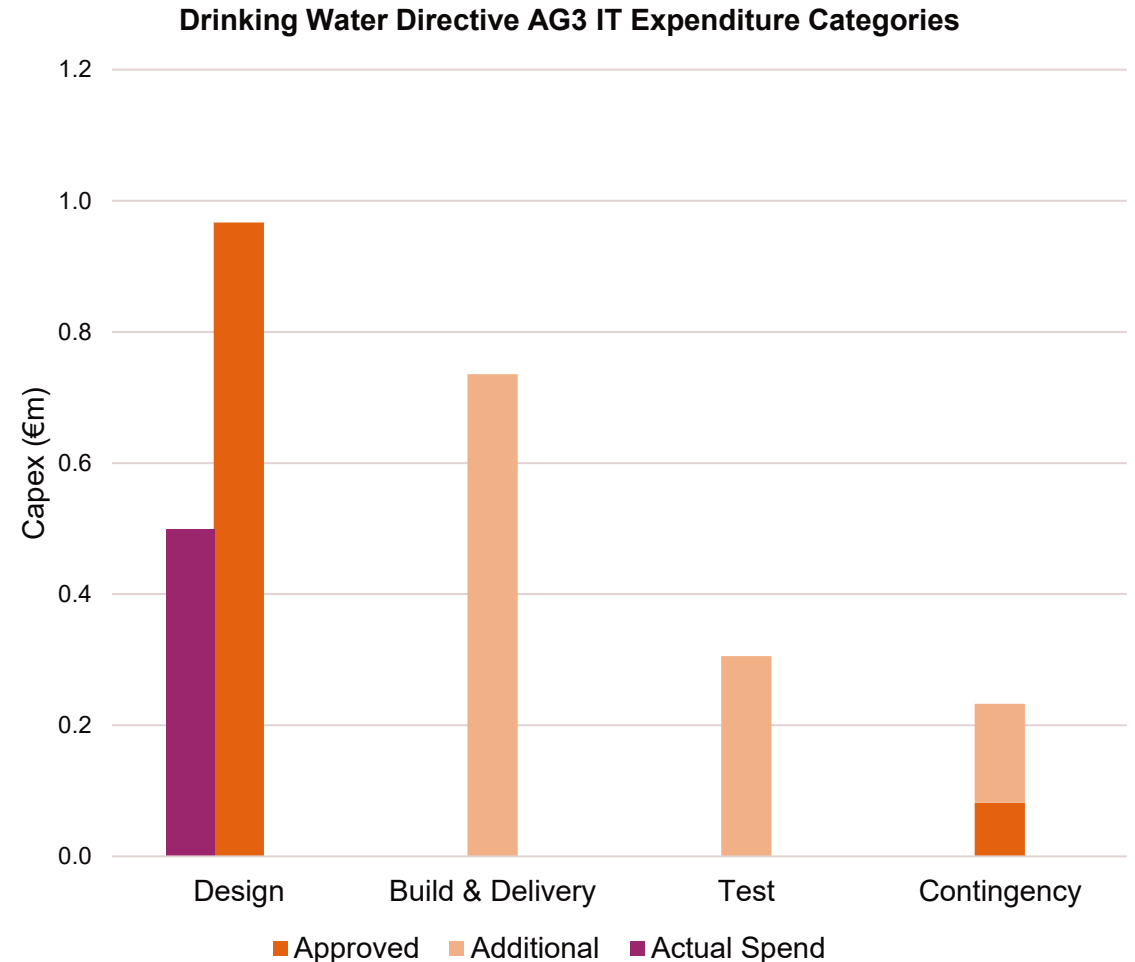
**Requested Capex:** €2.24m (IT only)

**Overall IT contingency:** 11.6%

Capital efficiencies through standardisation were identified. This would be achieved by modelling the system for operational monitoring data on the regulatory monitoring data system.

## Arcadis View

- Positively to date, the capex spent on design works has not exceeded the forecasted budget and only 50% of the spend has been incurred to date.
- It is understood for this project; design is nearing completion therefore a small underspend is envisaged for the design.
- However, additional budget for build & delivery, testing and contingency has been forecast and was not initially approved.
- This is an indication that thorough planning, forecasting and budgeting was not carried out at the start of the project
  - It is also expected that design costs are not the highest line item of these types of projects
  - From a capex perspective, build & delivery costs are higher and more material than design and testing.
- More budget has been assigned as “Additional” compared with “Approved” which indicates forecasted overspend from initial estimates
- A typical contingency position for an IT project is 8-12% of the total budget, the contingency position appears reasonable, however in practice, approved spend is tracking lower considering the volume of additional therefore actual contingency is lower.



# Non-Network Capex | IT Deep Dives: GIS to MS Cloud Migration

## Background:

UÉ uses GIS to maintain a map of pipelines and infrastructure assets. The GIS data is accessed through several platforms, each using different software. This makes updates and integration with other systems more complex and limits capacity for growth. Compass Informatics, a leading GIS consultancy, was engaged to develop a roadmap for UÉ to modernise the GIS platform and improve geospatial applications.

## Problem Definition:

- The existing GIS suite is neither scaled nor optimised. Running the user end service also results in high Opex.
- Currently, the GIS tools use desktop applications. This is limited by the local capabilities, resulting in poor performance.
- The lack of integration with other business applications results in duplication of data. This is typically done manually, leading to a higher risk of errors.

## Optioneering:

Three options were considered:

0. Business as usual (BAU) – continue using the existing GIS suite.
1. Upgrade on-prem infrastructure – Continue to use on-site servers, but upgrade to the latest GIS platform.
2. Migration to the cloud – Move the GIS suite to a cloud platform with greater capability.

Only option 2 was considered feasible, but BAU and Migration to the cloud were selected for financial appraisal. Migration to the cloud was found to have a saving with a net present value of €7.30m relative to the BAU scenario (over a seven-year

appraisal period). Therefore, Migration to the cloud was selected. UÉ ran scenarios with increases in Capex and Opex by 10 and 30% to establish the financial headroom.

## Proposed Solution:

Migrate GIS data to Microsoft (MS) Azure cloud to consolidate GIS services onto a centralised, scalable, higher performing platform. This will be done through three steps:

- Build and test a base platform in MS Azure.
- Release an invitation to tender on: the upgrading of the desktop platform, migration, user migration, application upgrades and Oracle to SQL migration.
- Award the contract and complete the migration.

This option was selected because it was seen as making GIS tools capable of the desired performance level and reducing cybersecurity risk through decommissioning on-site servers which currently host the GIS platform.

## Procurement:

Prior to releasing the tender, UÉ met with five suppliers to gather information on the market and refine the decision-making process. Tendering was undertaken in two steps:

- Pre-Qualification Questionnaire – UÉ received five responses, four of which were continued to the next stage.
- Invitation to Negotiate – Tata Consultancy Services Limited were selected.

# Non-Network Capex | IT Deep Dives: GIS to MS Cloud Migration

**Requested Capex:** €6.43m (IT only)

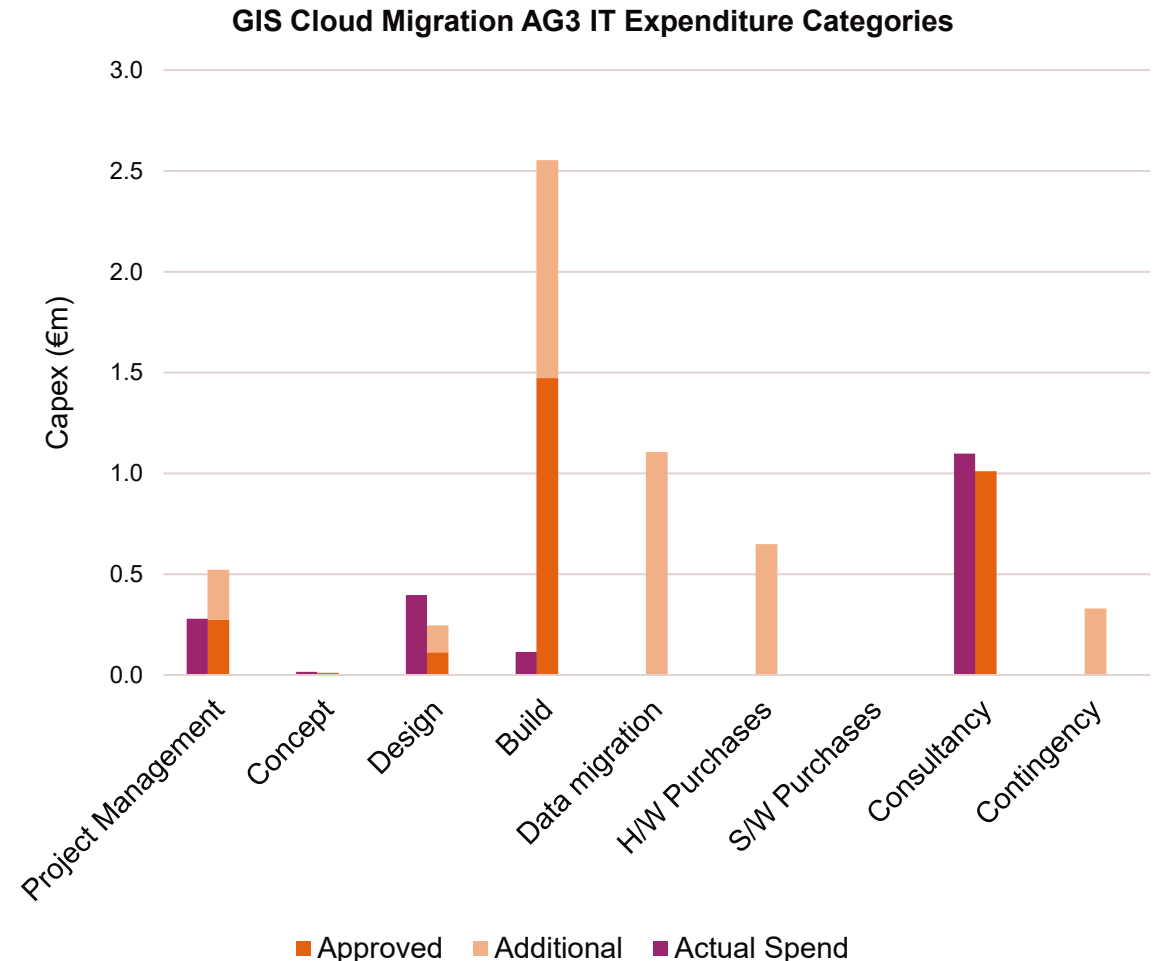
**Overall IT contingency:** 5.4%, made up of:

- 15% contingency on the uplifts to project management, design and build costs.
- 10% contingency for data migration.

No capital efficiencies were identified.

## Arcadis View

- Evidence of inaccurate budgeting is present in cloud migration cost information. The concept, design and consultancy phases are all tracking higher than the approved budget.
  - It is expected that design is completed and therefore this is a known overspend. However, consultancy is likely to continue to overspend for the duration of the project.
- The project management budget is over the “Approved” amount with additional costs forecasted, however, it is our view that project management costs will exceed this amount. The project is not over halfway completed, and the project management Actual spend is over half the initial budget (Approved + additional).
- There is some logic in the budget and the cost quantum's is spread across the key activities appropriately (i.e. design and migration costs are the key drivers in the budget). More budget has been assigned as “Additional” compared with “Approved” which indicates forecasted overspend from initial estimates.
- There is evidence of overspend across two of the examples provided. However, in IT capital projects this is a common occurrence. The cost management approach and governance shown exceeds best practice from other industry examples, experience gained to date provides confidence to improve performance in RC4. In IT, lessons learnt, and experience gained are key factors for improving efficient delivery of IT capital projects.



# Non-Network Capex | Business Change

Business Change costs are associated with supporting the delivery of complex projects, including project, portfolio and change management, business analysis, process delivery and on-going support. Over RC4, €31.2m has been requested to make the

The largest sub-category is the development of the UÉ corporate strategy. The Business Change team leads development opportunity identification, then undertakes planning and delivery of projects to fill these gaps. There are 16 emerging projects such as:

- Building Information Management (BIM) implementation and integration
- Inventory and Stock Control system implementation
- Customer First Programme
- Risk Management Strategy

These projects are aimed towards improving customer experience, efficiency and data management and decrease uncertainty around projects. All 16 projects have delivery capex requested in the IT section. The largest individual project is support for the Investment in Applications and Infrastructure IT project (€4.22m).

The Business Change team undertake a five-step process annually to assess the demand for project and programme support. Each project is reviewed weekly or monthly against eight project controls including status, RAID (Risks Assumptions Issues Decisions) logs, budget and resource management. Team performance is also evaluated quarterly through lookbacks and look forwards. For multi-year programmes, a long-term plan is developed, aligned to best practices and validated externally.

The Business Change team has played a role in feeding back learnings from previous projects, as it set up delivery gates methodology for non-network projects. This allows for consolidation of the lessons learned after the delivery of a project and to incorporate them into new projects at an early stage.

## Arcadis View

Arcadis understands RC3 expenditure was higher than expected due to a higher demand for Business Change services on regulatory and compliance projects. To avoid a similar overspend, Arcadis recommends conducting a risk analysis on the impacts of upcoming Irish and EU legislation.

Arcadis notes positively support is provided across the identification, planning and delivery stages of projects key to delivering outputs and outcomes. The annual planning horizon and quarterly reviews are reasonable to identify projects requiring support and areas for efficiency.

Since the benefits of Business Change are necessarily intangible, it is difficult to provide a tangible measure of performance. Arcadis understands the main KPI is the weekly and monthly RAG status of schedule, budget, scope, resources, risk and stakeholders of projects receiving Business Change support. This is a reasonable measurement of success as it reflects the capability of the Business Change team to manage external pressures and prevent escalation.

Business Change Cost Sub-Category	RC4 Request (2022 €m)	Sub-Category description
Projects Continuing into RC4	6.6	Support for inflight projects from RC3
Run-Maintain	4.2	Support for small projects and BAU Business Change activity
Corporate Strategy - New Demand	20.4	Leading from need identification to project delivery
<b>Total</b>	<b>31.2</b>	

# Non-Network Capex | Fleet & Facilities

This cost category includes the management of the company vehicles and physical offices, including laboratories. Over RC4, €22.0m has been requested to follow the UÉ Property Strategy, improve energy efficiency and reduce vehicle emissions. This determined the need for the following by 2026:

- 16 offices (in addition to the nine existing offices) – Whilst the existing offices will have sufficient capacity for the forecast 3000 staff (up from 1100 current employees), it will not provide local coverage. The additional offices will allow for local presence.
- 21 Area Operations Centres – central distribution centres will act as a base for field staff, spare parts, tools, equipment and machinery.
- Up to 46 Local Operations Centres – Co-located with satellite stores of equipment.

These locations were found through modelling with ArcGIS, where UÉ aimed to maximise coverage and minimise staff relocation. The proposed option has a no point in the network >60km from an Operations Centre and staff are transferred <45km.

Establishing the Operations Centres is the largest cost in the Fleet & Facilities category. UÉ have deemed this investment critical due to its impact on operation of the company. Plans for the Operations Centres and offices were all laid out in the RC3, however, due to the pandemic restrictions and the impact on the construction industry, these were delayed to RC4.

The consolidation of the existing LA fleet is the second largest expense category. UÉ have found a substantial portion to be unfit for purpose, not standardised or posing a health and safety risk to staff. A reduction of c. 600 vehicles is expected, leaving a fleet size of 1580 by the end of RC4. This will be composed of:

- 1225 light commercial vehicles (450 of which will be electric)
- 265 heavy goods vehicles (12 of which will be electric or use alternative fuels) – these include specialist vehicles such as jetting trucks.

- 90 pieces of mechanical equipment, i.e., trailers, generators, small plant

The new fleet will be compliant with the Clean Vehicles Directive and Public Sector Climate Action Mandate of 2022.

### Arcadis View

Arcadis noted a lack of clarity on achievement of targets in each sub-category in RC3. It is therefore encouraging to see clear targets being laid out at the start of the RC4 period which will help to measure progress through the regulatory cycle.

Arcadis understands the location and number of the offices was chosen to minimise the relocation of existing staff and allow for the most even coverage of the UÉ network. Arcadis finds this a sensible approach targeting reasonable objectives.

Fleet & Facilities Cost Sub-Category	RC4 Request (2022 €m)	Sub-Category description
UÉT - Establishment Operations Centre	47.7	Bases for staff, fleet, equipment and machinery
UÉT - Establishment of UÉ Offices	15.9	Local offices to provide a presence across the country
Fleet (UÉT and BAU)	37.6	Consolidating the UÉ and LA vehicles and mobile equipment
Scientific Technical Services (F&F)	8.0	Delivering the Limerick and Eastern Region laboratories for national testing (started in RC3)
Facilities (BAU)	12.8	Energy efficiency upgrades to comply with EU regulation
<b>Total</b>	<b>122.0</b>	

# Non-Network Capex | UÉ Transformation Programme

The UÉ Transformation Programme (UÉT) was initiated in response to a 2022 mandate to unify 31 Local Authorities into a united publicly owned national authority within which all existing water and wastewater services could be delivered. It was originally planned to be completed in RC3 but was delayed. The last year with Capex requested for UÉT is 2025.

The UÉT includes costs related to transitioning water management staff from local authority employment to UÉ across various categories shown in the tables below.

Over RC4, €18.3m has been requested specifically for the UÉT to be spent over 2025 in the expectation of completing the staff transition by early 2026. Additionally, there are four associated subcategories of spending which will extend across RC4 related to UÉT (see table below).

The largest cost in the capex specifically requested for the UÉT is Implementation Costs. This relates to supporting resources, such as subject matter experts, analysts and data experts.

UÉT Associated Costs	2025	2026	2027	2028	2029	Total
UÉT (IT)	10.9	1.8	0.0	0.0	0.0	12.7
UÉT - Establishment Operations Centre	11.4	19.0	7.2	6.2	3.9	47.7
UÉT - Establishment of UÉ Offices	5.5	2.6	2.4	3.3	2.2	15.9
Fleet (UÉT and BAU)	5.7	8.9	8.4	7.9	6.6	37.6
<b>Total</b>	<b>51.8</b>	<b>32.3</b>	<b>18.0</b>	<b>17.4</b>	<b>12.7</b>	<b>132.2</b>

UÉ have developed an Employee Plan with reasonable milestones for when employees must have clarity on their transitioned roles, tasks and responsibilities. While UÉ intends to complete the majority of the transition by end 2025 it recognises that substantial streamlining and integration work will need to be carried out over 2026.

## Arcadis View

In the RC3 Lookback submission, UÉ estimated the UÉT would be delayed, but completed within the original budget. The remaining RC3 budget, after inflating to 2022 monies, was €13.1m, hence UÉ can be seen to have overspent by €5.2m (5.6%).

UÉ has recognised the core processes and investments required to complete the UÉT and achieve the target of combining previously disparate local authorities within a new national authority. While some integration and streamlining will need to occur over RC4 Arcadis has not identified any major risks relating to the UÉT and believes UÉ is maturing reasonably given the complexity of the task.

UÉT Cost Sub-Category	RC4 2025, (2022 €m)	Sub-Category description
Implementation costs	14.9	Resources supporting the transformation into an SPU (e.g programme managers)
Internal Staff Costs	0.5	Resources directly working on the UÉT
IT Costs	0.8	Software costs including licencing, support and maintenance
Other Costs	2.1	Supporting the transfer of staff from LAs to UÉ
<b>Total</b>	<b>18.3</b>	

# Non-network Capex | Key Sources Reviewed

A non-exhaustive list detailing the key documents and sources reviewed when producing this review.

Source Title	Document / Q&A / Workshop
Q&A responses	Q&A sheet
20241202 Uisce Éireann Revenue Control 4 (2025-2029) Non-Network Capital Expenditure Look Forward FINAL	UÉ Document
09.01.2025 Q16 UÉ Fleet Strategy - Summary_Q4_2023	UÉ Document
09.01.2025 Q25 UÉ Property Strategy - Summary_Q4_2023	UÉ Document
Asset Intelligence Strategy	UÉ Document
RC4 IT Permanent FTEs	UÉ Document
RC4 IT supporting Information – Drinking Water Directive Project	UÉ Document
RC4 IT Supporting Information GIS Strategy	UÉ Document
10.01.25 Q12 UÉ Tech Strategy - Board Summary	UÉ Document
14.01.25 Q13 Cyber Strategy Overview	UÉ Document
16.01.2025 AM Uisce Éireann Transformation Programme	UÉ Document
Follow up on IT, 17th Feb – presentation and meeting notes	Workshop
Non-network Capex, 27th Jan – presentation and meeting notes	Workshop

# 6 Proposed Cost Challenge

- 1 Introduction
- 2 UÉ's RC4 Capital Investment Plan
- 3 Capital Investment – Processes and Governance
- 4 Capex Programme & Projects Review
- 5 Non – network Capex
- 6 Proposed Cost Challenge

# Proposed Cost Challenge | Capex Efficiencies

## Efficiency Challenge

- UÉ has not proposed any visible Capex efficiencies at an overall portfolio level.
- Based on the comparative regulated industries in UK, it is common for regulator to set an ongoing efficiency (OE) challenge for utility companies of around 1 per cent p.a. (see table to the right for recent regulatory decisions). Most recently, Ofwat has set a 1 percent annual ongoing efficiency challenge for the PR24 price control in England and Wales.
- This is based on an assessment of the estimated growth in productivity across either the entire economy or comparable companies

Regulator	Sector	Period	Ongoing efficiency (% per year)	Applied to
Ofwat	Water PR24	2025-2029	1.00%	Totex
Ofwat	Water PR19	2020-2024	1.10%	Totex
Ofgem	RIO-ED2	2023-2028	1.00%	Totex
Ofgem	RIO-GD2	2021-2026	1.15%	Capex/repex
Ofgem	RIO-T2	2021-2026	1.15%	Capex/repex
UR	GD23	2023-2028	1.00%	Capex
UR	Water PR21	2021-2027	0.60%	Capex
<b>Average</b>			<b>1.00%</b>	

Source: <https://www.ofwat.gov.uk/wp-content/uploads/2024/12/9.-PR24-final-determinations-Expenditure-allowances.pdf>, p.13; <https://www.ofwat.gov.uk/wp-content/uploads/2024/07/CEPA-frontier-shift-real-price-effects-and-the-energy-crisis-cost-adjustment-mechanism.pdf>, p.82.

## Arcadis View

Based on discussions with NERA and the recent regulatory precedent, Arcadis proposes an ongoing efficiency assumption of 1.0 per cent.

# Proposed Cost Challenge | Inflation & RPE

## Hybrid Index Buildup

- This section was prepared in discussion with NERA.
- The UÉ network Capex request of €8,070m (2022 real prices) incorporates RPEs of 1.10 percent p.a. on average over RC4, based on its forecast of the “hybrid index”.
- The hybrid index is constructed from six different price indices (see table to the right), which UÉ combines in a weighted average to reflect inflationary pressures on its capital programme.
- UÉ forecasts hybrid index inflation of 3.4 percent in 2025, decreasing to 3.1 percent, thereafter, compared to an HICP inflation assumption of 2.0 per cent over RC4 (as shown in the table below).

Index	2025	2026	2027	2028	2029
UÉ HI	3.40%	3.10%	3.10%	3.10%	3.10%
HICP	2.20%	2.00%	2.00%	2.00%	2.00%

## Sub-indices in UÉ’s hybrid index

Name	Weight	Description	Freely Available
Sectoral Employment Orders (SEO)	27%	Tracks government mandated industry wide minimum pay increases.	Yes
Quarterly Earnings and Labour Costs Index – Construction Sector (CSO)	34%	Tracks changes in the cost of labor across the Irish construction sector, reflecting changes in average weekly earnings. Compiled by the Central Statistics Office (CSO) on a quarterly basis.	Yes
Wholesale Price Index – Building and Construction Materials (CSO)	20%	Tracks changes in wholesale prices across a range of construction materials (e.g., cement, reinforcing metal, structural steel). Compiled by the CSO on a monthly basis.	Yes
Wholesale Price Index – Energy Products (CSO)	2%	Tracks changes in wholesale prices of fuel purchased by manufacturing industry. Compiled by the CSO on a monthly basis.	Yes
Harmonised Index of Consumer Prices (HICP)	9%	Measures the change over time in the prices of consumer goods and services in Ireland. Used as the price control index.	Yes
BEAMA Index	9%	Tracks changes in costs in mechanical and electrical materials. Compiled by the UK manufacturing trade association for the electrotechnical sector, BEAMA, on a monthly basis.	No (paywall to access)

Source: NERA-analysis of i) Irish Water Capital Expenditure Submission, Response to CRU/202267 Irish Water Revenue Control 3 – Interim Review Consultation, dated July 2022, pp.7-8; UÉ response to Q&A Q42, dated 25 February 2025.

# Proposed Cost Challenge | Inflation & RPE

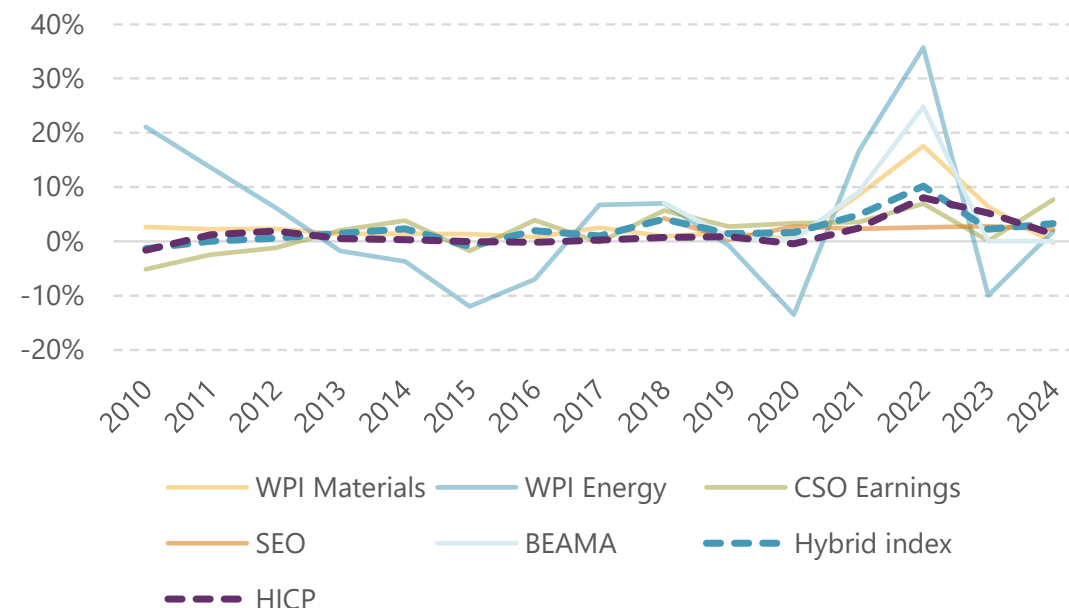
## Historical Data Analysis

- Arcadis understands that UÉ’s forecast of the hybrid index relies primarily on judgement rather than external data. UÉ’s forecasts for HICP and energy costs are based on external market data (i.e., ECB inflation target and energy futures prices, respectively), whereas UÉ’s forecasts for the other sub-indices are based on assuming constant growth rates informed by judgement.
- Following this, Arcadis proposes to draw on historical data instead, to inform the ex-ante RPE assumption over RC4.
- The graph to the right shows historical hybrid index inflation and inflation based on the sub-indices over the past 15 years (this is due to data on several sub-indices not available prior to 2010).
- As shown, hybrid index inflation has exceeded HICP inflation in most years. On average, from 2010 to 2024, hybrid index inflation has been 2.2 per cent, compared to an average HICP inflation of 1.4 per cent.
- This implies an average RPE of 0.8 percent, which is slightly lower than UÉ’s forecast of 1.1 percent.
- The calculation of historical hybrid index inflation used by Arcadis excludes the BEAMA index and the SEO index prior to 2018, as the BEAMA index is not publicly available (UÉ provided values from 2018 onward) and the SEO index was only introduced in 2018. For the years before 2018, the sub-index weights are re-scaled so that they sum to one.

## Arcadis View

Arcadis proposes to re-state UÉ’s Capex submission using an RPE assumption of 0.8 percent based on historical hybrid index inflation. Arcadis also recommends extending the impact of RPE and efficiencies to the non-network Capex.

Historical change in UÉ hybrid index sub-indices



Source: NERA-analysis of CSO data and UÉ response to Q&A Q42, dated 25 February 2025.

# Proposed Cost Challenge | Inflation & RPE

## RPE and Ongoing Efficiency reductions

- Applying 0.8% RPE and 1% of ongoing efficiency results in an RPE assumption net of ongoing efficiency of -0.2% p.a.
- As shown in table to the right, applying the -0.2% net RPE results in a reduction in UÉ's overall Capex request by 4.3 per cent, from EUR €8,561m to **€8,192m** (2022 real prices).
- The table on the right, shows calculations for the total Capex requested (network and non-network). For the final proposed cost challenge, refer to the next page which also accounts for targeted efficiencies in Capex deep dives.

**Re-stated UÉ overall Capex under 0.8% RPE and 1.0% annual ongoing efficiency assumption (i.e., -0.2% "net" RPE)**

		2024	2025	2026	2027	2028	2029	Total
<b>A</b>	UÉ RPE, %		1.17%	1.08%	1.08%	1.08%	1.08%	
<b>B</b>	UÉ RPE index	1.00	1.01	1.02	1.03	1.04	1.06	
<b>C</b>	Arcadis "net" RPE, %		-0.2%	-0.2%	-0.2%	-0.2%	-0.2%	
<b>D</b>	Arcadis RPE index	1.00	1.00	1.00	0.99	0.99	0.99	
<b>E = D / B</b>	Adjustment factor		0.99	0.97	0.96	0.95	0.94	
<b>F</b>	Total Capex under UÉ 1.1% RPE		1220	1249	1467	2067	2558	8,561
<b>G = F * E</b>	Total Capex under Arcadis 0.8% RPE and 1.0% OE (€m)		1203	1216	1411	1963	2398	8,192

Source: NERA-analysis

# Proposed Cost Challenge | Overview

## Final cost challenge proposals

Arcadis proposes to re-state UÉ’s Capex submission using the following four elements:

1. **Cost Challenge – Network Capex Deep Dives:** Targeted efficiency challenge applied to €2,168m network Capex value related to 15 projects/programmes identified as part of deep dive assessment (see [Section 4.1 Deep Dive Assessments](#) for details).
2. **Cost Challenge – Remaining Network Capex:** Overall cost challenge to the remaining network Capex €1,004.8m (excluding WSP major project and the remainder of capital maintenance) extrapolating proportionately from deep dive findings (see [Section 4.1 Deep Dive Assessments - Cost Challenge Proposal](#)).
3. Applying an overall Capex ongoing efficiency (OE) assumption of 1 percent based on recent regulatory precedent.
4. Applying an overall RPE assumption of 0.8 percent based on historical hybrid index inflation.

Table on the right sets out two proposed options for CRU to consider, with final re-stated UÉ Overall Capex (network and non-network) considering the overall RPE and ongoing efficiency reductions as well as targeted efficiencies based on deep dives.

**Final Re-stated UÉ network Capex under 0.8% RPE, 1.0% annual OE and network Capex efficiencies based on deep dives – Option 1 & Option 2**

	Option 1	Option 2
<b>Overall RC4 Capex request (0)</b>	<b>8,561</b>	<b>8,561</b>
<b>Cost Challenge – Network Capex Deep Dives (1)</b>	108.4	216.8
<b>Cost Challenge – Remaining Network Capex (2)</b>	50.6	101.1
<b>Post Challenge Capex Request (0-1-2)</b>	8,402	8,243
<b>Overall Capex under Arcadis 1% OE (3), 0.8% RPE (4) the Network Capex Deep Dives Targeted Efficiency (€m) and the remaining Network Capex efficiency. (0-1-2-3-4)</b>	<b>8,040</b>	<b>7,888</b>

**Option 1 suggests overall 6% efficiency to UÉ’s Capex, whilst Option 2 suggests overall 8% efficiency to UÉ’s Capex. This can be achieved by UÉ delivering 6% or 8% of additional outputs / outcomes instead of a budget reduction.**

# Proposed Cost Challenge | Key Sources Reviewed

A non-exhaustive list detailing the key documents and sources reviewed when producing this review.

Source Title	Document / Q&A / Workshop
Q&A responses	Q&A sheet
PR24 final determinations Expenditure allowances.pdf, p.13;	UÉ Document
CEPA frontier shift real price effects and the energy crisis cost adjustment mechanism.pdf, p.82.	Public Document
Irish Water Capital Expenditure Submission,	Public Document
UÉ response to Q&A Q42, dated 25 February 2025	UÉ Document
Response to CRU/202267 Irish Water Revenue Control 3 – Interim Review Consultation, dated July 2022, pp.7-8	UÉ Document
20241202 Uisce Éireann Revenue Control 4 (2025-2029) Network Capital Expenditure Look Forward FINAL	UÉ Document
20241202 Uisce Éireann Revenue Control 4 (2025-2029) BPQ FINAL	UÉ Document

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