PR24

# Cost Adjustment Claim: Industrial Emissions Directive compliance at anaerobic digestion sites

## Document Reference ID: UUW_CAC_004

**9 June 2023**

A cost adjustment claim to reflect higher than historical costs, arising from changes in regulatory requirements across the industry at anaerobic digestion sites, to operate under the Industrial Emissions Directive and comply with Appropriate Measures guidance.

United Utilities

Water for the North West

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# Cost Adjustment Claim Submission

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| Title: | Industrial Emissions Directive compliance at anaerobic digestion sites<br><br>A cost adjustment claim to reflect higher than historical costs, arising from changes in regulatory requirements across the industry at anaerobic digestion sites, to operate under the Industrial Emissions Directive and comply with Appropriate Measures guidance. |
| Price control: | Bioresources |
| Total value of cost adjustment claim for AMP8 | £172.594 million |
| Cost adjustment headline: | This document sets out the case for a cost adjustment to reflect the additional costs of complying with the Industrial Emissions Directive (IED) at our 13 anaerobic digestion sites. We have a new requirement to comply with Appropriate Measures statutory guidance that was published in 2022. This goes over and above the previously understood requirements of IED compliance, which the company is absorbing at a cost of £66.030 million in AMP7.<br><br>The Environment Agency (EA) clarified in 2019 that all water industry anaerobic digestions sites would now be regulated under the IED. The guidance governing the requirements to comply with IED was revised in 2022, which will result in additional actions we will have to take in AMP8, on top of the 2018 guidance.<br><br>Bioresources cost models are based on historical expenditure (pre-imposition of more stringent regulatory standards), and do not reflect the additional costs associated with meeting the IED and Appropriate Measures. We consider that Ofwat's modelled allowance will not allow us to fulfil our legal obligations, and therefore we consider a cost adjustment claim to be the most appropriate way to ensure we are able to recover efficiently incurred expenditure relating to enhanced IED compliance, as set out in the 2022 guidance. |

# 1. Cost adjustment case summary

| Gate | Summary | Location reference |
|---|---|---|
| Need for cost adjustment | • The EA clarified in 2019 that all water industry Anaerobic Digestion (AD) sites would now be regulated under the Industrial Emissions Directive (IED). This has ongoing implications for our compliance costs at 13 sites to comply with IED.<br>• In September 2022 the standards of environmental protection to meet IED compliance were raised once again, with the publication of Appropriate Measures for the Biological Treatment of Waste. The EA has adopted a precautionary principle approach in setting the Appropriate Measures guidance, which has resulted in many requirements being more onerous than previous standards.<br>• As bioresources cost models are based on historical expenditure (pre-imposition of more stringent regulatory standards), they do not reflect the additional costs associated with meeting the IED, and therefore an allowance is required in addition to modelled costs in AMP8. We are unaware of any companies incurring any significant monies to date to deliver IED compliance. There is, therefore, no element of costs in historical data.<br>• We were not informed of the legal clarification to comply with IED at the time of our PR19 submission and therefore we did not submit an enhancement case at that time. The timing of the clarification of the legal status of our AD sites will mean that by the end of AMP7, we anticipate that we will have absorbed £66.030 million IED compliance costs associated with the EA's 2018 BAT guidance, that are not reflected in AMP7 cost allowances.<br>• As IED compliance is a pre-existing obligation dating from 2019 (or even earlier for a subset of our sites) we anticipate that it will be appropriate for compliance costs to be recognised as a cost adjustment claim, rather than an enhancement case (albeit, this position is somewhat ambiguous). | **Section 3: Need for adjustment**<br>Table 2<br>Section 3.4<br>Figure 10 |
| Cost efficiency | • We have undertaken a significant programme of surveys, site assessments, modelling and engineering design and estimating to derive costs for AMP8 IED compliance, which are highly site-specific and variable. We have extrapolated learning from the AMP7 IED permitting process to develop assumptions for developing cost estimates and to understand what proposals will be acceptable to the EA under the new requirements for 2022 Appropriate Measures guidance.<br>• Costs for compliance across the sector are as yet unknown, however high level assessment by an independent consultant has indicated that our proposed compliance costs are consistent with industry norms. We have sought third party assurance of our costs to ensure that our cost estimates are robust.<br>• We have taken steps to control costs for customers and have pursued and promoted the use of a risk assessment approach with the EA. We seek to use management and monitoring techniques to demonstrate compliance in preference to capital investment works. Acceptance of these measures has been limited by the EA which is pursuing a precautionary and risk-averse approach to setting requirements. | **Section 4: Cost efficiency**<br>4.1.2<br>4.2<br>Table 5<br>4.5 |

| | | |
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| Need for investment | • Publication of Appropriate Measures guidance has raised the level of environmental protection to be delivered at our AD sites.<br>• The significant capital interventions that are required to meet latest standards include:<br>– Reduction in fugitive emissions through retrospectively covering open tanks and cake stores<br>– Provision of secondary containment in the event of catastrophic failure of assets. Sewage sludge treatment facilities are now considered 'high risk sites' increasing the level of protection required.<br>– New requirements for monitoring sludge liquor returns.<br>• Costs to comply with our IED permits at 13 AD sludge treatment centres are a pre-existing obligation. Expenditure incurred to comply with IED post 2022 Appropriate Measures publication is an additional £172.594 million. These are new and more onerous service standards on top of those required to comply with the 2018 BAT guidance, reflecting a step change in regulatory expectations for waste treatment. | **Section 5**<br>Figure 5<br>Figure 10 |
| Best options for customers | • We have considered a range of options including 'do nothing'. We are presenting the lowest cost compliance option on behalf of customers.<br>• The benefits delivered through the investment will be compliance against our statutory obligations. The investment will increase the level of protection for the environment from the harmful effects of industrial activities. This will reduce the environmental impacts of releases to land, air and water from our sludge treatment activities.<br>• We have proposed a pragmatic timescale to deliver waste treatment compliance, based on feasibility and deliverability challenges, and recognising the scale of investment required. We have sought to align investment with other works on sites, and ensure sites can remain operational during the works.<br>• So far as possible, we have ensured that our proposed investment is efficient through alignment with our bioresources long-term delivery strategy. We have closed several aging AD sites, where it was more cost efficient to cease digestion and convert sites to dewatering centres, rather than updating the sites to comply with IED standards. | **Section 6: Best option for customers**<br>Table 7<br>3.2.5 |
| Customer protection | • Compliance requirements are site specific and the exact requirements will not be known in full until we progress each individual permit variation. We have developed an efficient cost to deliver a clear scope of works. If investment is not required at a site, or we are able to agree with the EA a lesser interpretation of the regulatory requirements, we commit to handing back the cost of any reduced requirements through the use of a Price Control Deliverable.<br>• There are also three main areas of additional uncertainty where scope could increase based on further review with the EA and detailed design to confirm solutions. This is estimated at an additional circa £180 million and is not currently included in this claim pending further review with the EA and detailed design to confirm solutions.<br>• Given the potential scale of scope and cost increases, we will, through our Business Plan submission, promote management of these compliance scope risks through an uncertainty mechanism. We may seek to revise the cost | **Section 7: Customer protection**<br>7.1.1<br>7.1.4<br>7.1.7 |

| | | |
|---|---|---|
| | adjustment claim value in future, if further work or scope requirements are confirmed by the EA make it appropriate to do so.<br>• The EA will ensure that the environment is protected in this area on behalf of customers through the AMP8 introduction of a common industry Environmental Performance Assessment (EPA) metric for waste treatment compliance. Moreover, non-delivery of the outputs will likely incur prosecution and fines by the EA. If non-compliance is through deliberate actions by the company this is likely to influence the scale of any fines issued. | 7.1.8 |

# 2. Introduction

## 2.1 Document purpose

2.1.1 Evolving and more stringent regulation of sewage sludge treatment is leading to increasing environmental protection requirements across our sludge treatment sites. The change in requirements is driving higher than historical sludge treatment costs and as such we are submitting two separate cost adjustment claims:

(1) **Industrial Emissions Directive compliance at anaerobic digestion sites**. This is an industry-wide adjustment (as it impacts on all companies) with a claim value for United Utilities Water (UUW) of £172.594 million. This claim is specific to regulatory changes at our (biological) sludge digestion sites.

(2) **New waste permit obligations at physico-chemical sludge treatment sites that previously had PPC permits**. This is a company-specific adjustment with a claim value of £78.086 million. This claim is specific to regulatory changes at our (non-biological) sludge thickening and dewatering sites (hereafter "physico-chemical" sludge treatment sites).

2.1.2 This document relates to Claim 1: Industrial Emissions Directive (IED) compliance at Anaerobic Digestion (AD) sites only. We set out the costs to comply with the additional requirements emanating from the 2022 'Appropriate Measures' statutory guidance in AMP8, as an ongoing consequence of regulation under the IED, and why additional cost allowance is required, in addition to modelled costs. The scope of this claim is separate and distinct, and over and above AMP7 IED compliance costs, which result from the 2018 BAT guidance. Allowances made through this cost adjustment claim will ensure full regulatory compliance for a defined scope of requirements to meet environmental protection standards.

2.1.3 Claim 2 is set out in cost adjustment claim document, *UUW_CAC_005: New waste permit obligations at physico-chemical sludge treatment sites that previously had PPC permits*. We have only included costs for the bioresources price control in the cost adjustment claim (£78.086 million). We have not included the costs for the physico-chemical sludge treatment sites in the wastewater network plus price control in the cost adjustment claim (£11.319 million).

2.1.4 There is also significant change in the regulation of sludge disposal activities that may further impact the bioresources price control. The regulation of sludge to land activities is outside the scope of this document, which addresses sludge treatment activities only.

2.1.5 Through our Business Plan submission we will promote management of these other significant regulatory risks through an uncertainty mechanism.

## 2.2 Structure of this document

2.2.1 We have divided our cost adjustment claim into the following sections:

(a) The remainder of this section provides background on the evolving regulation of sewage sludge treatment and how this is leading to the need for two separate cost adjustments.

(b) **Section 3** provides an overview of the need for this cost adjustment, explaining that the new requirements at our AD sites will increase our operating costs and capital investment requirements. This activity is not reflected in the historical dataset or within the cost assessment framework and Ofwat's modelled allowance is insufficient to fulfil our legal obligations.

(c) **Section 4** provides evidence that our costs to comply with IED and 2022 Appropriate Measures guidance are efficient. We explain the opportunities, through innovation and alternative solutions, we have explored with the Environment Agency (EA) to seek to reduce compliance costs.

(d) **Section 5** provides clear evidence of the investment need. We use evidence gathered by independent consultants, on behalf of the water industry, to demonstrate that Appropriate

Measures compliance in AMP8 is driving additional costs, over and above those required to meet IED compliance in AMP7 to previous standards.

(e) **Section 6** sets out our approach to optioneering to demonstrate that we have considered a range of options, including 'do nothing', to deliver IED and Appropriate Measures compliance.

(f) Finally, in **Section 7** we explain how customers are protected if the investment is cancelled or reduced in scope.

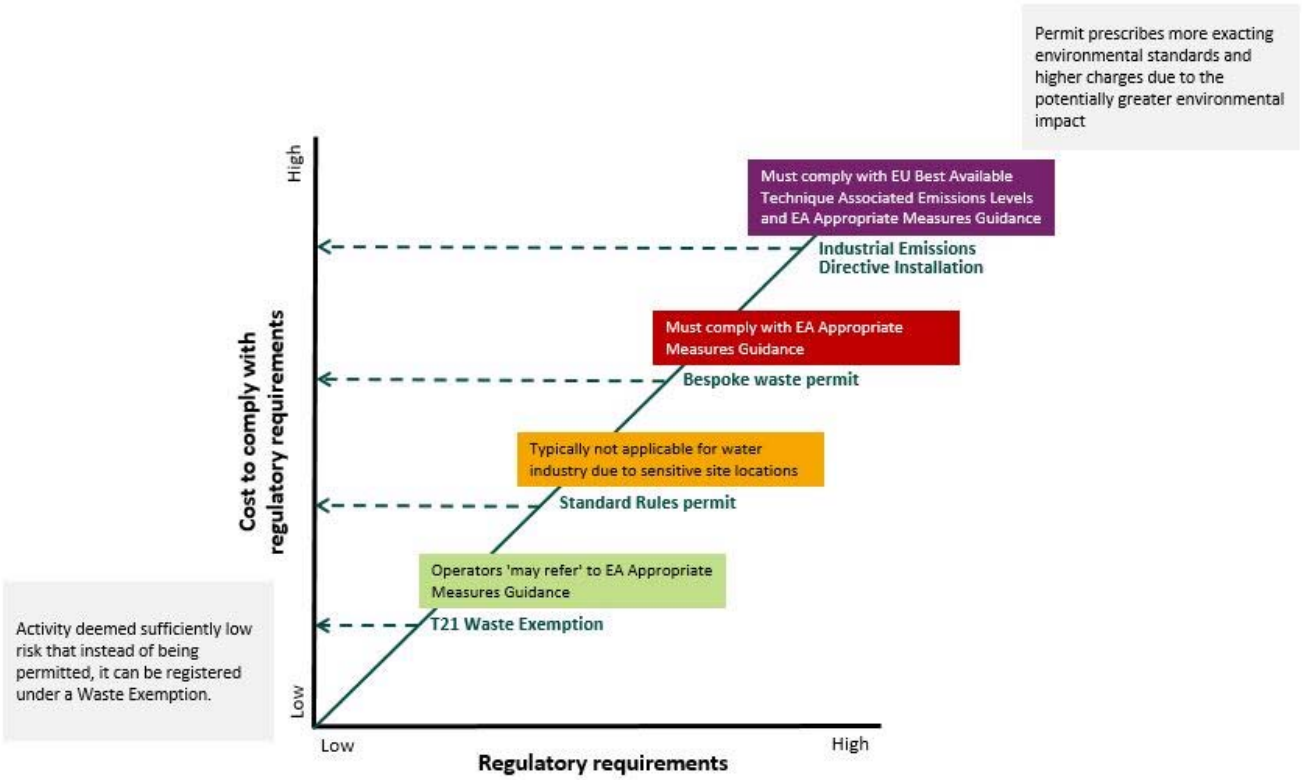
## 2.3 Environmental Regulatory Framework

### Background

2.3.1 We present in this section the context detailing the evolution of the regulation of sewage sludge treatment at both physico-chemical and AD sites, common across both cost adjustment claims. We explain that the regulation of sewage sludge treatment is undergoing significant transformation. Activities are becoming more stringently regulated with ever increasing requirements for environmental protection.

2.3.2 The EA implements environmental permitting through the Environmental Permitting Regulations (EPR) framework, which uses a risk-based approach, dependent on the environmental risk of the activity. Regulation ranges from sufficiently low risk activities, that can be registered at no cost under a waste exemption, to installations under the Industrial Emissions Directive (IED), that are required to comply with more exacting environmental standards and incur high operational charges. A schematic to show these tiers of regulation is presented in Figure 1.

***Figure 1 – Tiers of waste regulation that may be applied through the EPR framework***




2.3.3 Historically, there have been different regulatory regimes for sludge treatment sites based on the ultimate outlet of the sludge they treat, rather than the process operating on-site. Operations are classed as either:

(a) **Recovery**: Supplying sludge to a recovery outlet (operations are classified as having a principal objective to ensure that the waste serves a useful purpose i.e. biosolids recycling to agricultural or land restoration).

(b) **Disposal**: Supplying (or the potential to supply) sludge to a disposal outlet (operations are classified as being primarily aimed at getting rid of waste i.e. landfill or incineration).

2.3.4 Disposal operations have historically been regulated more onerously, reflecting the greater environmental impact associated with the ultimate disposal outlet. The consequence of which is that two equivalent sites, carrying out the same processes, may be permitted under different regulatory regimes and incur different operating costs.

2.3.5 In Figure 2, and the remainder of this section, we set out a timeline to summarise regulatory changes at both disposal and recovery operations.

### How the Waste Framework works differently

2.3.6 Since 2019 sludge treatment activities are regulated through the EU Waste Framework Directive. Prior to this, regulation of sludge treatment was covered by the Urban Wastewater Treatment Directive (UWWTD), which governs wastewater treatment activities in England.

2.3.7 An implication of regulation under the Waste Framework Directive, is that the bioresources price control operates under unique water industry circumstances. Significant environmental investment needs can arise, but these needs are not being recognised in the Water Industry National Environment Programme (WINEP), and nor do they originate through primary legislative change (but through updated guidance). The waste treatment compliance needs set out in this cost adjustment claim, have arisen in exactly these circumstances: Guidance detailing how to comply with primary legislation has changed, rather than the legislation itself.

2.3.8 In these circumstances we consider that a cost adjustment claim would seem to be an appropriate way to ensure that we are able to recover efficiently incurred expenditure relating to enhanced waste treatment compliance standards. As IED compliance is a pre-existing obligation dating from 2019 (or even earlier for a subset of our sites) we do not consider an enhancement claim would be appropriate. However, we do recognise that significant parts of the AMP8 investment need may be considered typically as enhancement expenditure. The main issue for the company is that we are facing a significant increase to costs of compliance resulting from the 2022 guidance, which will need to be recovered from customers.

2.3.9 Under the Waste Framework Directive there is a requirement to comply with ‘Best Available Technique’ or ‘BAT’ standards. Importantly, it is implicit that BAT standards will continue to evolve, as improvements in BAT are developed, driven by changes in technology and tightening of standards, and therefore these sites will continue to attract periodic investment needs. The Waste Framework Directive is specifically designed to allow for these continuous updates to standards, and frequent and numerous changes to the EPR framework can be made within the EA’s control, rather than requiring primary legislative change.

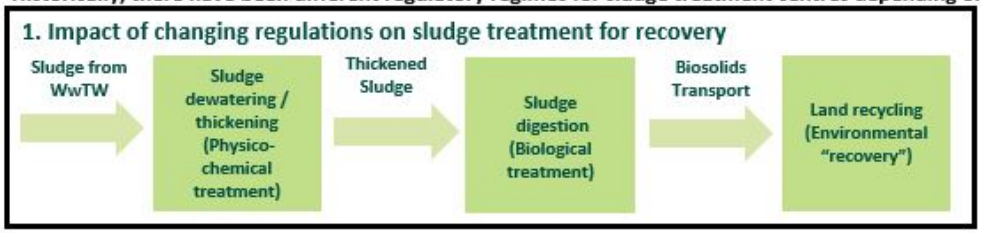
2.3.10 The EA can make changes to government websites and guidance without the need for public consultation. This can lead to new or tighter standards being implemented with a quick turnaround and these types of changes cannot always be predicted or accounted for in water company planning cycles. This can leave the operator with limited time to respond, especially if multiple facilities are impacted by the changes, and it poses challenges in terms of the practicality and funding of delivery. Moreover, within the Waste Framework Directive, there is no ‘hands-off period’, unlike for wastewater discharge permits that prevent further guidance or permit changes for four years following a change. There is a possibility that investment decisions could be out of date before they are delivered, creating an additional level of investment risk.

2.3.11 Guidance documents under the Waste Framework Directive, although termed ‘guidance’, are legally enforceable through the waste permitting process. While guidance itself is not law and does not operate

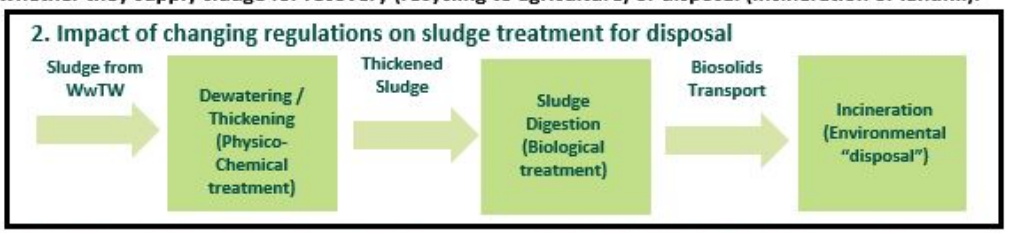
to override legal duties or obligations, government advice and guidance, may in practice, have the "force of law" and the EA Appropriate Measures guidance makes it clear that the standards are enforceable, and these measures are likened to Environmental Permit conditions and associated compliance with those.

***Figure 2 - Summary of the evolution of regulation of sludge treatment***

**Historically, there have been different regulatory regimes for sludge treatment centres depending on whether they supply sludge for recovery (recycling to agriculture) or disposal (incineration or landfill).**




| Permitting regime | Sludge dewatering / thickening (Physico-chemical treatment) | Sludge digestion (Biological treatment) |
|---|---|---|
| Pre-2019 | Sites operate under T21 exemption from waste legislation.<br>Activity already covered under the UWWTD and therefore excluded from the IED scope (known as the "UWWTD exclusion") | Sites operate under T21 exemption from waste legislation<br>Activity already covered under the UWWTD and therefore excluded from the IED scope (known as the "UWWTD exclusion") |
| 2019 | No change | July 2019 EA confirm implementation of the IED with respect to sewage sludge, having concluded that sewage sludge is not an activity covered by the UWWTD and is therefore within the scope of the IED.<br>IED compliance requirements set out in European Commission 2018 BAT reference (BREF) document. (per Green Recovery requirements) |
| 2022 | No change | September 2022 EA issues their guidance on IED compliance for the sector, Appropriate Measures for the Biological Treatment of Waste. Requirements go significantly beyond those set out in BREF. |
| Additional costs claimed | - | Cost of additional work required by 2022 guidance, above that expected from 2018 guidance (i.e. the work in excess of the Green Recovery requirements) |
| Which Cost Adjustment Claim? | N/A | Industrial Emissions Directive compliance at anaerobic digestion sites<br>**UUW_CAC_004** |




| Permitting regime | Sludge dewatering / thickening (Physico-chemical treatment) | Sludge digestion (Biological treatment) |
|---|---|---|
| Pre-2019 | Sites permitted under the former PPC Directive (which was subsumed into IED). IED implementation deferred by the EA whilst legal clarification over the applicability of the "UWWTD exclusion" sought. | Sites permitted under the former PPC Directive (which was subsumed into IED). IED implementation deferred by the EA whilst legal clarification over the applicability of the "UWWTD exclusion" sought. |
| 2019 | July 2019 EA confirm implementation of the IED with respect to sewage sludge, having concluded that sewage sludge is not an activity covered by the UWWTD and is therefore within the scope of the IED.<br>Existing PPC permits to be varied to IED permits.<br>IED compliance requirements set out in European Commission 2018 BAT reference (BREF) document (per Green Recovery requirements) | July 2019 EA confirm implementation of the IED with respect to sewage sludge, having concluded that sewage sludge is not an activity covered by the UWWTD and is therefore within the scope of the IED.<br>Existing PPC permits to be varied to IED permits.<br>IED compliance requirements set out in European Commission 2018 BAT reference (BREF) document (per Green Recovery requirements) |
| 2022 | EA confirm sites are no longer above the IED threshold (as incineration has ceased). Sites to operate under Bespoke Waste Permits and not the IED.<br>Introduces a requirement to comply with Appropriate Measures Guidance. | September 2022 EA issues their guidance on IED compliance for the sector, Appropriate Measures for the Biological Treatment of Waste. Requirements go significantly beyond those set out in BREF. |
| Additional costs claimed | Cost of additional work required by Bespoke Waste Permit and Appropriate Measures, above that to comply with baseline PPC permit | Cost of additional work required by 2022 guidance, above that expected from 2018 guidance (i.e. the work in excess of the Green Recovery requirements) |
| Which Cost Adjustment Claim? | New waste permit obligations at physico-chemical sludge treatment sites that previously had PPC permits<br>**UUW_CAC_005** | Industrial Emissions Directive compliance at anaerobic digestion sites<br>**UUW_CAC_004** |

## 2.4 Regulation of sewage sludge treatment prior to 2019

- Pre-2019 the majority of sludge treatment centres operated under exemptions from waste legislation.
- Only those sites that supplied (or had the potential to supply) sludge to a disposal outlet (i.e. incinerator) were regulated under permits.
- Sites were permitted under PPC (later subsumed into IED). IED permitting was deferred while the EA sought legal clarification over whether it applied.
- At PR19 we were allowed £8.4 million of costs in addition to modelled costs in the Bioresources price control, to account for the increased operating cost of complying with PPC permits.

2.4.1 Sewage sludge treatment for **recovery** benefitted from an exclusion from the EU Waste Framework Directive and did not need to comply with IED:

- Regulation of sludge treatment was already covered by the UWWTD (known as the 'UWWTD exclusion').
- Sites typically operated under a T21 exemption and permitting was not required.
- This applied regardless of whether sites were undertaking AD or physico-chemical treatment.

2.4.2 Sewage sludge treatment for **disposal** was regulated under Pollution Prevention and Control (England and Wales) Regulations 2000[1]. A 2006 court ruling[2] deemed that any intermediate sludge treatment before the sewage sludge reached the disposal outlet for incineration should be included in the permitting regime. The implication of this determination resulted in us requiring a significant number of physico-chemical sludge treatment centres, as well as AD sites, to be permitted under PPC.

2.4.3 PPC was subsumed into IED[3] and in 2013 the EA led a variation process that sought to change PPC permits to IED permits. We appealed the permit variations, as at the time there was much disagreement about whether the treatment of sewage sludge was an activity covered by the UWWTD exclusion. We also challenged that, should they become IED permitted, then the PPC permits had been incorrectly classified by the EA as 'disposal' as opposed to a 'mix of recovery and disposal'. The impact of this was that all physico-chemical sludge treatment centres supplying sludge would also need to be permitted as IED Installations.

2.4.4 In July 2014 the EA issued the "Industrial Emissions Directive – Waste Sector update" which formally deferred permitting requirements to allow time for further consideration of the regulations and the interpretation of the UWWTD exclusion clause[4]. While legal clarification was being sought, these sites continued (and still continue) to operate under PPC permits (held in abeyance).

2.4.5 It has been recognised in previous price reviews that our physico-chemical sites are uniquely regulated in the sector, and have incurred higher costs than equivalent sites operated under T21 waste exemptions.

[1] The PPC regulations were made in order to transpose into domestic law the Integrated Pollution Prevention and Control Directive (96/61/EEC) or IPPC.

[2] England and Wales Court of Appeal (Civil Division), "United Utilities Water Plc V Environment Agency for England and Wales," 19 05 2006.

[3] Directive 2010/75/EU on industrial emissions (IED) entered into force on 6 January 2011 and was transposed into UK regulations on 20 February 2013.

[4] Environment Agency, Briefing: Industrial Emissions Directive – Waste Sector, July 2014.

## 2.5 IED implementation in 2019

- In 2019 the EA confirmed implementation of IED for sludge treatment. This captured:
  - All industry AD Sites (regardless of whether previously exempt or PPC permitted)
  - Uniquely, our physico-chemical sites which held existing PPC permits. All other recovery physico-chemical sites continued to operate under a T21 waste exemption.
- All sites captured by IED were now required to comply with the measures set out within 2018 BREF Conclusions
- In 2021 we submitted a Green Recovery proposal which was rejected as the EA confirmed that IED compliance was an AMP7 obligation (albeit unfunded). IED compliance with the 2018 BREF was estimated to cost:
  - £59.8 million at our AD Sites
  - £7.4 million at our physico-chemical treatment sites

2.5.1 The regulatory position over IED implementation was clarified in July 2019, when the EA wrote to companies[5] to inform us that it was now implementing IED with respect to sewage sludge. This marked the first time that the IED regulations had been formally confirmed to apply to any of our (and the whole water industry's) sludge treatment activities. The regulatory compliance date for IED permitting was set as August 2022.

2.5.2 Following notification by the EA of its intent to commence implementation of IED we identified the sites requiring IED permits:

- Nine AD sites required a permit variation from existing PPC permits
- Seven AD sites required permits for the first time
- Fifteen physico-chemical sludge treatment sites required a permit variation from existing PPC permits.

2.5.3 Implementation of IED has had significant implications for the whole water industry in AMP7. It introduced a requirement for sites, now regulated under IED, to increase environmental protection to meet Best Available Techniques (BAT) for waste treatment for the first time. The European Commission defines BAT to be applied for the specific installations covered within the IED scope, which means the best economically and technically viable techniques to prevent, minimise and reduce emissions to air, water, and land. These BAT conclusions were established in 2018 when the Commission Implementing Decision (EU) 2018/14476[6] BAT reference document (BREF) was published.

2.5.4 We were not informed of the legal clarification to comply with IED at the time of our PR19 submission. Therefore we did not submit an enhancement claim at PR19 to ensure provision of adequate resources to comply with the IED. Companies which challenged their PR19 determination with the Competition and Markets Authority and included for IED were awarded an allowance to comply with the IED in AMP7. This has created a distortion in the bioresources market in AMP7.

2.5.5 Our understanding is that Ofwat considers those companies that did not challenge their PR19 determination with the Competition and Markets Authority should meet the AMP7 IED costs. However, if through the PR24 process AMP7 costs for IED are to be allowed, then this will need to be a consistent approach applied across the industry.

[5] Letter from EA to water industry, *Industrial Emissions Directive*, 8 July 2019

[6] https://eur-lex.europa.eu/legal-content/EN/TXT/?toc=OJ:L:2018:208:TOC&uri=uriserv:OJ.L_.2018.208.01.0038.01.ENG

2.5.6 In 2021 we submitted a Green Recovery proposal[7] to seek funding to deliver compliance with the IED. This was unsuccessful as the EA declared that IED is an AMP7 obligation. The Green Recovery proposal identified the estimated costs to comply with the 2018 BREF:

- £59.8 million across our 16 AD Sites
- £7.4 million across our 15 physico-chemical treatment sites

2.5.7 While IED compliance should have been an AMP7 enhancement allowance, we have continued to undertake work to comply with IED. We anticipate by the AMP7 this situation will have led us to absorb £66.030 million of unfunded IED compliance costs.

## 2.6 Updated regulatory requirements in 2022

**AD sites (this claim):**

- All industry AD Sites are now required to additionally comply with 2022 Appropriate Measures for the Biological Treatment of Waste.
- Appropriate Measures has further raised the bar in the level of environmental protection required creating an additional investment need, over and above 2018 BREF requirements.
- Compliance costs at AD sites have risen by £172.594 million.

**Physico-chemical treatment sites:**

- Our sites no longer meet the threshold to be regulated as IED waste installations.
- Existing permits are to be varied to bespoke waste permits, introducing a requirement to comply with statutory Appropriate Measures guidance.
- Compliance costs at physico-chemical treatment sites have risen by £89.405 million across bioresources and Wastewater Network plus.
- We have only included costs of £78.086 million for the bioresources price control in the cost adjustment claim.

### At AD sites (this claim)

2.6.1 The gap to raise existing sites to meet IED compliance at AD sites has been further compounded by the publication of "Appropriate Measures for the Biological Treatment of Waste" on 21st September 2022[8], (hereafter "Appropriate Measures"). The EA, as the competent authority for implementing IED in England, has provided interpretation of the BAT conclusions for England. This document, although termed 'guidance', is legally enforceable through the IED permitting process.

2.6.2 Appropriate Measures has further raised the bar in the level of environmental protection required, setting out new and more onerous standards to be achieved. It has led to significant IED compliance scope creep, and moreover the timing of the publication, after our initial IED applications had been made, has generated significant re-design and re-engineering of solutions.

2.6.3 There are three core aspects to the 2022 Appropriate Measures that create an additional investment need, over and above 2018 BREF requirements:

(i) More stringent and onerous compliance requirements (based on specified Technical Reference Documentation)

(ii) Prescriptive compliance criteria: The 2018 BREF Document includes terminology that is open to flexibility and practicability, whereas the EA's "Biological Waste Treatment: Appropriate

[7] https://www.unitedutilities.com/globalassets/z_corporate-site/about-us-pdfs/main-documents/gr0005---emissions-regulations-and-the-journey-to-zero-carbon-redacted.pdf

[8] https://www.gov.uk/guidance/biological-waste-treatment-appropriate-measures-for-permitted-facilities

Measures for Permitted Facilities" uses terminology such as 'you must'. This limits the use of risk assessment to demonstrate that an equivalent level of environmental protection is being or can be achieved to capital investment, particularly when seeking to apply these standards retrospectively.

(iii) Additional sludge treatment activities covered by the document including storage of digestate material.

2.6.4 A detailed assessment and comparison of 2018 BREF requirements versus 2022 Appropriate Measures has been independently undertaken by Atkins[9]. This report clearly sets out the evidence for the additional circa £2.0billion of investment needs across the industry. The majority of additional scope is associated with secondary containment and covering of storage, both driven by Appropriate Measures requirements. The consequence of the scope increase of the Appropriate Measures is summarised below:

- IED compliance cost prior to Appropriate Measures: Our Green Recovery proposal quantified the cost of complying with IED for AD sites based on the 2018 BREF and review with the EA was £59.8 million.
- Since our Green Recovery proposal we have reduced our number of AD sites from 16 to 13. This rationalisation has been accelerated due to the significant capital investment needed to comply with Appropriate Measures in AMP8.
- The accelerated rationalisation of sites enables us to avoid wasteful investment in meeting Appropriate Measures guidance standards at sites that would ultimately have been closed in the medium term as we implement our long-term delivery strategy.
- The total cost of compliance for the scope over and above the 2018 BREF compliance scope is £172.594 million.

2.6.5 This activity is not reflected in the historical dataset or within the cost assessment framework and Ofwat's modelled allowance is insufficient to fulfil our legal obligations. The AMP7 green recovery proposal was rejected as Ofwat considered this an existing requirement and therefore expected to be funded from base expenditure. Recognising this, we are submitting a cost adjustment claim rather than an enhancement case to meet the additional AMP8 costs of IED compliance at our AD Sites.

### At physico-chemical sludge treatment sites

2.6.6 With respect to our physico-chemical treatment sites operating under PPC permits the aim of the EA was to vary the existing permits to IED permits. The EA-led permit variation process commenced in 2021 when we were issued with Notices Requiring Information under Regulation 61(1) of the Environmental Permitting Regulations 2016. The information requests aimed to inform the EA about the current operation of the sites and compliance with BAT, to inform the EA review of permits.

2.6.7 At the time we submitted our Regulation 61 responses the disposal outlet at our incineration plant had ceased day-to-day operation. Following submission of our Regulation 61 responses, which outlined the latest operating position, we received a letter from the EA in March 2022 stating[10]:

*"you confirmed your facilities will operate below the IED threshold and you will vary the permits to reflect the ongoing activities in the near future. On this basis, we agreed not to progress with the permit reviews."*

2.6.8 The letter agreed that for these sites because they no longer supplied sludge to a disposal outlet, they did not meet the threshold to be regulated as IED Waste Installations. Permits at these sites should instead be varied to a tier within the EPR regulatory framework known as "Bespoke Waste Permits". This tier has no requirement to comply with 2018 BREF. Costs of £7.4 million in AMP7 to comply with IED, and as set out in our Green Recovery proposal were therefore negated.

[9] Atkins, Industrial Emissions Directive Supporting Document, 31 May 2023 (for Water UK).

[10] Letter from the EA, *Reg 61 – WaSC sludge treatment BAT review,* 4 March 2022.

2.6.9 Varying the existing PPC permits to bespoke waste permits will, however, introduce a requirement to comply with statutory Appropriate Measures guidance[11]. As we have set out to the EA, we believe that these sites should be eligible to operate under T21 waste exemptions[12]. We are concerned that 13 of our physico-chemical sites are being subjected to more onerous regulatory requirements, and greater waste treatment compliance costs, than at other equivalent sites across the water industry, which are operating under T21 exemptions. The EA has stated that operating under T21 exemptions would be an unacceptable reduction to the level of environmental protection afforded at these sites, and they require bespoke waste permits.

2.6.10 The change in requirements to operate under bespoke waste permits and comply with Appropriate Measures guidance is driving higher than historical sludge treatment costs. We have incurred higher costs in the past due to the specific application of the regulatory framework to these sites, but these are expected to increase in AMP8 as a consequence of needing to comply with Appropriate Measures. This is set out in our cost adjustment claim for £78.086 million in document *UUW_CAC_005: New waste permit obligations at physico-chemical sludge treatment sites that previously had PPC permits*.

2.6.11 Compliance costs at physico-chemical treatment sites have risen by £89.405 million across bioresources and Wastewater network plus price controls. The impact of this is specific to ourselves and cost models do not reflect this activity. These are not IED compliance costs, so cannot be assumed to have been part of previously rejected IED claim for AMP7.

## 2.7 Summary of the need for cost adjustment

2.7.1 As set out above, there have been significant changes to the regulation of sewage sludge treatment that will lead to additional sludge treatment costs being incurred in AMP8 and beyond. The change in requirements is driving higher than historical sludge treatment costs and as such we are submitting two separate cost adjustment claims.

2.7.2 We expect all companies to be seeking to recover costs at PR24 as there will need to be some form of adjustment to account for greater regulatory compliance costs. We consider a cost adjustment to be the most appropriate mechanism to recover costs, as IED is a pre-existing obligation, although we recognise that a lot of the investment will fall in AMP8 and may be considered enhancement.

**(1) Industrial Emissions Directive compliance at anaerobic digestion sites (this claim).**

2.7.3 A cost adjustment claim to reflect higher than historical expenditure requirements at 13 AD sites to comply with Appropriate Measures guidance. This is an industry wide adjustment with a claim value for UUW of £172.594 million.

2.7.4 This cost adjustment claim is valid because:

- The additional expenditure requirements result from the 2022 publication of new statutory guidance and are outside of our control.
- This activity isn't reflected in the historical dataset or within the cost assessment framework and Ofwat's modelled allowance is insufficient to fulfil our legal obligations.
- The scope of this claim is over and above the prior IED Green Recovery proposal that Ofwat has already rejected for AMP7.

**(1) New waste permit obligations at physico-chemical sludge treatment sites that previously had PPC permits.**

[11] Which Appropriate Measures Guidance is unclear. We have asked the EA to clarify requirements between, *Chemical waste: appropriate measures for permitted facilities (*https://www.gov.uk/guidance/chemical-waste-appropriate-measures-for-permitted-facilities) or *Non-hazardous and inert waste: appropriate measures for permitted facilities* (https://www.gov.uk/guidance/non-hazardous-and-inert-waste-appropriate-measures-for-permitted-facilities). The Compliance requirements do not vary significantly between the two documents.

[12] UUW letter to EA 26 May 2023.

2.7.5 A company-specific cost adjustment claim to reflect higher than historical costs, arising from changes in regulatory requirements for 13 physico-chemical sludge treatment sites, to operate under bespoke waste permits and comply with Appropriate Measures guidance. The requirement arises from a legacy of the sites ever having supplied (or had the potential to supply) sludge for disposal at our incineration plant and the specific EA approach to implementing the EPR framework. Claim value of £78.086 million.

2.7.6 To be clear, our cost adjustment claim only includes costs of £78.086 million for activity in the bioresources price control.

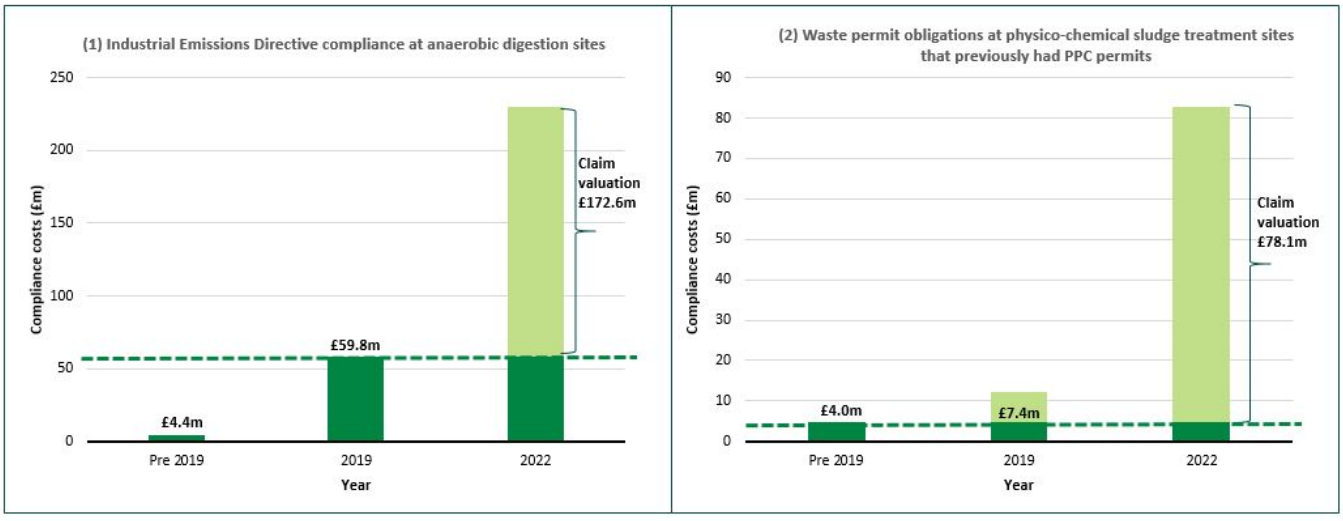
2.7.7 We will incur further costs at four physico-chemical sludge treatment sites that are within the Ofwat boundary for Wastewater network plus. We consider that under the PR24 methodology this cost does not meet the materiality threshold for a cost adjustment claim relating to the Wastewater network plus price control. Therefore, we have not included the costs to comply with appropriate measures at physico-chemical sludge treatment sites in the Wastewater network plus price control in the cost adjustment claim (£11.319 million).

2.7.8 This cost adjustment claim is valid because:

- The additional expenditure requirements arise from changing regulatory requirements to comply with bespoke waste permits and are outside of our control.
- The impact is specific to ourselves and cost models do not reflect this activity. Ofwat's modelled allowance is insufficient to fulfil our legal obligations.
- We have incurred higher costs in the past due to the nature of the regulatory framework applied to these sites, but costs are expected to increase significantly in AMP8 as a consequence of needing to comply with Appropriate Measures.
- These sites are no longer required to comply with IED and therefore, the scope cannot be assumed to have been part of previously rejected IED claim for AMP7.

2.7.9 Presented in Figure 3 is a summary of the valuation for each of the two cost adjustment claims. Cost estimates have been developed through a bottom-up engineering assessment at each site.

***Figure 3 – Cost adjustment claim valuations***




## 2.8 Scope of this cost adjustment

2.8.1 This claim is for a £172.594 million cost adjustment to base totex across 13 AD sites. Anticipated expenditure to comply with the IED at our AD sites in AMP8 results from the investment needed to meet new and more onerous service standards, reflecting a step change in regulatory expectations for waste treatment.

2.8.2 Despite in 2019 all sites now being required to have IED permits and comply with standards set out in the 2018 BREF, these sites have never before been required to comply with 2022 Appropriate Measures standards. The more onerous service standards will result in significantly increased waste treatment costs than incurred historically. The value of this cost adjustment claim is for scope over and above AMP7 IED compliance scope.

2.8.3 In Table 1 we present a summary of the AMP8 cost adjustment claim. A build-up of the costs by site and scope item is presented in section 4 (Cost efficiency). The cost models, based on the volume of sludge processed, do not reflect the additional costs associated with meeting more stringent tiers of regulation and therefore, an allowance is required in addition to modelled costs. Our cost allowance is not sufficient to deliver the substantial investment required in AMP8 to maintain IED compliance.

***Table 1 – Summary of cost adjustment claim***

| Number of Sites | Totex (£m) | | | | | |
|---|---|---|---|---|---|---|
| | FY26 | FY27 | FY28 | FY29 | FY30 | AMP8 |
| 13 | £51.916 | £41.840 | £33.192 | £28.480 | £17.167 | £172.594 |

2.8.4 The cost adjustment claim for £78.086 million of costs incurred at our physico-chemical sludge treatment sites is in document, *UUW_CAC_005: New waste permit obligations at physico-chemical sludge treatment sites that previously had PPC permits*.

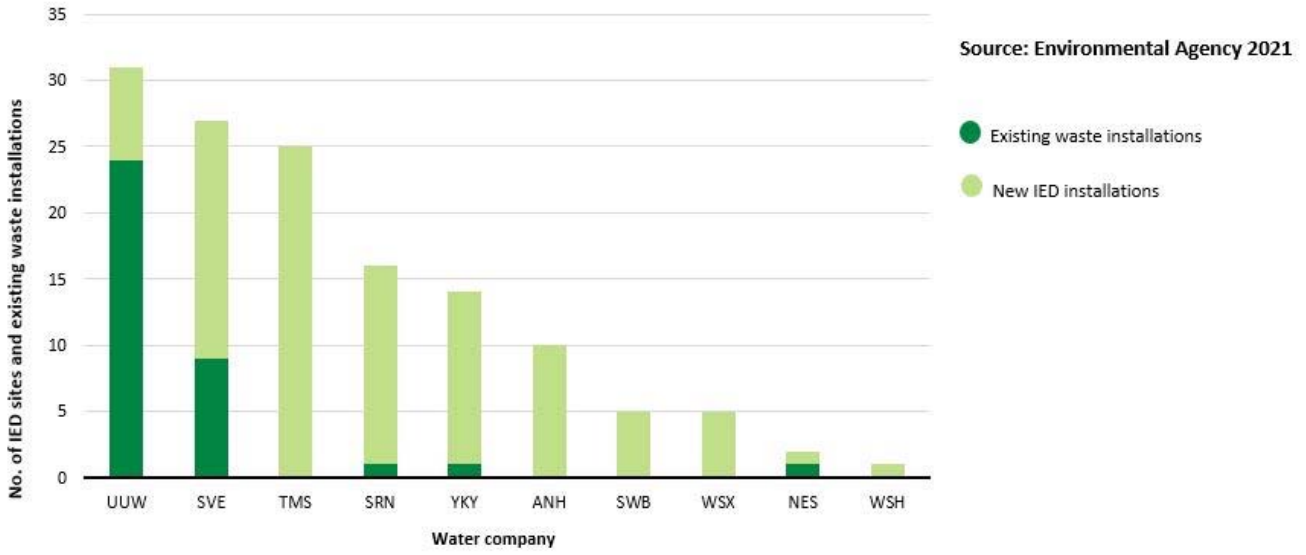
# 3. Need for adjustment

## 3.1 Unique circumstances

3.1.1 The obligation to comply with the IED at AD sites applies across the industry, and from 2019 when the EA confirmed their intention to implement the IED with respect to sewage sludge.

3.1.2 The impacts across the industry are highlighted in Figure 4. It can be seen that we have a greater number of sites captured by the regulations than any other company. This is a legacy of use of a disposal outlet, meaning that not only are our AD sites within the remit, but also includes the upstream physico-chemical sludge treatment sites (undertaking sludge thickening or dewatering) that once supplied (or had the potential to supply) sludge to our incineration plant. Compliance requirements at our Physico-chemical sludge treatment sites is discussed in cost adjustment claim, "*UUW_CAC_005 - New waste permit obligations at physico-chemical sludge treatment sites that previously had PPC permits*", and are outside the scope of this document.

***Figure 4 – Number of sites requiring IED permits by company (as per 2021 data[13])***




3.1.3 This cost adjustment claim relates to AD sites, which is a consistent requirement across the industry. Of our 13 AD sites now to be regulated under the IED:

- Seven AD sites requiring a permit variation (from existing PPC permits); and
- Six AD sites require permits for the first time.

3.1.4 Sites that already hold a PPC permit face as large an upgrade in levels of environmental protection to meet IED and Appropriate Measures standards, as sites to be newly permitted, and there are no efficiencies gained from already holding a PPC permit. Until the need was confirmed for these sites to comply with the IED in 2019, existing permits had not been varied to IED permits, nor had they ever before been required to comply with BAT standards.

3.1.5 Implementation of IED has had significant implications for the whole water industry in AMP7. It introduced a requirement for sites, now regulated under IED, to increase environmental protection to meet BAT for waste treatment for the first time, as set out in 2018 BAT reference document (BREF).

[13] Data Source, EA, 2021 and presented in https://assets.publishing.service.gov.uk/media/60702370e90e076f5589bb8f/Final_Report_---_web_version_-_CMA.pdf (pg382)

3.1.6 We were not informed of the legal clarification to comply with IED at the time of our PR19 submission. Therefore we did not submit an enhancement claim at PR19 to ensure provision of adequate resources to comply with the IED. Our unsuccessful 2021 Green Recovery proposal sought £59.8 million of funding to deliver compliance with the IED at our AD sites: This was the estimated cost to comply with the 2018 BREF.

3.1.7 In September 2022, the standards of environmental protection to meet IED compliance were raised once again, with the publication of Appropriate Measures for the Biological Treatment of Waste. The EA has adopted a precautionary principle approach in setting the Appropriate Measures guidance, which has resulted in many requirements being more onerous than those in the 2018 BREF. This position reflects a step change in regulatory expectations for waste treatment and generates significant, additional investment needs at the industry's AD sites.

3.1.8 A detailed assessment and comparison of 2018 BREF requirements versus 2022 Appropriate Measures has been undertaken, on behalf of the water industry, by Atkins[14]. It demonstrates, in Atkins' expert opinion, where Appropriate Measures requirements go beyond, or even significantly exceed, those of BREF.

3.1.9 Overall, it was found that Appropriate Measures tends to set out blanket requirements for all equipment / procedures using terminology such as 'you must', whereas BAT implements a more risk-based approach including terminology that is open to flexibility and practicability. BAT gives more leniency for existing facilities in implementing the full range of best practices, recognising the constraints posed by existing layout and infrastructure.

3.1.10 The report clearly sets out the evidence for the additional investment needs across the industry resulting from the publication of Appropriate Measures guidance. In Table 2 we present a summary of the additional scope requirements in the Appropriate Measures guidance, above and beyond 2018 BREF at our AD sites.

[14] Atkins, Industrial Emissions Directive Supporting Document, 31st May 2023 (for Water UK)

***Table 2 - Additional scope requirements in Appropriate Measures guidance, above and beyond 2018 BREF[14]***

| Focus Area | Sub-Areas |
|---|---|
| **Covering / Storage** | Volume / residence time |
| | Storage areas |
| | Covering |
| | Storage tank design |
| | Lagoons |
| | Handling / transfer |
| **Primary Containment / Failure Modelling** | Monitoring |
| | Maintenance planning |
| | Operational areas |
| **Secondary Containment** | Minimising risk |
| **Emissions Control / Monitoring** | General |
| | Bioaerosols |
| | Point source emissions |
| | Biofilters |
| | Pre-treatment abatement scrubbers |
| | Fugitive emissions |
| **Liquor Sampling** | Sample analysis |
| **Surface Water / Liquor Drainage** | Infrastructure and inspection |
| **Anaerobic Digestate Stability** | Parameter monitoring/maintenance |

3.1.11 Atkins' has summarised and classified their assessment as follows:

- If the requirements of BREF and Appropriate Measures are very similar, these are coloured green;
- If Appropriate Measures requirements go above those set out by BREF these are coloured amber; and
- If Appropriate Measures requirements significantly exceed those of BREF these are coloured red.

3.1.12 Where scope is very similar between BREF and Appropriate Measures these items are being delivered and funded outside this cost adjustment claim. The scope of this cost adjustment claim is only for the additional scope, now required as a direct result of the publication of Appropriate Measures guidance.

3.1.13 In Table 4, we set out the total cost of Appropriate Measures compliance for these additional scope items, over and above the 2018 BREF compliance scope is £172.594 million.

### Higher costs in the round

3.1.14 In 2019, when the EA first notified the water industry of its intent to implement the IED with respect to sewage sludge, we identified 16 AD sites that would be required to comply with IED. As we started on the permitting journey in AMP7, it rapidly became apparent that compliance costs were material. To ensure efficient expenditure in the long-term, we have accelerated the closure of small, aging AD sites to minimise the risk of potentially wasteful IED investment at sites that would ultimately have ceased digestion in the medium term as we implement our long-term delivery strategy. This site rationalisation has now reduced the number of AD sites requiring IED permits to 13.

3.1.15 The efficiencies gained from ceasing digestion at three digestion sites, impacts our regional treatment capacity. We will absorb the costs for the write-off of assets prematurely; digester clean-outs and decommissioning of AD assets. We will also absorb the cost to either install sludge thickening assets or undertake additional liquid sludge transport for sludge treatment at an alternative site in base costs.

3.1.16 We expect that by the end of AMP7 we will have absorbed £66.030 million of unfunded IED costs, either through investment on site or prematurely ceasing digestion at digestion sites.

3.1.17 The cost of Appropriate Measures compliance will result in higher costs in the round, even when any efficiency from rationalisation of assets is taken into consideration.

## 3.2 Management control

3.2.1 The investment required at our AD sites to comply with IED results from the application of the regulatory framework in England, and is outside of our control.

3.2.2 When the EA first sought to apply the IED to our AD sites in 2013 we challenged its position, arguing that regulation of our sludge treatment activities was an activity already covered by the UWWTD. This deferred the implementation of IED until 2019, at which time agreement between all UK regulators was reached. At that time, on the basis of legal advice provided to WaterUK, it was felt there was no remaining uncertainty in our statutory obligations, and no recourse for further legal action.

3.2.3 Moreover, the application of Appropriate Measures guidance through IED permitting is not subject to cost-benefit assessment and any alternative measures we may propose are subject to EA approval. The EA has ultimate control over the standards set for each of our sites through the permitting processes.

3.2.4 While acknowledging that the increased regulatory obligations results from factors outside of management control, we have taken steps to control costs for customers:

- By the end of AMP7 we will have absorbed £66.030 million of unfunded IED costs. These costs have not been passed onto customers.
- In AMP7 we have accelerated the rationalisation of our small, aging AD sites. This has reduced the scope of this cost adjustment claim from 16 to 13 sites, reducing costs for customers as we are not seeking Appropriate Measures compliance costs for the three sites which stopped digestion in AMP7.
- At a further two sites, in AMP8 we seek reduced appropriate measures compliance costs, associated with a reduced scope once sites are converted to sludge thickening centres, as this is a lower cost option than making the existing AD assets Appropriate Measures compliant. (See Section 6: Best option for customers).
- As we set out in section 6, we will ensure that we deliver investment to meet new obligations, as efficiently as possible. We will seek to re-use available information and data, such as odour modelling, air quality modelling, CCTV surveys and structural surveys. Through re-use of this company information we will minimise the work required to demonstrate compliance and the costs to customers.
- As far as possible we will use management and monitoring techniques to demonstrate Appropriate Measures compliance in preference to capital investment works. However, acceptance of these risk-based measures is reliant on EA agreement. Through permitting to date, the EA has pursued a precautionary and risk-averse approach to setting requirements.

3.2.5 We have tried so far as possible to ensure that our costs are efficient, by aligning our investment with our bioresources long-term delivery strategy. However, the EA has limited support for deferral of compliance investment at sites with a finite lifespan (i.e. Blackburn wastewater treatment works), citing concerns over the level of risk being carried in the intervening years. We wrote to the EA in January 2022 seeking to defer implementation of IED investment at Blackburn wastewater treatment works until 2027, to minimise the risk of inefficient and abortive investment, when a planned expansion and re-

build of the site was expected to come on-line. The EA did not support this deferral and wrote to us in July 2022[15] to state:

*"we would still be requiring any operational site to be delivering a high level of environmental protection regardless of whether it was proposed to cease operations in 2027".*

3.2.6 The letter goes on to confirm:

*"Where improvement conditions are used they will specify deadlines for compliance between now and the end of 2024."*

3.2.7 We acknowledge the EA's position and continue to endeavour to meet timescales so far as possible for IED compliance, but recognise that Appropriate Measures requirements add further to the risk of abortive expenditure. Our solutions will seek to minimise the level of abortive spend at these sites. Two of the sites will be converted to thickening and/or dewatering sites to minimise the risk of abortive investment.

3.2.8 No potential cost savings (i.e. spend to save opportunities) are anticipated from these improvements. The improvements will not deliver any benefits to sludge quality or efficiencies in the operating process. The types of interventions, to cover tanks, reduce odour emissions, provide secondary containment of potential spills and bunding of assets are solely in place to reduce the risk of pollution from site activities.

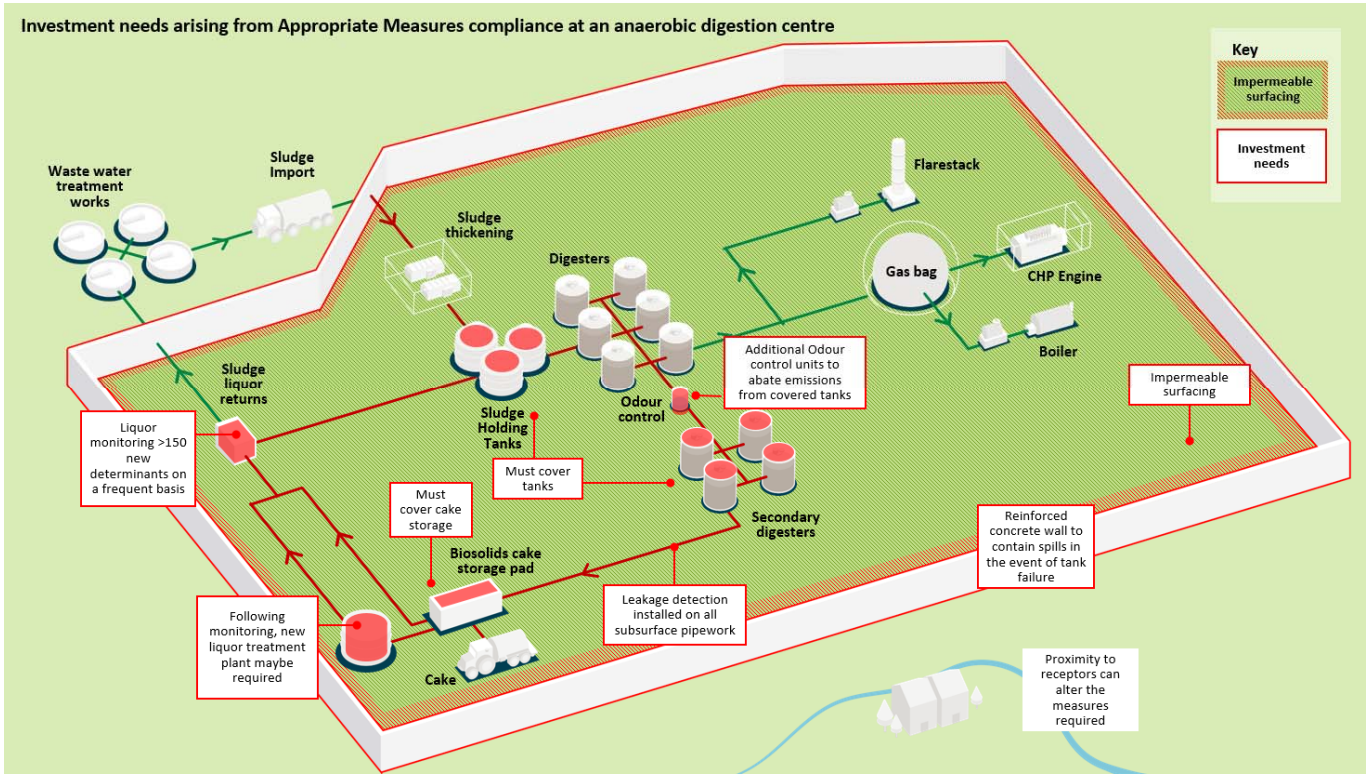
## 3.3 Materiality

3.3.1 This claim is for a £172.594 million cost adjustment to base totex. Costs are driven by the requirement to meet the latest standards for waste treatment, as set out in Appropriate Measures guidance.

3.3.2 We present in Figure 5 the explicit requirements of the Appropriate Measures guidance, over and above 2018 BREF compliance at our AD sites.

[15] EA Letter to UUW, *Industrial Emissions Directive Permitting – 7 July 2022*

***Figure 5 – Material investment needs arising from Appropriate Measures guidance, over and above 2018 BREF at an AD site***




3.3.3 The precautionary principle approach adopted by the EA in setting the Appropriate Measures guidance, has resulted in many requirements being more onerous than those in the 2018 BREF. The standards represent a step change in requirements at our existing sites, and these sites must be retrofitted to meet entirely new service standards, driving material additional costs.

3.3.4 The scale of investment required to meet these new service standards is material, and cannot be absorbed through existing cost allowances. To put the scale of the investment need into perspective, the entire bioresources price control for AMP7 was £357 million, but the investment required to meet the latest standards at AD sites alone is £172.594 million. It is clear that this level of investment cannot be met through existing cost allowances and the cost models do not provide sufficient resources to enable us to comply with legal obligations.

3.3.5 The latest best estimate of the investment required by the industry to comply with Appropriate Measures and 2018 BREF is a total capex and one-off-opex expenditure of circa £2.0 billion (Atkins, 2023[16]). Much of this investment need is driven by requirements to cover tanks, silos, cake pads or secondary digesters to prevent fugitive emissions; and secondary containment of spills (driven by CIRIA 736 compliance[17]). Both of these requirements are directly attributable to Appropriate Measures requirements, and are over and above 2018 BREF requirements (See Table 2). This represents an additional investment requirement, at a scale of more than 75 per cent of the entire industry bioresources price control in AMP7.

3.3.6 2022 Appropriate Measures compliance costs have not yet been incurred, and will only be in evidence once we complete the permitting process at each of the sites and start to comply with the new requirements. We have developed an efficient cost to deliver a clear scope of works using independent consultancy expertise to understand the latest EA permitting requirements to make a quantitative assessment of the expenditure requirements.

[16] Atkins, Industrial Emissions Directive Supporting Document, 31 May 2023 (for Water UK)

[17] The CIRIA 736 guidance "Containment systems for the prevention of pollution: Secondary, tertiary and other measures for industrial and commercial premises", was published in 2014.

3.3.7 The industry programme to ensure that all AD sites have IED permits requires the permitting of over 100 sites. The permit application process started in April 2020. However, at the time of writing we are aware of only two sites that have had permit applications determined (both in May 2023). This delay to the process is partially due to much uncertainty over the improvements that will be acceptable to the EA. We are therefore unaware of any companies incurring any significant monies to date to deliver Appropriate Measures compliance. There is, therefore, no element of Appropriate Measures costs in historical data.

## 3.4 Adjustment to allowances (including implicit allowance)

3.4.1 At PR19, ongoing costs arising from maintenance of our existing PPC permits at a subset of our AD sites were acknowledged to be outside cost models and were allowed as unmodelled IED costs.

3.4.2 The PR24 methodology also recognises that IED compliance costs, due to sites being regulated at a higher regulatory tier, are not included in the cost models. The PR24 methodology refers only to the ongoing permit administration costs of IED compliance.

3.4.3 Our understanding is that Ofwat considers those companies that did not challenge their PR19 determination with the Competition and Markets Authority should meet the AMP7 IED costs. However, if through the PR24 process, AMP7 costs for IED are to be allowed, then this will need to be a consistent approach applied across the industry.

3.4.4 The costs set out within the cost adjustment claim are the capital costs (and future ongoing opex resulting from this investment) to comply with Appropriate Measures guidance. We consider that these costs should also be recognised as additional to the modelled allowance.

3.4.5 The bioresources cost models include no cost drivers that consider the additional costs incurred when sites are permitted at a more stringent regulatory tier. The cost models are based only on the volume of sludge processed and sparsity factors, neither of which is a determining factor of the costs of regulatory compliance at AD sites.

3.4.6 All companies will incur costs to comply with Appropriate Measures guidance at their AD sites. However, as established by Atkins in its 2023 assessment, compliance costs are highly site-specific. Costs will be influenced by site-specific factors such as proximity to receptors, underlying geology, and existing assets on sites.

3.4.7 This was reflected in the CMA decision of 2021, which with reference to IED compliance requirements (pre-Appropriate Measures publication) stated:

*"In general, the CMA observes that IED compliance costs appear highly sensitive to the assessment of detailed requirements at specific sites. This accords with the Environment Agency's view that 'accurate estimates of the costs attributable to IED will only be available once all the site and company specific factors have been assessed and the review or issue of permits has been completed."*[18]

### Implicit allowance

3.4.8 There is no implicit allowance for compliance with more stringent regulations as these requirements are an addition to base service provision. The costs set out within the cost adjustment claim are the capital costs (and consequential ongoing opex) for compliance with the latest statutory Appropriate Measures guidance. These represent a step-change in acceptable waste treatment standards in England and are over and above standards set out in 2018 BREF.

3.4.9 The scope of works within this cost adjustment claim relates to new assets, not replacement or refurbishment of existing assets. We present in Table 3 a summary of our cost estimating assumptions

[18] https://assets.publishing.service.gov.uk/media/60702370e90e076f5589bb8f/Final_Report_---_web_version_-_CMA.pdf (pg382)

to demonstrate that there is no implicit allowance for any of the individual scope elements that make up the cost adjustment claim.

***Table 3 - Estimating assumptions for cost adjustment claim***

| Bespoke waste permit compliance element | Estimating assumptions | Included in cost adjustment |
|---|---|---|
| Odour control | Cost estimates are for new odour control units, associated with abatement of vented emissions from covering tanks.<br>Any refurbishment or maintenance of existing units to meet new standards have been excluded from the cost adjustment claim. | Costs included for new odour control units only |
| Leak detection | Cost estimates are for flow meters at the start and finish of pipe runs.<br>No costs have been included to replace or maintain existing pipework. There is a possibility that once capital works commence maintenance issues will be uncovered and repairs will be undertaken through base allowances. | Costs included |
| Containment:<br>Walls, kerbing, access and impermeable surfacing | Costs are for new areas of containment only, including walls, kerbing, access and hardstanding.<br>Repairs to existing areas of hardstanding will be undertaken through base allowances. | Costs included for new containment only |
| Covering of tanks | Costs have been assumed to cover existing tanks only.<br>No costs have been allowed to repair or replace existing tanks. It has been assumed that it is possible to retrospectively fit covers to existing tanks. | Costs included for covering tanks only |
| Covering of cake pads | Costs estimates are for new covered cake store (aka 'Dutch Barn'). The structure is new and the existing cake pad will be re-used. | Costs included for Dutch Barn |
| Additional instrumentation | Costs excluded from scope, to be delivered in AMP7 | Costs not included |
| Liquor monitoring | Laboratory analysis costs included for >150 new determinants over and above existing requirements.<br>No associated personnel costs have been included. | Costs included |
| Surplus activated sludge plants | Costs excluded from scope, to be delivered in AMP7 | Costs not included |
| Site closures<br>(two sites in AMP8) | Reduced Appropriate Measures compliance costs, associated with a reduced scope once sites are converted to sludge thickening/dewatering centres, are included in the lines above.<br>Costs to install new sludge thickening/dewatering assets, to write-off AD assets prematurely and clean-out and decommission AD assets are all excluded from the claim. | Costs included in lines above<br>Costs not included |

3.4.10 As explained in sections 3.1.14 to 3.1.17 accelerated rationalisation of small, aging AD sites will incur ongoing maintenance efficiencies. However, these efficiencies are more than offset by the one-off capital and operational costs absorbed; to write-off assets prematurely; clean-out and decommission AD assets; and either install sludge thickening assets or undertake additional liquid sludge transport. The cost of Appropriate Measures compliance will result in higher costs in the round, even when any efficiency from rationalisation of assets is taken into consideration.

### Timing of expenditure

3.4.11 Expenditure to ensure compliance with Appropriate Measures at our AD sites cannot be accelerated to be delivered in AMP7: The scale of the investment required is so complex and significant, and too great a proportion of botex to be absorbed.

3.4.12 The EA has set out an expectation that work to be IED compliant is due by December 2024, and we anticipate this date to be written into our IED permits when we receive them. We have sought a pragmatic discussion with the EA about timescales for implementation of IED. The delays to permitting across the industry will necessarily delay compliance timescales. We will endeavour to comply as soon as practicable but actual compliance dates will take considerably longer, once feasibility and deliverability challenges are taken into account.

3.4.13 Specific timescales for compliance with Appropriate Measures guidance at existing facilities are not set out within the guidance. The EA has signalled its intent to also assign December 2024 dates into permits for items resulting from requirements from Appropriate Measures. With publication of the guidance in only September 2022, we consider these compliance timescales are infeasible to meet.

3.4.14 We note that other Appropriate Measures guidance, for other wastes, treatment types or industries, set out a common expectation on timescales for compliance with long-term and capital-intensive improvement:

*"Operators should complete these improvements as soon as practicable and within 3 years[19]".*

3.4.15 We understand for sites being permitted to meet these requirements for the first time, this 'within three year' period would commence at the time the site permit is issued and not apply retrospectively, from the time the guidance was published.

3.4.16 In contrast, the Appropriate Measures for the Biological Treatment of Waste, with regard to long-term and capital-intensive improvements, states:

*"Operators should periodically review, modify and update management, process systems or equipment in line with existing permit conditions. This may include periodic capital investment"[20].*

3.4.17 No evidence or reasoning has been provided as to why this guidance takes a different approach but it appears to be deliberately intended. If a long stop or a shorter compliance period had been intended the guidance could have stated this. The deliberate omission of a long-stop indicates that no long stop was intended and that the timescales for implementation must be flexible and depend on the specifics of each case (e.g. the nature and complexity of the works).

3.4.18 We seek to deliver Appropriate Measures compliance as soon as practicable in AMP8.

[19] https://www.gov.uk/guidance/non-hazardous-and-inert-waste-appropriate-measures-for-permitted-facilities/1-when-appropriate-measures-apply section 1.3

[20] https://www.gov.uk/guidance/biological-waste-treatment-appropriate-measures-for-permitted-facilities/1-when-appropriate-measures-apply section 1.3

# 4. Cost efficiency

## 4.1 Development of efficient cost estimates

4.1.1 In this section we demonstrate that our cost estimates for delivering compliance with Appropriate Measures guidance are efficient. Appropriate Measures is a prescriptive set of guidance, not subject to cost benefit assessment and therefore, there are limited opportunities to make efficiencies in the scope that can be delivered. However, as we demonstrate in this section, we are doing as much as possible to reduce costs for customers.

4.1.2 We have undertaken a significant programme of surveys, site assessments, modelling, engineering design and estimating to derive bottom-up costs for Appropriate Measures compliance. We have extrapolated learning from AMP7 IED permitting to developing Appropriate Measures compliance cost estimates and to understand what alternative proposals (if any) will be acceptable to the EA.

4.1.3 We have limited the scope of this cost adjustment claim to only the scope items where we have certainty in requirements, and explicit standards set out in Appropriate Measures guidance.

4.1.4 We have excluded other scope items, such as the need to demolish and replace open tanks, covering sludge lagoons, or new liquor treatment plants to improve the quality of discharges back to a wastewater treatment works (see section 7.1.3 to 7.1.5 for more details). These requirements are too uncertain at present to include within this claim. However, given the potential scale of scope and cost increases, we will, through our Business Plan submission, promote management of these compliance scope risks through an uncertainty mechanism. We may seek to revise the cost adjustment claim value in future, if further work or scope requirements are confirmed by the EA make it appropriate to do so.

4.1.5 In Table 4 we present a summary of our efficient costs by site, based on delivery of this scope. There are four key scope items that are driving the uplift in required capital expenditure (as we present in Figure 5). These items are all specific requirements in Appropriate Measures Guidance, over and above the requirements set out in 2018 BREF. The majority of the cost relates to secondary containment and tank covering scope items.

4.1.6 The majority of the Opex relates to the emissions control and abatement related to the covering of open storage tanks.

***Table 4 - Summary of cost adjustment claim scope by site***

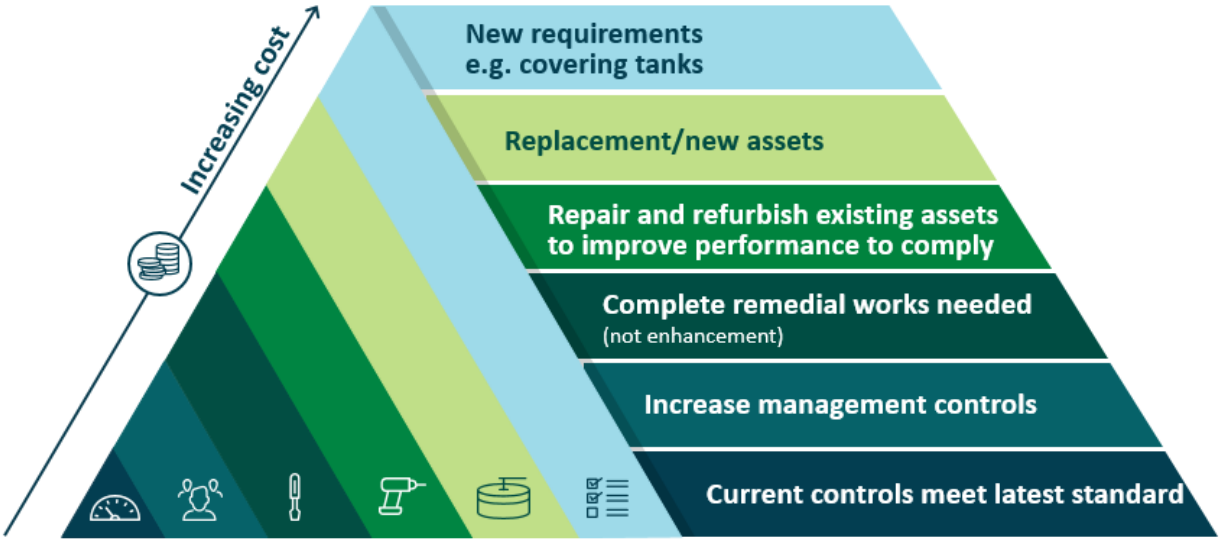
| Site | Capacity TDS | Existing PPC permit or new application | Permit application (£m) | Leak detection (£m) | Secondary containment (£m) | Tank covering (£m) | Cake pad covering (£m) | Total capex (£m) | Opex total (£m) | Totex total (£m) |
|---|---|---|---|---|---|---|---|---|---|---|
| Blackburn | 11,003 | New | - | £0.269 | £4.790 | £3.346 | £5.521 | £13.926 | £1.552 | £15.478 |
| Burnley | 3,938 | New | - | £0.270 | £2.192 | - | £0.866 | £3.328 | £0.587 | £3.916 |
| Ellesmere Port | 11,005 | New | - | £0.378 | £2.839 | £0.794 | £0.343 | £4.353 | £1.008 | £5.361 |
| Lancaster | 8,692 | New | £0.100 | £0.372 | £2.822 | £0.848 | - | £4.142 | £0.197 | £4.339 |
| Leigh | 5,986 | New | - | £0.149 | £3.195 | - | - | £3.345 | £0.700 | £4.045 |
| Southport | 3,676 | New | £0.100 | £0.083 | £2.957 | - | - | £3.140 | £0.321 | £3.461 |
| Bolton | 8,257 | PPC Variation | - | £0.277 | £3.070 | - | - | £3.346 | £0.854 | £4.201 |
| Bury | 9,456 | PPC Variation | - | £0.270 | £2.984 | £6.070 | - | £9.325 | £1.787 | £11.112 |
| MBC | 91,000 | PPC Variation | - | £0.403 | £20.989 | £40.644 | - | £62.036 | £8.495 | £70.531 |
| Liverpool | 18,031 | PPC Variation | - | £0.534 | £7.937 | - | - | £8.471 | £0.847 | £9.319 |
| Oldham | 4,994 | PPC Variation | - | £0.270 | £3.622 | £3.040 | - | £6.932 | £1.082 | £8.014 |
| Stockport | 8,665 | PPC Variation | - | £0.271 | £2.750 | £2.410 | £1.269 | £6.700 | £1.440 | £8.140 |
| Warrington North | 5,572 | PPC Variation | - | £0.272 | £4.403 | £16.720 | - | £21.395 | £3.283 | £24.678 |
| Total | 190,275 | | £0.200 | £3.818 | £64.550 | £73.873 | £8.000 | £150.441 | £22.153 | £172.594 |

4.1.7 The scope for complying with Appropriate Measures is highly site specific as it depends on the design and configuration of assets operating on site, as well as site sensitivity factors, such as proximity to watercourses, underlying geology and the distance to nearby receptors.

4.1.8 In the absence of finalised IED permits, a series of assumptions have been made over the likely works that will be required, and is based on learning from our AMP7 IED programme. As well as relying on our own experience, we have collaborated with other WaSCs to understand their experience of IED permitting, and sought the support of technical expertise from multiple consultants to understand best practice outside the sector.

4.1.9 In developing measures to demonstrate compliance with Appropriate Measures guidance we will use management and monitoring techniques in preference to capital investment works. We will seek to minimise scope wherever possible in order to ensure we are efficient in delivering compliance. This hierarchy of interventions, to ensure delivery of efficient solutions, is presented in Figure 6.

*Figure 6 - Hierarchy of interventions to demonstrate appropriate measures compliance*




## 4.2 Cost benchmarking

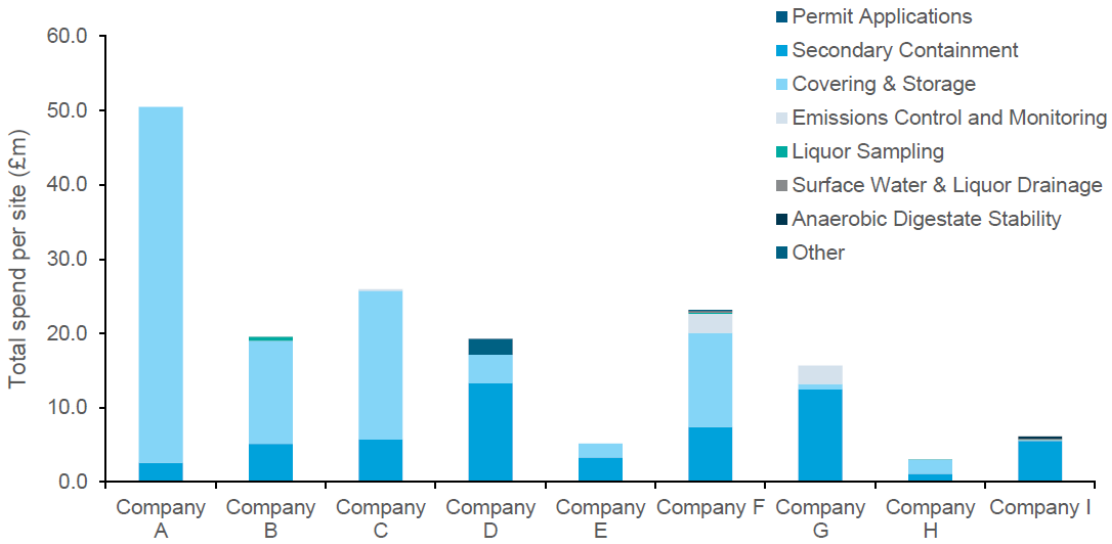
4.2.1 There are currently no agreed industry benchmarks for cost of compliance against the 2022 Appropriate Measures guidance as this is a new regulatory requirement.

4.2.2 Atkins' collation of company investment programmes to meet IED and Appropriate Measures has provided an indication of the range of investment required per site across companies. Variability in expenditure is significant, both between companies and at different sites within a company. The assessment noted that site-by-site variability was driven by different starting points in terms of technologies employed, standards at the time the site was constructed, local receptors and the varying guidance given by area teams at the EA to individual companies.

4.2.3 The average costs of compliance across the industry is in the order of £18 million per site, noting the significant site-by-site variability.

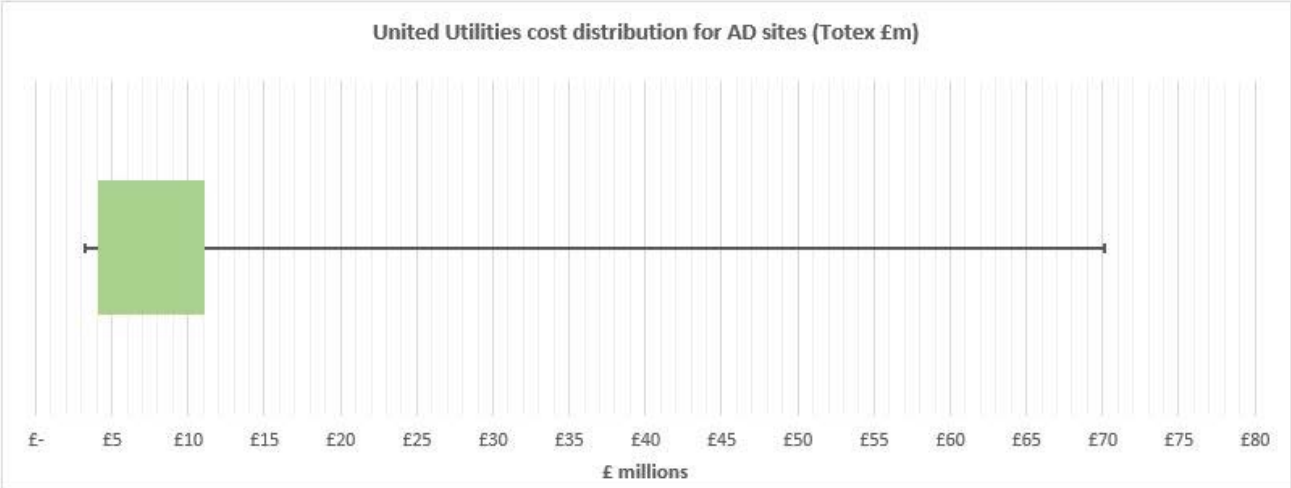
4.2.4 A summary of the total 'one-off' spend by site, per company is presented in Figure 7. It is not possible to directly compare our Appropriate Measures compliance costs, as we are uncertain of the assumptions used to build up compliance costs at other companies. However, we note that the average cost to comply across our sites is below the average presented across the industry. Our cost build-up is also similar to that of the wider industry, costs are predominantly being driven by the prescriptive requirements within Appropriate Measures to provide secondary containment to CIRIA 736 standards and provide covering of open tanks and cake bays.

***Figure 7 – Anonymised total one-off expenditure per site by company (Source: Atkins, 2023)[21]***




4.2.5 There are significant cost outliers without our own dataset. For example, our largest sludge treatment centre (Manchester Bioresource Centre or "MBC") has compliance costs of over £70.5 million alone. Leigh and Burnley, our most recently constructed advanced AD sites, have compliance costs of only £4.0 million each, well below industry average costs. A box and whisker chart showing this data variability is presented in Figure 8. The green box represents the 25 to 75 percentile range.

***Figure 8 – Distribution of UUW Appropriate Measures compliance cost by site Totex(£m)***




4.2.6 The significant costs at MBC are being driven by a combination of the large number of secondary digester tanks on site, and a sensitive location in an urban area with immediate adjacency to a water course. The unique arrangement of assets means that secondary digestion for Oldham, Bury and Bolton sludges all occurs at MBC. This large number of secondary digester tanks creates two significant Appropriate Measures compliance costs, firstly to cover and abate emissions from all tanks, and secondly to contain 25 per cent of the total tank volume in the risk of catastrophic failure.

4.2.7 Excluding MBC from our site costs our site average cost reduces to £8.5 million, and we consider that our costs are efficient when compared with others in the sector. We have a high confidence in the costs from the extensive assessment and design work already completed. We have also sought third party assurance of our costing methodology to ensure our cost estimates are robust and efficient (see section 4.5).

[21] Atkins, Industrial Emission Directive Supporting Document, 31 May 2023, Figure 6-4 (page 30)

4.2.8 Our PR24 capital cost estimating approach has been based on data collected over AMP3 to AMP7 and updated to reflect the present market conditions under which we and the UK water industry are operating. Mott Macdonald (MM) has provided us an estimating service over AMP6 and AMP7. They also provide an estimating service to a number of other UK water companies, which allows them to provide a benchmarked approach to our PR24 capital cost estimates.

4.2.9 The capital costs consist of Contractor Direct Costs, Contractor Indirect Costs, UUW Risk, UUW Costs to Serve and UUW Corporate Overhead. MM have benchmarked UUW's direct costs and cost curves and assessed the water industry construction inflation based on their Construction Industry Basket of Goods index.

4.2.10 Delivery of this scheme will be across a portfolio of multiple projects, across multiple sites. We have experience of delivering work at all of these sites, and project managing the work to ensure that it is delivered effectively and efficiently, and as such we are confident that we have the technical skills and capabilities to deliver this work. Furthermore, we will drive delivery efficiencies through batching at a programme level or with other ongoing projects at site level.

## 4.3 Developing alternative solutions with the EA

4.3.1 We have held multiple PPC permits since at least 2013. As such we have developed considerable internal capability in order to deliver the additional compliance work set out in this submission. We have experience in developing permit applications, undertaking risk assessments to avoid unnecessary capital investments and ensuring that we continue to comply with our permits. However, despite this experience, through the AMP7 IED permit application process at our AD sites, it has proven challenging to come to agreement with the EA over the deployment of any alternative or risk-based proposals that provide equivalent environmental protection at lower costs for customers.

4.3.2 For example, to demonstrate compliance with spill containment requirements, our existing permit applications were determined using our Environmental Quantitative Risk Assessment (EQRA) approach. This looked at asset condition, and the source-pathway-receptor methodology to prioritise the risk to the environment from tanks and pipework. This significantly reduced the capital requirements at the time.

4.3.3 The EA, through Appropriate Measures, requires that all assessments are undertaken using the ABDA tool and CIRIA 736 methodology[22] and has rejected our EQRA approach. The EA response to our IED application at Ellesmere Port stated:

*"The EQRA report is not an equivalent to a CIRIA 736 assessment and does not demonstrate BAT"*

4.3.4 The response goes on to state:

*"CIRIA 736 is considered the industry standard of choice and is based on the source-pathway-receptor-approach to risk assessment. It proves a clear methodology for demonstrating BAT, appropriate measures and compliance with permit conditions".*

4.3.5 There are several significant factors in using the ABDA tool and CIRIA 736 methodology that drive additional costs:

- While not explicitly stated, the ADBA guidance is aimed at smaller, new build Anaerobic Digestion developments rather than existing wastewater treatment works. The guidance does not reflect that in retrospective application to existing sites, the costs of upgrading existing facilities might outweigh the environmental benefits, and therefore are not viable.

[22] The CIRIA guidance "Containment systems for the prevention of pollution: Secondary, tertiary and other measures for industrial and commercial premises" was published in 2014 and is described as being "*applicable to the containment of a wide range of inventories and to all sizes of site from small commercial premises with a single storage tank, through to large chemical and petrochemical sites.*". In 2016, the Anaerobic Digestion and Bioresources Association (ADBA) produced a spreadsheet tool and associated guidance document[22] as a "*guide to secondary containment at anaerobic digestion (AD) plants"* that drew "*upon the principles and methodologies within CIRIA 736.*"

- The CIRIA assessment process leads to all sites as having a “high” environmental hazard rating, as the default classification under CIRIA 736. Applying a "high" environmental hazard rating all but guarantees an overall site classification of Class 2 (equivalent to a petrochemical or cyanide facility). The Class then determines the quality/integrity of the surface that needs to be impermeable to provide the containment volume. For example, Class 2 would typically require reinforced concrete, whereas Class 1 may be achieved with impermeable membranes or good underlying geology. It is recognised that specific areas of a site may require a higher level of integrity but these should be identified by risk assessment and area-specific measures proposed, proportionate to the risk, not a default classification of the entire site.
- CIRIA guidance considers two scenarios for secondary containment volume; whichever is the greatest of 110 per cent of the volume of the largest tank within the bund; or 25 per cent of total capacity of all tanks within the bund. For the 25 per cent rule to apply there must be a credible scenario(s) where multiple tanks could fail catastrophically at the same time. The EA require use of the 25 per cent rule, which is driving additional costs at applicable sites.
- Furthermore, when retrospectively applying the 25 per cent rule to existing sites, the only practical location to install a bund, is often towards the boundary of a site. In this case, all tanks across a sites are contained within the same bund. Having to contain 25 per cent of total capacity of all tanks within a single bund can result in a much greater containment volume (and cost) than bunding smaller areas.
- A further consideration in developing containment solutions is the increased carbon cost (embedded and operational), which is not considered against the risks associated with retaining permeable areas i.e. consideration of the environment as a whole through this methodology.

## 4.4 Thinking differently: Developing more efficient solutions

4.4.1 Although Appropriate Measures sets out a prescriptive set of compliance requirements, we have challenged all areas of scope using our Minimum Viable Product (MVP) methodology to ensure our solutions are as efficient as possible, while delivering compliance. Our totex costs capture opportunities discussed in this section (where they are likely to be acceptable to the EA) and have reduced the overall costs of compliance for customers.

4.4.2 We present in Table 5 a summary of the opportunities considered to ensure our solutions are as efficient as possible. We have assessed a wide-range of scope solutions and approaches and our engineering team has ranked and developed these opportunities to identify potential efficiencies in the capital programme. Where we consider the opportunities have a likelihood of acceptance by the EA as compliant solutions we have included these efficiencies in cost estimating.

4.4.3 Given the large costs to meet CIRIA 736, the largest efficiency opportunities stem from the potential to reduce the areas of impermeable surfaces and spill volume to be contained. We have proposed through our IED permit applications to reduce the amount of impermeable surfacing contained within a bund. We suggest that at site locations with impermeable underlying geology, the likelihood of pollution reaching a receptor (and given the speed of any clean-up of lost material) is sufficiently low to not require hardstanding across the site. The ADBA tool doesn’t reflect ground conditions and therefore this solution would require a deviation from Appropriate Measures.

4.4.4 We have considered opportunities for alternatives to cast in-situ reinforced concrete walls, to bund a site and provide spill containment in the event of catastrophic tank failure. The alternatives considered included plastic barriers, sand bags, earth bunds, or legato blocks. All were considered to be only applicable to sites with a Class 1 site classification.

4.4.5 Our innovation team is seeking to identify alternative approaches to leak detection on sub-surface infrastructure. We are trialling Artificial Intelligence Leak Detection in partnership with FIDO Tech Ltd at Blackburn wastewater treatment works as an alternative to installing flow meters for leak detection. This is a low cost solution deployed on our water network. This is a fully automatic process that analyses

thousands of acoustic sound files instantly, providing standardised daily outputs to deliver leakage detection efficiency improvements. The greater accuracy from acoustic monitoring can also inform repair prioritisation through its innovative leak sizing capability.

***Table 5 - Summary of cost efficiency opportunities already assumed***

| Opportunity | Rationale | Value of opportunity | Likely EA position+ |
|---|---|---|---|
| Covering tanks | Retrospectively fitting covers and emissions abatement to tanks rather than full tank replacement | c. £130 million | Accept – approach accepted through EA permitting to-date |
| Covering cake pads | Cost estimates are for covered cake stores (aka 'Dutch Barn'). Costs exclude fully enclosed storage with ventilation. | c. £15 million | Accept – approach accepted through EA permitting to-date |
| Flow meter installation | Installation of flow meters on either end of subsurface pipework, in preference to moving all subsurface pipework above ground. | Not costed | Accept – approach accepted through EA permitting to-date |
| FIDO leak detection | Lower cost alternative to flow meter installation in below ground pipework | C. £4 million | Uncertain if approach will be accepted by the EA. Further trials required at Blackburn. Efficiency cannot be assumed to be accepted. |
| Reduction in total containment volume within bunds | Reducing height of concrete walls and areas of impermeable surfacing by containing 110 per cent of the volume of the largest tank, rather than 25 per cent of total capacity of all tanks within the bund. Higher walls also incur high cost per linear meter. | C. £20 million | Unlikely the approach will be accepted by the EA as a non-compliant solution. Efficiency cannot be assumed to be accepted. |
| Reduction in impermeable surfacing area within bunds | Use of risk assessment at sites with impermeable underlying geology to reduce the areas of hardstanding required. | Not costed | Unlikely the approach will be accepted by the EA as a non-compliant solution. Efficiency cannot be assumed to be accepted. |
| Alternatives to cast in-situ reinforced concrete walls | Lower costs alternatives to provide bunding around tanks | Up to 25 per cent reduction against reinforced concrete wall costs | Unlikely the approach will be accepted by the EA as a non-compliant solution. Alternatives only suitable for 'Class 1' sites. All sludge treatment centres classed as 'Class 2' sites by default under CIRIA methods. |

+ Where an opportunity is marked as 'Accept', the cost savings have already been included in the overall costs presented, and demonstrates how we have built up efficient costs.

## 4.5 Assurance of this submission

4.5.1 We have sought external assurance from PwC for the methodology and information used to derive our claim value. An extract from PwC's report is provided below.

*4.5.2 "As a result of the work performed, we can conclude that management has developed a detailed and logical methodology for producing each cost build and the approach followed to develop the cost estimates appears robust. We have undertaken detailed walkthroughs to understand the source of the cost data and rationale for assumptions and estimates made. We have not identified any priority actions which require attention in advance of the submission."*

# 5. Need for investment

## 5.1 New regulatory requirement

5.1.1 Publication of Appropriate Measures guidance has raised the level of environmental protection to be delivered at our AD sites. We have not, to date, been required to invest in our sites to meet Appropriate Measures standards. In 2019 following clarification of the regulatory position of the industry's AD sites, we were required to comply with the environmental protection standards set out in the 2018 BREF. Compliance costs for the 2018 BREF were set out within our 2021 Green Recovery proposal. This claim was rejected as IED Compliance with 2018 BREF was considered to be an AMP7 requirement.

5.1.2 The scope requested in this cost adjustment claim result from explicit requirements set out in Appropriate Measures. Evidence provided by the 2023 Atkins assessment[23] clearly demonstrates the additional scope requirements.

5.1.3 Atkins assessment has identified that the EA, through its statutory duty to reduce potentially harmful emissions, has adopted a precautionary principle approach in setting their Appropriate Measures guidance. This has resulted in many requirements being more onerous than those in the existing 2018 BREF. The EA has deemed the risk posed by permitted facilities that handle sewage sludge are higher than the original BAT conclusions in 2018 BREF.

5.1.4 In Table 6, we summarise the new requirements within Appropriate Measures that are driving the significant capital investment requirements at our sites.

[23] Atkins, Industrial Emission Directive Supporting Document, 31 May 2023

## *Table 6 - Additional scope requirements driven by the publication of 2022 Appropriate Measures (Adapted from Atkins 2023)[24]*

| Focus Area | Sub-Areas | New requirements resulting from Appropriate Measures (2022) | Included within scope of Cost Adjustment Claim? | Costs Adjustment Claim Scope |
|---|---|---|---|---|
| Covering / Storage | Volume / residence time | N/A | No | |
| | Storage areas | See Covering | | |
| | Covering | You must cover all bulk storage tanks. Where possible you must contain and vent tanks and vessels through suitable abatement, or direct emission to a gas recovery system.<br>Section 7.1 | **Yes** | We will address emissions from tanks across 8 sites through retrospective tank covering and abatement through new odour control units. |
| | Storage tank design | See Covering | | |
| | Lagoons | - Existing lagoons must be risk-assessed by a suitably qualified engineer. You must maintain the structural integrity of the lagoon. You must address and resolve any problems identified during the assessment.<br>'- Existing lagoons can use floating covers or a crust (formed where there is a high dry matter content) to manage emissions. Coverage must be sufficient to minimise the surface to air ratio to prevent emissions.<br>Section 7.3 | No | |
| | Handling / transfer | N/A | No | |
| Primary Containment / Failure Modelling | Monitoring | N/A | No | |
| | Maintenance planning | N/A | No | |
| | Operational areas | You must have the following measures in place in operational areas: an impermeable surface, spill containment kerbs, sealed construction joints, connection to a contained drainage system. Section 11.13<br>Scope included in Secondary Containment. | **Yes** | |
| Secondary Containment | Minimising Risks | Secondary containment (bunds) must: be constructed to CIRIA 736 (Section 7.1).<br>- CIRIA guidance considers two scenarios for secondary containment volume; whichever is the greatest of 110% of the volume of the largest tank within the bund; or 25% of total capacity of all tanks within the bund.<br>- The CIRIA assessment process leads to all sites as having a "high" environmental hazard rating, as default classification under CIRIA 736.<br>- Assuming a "high" environmental hazard rating all but guarantees an overall site classification of Class 2 which would typically require reinforced concrete walls, whereas Class 1 containment may be achieved with impermeable membranes or good underlying geology. | **Yes** | We will address containment by constructing new secondary containment bunds for the greater of 110% of the largest tank or 25% of the total volume of tanks, with new impermeable surfaces, spill containment curbs, sealed construction joints and connection to a contained drainage system at 13 sites. |
| | | For subsurface structures, you must:<br>-provide secondary containment and leakage detection for sub surface pipework, sumps and storage vessels (Section 11.13) | **Yes** | We will install flow meters on underground pipework at multiple points per site to evaluate the integrity of the sub-surface pipework through measuring losses over the system at 13 sites. |
| Emissions Control / Monitoring | General | N/A | No | |
| | Bioaerosols | N/A | No | |
| | Point source emissions | N/A | No | |
| | Biofilters | N/A | No | |
| | Pre-treatment abatement scrubbers | N/A | No | |
| | Fugitive emissions | You must effectively minimise fugitive emissions from dewatered digestate fibre and digested sewage sludge cake. This applies to all stored material. For example, you must store it:<br>-under a suitable cover<br>-in an enclosed building fitted with an air ventilation and extraction system<br>-in field stores in line with farming rules for water (Section 9.4) | **Yes** | We will address emissions from storage by covering cake storage bays including monitoring across 4 sites. |
| Liquor Sampling | Sample analysis | Sampling of return liquors prescribed by the EA. Reference to 'Surface water pollution risk assessment for your environmental permit'.<br>Liquor characterisation expanded to >150 determinands | **Yes** | We will undertake routine monitoring of appropriate liquor returns to assess the required parameters at 13 sites. |
| Surface Water / Liquor Drainage | Infrastructure and inspection | N/A | No | |
| Anaerobic Digestate Stability | Parameter monitoring / maintenance | N/A | No | |

[24] Atkins, Industrial Emission Directive Supporting Document, 31 May 2023, Table 4-1 (page 12). Where BREF and Appropriate Measures are very similar (coloured green); where Appropriate Measures requirements go above those set out by BREF (coloured amber); or where Appropriate Measures requirements significantly exceed those of BREF (coloured red).

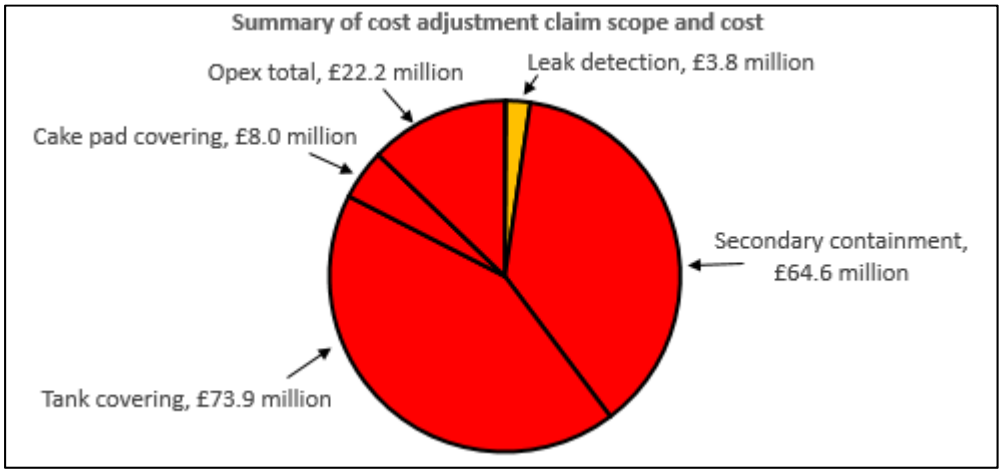
5.1.5 We have produced a pie chart in Figure 9 to illustrate the relative cost by scope item, and used the Atkins' red, amber, green, categorisation of requirements, to demonstrate how it aligns to the 2022 Appropriate Measures guidance requirements, over and above the requirements of the 2018 BREF.

5.1.6 The pie chart shows that our scope clearly aligns with those areas where Appropriate Measures requirements significantly exceed those of the 2018 BREF, in Atkins' assessment.

5.1.7 The scope associated with red coloured sectors of the pie chart are all new scope items to meet new obligations in Appropriate Measures, so all the costs for these scope items are included in the cost adjustment claim.

5.1.8 The small scope associated with amber coloured sector of the pie chart is leak detection, which was identified as an item where Appropriate Measures requirements go above those set out by BREF. In our Green Recovery proposal to meet BREF 2018 we included £6.8 million for leak detection. The cost to meet Appropriate Measures requirements is £10.6 million. We have only included the cost of £3.8 million in this cost adjustment claim to deliver the scope that goes above the requirements set out in BREF 2018.

***Figure 9 – Pie chart showing the cost adjustment claim scope and cost, aligned to Atkins' (red, amber, green assessment) comparison of requirements between the 2018 BREF and the 2022 Appropriate Measures guidance***




5.1.9 We seek to deliver Appropriate Measures compliance as soon as practicable in AMP8, and have profiled our forecast expenditure accordingly.

5.1.10 We have proposed a pragmatic timescale for Appropriate Measures, based on feasibility and deliverability challenges, and recognising the scale of investment required. We have sought to align investment with other works on sites, and ensure sites can remain operational during the works. In addition, needs must be considered under wider planning regulations and Construction Design and Management (CDM) Regulations which have the potential to add necessary delays to construction completion.

5.1.11 Specific timescales for compliance with Appropriate Measures guidance at existing facilities are not set out within the guidance. The EA has signalled its intent to assign December 2024 dates into permits for items resulting from requirements from Appropriate Measures. With publication of the guidance in only September 2022, and the scale of work required, these compliance timescales are considered infeasible to deliver.

5.1.12 The timescales set out are dependent on EA acceptance of our proposals. In this context it is important to recognise that over two years has elapsed since UUW's first submission of an application but as of 1st June 2023, we have yet to have a permit determined. The industry programme to ensure all AD sites have IED permits, requires the permitting of over 100 sites. The permit application process started in April 2020. However, at the time of writing we are aware of only two sites that have had permit

applications determined (both in May 2023). This delay to the process is partially due to much uncertainty over the improvements that will be acceptable to the EA.

5.1.13 It is not in customers' interest to invest before the requirements and scope are agreed through the permitting process. We will not start to invest to deliver capital improvements to meet Appropriate Measures standards until we have certainty in the scope required by the EA to avoid inefficient spend on behalf of customers.

## 5.2 Funding for IED compliance in previous price reviews

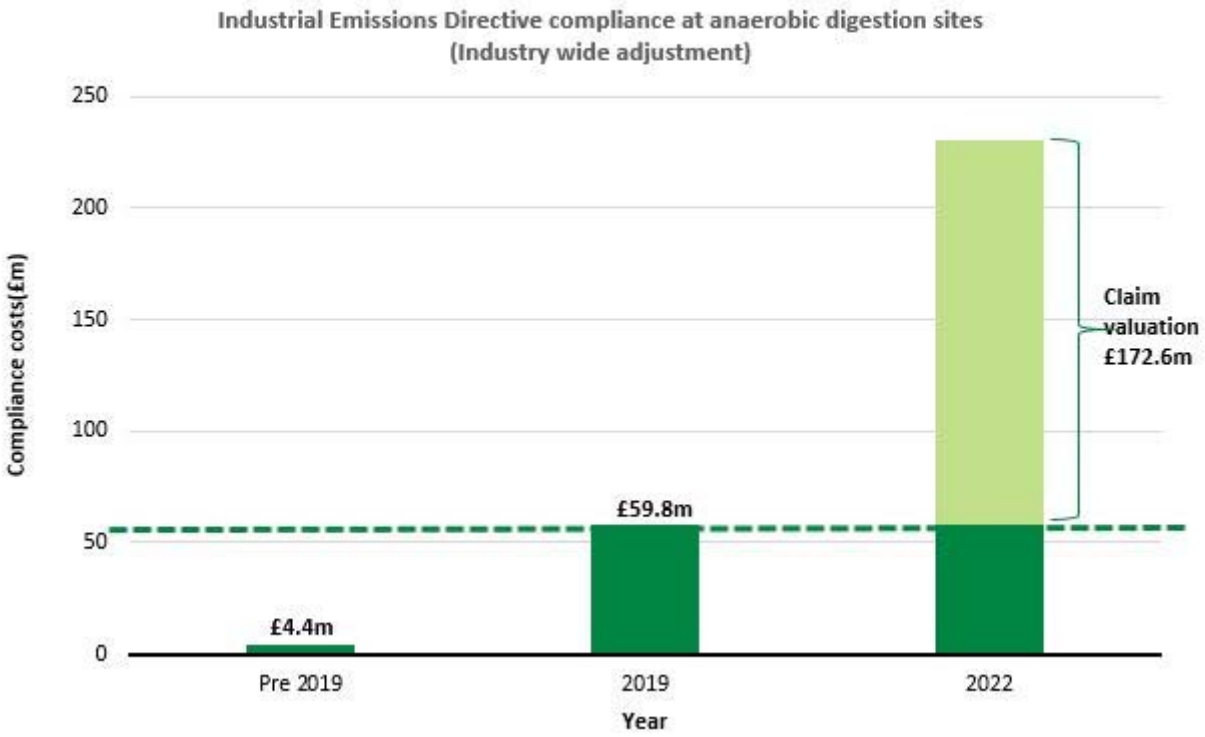
5.2.1 It has been recognised in previous price reviews that our existing PPC permitted sites, have incurred higher costs than equivalent AD sites that do not hold permits. In Figure 10, we illustrate how this cost adjustment has been valued, recognising funding in previous price reviews:

(a) **Pre 2019:** These sites were regulated under the existing PPC permits. Minimal costs were incurred, relating only to the administration of those permits. We were allowed unmodelled costs of £4.4 million associated with this requirement at PR19.

(b) **2019**: Post-PR19 submission we received notification that the EA was to implement IED with respect to sewage sludge. At the time we understood that the EA would vary the existing PPC permits to IED permits. This would require compliance with the requirement set out in the 2018 BREF. Through our Green Recovery proposal we sought £59.8 million of costs for compliance with BREF. This claim was not successful as the EA stated that compliance was an AMP7 requirement.

(c) **2022:** Publication of Appropriate Measures guidance in 2022 drives additional costs, over and above the 2018 BREF, to comply with Appropriate Measures guidance. This cost adjustment claim of £172.594 million is for scope above the £59.8 million of costs to comply with the 2018 BREF.

***Figure 10 – Valuation of cost adjustment claim***




5.2.2 The change in requirements to meet 2022 Appropriate Measures guidance is driving higher than historical sludge treatment costs. Although we have incurred higher costs in the past due to the

regulation of these sites under PPC and then IED, costs are expected to increase by £172.594 million in AMP8.

5.2.3 We are seeking financial resources through a cost adjustment claim as IED compliance is an existing obligation, but this is the latest iteration of standards that we must comply with. As these are new compliance standards, costs are not reflected in econometric models and there is no provision in Ofwat's Final Methodology to fund compliance at these sites. These costs are over and above the 2018 BREF compliance costs, so cannot be assumed to have been part of previously rejected IED claim for AMP7.

## 5.3 Customer support for investment

5.3.1 Customers and regulators expect that we are compliant with our regulatory and legal obligations and it is our non-negotiable responsibility. We need to be fully compliant with our statutory commitments in order to maintain our trusted brand reputation with customers, communities and our regulators.

5.3.2 We have not commissioned specific customer research associated with this cost adjustment claim as it would not drive change in the programme we are delivering, as we are proposing compliance at the lowest cost for customers.

# 6. Best option for customers

## 6.1 Options assessment

6.1.1 The focus of optioneering has been to identify the lowest cost and best value approach to delivering Appropriate Measures compliance.

6.1.2 The following options were identified and discounted at the early stages of the optioneering process:

(1) **Do nothing**: this option was discounted as we must operate our assets to meet legal requirements and 'do nothing' would result in environmental non-compliance.

(2) **Alternative treatment for all sludge**: this option was discounted as the additional costs involved in delivering IED compliance are small when compared to the cost of building all new assets to treat the sludge.

6.1.3 In Table 7 we set out the options we have considered to meet the need.

***Table 7 - Options considered to meet Appropriate Measures compliance***

| Option | Rationale | Select/reject | Reason |
|---|---|---|---|
| **Options to comply with our IED permits** | | | |
| Deliver IED Compliance at all 13 sites | Deliver our IED compliance requirements at all 13 AD sites individually | Reject | Higher cost solution.<br>This would lead to inefficient investment at aging anaerobic digestion sites that are reaching the end of their asset life. |
| Deliver IED Compliance at a reduced number of sites by rationalising aging AD sites | Deliver IED compliance at a smaller number sites through site rationalisation.<br>• Deliver IED compliance at 11 anaerobic digestion centres.<br>• Convert two sites, which have high IED compliance costs per/TDS of sludge processed, to sludge thickening or dewatering centres. Avoids IED compliance costs.<br>• Incurs write-off costs, costs to convert sites, one-off decommissioning costs and reduces regional treatment capacity. | Select | Preferred solution.<br>More efficient expenditure that aligns with our bioresources long-term delivery strategy to consolidate larger treatment hubs over time. |
| **Options to comply with Appropriate Measures** | | | |
| Minimum Viable Product (MVP) Solution | All efficiencies in capital programme realised. We successfully agree with the EA:<br>• Acceptance of containment of 110 per cent of the volume of the largest tank within the bund (not 25 per cent of total capacity of all tanks)<br>• Sites rating downgraded to Class 1 under CIRIA assessment, minimising impermeable surfacing areas, and use of alternatives to reinforced concrete walls | Reject | It is considered unlikely that solutions are acceptable to the EA, as they deviate from Appropriate Measures requirements. |
| Limited risk assessment approach to demonstrate compliance with Appropriate Measures | Efficiencies realised where we have high confidence in EA acceptance:<br>• Full compliance with CIRIA 736, and no opportunities to reduce requirements.<br>• Assume it is possible to retrospectively cover tanks, rather than replace.<br>• Efficiency benefits through flow monitoring approach to leak detection. | Select | A balanced approach that minimises costs as far as possible, while having a high confidence in acceptance of the proposals by the EA |
| Full compliance with Appropriate Measures | Risk averse capex proposals guaranteed to comply with Appropriate Measures standards. Include full costs to replace assets (i.e. tanks) and provide fully enclosed and ventilated cake storage. | Reject | Inefficient capital expenditure for no additional environmental benefit. |

6.1.4 Compliance with Appropriate Measures standards is prescriptive and there are limited options to meet compliance. We have sought to propose alternative measures to the EA to deliver equivalent benefit. To

control costs for customers we seek to use management and monitoring techniques to demonstrate compliance in preference to capital investment works. Acceptance of these measures is limited as the EA are pursuing a precautionary and risk-averse approach to setting requirements.

6.1.5 Our preferred solution is a balanced approach that minimises costs as far as possible, while having a high confidence in acceptance of the proposals by the EA. We are meeting customers' expectations by delivering our regulatory obligations as efficiently as possible. As we are selecting the lowest cost, feasible option, we have not sought customer views on selection of the preferred solution.

6.1.6 The benefits delivered through this investment are full regulatory compliance with our obligations, and enable upgrade and improvement to meet evolving standards specified under EA statutory guidance. These are designed to achieve a high level of protection for the environment, reducing the risk of pollution or environmental harm from our activities.

6.1.7 We aim to seek the lowest cost to comply to deliver these benefits. There will be no benefit to operational efficiencies or any AMP8 performance commitments through implementation of these measures. Through our options development process we have sought to minimise the increased carbon cost (embedded and operational) of the proposed solutions.

## 6.2 Delivery of this scheme

6.2.1 Compliance requirements are highly site specific and the exact requirements will not be known until we progress each individual permit variation. We have utilised knowledge gained through our AMP7 IED permitting process to understand what proposals will be acceptable to the EA and minimise the uncertainty. In addition, we have engaged support from multiple independent consultancies to understand best practice and take learning from outside the water industry.

6.2.2 We will not start to invest to deliver improvements to meet Appropriate Measures standards until we have certainty in the scope required by the EA to avoid inefficient spend on behalf of customers.

6.2.3 The nature of the work; multiple disparate compliance works; entwined with day-to-day operations; and across a large number of existing operational sites, makes it inappropriate to seek to deliver through a market solution. There are no opportunities for third-party funding through this cost adjustment claim, as the works are entirely restricted to our asset base.

6.2.4 For completeness and for the avoidance of doubt, this scheme has not been identified to be delivered as Direct Procurement for Customers (DPC), as this is not applicable for projects within the bioresources price control.

# 7. Customer protection

## 7.1 Price Control Deliverable

7.1.1 Compliance requirements are highly site specific and the exact requirements will not be known until we progress each individual permit variation. As such, there is an element of uncertainty over the full and final scope of works for Appropriate Measures compliance. If investment is not required at a site, or specific scope items are not required, we commit to handing back unspent monies to customers through a Price Control Deliverable (PCD) mechanism.

7.1.2 We have minimised this risk, by ensuring that the scope of this cost adjustment claim, is for items where we have certainty in requirements, and there are explicit standards set out in Appropriate Measures guidance. In developing our scope we have had to make specific assumptions to define the cost which are presented in document.

7.1.3 There are three main areas where scope could increase based on further review with the EA and detailed design to confirm solutions. These are:

(a) Increase in scale of containment;

(b) Fully enclosing cake pads and fitting odour control; and

(c) We cannot cover existing open tanks and these need to be replaced and fitted with appropriate abatement.

7.1.4 We estimate the maximum cost increase for these three items is an additional circa £180 million and is not currently included in this claim, pending further review with the EA and detailed design to confirm solutions.

7.1.5 We have also excluded other scope items from this claim, such as the need for new liquor treatment plants or covering lagoons, which we also consider scope items that are presently too uncertain to include within this claim.

7.1.6 We will work with the EA to realise the efficiencies included in our scope of work for this claim. However, given the potential scale of scope and cost increases, we will, through our Business Plan submission, promote management of these compliance scope risks through an uncertainty mechanism. We may seek to revise the cost adjustment claim value in future, if further work or scope requirements are confirmed by the EA make it appropriate to do so.

7.1.7 We recognise the need to develop a PCD to ensure that customers are protected. Details of the PCD will form part of our business plan submission, alongside our enhancement proposals. To support the process we propose that Ofwat collect Appropriate Measures and IED capital compliance costs alongside APR data in AMP8. This would allow monitoring of spend against these pre-existing obligations.

7.1.8 The EA ensures that the environment is protected in this area on behalf of customers and will monitor performance through a common industry Environmental Performance Assessment (EPA) metric for Waste Compliance. This is a new EPA measure in AMP8 and reflects the increased regulatory scrutiny and increasing regulator expectations for our waste treatment activities.

7.1.9 If we fail to deliver the improvements outlined in this cost adjustment claim we will fail to achieve 100 per cent compliance with our statutory obligations under the EPA Waste Treatment Compliance metric.

7.1.10 Moreover, non-delivery of the improvements may also incur the following additional penalties:

- **Prosecution and fines** – If a scheme is not delivered it is very likely that our resulting non-compliance may result in prosecution by the EA[25]. If non-compliance is through deliberate actions by the company this is likely to influence the scale of any fines issued.
- **Reputational impact of EPA** – We have received a leading four star rating under the Agency's EPA for five out of the last seven years. The assessment currently consists of seven metrics, six of which must be green (including the core metric), with no red metrics to achieve four star performance. In AMP8 we expect the EPA to include a waste treatment compliance metric, and the requirements to achieve a four star performance rating to become increasingly stringent.
- **Additional cost** – There is no cost sharing mechanisms with customers in the bioresources price control and the additional cost to dispose of any non-compliant biosolids to alternative outlets such as restoration would be for the company to accept.

[25] EA Letter to UUW 7 June 2023

# Glossary

| Abbreviation | Name | Description |
|---|---|---|
| | | |
| **AD** | Anaerobic Digestion | Anaerobic digestion is a biological process through which bacteria break down organic matter. |
| **AAD** | Advanced AD | A biological process designed to extract a greater quantity of biogas and produce enhanced quality biosolids for recycling. |
| **ADBA** | Anaerobic Digestion and Bioresources Association | Anaerobic Digestion and Bioresources Association represent over 300 organisations involved in the UK anaerobic digestion and bioresources industry. |
| **AMP** | Asset Management Plan (or Period) | An AMP is a water company's detailed description of its investment plans for its assets. AMP is often used as a shorthand name for the companies' business plans. See also Business Plan. |
| **AMP7** | Asset Management Plan 7 | Refers to the planning period between 2020 and 2025. |
| **AMP8** | Asset Management Plan 8 | Refers to the planning period between 2025 and 2030. |
| **Appropriate Measures for the Biological Treatment of Waste** | Appropriate Measures for the Biological Treatment of Waste | Guidance published in 2022 impacting Anaerobic Digestion sites providing EA interpretation of the BAT conclusions for England. |
| **Appropriate Measures standards** | Appropriate Measures standards | Appropriate Measures are the standards that operators should meet to comply with their environmental permit requirements. |
| **APR** | Annual Performance Report | Annual data collection provided to Ofwat by companies. |
| **BAT (standards)** | Best Available Techniques | BAT means the available techniques that are the best for preventing or minimising emissions and impacts on the environment. 'Techniques' include both the technology used and the way the installation is designed, built, maintained, operated and decommissioned. |
| **Bespoke Waste Permit** | Bespoke Waste Permit | A type of site environmental permit within the Environmental Permitting Regulatory framework |
| **Bioresources** | | Name for sewage sludge |
| **Biosolids** | Biosolids | Organic matter recycled from sewage, and used in agriculture as fertiliser. |
| **Biological Treatment** | Biological Treatment | Biological treatment methods use microorganisms, mostly bacteria, in the biological decomposition of wastes to stabilise end products |
| **BREF** | Best Available Technique Reference Documents | BREFs bring together users' real-world experiences of BAT to provide reference information for regulators to use when determining permit conditions. |
| **CCTV** | Closed Circuit Television | A TV system in which signals are not publicly distributed but are monitored, primarily for surveillance and security. |
| **CIRIA** | Construction Industry Research and Information Association | CIRIA is the Construction Industry Research and Information Association, a neutral, independent and not-for-profit body. They work collaboratively across the construction industry to identify good practice. |

| | | |
|---|---|---|
| **CIRIA 736** | CIRIA 736 | Guidance with respect to containment systems for the prevention of water pollution from industrial incidents produced by CIRIA and referenced in Appropriate Measures. |
| **CDM** | Construction Design and Management Regulations | The Construction (Design and Management) Regulations (CDM 2015) are the main set of regulations for managing the health, safety and welfare of construction projects. CDM applies to all building and construction work and includes new build, demolition, refurbishment, extensions, conversions, repair and maintenance. |
| **CMA** | CMA | Competition and Markets Authority |
| **EA** | Environment Agency | The Environment Agency is a Non-Departmental Public Body (NDPB) and carries out its statutory and regulatory functions with technical expertise, impartiality and transparency, principally across England and at arm's length from its principal sponsor, Defra. In addition, the Environment Agency also works with, and delivers duties on behalf of, a range of other UK Government departments. |
| **EPA** | EPA | Environmental Performance Assessment conducted annually by the EA to evaluate water company's' environmental performance. |
| **EPR** | EPR | Environmental Permitting Regulations |
| **EQRA** | EQRA | Environmental Qualitative Risk Assessment |
| **EU** | EU | European Union |
| **Green Recovery** | Green Recovery | Water companies were invited to propose investment to support the country's green economic recovery from the COVID pandemic. |
| **IED** | Industrial Emissions Directive | A European Union Directive which commits European Union member states to control and reduce the impact of industrial emissions on the environment. |
| **IED Installation** | IED Installation | A type of environmental permit for a site required to comply with IED. |
| **MM** | Mott Macdonald | Mott Macdonald independent consultant |
| **MVP** | MVP | Minimum Viable Product |
| **Net zero** | Net Zero Carbon | Means that any carbon emissions are balanced by absorbing an equivalent amount from the atmosphere in order to meet the 1.5°C global warming target in the Paris Agreement |
| **Ofwat** | Ofwat | Water Services Regulation Authority |
| **physico-chemical** | physico-chemical | Physico-chemical treatment involves using chemicals or physical properties to provide thickening or dewatering. |
| **PPC** | PPC | Pollution prevention and control. |
| **PR19** | Ofwat's Price Review for AMP7 2021-2025 | The process of setting appointed water companies' price limits. |
| **PR24** | Ofwat's Price Review for AMP7 2026-2030 | The process of setting appointed water companies' price limits. |
| **Regulation 61** | Regulation 61 | A provision for regulators to obtain information to support a review of conditions in environmental permits. |
| **T21** | T21 exemption | The T21 exemption allows you to recover wastes such as sewage grits, screenings and sewage sludge at a waste water treatment works. |
| **tCO2e** | Tonnes of carbon dioxide equivalent | Unit of measurement for greenhouse gas emission reporting. |
| **TDS** | TDS | Tonnes dry solid a unit of measurement for biosolids (TTDS thousand tonnes dry solids). |
| **UUW** | UUW | United Utilities Water. |

| | | |
|---|---|---|
| **Urban Waste Water Treatment Regulations** | Urban Waste Water Treatment Regulations | Regulations for the treatment and discharge of urban waste water, and the treatment and discharge of waste water from certain industrial sectors. |
| **UWWTD** | UWWTD | Urban Wastewater Treatment Directive |
| **WaSCs** | WaSCs | Water and sewerage companies |
| **Waste Framework Directive** | Waste Framework Directive | The Waste Framework Directive is a European Union Directive concerned with "measures to protect the environment and human health by preventing or reducing the adverse impacts of the generation and management of waste and by reducing overall impacts of resource use and improving the efficiency of such use. |
| **WINEP** | WINEP | Water Industry National Environment Programme |
| **WISER** | Water Industry Strategic Environmental Requirements | WISER is issued jointly by the Environment Agency and Natural England to describe the environmental, resilience and flood risk obligations that must be taken into account when developing business plans. |
| **WwN+** | WwN+ | Wastewater Network plus |
| **WwTW** | WwTW | Wastewater Treatment Works |

# Appendix A

## A.1 Footnote 4

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## A.2 Footnote 5

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## A.3 Footnote 10

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## A.4 Footnote 12

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## A.5 Footnote 15

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## A.6 Footnote 25

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