TMS46 Uncertainty Mechanisms

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1. Summary

1.1. Uncertainty mechanisms play an important part in the regulatory framework to ensure appropriate incentives for efficiency and to maintain an appropriate cost of capital for customers. While Ofwat have included a number of uncertainty mechanisms in its final methodology, including cost sharing arrangements, we consider that there are further benefits for customers from a limited number of additional mechanisms to address considerable uncertainty over two specific issues, which could have significant costs:

- the continued disposal of biosolids to land; and
- Industrial Emissions Directive (IED) capital expenditure.

1.2. Potential changes in the interpretation of farming rules for sludge disposal may result in significant changes in the way that treated sludge is disposed of, with potentially substantial cost consequences as evidenced in Section 3.. We propose that should changes occur, which result in significant expenditure in AMP8, these costs are treated either through a specific uncertainty mechanism, or consistent with the treatment of Bioresources as a separate business, a notified item with a bespoke threshold.

1.3. The extent and timing of expenditure to provide compliance with the Industrial Emissions Directive (IED) remains uncertain. We have included only minor capital and operational costs in our AMP8 plan and propose that should capital expenditure be required in AMP8 these are dealt with using a similar uncertainty mechanism as proposed to manage Bioresources i.e. a re-opener if IED compliance costs within AMP8 breach a materiality threshold.

2. Introduction

2.1. In this document we set out the uncertainty mechanisms that we consider are appropriate for AMP8. We recognise that there are a number of uncertainty mechanisms already proposed by Ofwat in PR24 including: inflation indexation; totex cost sharing; outcome delivery incentives; and reconciliation mechanisms for wholesale revenue, cost of new debt and tax. Companies' licences also allow price limits to be reopened in certain limited circumstances where a materiality threshold has been exceeded.

2.2. Notwithstanding the existing mechanisms, the existing policy framework allows for additional uncertainty mechanisms. We note that Ofwat will set a high evidential bar for any bespoke uncertainty mechanisms and that they should be justified against:

- Materiality;
- Efficiency of risk allocation and customer protection; and
- Cost-benefit.

2.3. Our proposed uncertainty mechanisms included in this technical appendix are:

1. Uncertainty over continued disposal of biosolids to land
2. Uncertainty over IED capital expenditure.

2.4. We have also proposed a true-up mechanism, for real price effects affecting energy, chemicals, supply chain materials and wages in our document TMS42 Macroeconomic environment, real price effects and other cost modelling issues.

2.5. There is also continuing significant uncertainty over the size and scope of two project areas although we do not propose specific uncertainty mechanisms at this stage:

- The WINEP programme - in our WINEP enhancement case TMS26: Enhancement Case: WINEP we set out the requirement for flexibility over the programme to deal with the current uncertainty.
- The water resources Strategic Resource Options (SROs) where the timing and selection of projects is uncertain pending approval of the WRMP as set out in our water supply enhancement case TMS27 Enhancement Case: WRMP Supply Options.

2.6. The remainder of this document is structured as follows:

- Section 3 – Disposal of bio-solids to land
- Section 4 – IED capital expenditure
- Section 5 – Consideration of proposed uncertainty mechanisms against Ofwat's criteria

3. Bioresources – Recycling biosolids to land uncertainty

The uncertainty currently faced by the industry

3.1. The bioresources sector is currently facing significant uncertainty regarding the costs associated with biosolids recycling to agricultural land during AMP8. The main drivers of the uncertainty are anticipated legislative changes; combined with the potential shift in public perceptions, which would affect the willingness of farmers to accept biosolids on their land.

3.2. It is currently anticipated that the Environment Agency (EA) will conclude their Sludge Strategy after companies have already submitted their PR24 Business Plans in October 2023. This Sludge Strategy has the potential to have a material impact on the ability of companies to recycle biosolids to agricultural land, which will create the need for additional resources to address any new requirements.

3.3. The bioresources sector is currently facing uncertainty in the following areas:

1. Farming Rules for Water (FRfW). Within the current guidelines, there is a difference in interpretation between the EA and water companies. The Defra statutory guidance for FRfW, which allows autumn spreading to continue, is due to be reviewed no later than September 2025 and there is a real possibility that a different interpretation of the rules will lead to lower land bank availability. However, companies' AMP8 plans are currently assuming that 90-100% of biosolids will continue to be recycled to agricultural land.

2. EA sludge strategy. The industry has been engaging with the EA on the development of the Sludge Strategy since 2020. This includes the EA's planned transition for biosolids from the Sludge (use in agriculture) Regulations (SUiAR) to the Environmental Permitting Regulations (EPR). The change from SUiAR to EPR provides the EA with enhanced controls that would allow them to enforce their policies associated with nitrogen and phosphorus management and reduce deployments to land. This is also expected to lead to a significant reduction in land bank availability.

3. Bioresources WINEP for PR24. The EA's focus is on resilience in the supply chain and not the loss of landbank as a disposal route for biosolids in the medium term. The priorities for the EA for the Bioresources WINEP therefore are current issues such as fuel and HGV driver shortages. This does not address the medium-term risks to the delivery of biosolids to agricultural land. The EA has currently ruled out endorsing industry proposals relating to land bank availability, except those specifically related to storage.

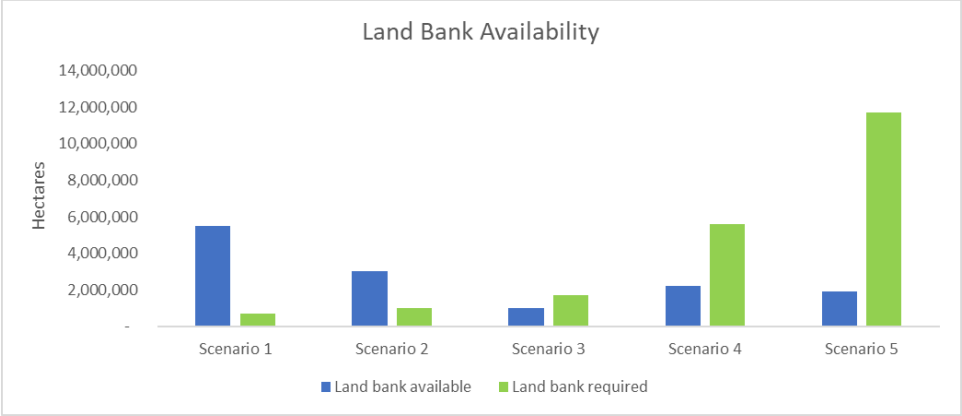
The Grieve national landbank study

3.4. Whilst the legislation above may be considered as primarily affecting the behaviour of farmers (the end users), this matters to water companies because end user acceptance affects the ability of companies to discharge their obligation of safely disposing biosolids and therefore the costs associated with biosolid disposal.

3.5. The Grieve report analysed national lank bank availability assuming five different scenarios. According to this report, the most likely scenario – scenario 4, will result in a reduction in

land bank availability of approximately 17% by the end of AMP9 compared to the baseline scenario (scenario 2 is the baseline scenario and reflects the situation as of today, scenario 1 reflects the situation at the beginning of AMP7).

Figure 3.1 Land bank availability according to Grieve report scenarios



Source: Grieve Strategic/ADAS National Landbank Study November 2022

3.6. The figure above illustrates that the true extent of the problem facing companies over AMP8 and AMP9. Scenario 4 models the phosphate restrictions indicated by the EA . These restrictions will extend the return frequencies to land and consequently dramatically increases the landbank required to dispose of biosolids. In the central / most likely scenario, Scenario 4, the shortfall in land bank availability compared to land bank required is just under 4 million hectares.

3.7. In Scenario 5, potential changes in public perceptions are modelled and suggest that the potential shortfall in land bank availability could increase to around 10 million hectares. Although Scenario 5 is currently not seen as presenting a likely outcome, the uncertainty around public perception driven by the speed with which public perceptions can change and require an urgent industry response, suggests that it is important that appropriate regulatory arrangements are in place to help companies to manage the uncontrollable risks in an efficient way.

Scale of the uncertainty and risk

3.8. As around 95% of treated bioresources currently go to land for agriculture, a major shift in processing and/or storage at sludge treatment centres will be required if insufficient agricultural land is available. With currently available technologies incineration is the most logical step but will lead to increased capital spending, emissions and unit costs. An alternative is using pyrolysis. However, there are some concerns. There has been no full-scale application for sewage sludge in the UK. It is the case that product yield is closely linked to individual operational conditions of each pyrolysis reactor. There is also an undeveloped biochar market, limiting application of the end product. Finally, it is unclear what the carbon sequestration potential of biochar is.

3.9. An industry shift to alternative routes of disposal for biosolids is expected to cost billions and include investing in existing and new as yet not commercially proven technologies. The cost to each company and the profile of investment required depends on the extent to which

legislation, regulations, interpretations of regulations or public perceptions change and how much investment companies need to make to fulfil any new obligations.

3.10. A report commissioned by a consortium of Water Companies[1] found:
*"Use of incineration instead of recycling to landbank was shown having a significant impact on both projected costs and emissions. Capital requirements increased by circa 6 times and was in excess of £1.3B for the 5 WaSCs. Operational emissions also more than doubled, compared to current activities…*In another scenario, use of pyrolysis was tested to replace incineration. This scenario still generated a similar capital cost as the incineration scenario, but overall produced a significantly lower fully built unit cost (circa 10% cost reduction opportunity) and lower emissions. This was primarily driven by using syngas to produce additional renewable electricity." (*Catalyst Stream of the Water Breakthrough Challenge 2: Unlocking bioresource market growth using a collaborative decision support tool* BMA July 2023 p31)

3.11. Water companies are therefore having to consider alternative means of bioresource disposal related to their circumstances. For Thames Water funding would be needed to reopen our pyrolysis plant in Crossness and use it as a pilot plant for future roll out of plant across other sludge treatment centres in AMP9 and beyond. We would also have to consider developing an additional sludge power generation or gasification plant to cope with the extra loads we cannot dispose of with our existing capacity. At this point we are uncertain what the lead times will be in order to comply.

3.12. Companies are committed to deliver their biosolids strategy and aim to deliver a low regrets plan for AMP8. However, the uncertain nature of upcoming legislative, regulatory and public perception changes and the resultant cost impact, makes it desirable that customers are protected from large bill increases by a more flexible regulatory approach.

Proposals for a flexible regulatory approach in response to changes in biosolids recycling to agricultural land at PR24

3.13. We think it is important that a pre-agreed mechanism is put in place for PR24 to enable companies to better manage the investment potentially required to adapt to any changes in biosolid regulations. As we set out below, we think that the implementation of a common re-opener for bio-resources would enable companies to develop effective enhancement plans to address the changing regulatory landscape outside of the price review timelines.

A common re-opener for bioresources compliance costs

3.14. In the table below we present Ofgem's environmental re-opener from the RIIO-ED2 final determination (November 2022) and an example of an equivalent bioresources re-opener.

3.15. A re-opener could use a materiality threshold linked to the bioresources price control to create a more focussed tool that would be easier to implement than an IDoK. The re-opener avoids the need to define a very clear trigger in advance, which is difficult for bioresources compliance costs because they could increase for many different reasons and by different amounts. A company could apply to Ofwat during one of the April application windows in AMP8 with its case explaining why its bioresources compliance costs have

[1] Anglian, Northumbrian, Southern, Thames Water and Yorkshire Water.

increased. Ofwat would have the discretion to accept or reject the application. It would be important for companies to show the steps they would take to mitigate and fund the additional expenditure from base through increased efficiency. If Ofwat accepts the application, it would assess the company's case in a similar way as it does for in-period ODIs with a consultation on a draft decision followed by a final decision.

3.16. The trigger in this case is a company application to Ofwat based on an **increase in bioresources compliance costs of more than 10% of bioresources AMP8 totex allowance.** We consider this to be more appropriate than 10% of annual company turnover (required for a Notified Item). The bioresources control exists separately to other controls as there is a specific policy objective of opening up the bioresources market to competition. Ofwat state *"Separate controls also promote wholesale markets, by revealing improved information that will incentivise companies to deliver better value for customers, the environment and wider society."* (p87 Ofwat: *Delivering Water 2020: Our final methodology for the 2019 price review*).

3.17. We consider that a re-opener is more appropriate than the existing IDoK / Notified Items approach for the following reasons:

a. The IDoK mechanism pre-dates separate price controls and a common re-opener related to bioresources is more in keeping with Ofwat's separate price controls.
b. We have no reason to think that the demand for specialist plant will be widespread or induced by competition given the limited size of the potential market.
c. The specific risk of reduced access to landbank affects the whole market and in a competitive market the price would increase if the additional compliance costs emerged.
d. A re-opener is in keeping with Ofwat's adaptive planning approach in the LTDS.
e. There is diminishing RCV protection in bioresources which is unique to the bioresources price control.
f. There is no cost sharing in bioresources.

Table 3.1 – The Ofgem RIIO-ED2 Environmental Re-opener and our proposed approach

Output Parameter (from Ofgem's Final Determination)	Ofgem RIIO-ED2 - Environmental Re-opener Page 57 of *Ofgem RIIO-ED2 FD Core Methodology* (30 November 2022)	Example of a Bioresources Re-opener for PR24
UM type	Re-opener	Re-opener
Re-opener Window	January 2024 January 2025 January 2026 January 2027	April 2025 April 2026 April 2027 April 2028
Trigger	DNO [Distribution Network Operator] trigger only.	Water and sewerage company application to Ofwat
Materiality threshold.	Zero materiality threshold	10% of bioresources AMP8 totex allowance
Scope	The scope of the re-opener has been updated to be used where the licensee has incurred or expects to incur costs caused by new or amended legislative requirements that relate to the licensee's impact on the environment that are contained within or could have been contained within the licensee's EAP [Environmental Action Plan].	The scope of the re-opener is a material increase in bioresources compliance costs driven by a change in legislation, a change in regulation, a change in guidance, a change in the interpretation or application of existing legislation, regulation, or guidance and/or a change in acceptability of disposing sewage sludge to land.
Licence condition	Special Condition 3.2, Part E	N/a, included as part of Final Determination

Bioresources Re-opener for PR24

Notified Item

3.18. For the reasons outlined above, we have proposed a common re-opener for bioresources compliance costs. If a common re-opener for bioresources compliance costs is not Ofwat's preferred option, companies could apply for a notified item. However, a notified item is subject to a threshold of 10% of annual company turnover to trigger an IDoK. Changes in bioresources compliance costs are unlikely to meet this threshold due to the relatively small size of the bioresources price control in the five price controls Ofwat sets for companies. This could therefore result in companies not being able to make efficient investment in a timely manner and having to defer expenditure until AMP9 Alternatively, if the threshold is met it could be administratively cumbersome and disproportionate for Ofwat and the industry to be involved in multiple IDoKs when they only relate to the bioresources price control.

3.19. We propose that a Notified Item in this instance should be an **increase in compliance costs of more than 10% of bioresources AMP8 totex allowance.** This would provide companies

with the opportunity to apply for an IDoK based on their increased costs. Ofwat would retain the discretion whether to accept or reject the application.

4. Industrial Emissions Directive (IED)

The uncertainty currently faced by the industry

4.1. There is considerable uncertainty in the industry relating to the efficient costs that will need to be incurred to secure compliance with the requirement for the water and sewerage companies when obtaining IED (waste management) permits for the following activities: (a) The biological treatment of sewage sludge; (b) The operation of biogas engines; and (c) The injection of biomethane gas into the grid.

4.2. This issue was considered carefully by the CMA in their PR19 re-determinations. They highlighted that there is a significant amount of uncertainty associated with securing compliance with IED requirements, relating to the potential differences in needs, scope, and efficient costs for a large number of activities. In addition, it was noted that the costs associated with securing compliance with IED requirements would be very site specific and depend to a large extent on the way in which the Environmental Agency (EA) implement the Directive.

4.3. The position has not advanced since the CMA determination. Indeed, Ofwat's letter to the industry published on 1st August 2023 noted that because only three IED permits have been issued, there remains considerable uncertainty relating to the scope and cost that will need to be incurred by the companies. Thus, there remains considerable uncertainty over the potential capital expenditure needed to comply with the IED requirements over PR24 and beyond.

Scale of the problem

4.4. A report commissioned by Water UK members estimated that across the industry securing compliance with the regulations will require around just under £2bn of investment. With much of the cost driven by the Appropriate Measures document, which was issued in September 2022. This has imposed new standards which differ from those put in place in July 2019[2].

4.5. Thames Water has 25 Sludge Treatment Centres that are likely to need some form of enhancement to meet the new standards that have been put in place, although the exact extent of the works required will not be known until the site visits have been completed and the EA has reviewed our submissions. We have commenced the process of obtaining consent and we intend to have them all "duly made" by April 2024.

4.6. When the EA first officially informed the water industry of its intent to require permits for biological treatment of sewage sludge in 2019, our initial estimate of the costs associated

[2] "Catalyst Stream of the Water Breakthrough Challenge 2: Unlocking bioresource market growth using a collaborative decision support tool" Report commissioned by Anglian, Northumbrian, Southern Water, Thames Water Yorkshire Water by BMA page 32.

with compliance was £38m (2019 prices) as per the cost adjustment claim that was submitted to Ofwat in PR19.

4.7. Following the receipt of the final guidance from the EA in September 2022, the full scope and scale of investment needed is somewhat clearer. Although as noted above there is still uncertainty about the costs because they are site specific in nature and depend on the way in which the EA will implement the regulations. At the time of submission, challenges remain with regards the interpretation of the Industrial Emissions Directive, with industry wide discussions taking place with the Environment Agency via WaterUK.

4.8. Within our TMS29 Enhancement Case: IED for PR24 we have set out the full programme of works that we anticipate to secure compliance, over the long term. A three phased approach is proposed to fully comply with the legislation based around current views on customer affordability, company deliverability, company fundability and overall environmental benefit when viewed alongside the WINEP programme. For AMP8 this is £15.4m Capex and £165m Opex giving a Totex of £180.4M. (The full range of activities proposed for AMP8 are set out in the Enhancement Case).

4.9. In addition to the costs forecast for AMP8, we have estimated Capex of £483.6m that will be spent over AMP9 and AMP10 to carry out the necessary investment to secure IED permits based on our current understanding of the implementation of the regulations.

4.10. In total we estimate that costs in the region of £650m will be required over AMP8-10 to secure compliance with the IED, based on the current EA guidance on the requirements. Given the significant size of the investment need, as articulated in the Enhancement Case, we have developed a phased and risk-based approach to deliver the investment in order to better manage the uncertainty and ensure value for money for our customers.

Our approach to managing the uncertain investment costs over AMP8

4.11. Given the size of the investment need and uncertainty around the scale, scope and timing of the programme delivery, we think it appropriate to apply an uncertainty mechanism to cover the capital expenditure required to implement the IED compliance programme that is articulated in our Enhancement Case (see TMS29 Enhancement Case: IED).

4.12. The case that we have presented assumes that £483.6m of totex will be incurred over AMP9 and AMP10. We have phased the investment in this way to ensure that the investment that we carry out delivers the best value for our customers and the environment, taking account the risks of trying to deliver investment within the current timeframes specified by the EA, i.e. the capacity of the supply chain to provide for the industry combined with the uncertainty around the site specific requirements.

4.13. However, given the fact that there is currently an end-2024 deadline for implementation of the IED and the potential for enforcement action and the requirement to suspend sludge treatment activities at non-compliant sites – which would create considerable opex costs; we note that it is possible that we will have to bring forward some of the capex into AMP8.

4.14. We therefore propose that an uncertainty mechanism is applied to help manage the risks around the capex required to secure IED compliance over AMP8. We propose that an

uncertainty mechanism similar to the mechanism that we have proposed to manage bioresources compliance costs, i.e., a specific re-opener if the costs required to comply with the IED requirements lead to an increase in bioresources compliance costs of more than 10% of the bioresources AMP8 totex allowance.

4.15. At present we consider that the timing of potential capex costs beyond the £15.4m specified in our Enhancement Case are too uncertain to include in our business plan proposals and therefore propose that the base level of £15.4m is included, although further clarity may be available by the time of draft determinations next year.[3]

5. Consideration of Ofwat criteria for uncertainty mechanisms

5.1. In this section we consider the criteria that Ofwat set out in the Final Methodology for uncertainty mechanisms and assess both the proposed uncertainty mechanism for Biosolids disposal to land and the IED capital expenditure mechanism against the criteria.

5.2. Ofwat's Aligning Risk & Return Appendix to the PR24 Methodology states that they will consider any proposals for uncertainty mechanisms against three criteria:

- **Materiality.** Ofwat state that the requests for any new proposed uncertainty mechanisms need to address issues where the uncertainty would have a material impact on the business. The specific materiality threshold is not defined, but we have considered the materiality thresholds for cost adjustment claims that are set out in the Setting Expenditure Allowances Appendix of Ofwat's PR24 Methodology when determining whether it is appropriate to propose an uncertainty mechanism.
- **Efficiency of risk allocation.** Assess whether the proposed mechanism will improve the allocation of risk and why the company is not in the position to manage the risk absent the introduction of the uncertainty mechanism.
- **Cost-benefit.** For the cost-benefit test, Ofwat emphasises the need for proposed mechanisms to be proportionate, to protect consumers' interests, and to ensure that the proposed mechanism does not include costs already covered in other areas of the allowance.

Assessment of our proposed mechanism for bio-resources against Ofwat criteria

5.3. We set out below an assessment of the bioresources mechanism that we have proposed against Ofwat's criteria, focusing primarily on the cost-benefit assessment.

Materiality – Recycling biosolids to land

5.4. Our proposal is to introduce a re-opener if the anticipated legislation on biosolid recycling is implemented and leads to costs in excess of 10% of the bioresources totex allowance in AMP8. This is thus potentially clearly a material level of expenditure.

Allocation of risks – recycling biosolids

5.5. Thames Water does have some potential to manage some of the costs associated with biosolid recycling, however the introduction of new obligations that impose significant

[3] Details on the outputs and outputs associated with our planned AMP8 expenditure are set out in the Enhancement Case: IED document (TMS29).

additional costs within AMP8 that are not within management control and our flexibility to manage our costs. Hence, the introduction of the mechanism is appropriate in this regard.

Cost-benefit assessment – recycling biosolids

5.6. We review briefly our proposed uncertainty mechanism against the status-quo – note that the option of making use of the IDoK / Notified Items approach was considered, a rationale for not adopting that approach is set out in Section 3.

Table 5.1 – High-level appraisal of the options against the status-quo for biosolids to land mechanism.

Criteria	Status quo	Proposed re-opener
Materiality	n/a	The process of managing a re-opener will involve significant resource, however it is justified given the scale of investment need that could be required, by suggesting that a trigger of 10% of the bioresources totex allowance is applied we have ensured that our proposal is proportionate. TWUL's cannot address this through cost sharing as there is no bioresources cost sharing in the control
Efficiency of risk allocation and customer protection	Having no protections in place would mean that companies would need to use a less efficient source of funds (i.e. having to fund an unanticipated overspend, noting that there is no cost sharing for bioresources) to meet obligations within AMP8 (or else delay investments into AMP9 if that is an option), which would ultimately increase costs for consumers.	The re-opener enables the companies to manage uncertainty have access to the most efficient way to raise the funds required to meet obligations associated with the anticipated legislation.
Cost-benefit	n/a	The costs covered by our proposed mechanism are not provided for anywhere else in the allowance. Without the cost sharing mechanism customers may pay more through a higher cost of capital.

5.7. Based on the analysis presented above, we consider that our proposal to introduce an uncertainty mechanism to manage the risk that legislation or other factors require additional AMP8 costs, represents the best option for consumers in the long-term.

Assessment of our proposed mechanism for IED capex against Ofwat criteria

Materiality - IED

5.8. As set out in the Enhancement Case, based on our interpretation of the final EA guidance, we estimate total capex of £488m to secure compliance across our 25 sites, with some uncertainty about exactly when that expenditure needs to take place which is outside of management control. This is clearly a material issue for us over AMP8.

Allocation of risks – IED

5.9. Thames Water does have some potential to manage some of the costs associated with securing compliance with the new regulations. However, as set out in the CMA decision and acknowledged in Ofwat's recent letter to the industry, the scope and costs can only become certain once the permits are agreed and depend on a combination of unknown site-specific factors and uncertainty around EA implementation of the regulations. Hence, the costs are largely outside of the control of our management and thus the introduction of the mechanism is appropriate in this regard.

Cost-benefit assessment – IED

5.10. We review briefly our proposed uncertainty mechanism against the status-quo (i.e. no uncertainty mechanism is applied and Thames Water and our customers are exposed to risks around IED enforcement).

Table 5.2 – High-level appraisal of the options against the status-quo

Criteria	Status quo	Proposed re-opener
Materiality	n/a	Our proposal is proportional and material because the capex costs required to comply with IED requirements are potentially considerable; we have proposed a mechanism that is flexible and gives us incentives to manage costs within the agreed allowance, whilst also enabling us to recover costs if much larger capex is required in AMP8.
Efficiency of risk allocation and customer protection	Having no protections in place would mean that companies would need to use a less efficient source of funds (i.e. having to fund an unanticipated overspend, noting that there is no cost sharing for bioresources) to meet any obligations that are required within AMP8 which would ultimately increase costs for consumers.	The mechanism enables the companies to manage uncertainty have access to the most efficient way to raise the funds required to meet the potential obligations associated with the IED compliance.
Cost-benefit	n/a	The costs covered by our proposed mechanism are not provided for anywhere else in the allowance. Without the cost

		sharing mechanism customers may pay more through a higher cost of capital.

5.11. Based on the analysis presented above, we consider that our proposal to introduce an uncertainty mechanism to manage the risk that the IED regulations require additional AMP8 costs, represents the best option for consumers in the long-term.


Thames
Water