



Thames Water Utilities Limited

Response to Ofwat's Draft Determination of Thames Water's IDoK application

23 October 2013

Public version



Board review process

As stated in our IDoK application, the Board of Thames Water Utilities Ltd approved the application unanimously and took full responsibility for its contents, having been fully apprised of the application, provided guidance and challenge as appropriate, ensured that appropriate checks and balances were applied and that each aspect of the application was fully justified.

Following publication of the Draft IDoK Determination on 16 October 2013, the Board of Thames Water Utilities Ltd has been closely involved in the preparation of Thames Water's response. The process we have followed is set out below:

- The Board was sent a copy of Ofwat's Draft IDoK Determination on 16 October 2013 and provided feedback to the team preparing Thames Water's response.
- The Board was sent a draft of Thames Water's response on 20 October 2013 for feedback by 5pm on 21 October 2013.
- Further discussion and feedback on the response took place at a Regulatory Committee meeting on 22 October 2013, an invitation to which had been extended to all Board members.
- Comments from the Board were incorporated into the response, and The Board was sent the final draft of Thames Water's response on 23 October 2013 prior to its submission to Ofwat on the same day.



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Section 1

Executive summary

A Introduction

- 1.1 This document is the formal response by Thames Water Utilities Limited (“Thames Water”) to Ofwat’s draft determination of Thames Water’s IDoK application (“the Draft IDoK Determination”).¹
- 1.2 As we set out in detail in this document, we have numerous concerns about the analysis of the individual elements of the Draft IDoK Determination. For the reasons we set out, however, our overriding concern is that Ofwat’s position is not in the long-term interests of our customers, nor in the long-term interests of water and sewerage customers in general.
- 1.3 We explained in our IDoK application that Ofwat’s provision for IDoKs was part of the regulatory determination that Thames Water and Ofwat agreed at PR09. IDoKs form part of the risk mitigation that ensures companies’ financial exposure remains at appropriate levels. They are not uncommon and are relatively mechanistic, with adjustments to price limits that follow a set calculation methodology. This benefits customers through a lower cost of capital. This is explicit in the PR09 documentation.²
- 1.4 The IDoK mechanism, therefore, serves to keep the cost of financing low. We would be concerned if it was not seen to be working as intended, as this could have adverse consequences for the stability of the sector and its attractiveness to future investors. We constructed our IDoK application to fit firmly within the PR09 regulatory agreement, but also to achieve a reasonable balance with customers given the wider AMP5 financial context.
- 1.5 We are concerned that the Draft IDoK determination – whilst ostensibly the result of independent and objective analysis of each element of the relevant IDoK and Counter-IDoK – could be viewed as having been put together to reach a pre-determined conclusion that we should not be permitted to recover any legitimately and efficiently incurred costs that were not included in prices at PR09. Evidence to support this concern resides in the assumptions that have been adopted to reach those provisional conclusions (for example, the position that the effect on Thames Water’s household bad debt arising from the economic downturn is “trivial”), and Ofwat’s proposal to amalgamate Thames Water’s IDoK with Ofwat’s Counter-IDoK, in a way that is at odds with the legal process set out on the face of the licence. Ofwat’s approach appears to undermine the protection against

¹ “Draft determination of Thames Water’s IDoK application”, Ofwat, 16 October 2013.

² “Future Water and sewerage charges 2010-15: final determinations”, Ofwat, 2009. See, for example pages 8 and 120.



unforeseen events provided to investors by the framework for Notified Items and Relevant Changes of Circumstance, increasing the perceived risk of investment in the English and Welsh water sector, which will translate into a higher cost of capital for all customers (not just those of Thames Water).

- 1.6 We are also concerned that Ofwat has allowed only a very short timeframe for customers, stakeholders and Thames Water to respond to the Draft IDoK Determination. We have needed to seek clarification from Ofwat on a number of aspects of its position.³ It is necessary, therefore, to limit this response to providing the additional information we can in the time available, particularly on the areas where Ofwat has suggested that it made its Draft IDoK Determination without the information it needed, and to pointing out the material errors in the Draft IDoK Determination and supporting analysis that we have identified so far. For the avoidance of doubt, if we do not comment on certain aspects of the Draft IDoK Determination, this does not mean that we agree these aspects are correct or that they are in the interest of our customers.

B An appropriate balance for customers

- 1.7 In our IDoK application, we set out why we considered our IDoK represented an appropriate balance for customers. We identified eight upward items that would qualify for inclusion in an IDoK,⁴ but only included four of them in our claim,⁵ thereby absorbing significant costs rather than passing them on to our customers. We included all of the downward items we identified, and proposed to absorb some of the costs even in respect of the upward items we had included. We also explained that even with the IDoK, our EBITDA would be below that assumed at PR09. We recognised the potential impact of the IDoK on our customers, which is why we sought to persuade Ofwat to allow us to spread this over more than one year.
- 1.8 The Draft IDoK Determination includes a calculation of the net present value (“NPV”) of increased and reduced costs not factored into prices.⁶ It undertakes this calculation by disregarding five of the eight upward items that we identified as qualifying for an IDoK⁷ (Ofwat has disregarded the costs of Counters Creek, Shaft G, CRC charges, the non-land related Thames Tideway Tunnel (“TTT”) costs and has rejected bad debt costs on grounds of triviality). The Draft IDoK Determination also makes a number of unjustified assumptions regarding the magnitude of the three downward items it identified for Ofwat’s own IDoK (one of which we included in our application, and the other two we do not believe qualify for inclusion in an IDoK, as we explain below). Notwithstanding these assumptions, Ofwat still

³ See, for example “Ofwat response 12”, Ofwat, 21 October 2013.

⁴ The eight items were Counters Creek, Shaft G, CRC charges, the non-land related TTT costs, Bad debt costs, EIUC Charges, Private Sewers, and TTT Land.

⁵ The four we included were Bad debt costs, EIUC Charges, Private Sewers, and TTT Land.

⁶ Table on pages 9, 10 and 11 of the Draft IDoK Determination.

⁷ Albeit that we calculated our proposed adjustment to K for 2014-15 using only four of the upward items in order to strike an appropriate balance for customers.



calculated that the NPV of the costs not included in prices was in excess of £140m – i.e. 8.2% of one year's revenue.

- 1.9 The Draft IDoK Determination has adopted a set of assumptions that we do not consider to be well-founded or well-evidenced. The approach taken in the Draft IDoK Determination is not compatible with good regulatory practice of transparency and stability. Further, if companies believe that regardless of the steps they take, they will in any case face extreme assumptions made by their economic regulator, it removes the incentive for companies to take ownership of regulatory submissions that secure an appropriate balance. Such disincentives are not in the best interests of our customers, nor indeed in the interests of customers of other companies regulated by Ofwat.

C The failure of the IDoK mechanism would increase the cost of capital to customers

- 1.10 Each year, Thames Water (like the other companies regulated by Ofwat) spends materially more on delivering services to customers than it collects from customers. This additional funding needs to be secured from debt and equity investors. Customers pay for the cost of this capital.⁸

- 1.11 It is very much in the interests of customers, therefore, for a low cost of capital to be secured, and therefore it is important that regulators, including Ofwat, work to ensure that regulatory risk is no higher than it needs to be. We note that Frontier Economics states that:

“The importance of regulatory risk is well accepted by regulators and Government. For example, the Government’s principles for economic regulation, published in April 2011 states, among other things, that the framework for economic regulation should provide a stable and objective environment enabling all those affected to anticipate the context for future decisions and to make long term investment decisions with confidence.

The Competition Commission in the recent Phoenix Natural Gas price determination identified that an increase in regulatory uncertainty could affect i) the cost of debt ..., ii) an increase in the cost of equity and iii) the willingness to invest...

*... The 2013 Water UK investor survey identified that regulatory risk was, by a significant margin, the most important risk factor identified by investors”.*⁹

- 1.12 Frontier Economics also provides evidence on the scale of the impact on the cost of finance. It states that:

⁸ There are a number of different routes whereby this is transferred to customers, for example, the bulk of the cost of capital is transferred relatively mechanically to customers through Ofwat's treatment of embedded debt at price controls.

⁹ TW Exhibit 146, “Regulatory uncertainty and the cost of financing”, Frontier Economics, August 2013.



“We have reviewed the literature of empirical and event studies relating to regulatory risk. These studies show that the impact on the cost of financing from regulatory actions can be significant and that regulatory uncertainty is associated with an increase in the cost of finance.

We have also developed a model that estimates the impact of increased regulatory discretion on the cost of finance. This is based on the published methodologies from rating agencies used to determine the credit rating (and hence cost of debt) of utilities.

... Overall the impact on the cost of capital could lie between 0.5% and 1.0% which represents a significant increase in the cost of financing utility infrastructure projects”.¹⁰

1.13 It is clear from the Frontier Economics report that if a regulator takes a regulatory decision that increases regulatory uncertainty then this will increase the actual cost of capital faced by the company (or companies) affected by the decision. In other words, it will have a material adverse impact on all water and sewerage company customers.

1.14 This was echoed by the Competition Commission (“CC”) in its report regarding the Phoenix Gas price determination:

“In summary, we consider that in circumstances where statements have been made to the effect that the rate of return would be fixed for ten years, and where the regulator has taken no action to signal that it wished to revisit the rate of return (other than in the context of the reference to the CC), the effect of changing that rate of return would have adverse effects on regulatory certainty and the cost of capital and these affects could have significant consequences for investment in Northern Ireland, in the gas industry and other regulated utilities in Northern Ireland and on future greenfield investments in Northern Ireland”.¹¹

D Main conclusions of our response

1.15 In the remainder of our response, we set out why we believe the Draft IDoK Determination does not represent an appropriate balance for Thames Water or our customers. In summary, we do not accept the Draft IDoK Determination because:

- it is not in the long-term interests of our customers (nor indeed in the long-term interests of customers of other companies regulated by Ofwat);
- it is not correct on legal grounds; and

¹⁰ TW Exhibit 146, “Regulatory uncertainty and the cost of financing”, Frontier Economics, August 2013.

¹¹ Phoenix Gas, CC final determination of 28 November 2012, para 8.113.



- it is based on assumptions that are extreme and include factual errors.

1.16 We provide our reasoning, supporting evidence and analysis below.

E Document Structure

1.17 This document is structured as follows:

- **Section 1** is this section.
- **Section 2** sets out our legal position with respect to the Draft IDoK Determination.
- **Section 3** sets out our response to the Thames Tideway Tunnel component of the Draft IDoK Determination.
- **Section 4** sets out our response to the Land Sales component of the Draft IDoK Determination.
- **Section 5** sets out our response to the Bad Debt component of the Draft IDoK Determination.
- **Section 6** sets out our response to the EA Abstraction Charge component of the Draft IDoK Determination.
- **Section 7** sets out our response to the Private Sewers component of the Draft IDoK Determination.
- **Section 8** sets out our response to the Sewer Flooding components of the Draft IDoK Determination.
- **Section 9** sets out our response to the Deephams project component of the Draft IDoK Determination.
- **Section 10** sets out our response to the Serviceability component of the Draft IDoK Determination.
- **Section 11** sets out our conclusions.



Section 2

The Draft IDoK Determination is not correct on legal grounds

A Introduction

- 2.1 By way of introduction, we feel obliged to make certain observations with regard to the process that Ofwat has pursued in relation to Thames Water's IDoK application.
- 2.2 We recognise from Ofwat's response to our application that Ofwat has been concerned by the fact that Thames Water submitted an IDoK application. We hope our responses and explanations have made it clear to Ofwat that we gave this careful consideration in advance of submission and duly reflected the interests of our various stakeholders in making a balanced application. We have also been open with our customers about our need to submit an IDoK application, including this within our May 2013 public consultation on our draft business plan,¹² and by making public an Executive Summary of our application.¹³ Prior to submitting the application on 9 August 2013, we engaged with Ofwat (and other stakeholders), and have had regular meetings with Ofwat since Autumn 2012.
- 2.3 We consider that, however concerned Ofwat has been by our making an IDoK application, this does not justify Ofwat's decision to depart from the principles of best regulatory practice in responding to our submission. Specifically, Ofwat only introduced new items on 13 September 2013, five weeks after Thames Water's application, and did not disclose full particulars of certain items and relevant calculations to us until 21 October 2013,¹⁴ only two days before Ofwat closed its consultation on the Draft IDoK Determination. Ofwat intends to issue a final determination for both Thames Water's IDoK and its own "Counter-IDoK" claims by 9 November 2013, having allowed only six working days for responses to the Draft IDoK Determination.
- 2.4 We accept that Ofwat gave warning that it would only allow one week for responses to its Draft IDoK Determination, however this does not solve the problem that this is an extremely demanding timetable, particularly given the extent and nature of Ofwat's challenge to our submission. Ofwat is departing from its established practice regarding other IDoK applications, where it allowed at least two weeks for responses, and from Ofwat's letter

¹² See TW Exhibit 10: "Our draft five-year plan: 2015-2020", Thames Water, April 2013.

¹³ Published with press release: "Thames Water applies for adjustment to prices for 2010 – 2015 and seeks change to rules to smooth impact on customer bills", Thames Water, 12 August 2013.

¹⁴ See "Ofwat response 12 private sewers", Ofwat, 21 October 2013.



RD13/10,¹⁵ since the Draft IDoK Determination has been issued in week 10 rather than 7 of the IDoK process. This process has not given customers, other stakeholders or, indeed, Thames Water, a full and fair opportunity to analyse and respond to all aspects of Ofwat's very extensive challenge to our IDoK application.

- 2.5 The timetable is particularly disappointing given the extent of our engagement with Ofwat prior to submitting our IDoK application on 9 August 2013.

B Ofwat's notice is a separate IDoK and cannot be aggregated to Thames Water's application

- 2.6 Thames Water's view, based on legal advice, is that Ofwat's notice of 13 September 2013 cannot be treated as a valid Counter-Notice within the meaning of paragraph 15.1(2) Condition B of the licence. This is because Ofwat failed to issue its notice within 14 days of Thames Water's IDoK application (i.e. by 23 August 2013). It is our view that Ofwat's notice of 13 September 2013 is a standalone IDoK under paragraph 15.1(1) of Condition B and therefore, under paragraph 15.2 of the licence, Ofwat's proposed items cannot be aggregated to those in Thames Water's application for the purposes of the materiality threshold in paragraph 14.2(7) of Condition B.

- 2.7 We note that Ofwat did not expressly say in its 13 September 2013 notice whether it was acting under paragraph 15.1(1) or 15.1(2). However, Keith Mason's letter to Martin Baggs on 13 September 2013 implied that Ofwat was acting under paragraph 15.1(1), as it noted that the three RCCs it had identified together hit the materiality threshold: "*When taken together the value of all three items is greater than 10% of the Appointed Business turnover*". Ofwat appears, therefore, to have altered its position between 13 September 2013 and the date of its Draft IDoK Determination, without being clear about that change or the reasons for it.

- 2.8 As Ofwat is aware from the legal submissions we provided to it on 14 October 2013,¹⁶ we consider that Ofwat is stepping out of the prescribed process and its own guidance (RD 13/10), which makes clear that Ofwat would be able to issue a counter-notice only within 14 days of receipt of an IDoK application. By not following the licence and its own guidance, Ofwat is departing from the permitted regulatory framework. It is also contrary to the principles of transparency, proportionality and predictability which form part of best regulatory practice.¹⁷

¹⁵ "RD 13/10 Interim determinations 2010-2015", Ofwat, October 2010.

¹⁶ TW Exhibit 141 "Legal analysis of Ofwat's notice of 13 September as a counter-notice to TWUL's IDoK", Linklaters, October 2013; and TW Exhibit 142 "Thames Water Note on Ofwat RCC Notice", Mark Hoskins QC, Brick Court Chambers, October 2013.

¹⁷ See "Principles for Economic Regulation", Department for Business, Innovation and Skills, April 2011. Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/31623/11-795-principles-for-economic-regulation.pdf.



- 2.9 We submit that Ofwat should correct its approach when it makes its Final IDoK Determination.

C If Ofwat changes the scope of our IDoK it needs to consider the other upward items in our application

- 2.10 Our IDoK application was submitted with the aim of recovering costs that we are due, while at the same time achieving a reasonable balance for customers. To achieve this balance, we included all relevant items that would lead to a downward adjustment to prices, yet only four of the eight items we identified as leading to an upward adjustment.
- 2.11 As we made clear in our discussions with Ofwat prior to submission and in our application, we excluded these relevant costs from our application on the basis that Ofwat would agree that our proposals achieved a reasonable balance. The Draft IDoK Determination concludes that bad debt cannot be included as part of the IDoK because it does not meet the triviality threshold, and concludes that the AMP5 sewer flooding item should not be included in our IDoK, for reasons that are unclear. It also significantly reduces our claim with regard to private sewers and introduces additional downward items (albeit in a separate IDoK). As set out in the remainder of this response, we disagree with Ofwat's views. If Ofwat is minded to proceed as set out in the Draft IDoK Determination, we believe it should consider the other relevant items we identified as set out at paragraph 3.43 of Thames Water's application.
- 2.12 These relevant items relate to Shaft G and Counters Creek (which have been through the Change Protocol process) and additional costs relating to TTT and CRC charges. Indeed, as we said at the time of our application:

*“For the avoidance of doubt, in both cases [unfunded costs relating to Shaft G and Counters Creek], the values of the change protocols meet the relevant triviality threshold and are referenced in this application as they are Relevant Items for the purposes of Condition B of our licence. Notwithstanding this, we have not included these two items in our application, under the assumption that Ofwat accepts that our proposal as it stands represents an appropriate balance between our various stakeholders. If, however, Ofwat is minded to determine that not all of the items in our proposal could be included as part of the IDoK, we contend that both of these items – as well as other TTT costs and CRC charges – could be considered for inclusion and would ask Ofwat to consider the relevant questions in paragraph 14.2 of Part IV of Condition B of the licence in relation to these items”.*¹⁸

¹⁸ Page 40 of Thames Water's IDoK application.



2.13 If Ofwat is minded to follow the approach set out in the Draft IDoK Determination, it should address these specific items, in line with the request made in our application. In particular, Ofwat has made clear its intention to consider costs and benefits “in the round”.¹⁹ We consider that the exclusion of these additional items from Ofwat’s considerations is at odds with this stated intention.

¹⁹ Letter from Regina Finn to Martin Baggs, 16 September 2013.



Section 3

Thames Tideway Tunnel land acquisition

A Introduction

- 3.1 We described the TTT project in Section 5 of our IDoK application. In that application, we set out the extensive regulatory governance and audit processes through which we agreed the relevant land-related costs to be included in the IDoK application, with Ofwat, which Ofwat signed-off as being appropriate and efficient. Indeed, we included seven signatures from senior Ofwat officials confirming this.²⁰ Notwithstanding the extensive regulatory and governance process, and subsequent sign-off of the costs by Ofwat, the Draft IDoK Determination departs from the costs and cost profile that Ofwat has itself agreed.
- 3.2 We have considered Ofwat's Draft IDoK Determination carefully. We do not accept that it is appropriate to make the adjustments that Ofwat has set out, because:
- departing from a position that has been previously agreed and signed-off by Ofwat is not in customers' interests and undermines regulatory certainty; and
 - Ofwat's treatment of the costs of Keltbray and Chambers Wharf is not correct.
- 3.3 We expand on these points below.

B Departing from a position that has been previously agreed and signed-off by Ofwat is not in customers' interests

- 3.4 Each year, Thames Water (like the other companies regulated by Ofwat) spends materially more delivering services to customers than it collects from customers. This additional funding needs to be secured from debt and equity investors. Customers pay for the cost of this capital.²¹
- 3.5 It is very much in the interests of customers, therefore, for a low cost of capital to be secured and, consequently, it is important that regulators, including Ofwat, work to ensure that regulatory risk is no higher than it needs to be.

²⁰ See Appendix J of our IDoK application.

²¹ There are a number of different routes whereby this is transferred to customers. For example, the bulk of the cost of capital is transferred mechanically directly to customers through Ofwat's treatment of embedded debt at price controls.



- 3.6 For the reasons we explain in Section 1, it is clear from the Frontier Economics report²² that, if a regulator takes a regulatory decision that increases regulatory uncertainty, this will increase the actual cost of capital faced by the company (or companies) affected by the decision. Ofwat's departure from what it signed-off following a rigorous and robust review and audit process is not, therefore, in the interests of customers.

C The treatment of the costs of Keltbray and Chambers Wharf in the Draft IDoK Determination is not correct

- 3.7 The Draft IDoK Determination made adjustments to land-related costs we reported as incurred in 2010-11 and 2011-12, specifically relating to the Keltbray and Chambers Wharf sites.
- 3.8 In making these adjustments, we understand Ofwat assumed that land acquisition costs reported in our IDoK application of £ in 2010-11 and £ of costs in 2011-12 related solely to Chambers Wharf and Keltbray respectively. This is not correct because:
- costs for both sites are spread over a number of years; and
 - costs related to other acquisitions (such as advisory costs) fall within these two years.
- 3.9 Further detail on these points and on some more minor differences are provided in Appendix B.

²² TW Exhibit 148, "Regulatory uncertainty and the cost of financing", Frontier Economics, August 2013.



Section 4

Land sales

A Introduction

- 4.1 Like most water and sewerage companies, our licence requires that the proceeds from land sales are shared equally between us and our customers. This is taken into account when setting a price control. However, as we stated in our application, the IDoK provides an opportunity to return to customers the benefits they are due from these sales, earlier than they would normally receive them.
- 4.2 On this basis, our IDoK submission proposed that £37.4m of revenue from land sales should be returned to customers. Ofwat sought to amend this figure in its Draft IDoK Determination by including rental income in addition to land sales income. Having reviewed Ofwat's Draft IDoK determination, we still believe that the correct figure to be returned to customers is the £37.4m we included in our application, for two reasons.
- first, the rental income that Ofwat's Draft IDoK Determination seeks to include falls outside the scope of the RCC on land sales (for the reasons we explain below); and
 - second, Ofwat's approach double counts the rental income, i.e. Ofwat assumes that we earn this revenue twice, which is an incorrect assumption.

B Rental income falls outside the scope of the RCC

- 4.3 Sub-paragraph 2 of the definition of "Relevant Change of Circumstance" ("RCC(2)") in Thames Water's licence allows Ofwat to make an interim determination to account for situations where the proceeds received from a disposal of protected land are different from the proceeds which Ofwat allowed for in respect of such disposal when Ofwat last made a determination.
- 4.4 "Disposal" in relation to land or any interest or right in or over land, is defined as including "*the creation of such an interest or right and a disposal effected by means of the surrender or other termination of any such interest or right*".²³ Ofwat states in its Draft Determination that, in its view, rental income falls within the definition of a "disposal of protected land" in

²³ RCC(2) states that "disposal" has the meaning attributed to it in section 219 of the WIA 1991.



the WIA 1991 and that we have not set out our reasoning as to why rental income does not fall within such definition.²⁴

- 4.5 As explained above, for ongoing rental income to qualify as proceeds from a disposal, it would need to be received as a result of the “creation”, “surrender” or “termination” of a leasehold interest. A plain reading of these terms suggests that only the initial granting or the renewal of a lease constitutes a disposal. These terms do not allow ongoing proceeds from leases granted or renewed before AMP5 to be counted as disposals in AMP5 for the purposes of RCC(2).²⁵
- 4.6 This interpretation is supported by Ofwat’s note “Disposal of Land by Appointed Companies” (written in 1996 and updated in 2002), by re-iterating the wording of the WIA91 at paragraph 2.3 and then providing examples in relation to leases at paragraph 2.4 as “sales” and “grants” of leases. There is no mention of the receipt of rental income from ongoing leases.
- 4.7 In its “Response to TW Exhibit 144 query A”, Ofwat highlights the following wording at Appendix 5 (“Guidance on business plan tables”) of “Setting price controls for 2015-20 – final methodology and expectations for companies’ business plans”: “*Disposals of land include the creation of an interest or right in or over land – for example, the granting of leases and wayleaves.*” In Ofwat’s view, this is consistent with its view that “rental income” falls within the definition of disposals. However we believe that the use of the example of the “granting” of leases as a disposal supports the interpretation that a “disposal” only occurs at the point of the granting or renewal of a lease, rather than during its continual existence.
- 4.8 We would also draw Ofwat’s attention to its final reporting requirements for PR09.²⁶ The Document entitled “C9 definitions v1.1” has two separate rows for “Other Income” (which includes rental income) on the one hand, and “Profit from disposals of land” on the other (see rows 119 and 120 respectively). This is consistent with the document entitled “Part C tables v1.1”, which categorises “other income” (which, the Draft IDoK Determination confirms, includes rental income)²⁷ as “other income and charges”, while “profit from disposals of land” is found in the separate “disposals” table. These documents clearly draw a distinction between rental income, on the one hand, and land disposals, on the other.
- 4.9 For the reasons explained above, we do not believe that ongoing rental income is captured by the relevant definition of disposal for the purposes of RCC(2).

²⁴ In fact we explained to Ofwat on 17 September (see Exhibit 117) that on-going rental income did not count as a creation, surrender or termination of an interest in land, as is required by the WIA 1991 for this to be a land “disposal”.

²⁵ Ofwat’s note “Disposal of Land by Appointed Companies” (written in 1996 and updated in 2002) The precise quote is: “*These wide-ranging definitions effectively bring nearly all land belonging to Appointees within the disposal procedures, and include sales, grants and renewals of leases, and the creation or extinguishment of any rights of use or charges over land – e.g. wayleaves, covenants, mortgages and options.*”

²⁶ <http://www.ofwat.gov.uk/pricereview/pr09phase2/>.

²⁷ See <http://www.ofwat.gov.uk/pricereview/pr09phase2/>, under “Key Documents” section, subsection entitled “final business plan reporting requirements”.



- 4.10 Indeed, it is difficult to see how Ofwat could have considered rental income as relevant for the purposes of RCC(2), given that it made the following statement in its PR09 Determination letter:

“For the purposes of this price review, we have assumed that the value of proceeds of the sale of protected land is zero in each of the five consecutive charging years starting on 1 April 2010. The notified values for the relevant disposal of identified land and non identified land are therefore zero in each of these years.”

- 4.11 Had rental income been relevant, land sales proceeds could not have been zero, and Ofwat could not have made this statement.

C The Draft IDoK Determination double-counts the rental income

- 4.12 Our treatment of land rental income returns the full benefit to customers. At PR09, our operating expenditure (“opex”) allowance for AMP5 was based on rolling forward our net opex in 2008/09 (the “base year”), with adjustments for any forecast cost increments and efficiency.
- 4.13 Under our accounting treatment, the *full amount* of land rental income in the regulated business is reported as negative opex, meaning that the net opex rolled forwards into each year of AMP5 reflects the land rental income in 2008/09 (£1.6m in outturn prices), before adjusting for efficiency. Therefore, under our approach, £8.7m of the £10.7m rental income forecast to be earned in AMP5 (or 81%) is being returned to customers.²⁸
- 4.14 Ofwat has increased the land sales amount by £5.3m, representing 50% of the total land rental forecast to be earned in AMP5 (£10.7m). As set out above, as part of AMP5 £8.7m of the £10.7 is being returned to customers so by adding £5.3m (50% of £10.7m) Ofwat is double-counting. This would take the total amount being returned to customers to £14.0m (£8.7m plus £5.3m), which significantly exceeds the amount of land rental income we are forecast to earn and therefore double-counts this impact.

²⁸ We provide the calculation in TW Exhibit 27: “Calculation of unfunded Land sales proceeds, Thames Water, July 2013. We provided the results of this analysis to Ofwat on 1 October 2013 (in TW Exhibit 133: “Land sales query on rental incomes”, Thames Water, 1 October 2013).



Section 5

Bad debt and debt management costs

A Introduction

- 5.1 Our IDoK application set out the bad debt and debt management costs we have incurred above the level provided for by Ofwat at PR09. We also provided evidence that there has been a significant deterioration in the economic circumstances in our operating area since 2008-09, and that £68m of the additional £162m of bad debt we will have to write off during AMP5 is due to this deterioration. In its Draft IDoK Determination, Ofwat made very substantial adjustments to several components of our bad debt application. The analysis in the Draft IDoK Determination suggested that of the additional £162m bad debt written off during this AMP, only £11.6m related to the deterioration in economic circumstances. This led Ofwat to conclude that our bad debt claim did not exceed the necessary Triviality Threshold, and therefore discarded it from its calculations.
- 5.2 The most substantial adjustments made in the Draft IDoK Determination were on the basis of challenges made by PwC to the work we commissioned from economic consultants CEPA, to quantify the impact on bad debt of the deterioration in economic circumstances. Regrettably, owing to new contractual obligations CEPA has with Ofwat, we were unable to engage CEPA to provide a defence of its econometric modelling, or to defend the assurance process it deployed for the IDoK.
- 5.3 To assist with our response to Ofwat's challenge, therefore, we commissioned an independent report from FTI Consulting LLP ("FTI"), to both review PwC's econometric methodology, and provide a new and independent analysis of the amount of additional bad debt that is attributable to the deterioration in economic circumstances called "The impact of the deterioration in economic circumstances on Thames Water's bad debt" ("FTI's First Report").²⁹ We have already provided FTI's First Report and the associated econometric data files and code files to Ofwat. FTI's analysis addresses the issues Ofwat identified with CEPA's analysis and concludes that material increases in Thames Water's bad debt costs – significantly above the Triviality Threshold – have arisen as a result of the deterioration in economic conditions in our operating area. FTI also found key limitations in PwC's modelling approach.
- 5.4 We also engaged FTI to review Ofwat's decision to disallow the "Atypical" write-off made in 2011-12, which was made as a result of the recession call "Atypical bad debt write offs made by Thames Water in 2010/11" ("FTI's Second Report").³⁰ We understand from Ofwat

²⁹ TW Exhibit 145a "FTI's First Report", FTI, October 2013.

³⁰ TW Exhibit 149 "Atypical bad debt write offs made by Thames Water in 2010/11", FTI, October 2013.



that the rationale for its exclusion was that in its view, in the normal course of business these debts would have been written off prior to 2010-11 and therefore would be outside the period being considered in the IDoK application. As we set out later in this section, this reasoning is specious since, if the atypical write-offs had not occurred in 2010-11, the debt would likely have been written off in 2011-12 or 2012-13 and therefore still fall within the relevant time period being considered in the IDoK application.

5.5 Finally, we re-engaged TDX to provide commentary on PwC's report into our debt prevention and debt management processes. TDX provides responses to the points raised in the Draft IDoK Determination, and supports its original findings that we have a coherent strategy on debt prevention and management.

5.6 The remainder of this section addresses the following key points:

- it is incorrect to exclude the Atypical write-off for 2011-12 as it is a direct result of the deterioration in economic circumstances, as shown by FTI's Second Report;
- PwC's analysis, which found only a weak relationship between bad debt and economic deterioration, has severe limitations and therefore cannot be used to estimate the bad debt claim;
- FTI's First Report confirms a significant impact on bad debt of the deterioration in economic circumstances in our operating area; and
- we have a coherent strategy on debt prevention and management.

5.7 We expand on each of these points below.

B The Atypical write-off is a direct result of the deterioration in economic circumstances

5.8 KPMG's agreed upon procedures report for 2010-11 reports an "Atypical" write-off of bad debt as a result of the deterioration in economic circumstances (which we understand was described by KPMG at the time as a "recessionary write-off"), of which £29.2m related to households. The Draft IDoK Determination suggests that the £29.2m of Atypical debt written off in 2010-11 should not be included in the analysis of the additional write-off as a result of the deterioration in economic circumstances.

5.9 The main reason advanced for its exclusion is that it would, under normal circumstances, have been written off earlier, thereby falling outside the relevant time period considered in the IDoK. However, the Draft IDoK Determination provides no evidence relating to the age profile of this debt. We analysed the age profile of this debt, and can confirm that it is not materially different from the age profile of the other debt that was written off.³¹

5.10 We note, in addition, that the Draft IDoK Determination states that this debt written off was: "*...confirmed as atypical in KPMG's agreed upon procedures report for the June return*

³¹ See TW Exhibit 149: "FTI's Second Report", FTI, October 2013.



2011 as it related to a 'one off exercise carried out during the year to write off old uncontrollable debt'.³² This statement is not correct, as KPMG's report did not identify any uncontrollable debt.

5.11 It is clear, therefore, that this Atypical write-off occurred as a result of the deterioration in economic circumstances. It follows that it should be included in an assessment of the additional debt written-off as a result of the deterioration in economic circumstances in Thames Water's operating area.

5.12 Indeed, FTI's view on its exclusion by Ofwat is as follows:

*"Ofwat's suggestion is, for reasons set out in the remainder of [FTI's] report, simply incorrect ... Ofwat appears to have compounded the error further by assuming that the level of bad debt write-offs in 2013/14 and 2014/15 should be based on the reduced levels of write-offs they derive for the preceding years by excluding those that are atypical. This is also simply incorrect, for the same reason..."*³³

C PwC's econometric analysis is not robust

5.13 We have reviewed the econometric analysis supporting the Draft IDoK Determination, which was carried out by PwC and set out in the "Review of econometric analysis of bad debt, Technical paper" (15 October 2013).³⁴ In order to assess Ofwat's provisional bad debt adjustments, we recreated the analysis conducted by PwC in support of the Draft IDoK Determination. Ofwat shared with us the PwC report and underlying model upon request.

5.14 Our analysis identified a number of issues with PwC's methodology. Correcting for these issues, we find that the deprivation coefficient (and therefore bad debt claim) would be very similar, or in fact slightly higher under the PwC analysis, than under CEPA's analysis.

5.15 We set out further detail below and in Appendix C.

A correct application of PwC's econometric methodology supports our findings

5.16 PwC stated in its report that it "*appl[ie]d the estimator to CEPA's model specification, and ... The coefficients are much smaller using the quantile regression approach.*"³⁵

5.17 This is not correct. PwC applied its estimation approach (a 'quantile regression')³⁶ to a simpler model specification that pooled data across LAs and over time. CEPA's model

³² Draft IDoK Determination, page 30.

³³ TW Exhibit 149: "FTI's Second Report", page 2, FTI, October 2013.

³⁴ Sent to Thames Water on 17 October 2013.

³⁵ PwC, "Review of econometric analysis of bad debt", Technical Paper, 15 October 2013, Section 4

³⁶ This uses the median, rather than the mean, to estimate the relationship.



included 'fixed effects' to take account of the features of the panel data, but PwC did not include these in its models.

- 5.18 Applying PwC's estimator to CEPA's model specification actually increases the deprivation coefficient slightly (from 4.429 under CEPA's model to 4.872 under the quantile regression, as shown in Appendix C); it does not lower it as PwC stated.

PwC's econometric methodology is not reliable

- 5.19 There is a high level of heterogeneity in the bad debt data, which must be accounted for in the modelling using panel data techniques. This is recognised by PwC in its critique of CEPA's model. PwC states, for example, that:

"An important feature of the dataset used by CEPA in their econometric analysis is the high level of heterogeneity in bad debt levels that exists between the various local authorities. In such a context, using a quantile regression approach, which is more robust to the presence of outliers, seems to have merits".³⁷

- 5.20 PwC's model does not correct for the very issue it identified in taking into account the heterogeneous feature of the panel dataset. Its model does not use "fixed effects-type" techniques to correct for heterogeneity and the quantile regression estimation, in itself, has little effect on the size of the coefficient or explanatory power of the model (as shown in Table C of Appendix C).^{38,39}
- 5.21 CEPA's model, which formed the basis of the bad debt component of our IDoK application, addressed this heterogeneity by using "fixed effects" techniques.⁴⁰ The need to include these effects is demonstrated by the significant improvement in the explanatory power of the models (as shown in Table C of Appendix C).
- 5.22 PwC's models cannot therefore be relied upon to determine whether there is a relationship between the significant deterioration in economic circumstances and increase in bad debt in our area, nor to quantify this relationship.
- 5.23 In the next section, we summarise the work we commissioned from FTI to provide a correct and independent analysis, which deals with the issues of heterogeneity in the data and potential for omitted variable bias. We have already shared FTI's report and underlying models with Ofwat.⁴¹

³⁷ "Review of econometric analysis of bad debt", Technical Paper, PwC, 15 October 2013, Section 4.

³⁸ This is represented by the R-squared parameters.

³⁹ Though quantile regression does mitigate the effect of outliers, this is not the same as correcting for heterogeneity in the data.

⁴⁰ In panel data models, heterogeneity is usually tackled by using fixed effects techniques. There are two types of fixed effects: (i) panel-specific, i.e. factors that affect each LA differently but do not vary over time; and (ii) time-specific, i.e. factors that affect each LA in the same way but are specific to each time period (each year).

⁴¹ See TW Exhibit 145a: "FTI's First Report"; and TW Exhibit 146: "FTI model files".



D An objective economic analysis confirms a significant impact on bad debt as a result in the deterioration of economic circumstances

5.24 FTI reviewed the analysis underpinning bad debt data used in our IDoK application, and undertook the analysis independently so as to verify the extent to which the increases in our bad debt costs have arisen as a result of the deterioration in economic conditions in our operating area.

5.25 In summary, FTI's econometric analysis:

- used the largest dataset available from Thames Water on debt written-off;
- utilised a measure of deprivation that is representative of the population at risk of not paying their water bills;
- utilised a consistent measure of deprivation that does not suffer from measurement and forecasting errors;
- used a weighted regression to minimize the impact of outliers;
- used a panel data estimator to exploit as much information in the data as possible;
- accounted for time and LA fixed effects to address heterogeneity; and
- corrected for autocorrelation caused by omitting the “churn” variable.

5.26 FTI concludes that £58.4m of AMP5 household bad debt is attributable to the deterioration in economic circumstances. We provided FTI's full report to Ofwat on 18 October 2013.⁴²

E Thames Water's bad debt management is efficient

5.27 To support our IDoK application, and in line with the Notified Item for bad debt, we engaged TDX Group (“TDX”) to assess our debt collection and debt management processes. TDX found that we had a “*coherent strategy on debt prevention and management*” which complied with each of the 56 specific expectations set out by Ofwat in its guidelines for dealing with household customers in debt.⁴³ In light of Ofwat's Draft IDoK Determination, we re-engaged TDX to evaluate the main points raised in the PwC review into the efficiency of our debt management practices, which Ofwat has shared with us.

5.28 Among a variety of measures, PwC identified three particular areas in which it believed Thames Water has an opportunity to improve relative to our water sector peers:

- “decisive recovery action”, whereby companies trace and pursue outstanding payments;
- consequences of non-payment for customers; and

⁴² TW Exhibit 145a: “FTI's First Report”.

⁴³ TW Exhibit 58: “Consultancy Support for Thames Water to assist with IDoK Bad Debt Expense submission”, TDX, June 2013.



- debt write-off policy.

- 5.29 TDX's additional comments are set out in full in its review of the PwC report;⁴⁴ we summarise its response to PwC's three main points in turn below.
- 5.30 We also set out below our response to a challenge that we received from CC Water on the efficiency of our debt management processes.

Decisive recovery action

- 5.31 The Draft IDoK Determination states that there is no evidence in our application or the TDX report that we carry out the same level of active tracing as some of our peers. This is not correct. On page 66 of TDX's report, TDX summarises the work it carried out in assessing our extensive Debt Collection Agency ("DCA") activities, which is tailored to understand the circumstances of individual debtors. TDX also describes in its report our strategy for utilising the services of an external credit bureau's specialist trace product to try and establish a forwarding address.
- 5.32 TDX in its review of the PwC report concludes that our approach to the collection of absconded and gone-away debt as part of our research is "*robust and in line with peers*".⁴⁵ We do not agree, therefore, that our tracing activities fall below the level of the rest of the industry.

Consequences of non-payment for customers

- 5.33 TDX reiterates that our current processes do ensure that debtors are made well aware of the consequences of non-payment. In particular, TDX cites the example of "*letters of escalating tone with the statement of intent clearly outlining the course of actions [Thames Water] will follow in order to collect the debt*".⁴⁶ TDX concludes that "*the threat of negative impact on a debtors position is clearly articulated through the current communications and the planned implementation of credit bureaux reporting will only strengthen this*".⁴⁷

Write-off policy

- 5.34 As part of its original assessment we asked TDX to review our write-off policy. TDX found that our write-off policy was "*in line with the majority of industry peers*", which is also consistent with the findings of the KPMG benchmarking study undertaken in May 2012.⁴⁸

⁴⁴ See TW Exhibit 149: "TDX additional commentary", TDX, October 2013.

⁴⁵ TW Exhibit 149: "TDX additional commentary", TDX, October 2013.

⁴⁶ Examples include the threat of legal actions (and the associated threat this could have on credit worthiness, for example), and the referral of accounts to DCAs.

⁴⁷ TW Exhibit 149: "TDX additional commentary", TDX, October 2013.

⁴⁸ TW Exhibit 102: "KPMG bad debt report", KPMG, May 2012.



Additional CC Water challenge

- 5.35 In the course of engagement with CC Water, we have also been challenged to show that we have taken appropriate steps to manage our debt and, in particular, to explain why the Cash Action Plan was not implemented sooner.
- 5.36 We explained to CCWater that we have been trialling and implementing improvements to our debt collection processes since the beginning of the AMP. We initially focussed our efforts on improvements that could be implemented quickly, and would have an immediate effect on our debt collection. As the bad debt situation worsened, we undertook a number of further initiatives to tackle the problem, including the Cash Action Plan.
- 5.37 As confirmed by TDX⁴⁹, by the time we introduced the Cash Action Plan we had already introduced a range of substantial improvements to our debt processes, including:
- sustained outbound dialling;
 - the use of Experian auto-trace data to append forwarding addresses;
 - an additional tier to our debt collection agency strategy; and
 - automated outbound dialling to provide early, cost-effective intervention for slow payers.
- 5.38 The Cash Action Plan is one important part of our ongoing continuous improvement programme in this area.

⁴⁹ See TW Exhibit 58.



Section 6

Increases in the Environmental Improvement Unit Charge component of the EA's abstraction charges

A Introduction

- 6.1 We welcome Ofwat's recognition that our actual and forecast expenditure that was unfunded at PR09 was reasonably incurred, and suitable for recovery through the IDoK. We agree with Ofwat's view that we should be recovering more than was in our application both due to the efficiency adjustment Ofwat includes, but also because of a further invoice that we have received from the EA since we submitted our application. This additional charge will also be levied in 2014-15.
- 6.2 We do not agree with Ofwat's assessment of our company cross-check procedures and provide a response to this point below.

B We agree with Ofwat's efficiency adjustment

- 6.3 We agree with Ofwat's view that the FD09 allowance should be expressed post-efficiency. We have reviewed Ofwat's calculation and the accompanying explanation, which Ofwat provided on 17 October 2013, and confirm that this appears correct.

C Additional invoices from the EA need be taken into account

- 6.4 Each year when we have received the invoices from EA for abstraction charges, we cross-check the invoices against our calculations of the EA charges. This process highlighted a potential undercharge by the EA in 2013-14 charge of £1.7m, which, as Ofwat is aware, we raised with the EA at the time (Section 6D provides further details).
- 6.5 Prior to the Draft IDoK Determination, we informed Ofwat that we had received an informal notice from the EA confirming that it had underestimated Thames Water's EIUC charge for



2013-14 by approximately £1.7m and that the EA planned to send a further invoice, which we would share when received.⁵⁰

- 6.6 We received an invoice from EA on 17 October 2013, for a further £1.691m (see TW Exhibit 147)⁵¹, which needs to be included in the EIUC claim for 2013-14 and 2014-15.⁵²

D We apply robust cross-check procedures to the Environment Agency's abstraction charges

- 6.7 In the Draft IDoK Determination, Ofwat expressed a concern about "*the robustness of the [Thames Water] cross-check procedures*".⁵³ Ofwat provided further explanation on 17 October 2013 that this concern related to Ofwat's assessment that we carry out sense-checks on the expected versus actual EIUC charge but do not follow up with the EA on any issues identified by the sense-checks. This was based on the potential discrepancy we found in the 2013-14 EIUC charge, discussed above.

- 6.8 Ofwat's assessment is incorrect. Each year when we receive the invoices from EA we calculate the EA charges (including both the EIUC and SUC components separately) using the prescribed formulae and parameters from EA that are available on the EA website.⁵⁴ It is this process that highlighted a potential omission in the EA invoice in 2013/14 because the EA had not applied the increase to the EIUC. This was raised with the EA:

- at a Water UK Water Resources Task and Finish Group meeting on 3 June 2013, attended by the EA and Ofwat. The meeting note is provided in TW Exhibit 152, which we also shared with Ofwat on 15 October 2013; and
- by telephone, between our Head of Environment Regulation and the Environment Agency South East's Environment and Performance Manager, who then passed this to colleagues in the Water Resources team at the Environment Agency's national office. An email confirming this is provided in TW Exhibit 153.

⁵⁰ TW Exhibit 17: "Calculation of unfunded EIUC costs", Thames Water, July 2013.

⁵¹ The exact amount in the invoice is £1,691,358.52.

⁵² From correspondence with the EA, we are expecting further invoices, which would increase our cost further. However, we are only including here the invoices we have received.

⁵³ Ofwat, "Draft determination of Thames Water's IDoK application", October 2013, page 43.

⁵⁴ See "Abstraction charges – Charges for 2013/14" Environment Agency. 5 September 2013. Available at: <http://www.environment-agency.gov.uk/business/regulation/38809.aspx>.



Section 7

Transfer of private sewers, lateral drains and pumping stations

A Introduction

- 7.1 The Draft IDoK Determination makes a number of substantial adjustments to the costs we have incurred relating to the transfer of private sewers, lateral drains and pumping stations. We understand the rationale for some of the adjustments, but other adjustments appear to us to be arbitrary, and not supported by the evidence presented. The impact of the adjustments reduces the operational expenditure (“opex”) and capital expenditure (“capex”) components of our claim by £12.7m and £5.5m respectively.
- 7.2 For the reasons we set out in our IDoK application, our claim is inherently conservative, and understates the costs that have actually been incurred. We do not accept that the adjustments Ofwat has made are warranted. Specifically:
- Ofwat’s top down benchmarking underestimates Thames Water’s efficiency;
 - the efficiency adjustments applied by the Draft IDoK Determination are unjustified;
 - the Draft IDoK Determination misinterprets the £63-£67 and the resultant calculations are flawed; and
 - the Draft IDoK Determination excludes efficient costs that were directly related to the transfer of private sewers.
- 7.3 We expand on each of these points separately below.

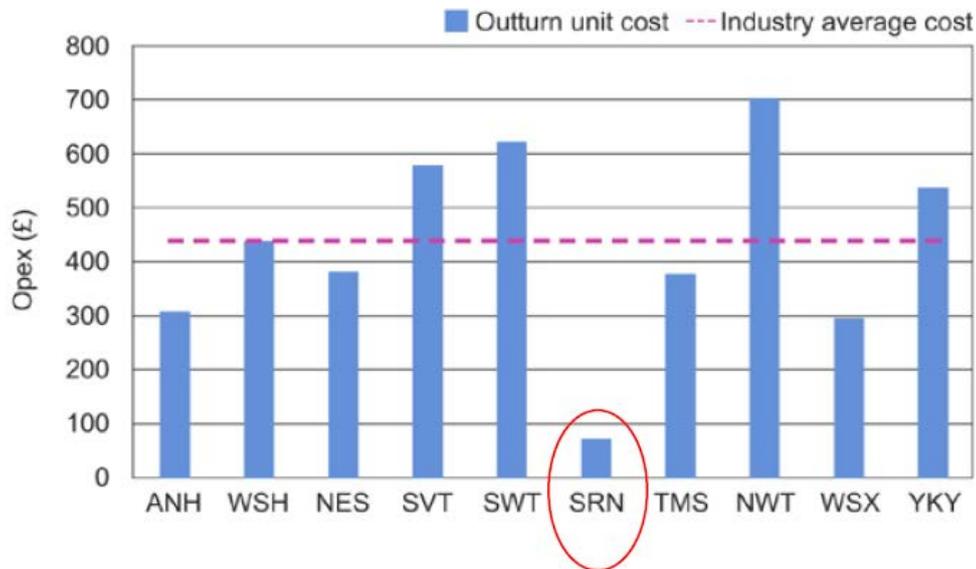
B Ofwat’s top down benchmarking underestimates Thames Water’s efficiency

- 7.4 Ofwat undertakes its top down benchmarking using data on a range of companies, as follows:



Figure 7.1: Benchmarking data from the Draft IDoK Determination

Figure 6 Total outturn operating expenditure per blockage



Source: Draft IDoK Determination, page 56

7.5 It can be seen from the figure that the value used for Southern Water (SRN) is materially lower than that for the other companies. We regard this value as implausible, given our engineering knowledge of what the activity entails. This level of cost could only be achieved for the very simplest jobs, and is unachievable for blockages jobs on average. The inclusion of this datapoint leads Ofwat to understate Thames Water's comparative efficiency.

C The efficiency adjustments in the Draft IDoK Determination are unjustified

Ofwat's downward adjustment to opex relating to blockages is inconsistent with Ofwat's own top down benchmarking result

7.6 When assessing our operating costs relating to the transfer of private sewers, Ofwat calculated that our unit costs for blockage clearances was 13% below the weighted industry average (see Figure 6 of the Draft IDoK Determination). Indeed the Draft IDoK Determination states explicitly that we were:



*“operating at a reasonable level of efficiency in 2012-13 and the application of a ‘catch-up’ efficiency adjustment is unwarranted for operating expenditure relative to its industry peers”.*⁵⁵

7.7 Ofwat also concluded that the level of activity upon which the application was based was

*“broadly in line with industry norms given the extent of the asset base transferred on 1 October 2011”.*⁵⁶

7.8 Notwithstanding that Ofwat calculated our operations were efficient, and below the average industry costs, the Draft IDoK Determination disallowed £7.23m, on the basis that it was *“difficult to accept [our] claim that [we are] delivering “good value” to customers”*,⁵⁷ that the expenditure was *“not substantiated”* and it *“is not possible for [Ofwat] to be confident that the expenditure claimed is properly or wholly attributable to the transfer”*.⁵⁸ Ofwat's approach is neither internally consistent nor are its findings consistent with the results of our independent audit, for the reasons stated below:

- Ofwat's own benchmarking shows that we are efficient and providing good value to customers;
- we provided further information in response to Ofwat's queries on the splits between different types of activities and costs that we have incurred directly related to the transfer and why these were necessarily incurred as a result of the transfer;⁵⁹ and
- the costs included in our application were audited by an external auditor, Halcrow Management Services Limited. Indeed, in its audit of our application, Halcrow Management Services Limited found that we had *“used reasonable care, diligence and control in collecting data, with assurance processes that are considered appropriate”* and concluded that it had *“no material concerns with the accuracy and reliability of cost data which has been drawn from various source”*.⁶⁰

7.9 Ofwat's benchmarking analysis and the assurance process we have followed demonstrate that our costs were reasonably and efficiently incurred. Ofwat, therefore, has no reason to exclude these costs from an IDoK.⁶¹

⁵⁵ Draft IDoK Determination, page 56.

⁵⁶ Draft IDoK Determination, page 47.

⁵⁷ Draft IDoK Determination, page 55.

⁵⁸ Draft IDoK Determination, pages 55-56.

⁵⁹ See, for example, TW Exhibit 126.

⁶⁰ TW Exhibit 22: Halcrow Audit of S105a IDoK Cost Data”, Halcrow, 2013.

⁶¹ We note that Ofwat's assessment relies on data from Southern Water which appears implausible – a unit cost per blockage of £75 compared to an industry average of almost £450. If this data point was excluded, then the industry average would be higher and would show that Thames Water is even more efficient.



Ofwat's downward adjustment to capex relating to collapses does not take proper account of the inherent differences between companies

- 7.10 Ofwat takes the overall capex spend for each company and divides this by the number of collapses for each company to derive unit capex costs for each company. Ofwat then compares the unit costs it obtained for Thames Water with the weighted average unit cost and uses this to make a downward adjustment of £4.76m to our collapses costs and associated management fees.
- 7.11 For capex on transferred sewers, the range of activities carried out in practice results in a wide range of associated costs, e.g. from less expensive jobs such as manhole cover repairs to more expensive dig downs and network enhancements. This means it is probable that at least part of the differences in simple unit costs between companies will be driven by the amount of activity and the types of activity (for example, driven by the different ages and conditions of the network across England and Wales), not inefficiency. A robust comparison would need to take these factors into account.
- 7.12 Ofwat's analysis is based on comparing Thames Water to an industry weighted average. Our analysis suggests that the industry average is very sensitive to the use of simple or weighted averages. Using a simple average, which is consistent with Ofwat precedent on setting efficiency challenges, the apparent efficiency adjustment for Thames Water would be 25%, compared to Ofwat's estimate of 33% when using a weighted average.⁶²
- 7.13 Ofwat should not place undue reliance on the capex unit cost analysis as part of its assessment and should take account of the results using a simple average. Ofwat should also consider other relevant factors, including the efficiency rate Ofwat applied at PR09 to Thames Water's wastewater capex (which was significantly below the capex challenge in the Draft IDoK determination) and that we appear efficient under opex activities which are delivered by the same teams and contractors.

Ofwat's on-going efficiency adjustments are not supported by the evidence

- 7.14 The Draft IDoK Determination applied further on-going efficiency adjustments of 0.25% per year to our opex relating to blockages and 2.0% per year to our capex relating to collapses in 2013/14 and 2014/15. As we stated in our IDoK application,⁶³ our assumption that activity levels (and costs) continue at 2012-13 levels for the remainder of AMP5 is inherently conservative because it assumes that there is no increase in customer awareness of the transfer.⁶⁴

⁶² Draft IDoK Determination, page 57.

⁶³ Page 102 of our IDoK application.

⁶⁴ This is consistent with the published August submission private sewers data, which shows several companies forecasting an increase in operational activity over the rest of AMP5.



7.15 Ofwat did not accept this, stating that, in its view:

*“any increase in activity over time is likely to be offset by reductions in work once the backlog of maintenance work and operational problems that had built up in the period preceding the transfer is addressed”.*⁶⁵

7.16 Ofwat provided no evidence to support this view. Indeed, we have found no evidence of a backlog of work from before the transfer.

7.17 As our forecasts for operational activity to the end of AMP5 are conservative, the on-going efficiency assumptions do not represent a reasonable balance of risk.

D The Draft IDoK Determination misinterprets the £63-£67 and the resultant calculations are flawed

7.18 Following the publication of the Draft IDoK Determination, we sought additional information regarding the calculation used to determine that £3.5m of direct operating expenditure for blockages should be removed from our claim.⁶⁶

7.19 Our unit rate for blockage clearances is influenced by high-value jobs such as tankering (as recognised by Ofwat in its Draft IDoK Determination), but also, as we made clear in TW Exhibit 126, by follow-on activities which fall under the same code,⁶⁷ thereby increasing the cost of activities without increasing the number of reported activities. By assuming a £65 per blockage figure – which Ofwat accepts is our estimate for the most straightforward of jobs⁶⁸ – Ofwat does not take proper account of blockages where such follow-on activities lead to additional costs. As a consequence, Ofwat's calculation uses an unrealistically low unit rate, which leads it to conclude that our blockage-related costs should be lower. Ofwat extends this calculation to other opex costs in our application, which is arbitrary and inconsistent with its own top-down benchmarking across the industry.

E The Draft IDoK Determination excludes efficient costs directly associated with the transfer

7.20 In its Draft IDoK Determination, Ofwat excluded £1.53m relating to the upgrade of our wastewater network information systems, on the grounds that:

“It is not clear that these costs are wholly attributable to the transfer and whether instead some would have been incurred even if the transfer had not taken place”.

⁶⁵ Draft IDoK Determination, page 50.

⁶⁶ See: TW Exhibit 144.

⁶⁷ Such as CCTV investigations, root cutting and rodent baiting.

⁶⁸ Draft IDoK Determination, page 55.



7.21 As we explained in our IDoK application,⁶⁹ uncertainty around the exact timing of the transfer of private sewers required us to postpone the implementation of our Work, Asset Management and Information ("WAMI") system. As a consequence, our existing systems required upgrading to accommodate the transferred assets. Although it is true that these systems also supported the legacy wastewater network, these specific changes were made as a direct consequence of the transfer and the costs would not have been incurred otherwise. The costs are therefore directly related to the transfer. In our view, therefore these costs should be included in the IDoK.

⁶⁹ Page 99 of our IDoK application.



Section 8

Sewer flooding

A Introduction

- 8.1 Our IDoK application proposed to return to customers expenditure that is no longer required for our internal hydraulic flooding (DG5) programme. Under normal circumstances, an adjustment would be made at the end of the current price control period to reflect this variance in expenditure. The IDoK mechanism allows us to return these savings to customers at an earlier opportunity than the next full price review.
- 8.2 At any given time there are a number of properties in our operating area that have suffered internal sewer flooding. These properties are recorded on our DG5 flooding register.⁷⁰ At PR09 Ofwat funded a capital investment programme that would reduce the net number of properties on this register by 497 over AMP5.⁷¹ We forecast that we will deliver this regulatory output for £100.7m less capex than assumed by Ofwat at PR09, and therefore included this as a downward item for this amount in our IDoK application.
- 8.3 In the Draft IDoK Determination, as we understand it, Ofwat has rejected this item in our IDoK application and has instead included it in Ofwat's own IDoK. We note that without this item, there was no possibility of Ofwat's IDoK passing the materiality test.
- 8.4 Ofwat explains that it took this (unprecedented) step because:

“Overall, we consider the reduction in the number of properties on the Thames Water register was driven by changes in the company's business processes and not the regulatory reporting requirements for the sector.”⁷²

⁷⁰ The DG5 “1 in 10” and “2 in 10” internal flooding register contains properties “which have flooded and are deemed to be at risk of flooding” more than once in 10 years and more than twice in 10 years respectively. This definition is taken from the *June return reporting requirements and definitions manual 2010, Chapter 3, Key Outputs, Sewerage service. Covering DG5 Annual internal flooding summary. DG5 Properties on the internal flooding register, Issue 1.1 – March 2010*, page 11. The 2009 reporting requirements which were in force at the time of Thames Water's PR09 submission define the register differently as an “at risk” register with reference solely to the total number of properties at risk of flooding in the relevant time periods. (*June return reporting requirements and definitions manual 2009, Chapter 3, Key Outputs, Sewerage service. Covering DG5 Annual internal flooding summary. DG5 Properties on the internal “At risk” register, Issue 1.1 – March 2009*, pages 11 and 12).

⁷¹ TW Exhibit 50: “Final determination, Setting price limits for 2010-15, Supplementary report for Thames Water Utilities Limited”, ‘Known Programme’ section, page 118, Ofwat, 2009.

⁷² Draft IDoK Determination, page 66.



- 8.5 As we explain below, we do not accept that the transfer of this item from our IDoK to Ofwat's IDoK is valid, nor do we accept the alternative calculations set out in the Draft IDoK Determination.
- 8.6 We do not accept the transfer of this item from our IDoK to Ofwat's IDoK because:
- the sewer flooding item in our IDoK is valid and Ofwat has incorrectly rejected our RCC; and
 - the rationale for including the Sewer Flooding item in Ofwat's IDoK is not valid.
- 8.7 The Draft IDoK Determination adjusts the calculation to increase the value of this item as a result of:
- changing the number of properties that will be removed from the DG5 register over AMP5;
 - using different unit rate assumptions; and
 - making an opex adjustment.
- 8.8 We do not accept that the calculations relating to this item in the Draft IDoK Determination are correct because:
- the Draft IDoK Determination assumes an incorrect number of properties will be removed from the DG5 register over AMP5;
 - the Draft IDoK Determination assumed a unit rate in its financial adjustment calculation that is not consistent with Ofwat's own guidance; and
 - the Draft IDoK Determination uses the wrong number of properties to calculate the downward adjustment to opex.

We provide more detail on each of these below.

B The sewer flooding item in our IDoK is valid and Ofwat has incorrectly rejected our RCC

- 8.9 According to Thames Water's licence, to qualify as an RCC of this type, all of the following criteria need to be fulfilled:

"... an amount has been allowed for on account of steps taken or to be taken for the purpose of securing compliance with a legal requirement or achieving a service standard adopted or to be adopted by the Appointee..." **[Limb (i)]**

"AND...the Appointee has not taken ... any or all of those steps" **[Limb (ii)]**

...and as a result, the amount allowed for as aforesaid is substantially greater than the sum of ... the costs incurred by the Appointee for the relevant purpose; **[Limb (iii)]**



and ...that purpose has not been otherwise achieved...".⁷³ [Limb (iv)]

- 8.10 In our IDoK application we accepted that we had been allowed funding to engage in a capex programme to reduce the number of properties on the register (i.e. Limb (i) above); that we had not taken all the envisaged steps (i.e. Limb (ii) above); as a result the amount we had been allowed was substantially greater than its costs (i.e. Limb (iii) above); and the purpose of investing to reduce the number of properties on the register had not otherwise been achieved (i.e. Limb (iv) above).
- 8.11 It is clear, therefore, that all the relevant criteria for inclusion as an RCC in our IDoK were met. The Draft IDoK Determination was wrong, therefore, to exclude this item from our IDoK.

The arguments in the Draft IDoK Determination for transferring this item are not valid

- 8.12 The explanation we gave in our IDoK submission as to why the sewer flooding investment has been significantly lower than allowed for at PR09 was that additions to our sewer flooding register had been lower than expected at the time of our PR09 business plan submission. We explained that the main reason for this was the change to the DG5 reporting requirements in March 2010.⁷⁴ Ofwat disagreed with this explanation and said it believes that the reduction in the number of properties on the register is driven by “changes in the company’s business processes”. The fact remains that the reason why we made an IDoK submission on this point was due to the lower than expected additions of properties to our flooding register, with which Ofwat agrees. In any case, the relevant changes to Thames Water’s business processes are themselves driven in main part by the changes in the reporting requirements in 2010 which post-dated Thames Water’s PR09 business plan submission. There is no basis, therefore, for Ofwat to reject Thames Water’s application in this regard.
- 8.13 Ofwat has reached the conclusion that TWUL’s changes to its register and practices “*bring it into line with Ofwat and industry reporting at PR09*”.⁷⁵ There is no discussion of the content of the relevant reporting requirements or how they subsequently changed between 2009 and 2010. Ofwat’s conclusion in this regard is inconsistent with that made by SMC in its recent report for Ofwat which concluded that there were “*significant changes*” made to the reporting requirements in March 2010.⁷⁶ Those changes had significant implications as to whether certain properties should or should not be added to the relevant sewer flooding register during AMP5 (whether as part of the Enhancement or Growth Programmes).

⁷³ Licence Condition B Part IV, Clause 13.1, definition of a “relevant Change of Circumstance” (3).

⁷⁴ See page 120 of our IDoK application.

⁷⁵ Draft IDoK Determination, pages 66 and 68.

⁷⁶ Report: Advice on data reporting: sewer flooding information, Strategic Management Consultants, December 2012, paragraph 5.1 (provided to Thames Water by Ofwat on 3 May 2013 in connection with Ofwat’s on-going investigation in relation to hydraulic flooding aspects of Thames Water’s 2010 June Return).



- 8.14 Any suggestion that Thames Water's submissions at PR09 were inconsistent with reporting requirements would necessarily require consideration of: (1) the reporting requirements in force at the time of the submission of Thames Water's business plan in 2009; and (2) the question of why certain properties on the register should not have been on the register on the basis of the then current guidance. The Draft IDoK Determination does not consider these matters. Instead, Ofwat considers how the number of properties added to Thames Water's register decreased compared with the registers maintained by other companies over the same period.
- 8.15 Our experience of fewer additions in AMP5 than forecast at the 2009 Price Review is shared by six other water and sewerage companies, with Southern Water forecasting a 69% reduction in additions comparison to the 2009 forecast, a reduction which exceeds the 61% reduction forecast made by Thames Water.⁷⁷

Ofwat should not redefine the outputs specified in FD09

- 8.16 In its Draft IDoK Determination Ofwat recognises that, while relevant adjustments would normally be made at the following price review, given Thames Water's application, it has now considered whether the target set at PR09 should be adjusted to reflect changes since the last price control.⁷⁸ However, RCC3 (which Ofwat appears to be invoking) is designed to address failure to meet targets and to return the difference between what has been achieved and what was allowed in PR09 to customers. RCC3 is not designed to enable Ofwat to change the outputs/targets set in PR09.

C The Draft IDoK Determination assumes an incorrect number of properties will be removed from the DG5 register over AMP5

- 8.17 Ofwat's assessment of the number of properties which can efficiently be removed by the company in 2014-15 is 378 properties. This is materially lower than our forecast of 554 properties removed from the register in 2014-15. This leads Ofwat to the conclusion that we will spend less on our AMP5 Programme than we stated in our IDoK. Ofwat's assessment would lead to a reduction to the company's net reduction target by 176 properties, from 497 to 321 properties and a 'register end' position increase from 1,107 properties to 1,283 properties.⁷⁹
- 8.18 Our programme forecast is based on a number of known schemes, which our delivery partners are contractually bound to deliver, that is materially in excess of Ofwat's assumptions. Of the 554 properties in the 2014-15 programme, 538 have already been 'let' to our delivery partners. This means that we only need to award contract to deliver

⁷⁷ Draft Determination of Thames Water's IDoK application, Ofwat, October 2013, page 64.

⁷⁸ Draft IDoK Determination, page 69.

⁷⁹ Draft IDoK Determination, page 69.



schemes on a further 16 properties over the remainder of the AMP in order to hit our forecasts. Indeed, we have plans to let the remainder of the programme, subject to approval by our Investment Committee on 14 November 2013.

- 8.19 Given that we already have delivery contracts in place for 538 properties, Ofwat's assumption that we will deliver less than this is incorrect (and, indeed, somewhat implausible).
- 8.20 Furthermore, scaling down our 2014-15 flooding programme at this stage in the way envisaged by Ofwat would lead to customer detriment in two ways. First, fewer properties would be alleviated from flooding by cost beneficial schemes, leading to on-going service failures to more customers than expected. Second, we have optimised our AMP5 programme and contracts based upon clearly defined outputs, and curtailing the size of the programme at this stage, which is already let, would lead to these outputs being delivered less efficiently overall.
- 8.21 Our conclusion, therefore, is that the Draft IDoK Determination assumes an incorrect number of properties will be removed from the DG5 register over AMP5.

D The unit rate used in the Draft IDoK Determination is not consistent with Ofwat's own guidance

- 8.22 In our application, we set out our methodology for calculating the amount to be returned to customers through the IDoK. This involved separating the number of outputs into those associated with known flooding (the "Enhancement Programme") and newly identified flooding (the "Growth Programme"). Ofwat has increased the amount it deems appropriate to return to customers on the basis that it does not recognise separate unit rate assumptions for the Enhancement Programme and the Growth Programme.
- 8.23 This position is inconsistent with the statement in the Draft IDoK Determination that "*Generally, properties that have been on the register for longer are likely to cost more to address, because companies tend to resolve simpler, low cost problems first*".⁸⁰ In addition, throughout the Supplementary Report to the 2009 Final Determination, commentary relating to the flooding programme clearly differentiates between the Enhancement Programme and the Growth (supply demand) Programme. For example, on page 116 of the Supplementary Report Ofwat states:

"The total cost of the sewer flooding programme assumed in our final determination is £346.44m before any challenges for efficiency. Of this £204.46m is dealt with as service enhancement, £111.46m as supply demand and £30.53m as capital maintenance expenditure".⁸¹

⁸⁰ Page 72, Section 10.2.2. of the Draft IDoK Determination.

⁸¹ TW Exhibit 50: "Final determination, Setting price limits for 2010-15, Supplementary report for Thames Water Utilities Limited", page 116, Ofwat, 2009.



- 8.24 The single unit rate used for the Draft IDoK Determination is, therefore, also inconsistent with the basis on which prices were set at PR09. We believe that in its calculations Ofwat should recognise that, as it has done in Draft IDoK Determination, solutions for the two programmes are likely to cost different amounts, and therefore it is appropriate to account for this in the IDoK.

E The opex deduction is based on the wrong number of properties

The Draft IDoK Determination deducts of £1.5m opex for the sewer flooding programme in its Draft IDoK Determination (as described in "Ofwat response 6", 18 October 2013). This assessment is based on the wrong number of properties being removed from the DG5 register. The avoided opex should be the £1.2m related to expenditure on 728 properties.



Section 9

The “counter-item” relating to the Deephams scheme

A Introduction

9.1 As explained in Section 2 above, on 13 September 2013 Ofwat commenced its own separate IDoK process under Paragraph 15.1(1) of Condition 8 of Thames Water’s licence. One of the three items in that IDoK relates to “*Delays in delivering the Deephams sewage treatment works scheme*”.⁸² To qualify for inclusion in Ofwat’s IDoK, an item needs to meet the usual criteria for such inclusion, including meeting the “triviality threshold” that requires the NPV of the item to exceed 2% of service turnover. We discuss the application of the triviality threshold to the Deephams scheme further below.

Background

9.2 Deephams Sewerage Treatment Works is Thames Water’s fourth largest sewage treatment works serving a population equivalent of approximately 0.9m. The catchment includes much of north-east London and extends west as far as Barnet, north as far as Cheshunt and east as far as Chingford. The effluent is returned to the Pymmes Brook, a tributary (via the Salmons Brook) of the River Lee Navigation. The receiving watercourses offer very little dilution to the effluent. In March 2010, the EA imposed a new and materially more stringent discharge consent that will apply from March 2017. The EA has also stipulated that effluent quality must not deteriorate during any construction that takes place, which adds complexity to the project. Alongside this tighter consent, significant population growth is predicted within the catchment area, and the local population has expressed a strong desire for the levels of odour associated with the existing works to be reduced.⁸³

9.3 The Deephams upgrade scheme is designed to ensure that the criteria above are met at the relevant times. It spans AMP5 and AMP6, with a total funding allowance agreed at PR09 of for AMP5 of £86.8m.⁸⁴ As such, it constitutes just under 2% of our total capital programme for the current AMP period.

⁸² Interim Determination Notice [Paragraph 15.1 Of Condition 8], Ofwat, 13 September 2013

⁸³ For example, the letter from Councillor Simon (Enfield Council) to Sonia Brown of 21 October 2013.

⁸⁴ In 07-08 prices post-efficiency.



Issues with the Draft IDoK Determination

- 9.4 As we set out below, we believe there is no basis to include this item in an IDoK because:
- the Deephams project is on schedule to meet the relevant consent requirements on time and, subsequently, to deliver the additional non-statutory customer benefit of reduced odour from the site;
 - the actual spend on the Deephams project is sufficiently close to that allowed at PR09 such that it must fail the IDoK triviality test; and
 - if Ofwat's proposed spend profile were to be implemented, this would lead to both customer and environment detriment.

B The Deephams project is on schedule to meet the relevant consent requirements on time

- 9.5 Early in 2010, it became apparent that the original project plan for Deephams (which involved extensive construction of new plant on an adjacent site) was going to be difficult to deliver in time to meet the statutory consents from March 2017, largely because of the difficulties in obtaining planning permission for development of a new site, in the "green belt". We informed the EA and Ofwat at that time of the challenges we faced.
- 9.6 Perceived difficulties in obtaining the relevant planning consents for the scheme, led Thames Water to adopt an innovative solution that enabled redevelopment on the existing site. This had two advantages. First, there are fewer planning constraints with work undertaken on an existing site. Second, it allowed the development of a construction profile that facilitated compliance with the 2017 date required in the new EA consents, albeit on a temporary basis. The development of the existing site allows the local authority to impose stringent odour requirements as a condition of planning permission.
- 9.7 This new solution has been in progress for over two years and both the EA and Ofwat are aware of this. Indeed, we are at the point of awarding the delivery contract, and our preferred contractor has committed contractually to:
- “ ✂ ”⁸⁵
- 9.8 It is clear, therefore, that we have secured a delivery solution with a contractual commitment that the environmental output will be delivered on schedule.
- 9.9 We can also confirm (as should be apparent from the Deephams project cost profile) that we have undertaken the necessary preparatory and enabling works to ensure that the output is delivered on time.

⁸⁵ ✂



- 9.10 Ofwat has provided only a single item of evidence upon which its assessment of the delivery date was based. This is an apparently informal e-mail that states explicitly that the information on Deephams “...is *unconfirmed*”.⁸⁶
- 9.11 In our view, therefore, given the binding contractual commitment we have secured from our contractor to deliver the project, and the preparatory work undertaken already, we have provided more than sufficient evidence to demonstrate that the project is on schedule.

C The Deephams item fails the triviality test

- 9.12 To qualify for inclusion in an IDoK, an item must be “non-trivial”. To be deemed “non-trivial” the item must have an NPV greater than or equal to 2% of the relevant service turnover. Since the Deephams project relates to the wastewater business, its NPV needs to exceed £17.8m on this basis, in order to qualify for inclusion.
- 9.13 We note, however, that the spend forecast for AMP5 is only £10.2m below the PR09 allowance for AMP5 (£76.6m vs £86.8m; 2007-08 prices). It therefore fails the triviality test and cannot be included in an IDoK.

D Ofwat’s proposed cuts to the AMP5 expenditure will lead to both customer and environmental detriment

- 9.14 The Draft IDoK Determination proposed cutting £31m of capital expenditure in AMP5 compared to the Deephams project plan. Our delivery team has a clear view of the expenditure necessary in AMP5 to meet both the 2017 consent and facilitate delivery of the full rebuild project. Without the level of funding assumed in our project delivery plan, compliance with the March 2017 consent date will be jeopardised (potentially leading to enforcement action) and timely delivery of the full rebuild will be threatened.
- 9.15 The delays implied by Ofwat’s expenditure assumptions will also result in direct customer detriment, as site odour reduction would be delayed relative to Thames Water’s plans.

⁸⁶ “Ofwat Response 2”, page 1.



Section 10

Ofwat's "counter-item" relating to Serviceability

A Introduction

- 10.1 As explained in Section 2 above, on 13 September 2013 Ofwat commenced an IDoK process under Paragraph 15.1(1) of Condition 8 of Thames Water's licence. One of the three items in that IDoK related to the "*Failure to maintain performance of sewerage infrastructure assets to the level assumed when Ofwat set price limits*".⁸⁷ To qualify for inclusion in Ofwat's IDoK, an item needs to meet the usual criteria, including, in this case, the criteria to be an RCC as defined in the licence.
- 10.2 The basis on which Ofwat includes this "offsetting item" regarding serviceability is unclear from the Draft IDoK Determination. Indeed, we are unable to identify any discussion of the criteria it would need to meet. Consequently, while the Draft IDoK Determination includes extensive commentary, it does not provide the evidence or legal arguments to support the inclusion of this item. As we set out below, we do not believe that this item meets the relevant criteria to be an RCC, and it cannot, therefore, be included in an IDoK.
- 10.3 In addition we note that the Draft IDoK Determination:
- mischaracterised Thames Water's performance against the serviceability targets;
 - applied a shortfall value that is extreme and significantly exceeds shortfall values applied to other companies for similar failings against the same target; and
 - the correct calculation of the shortfall would fail the materiality assessment.
- 10.4 We address each of these in turn below.

B The serviceability counter-item does not qualify as an RCC

- 10.5 Thames Water's licence sets out the criteria that apply to such an RCC, as follows:

⁸⁷ Interim Determination Notice [Paragraph 15.1 Of Condition 8], Ofwat, 13 September 2013.



“... an amount has been allowed for on account of steps taken or to be taken for the purpose of securing compliance with a legal requirement or achieving a service standard adopted or to be adopted by the Appointee...” [Limb (i)]

“AND...the Appointee has not taken ... any or all of those steps ... ” [Limb (ii)]

“...and as a result, the amount allowed for as aforesaid is substantially greater than the sum of ... the costs incurred by the Appointee for the relevant purpose”; [Limb (iii)]

“and ...that purpose has not been otherwise achieved...”⁸⁸ [Limb (iv)]

- 10.6 In order for the item to constitute an RCC all four of the criteria above need to be fulfilled. If any one of these is not met, then the item does not qualify. As we show below, we do not believe that the serviceability counter-item meets these criteria.

Limb (i)

- 10.7 Funding has been allocated for the purposes of securing stable serviceability and therefore we agree that limb (i) has been satisfied. In this case the “service standard” is the achievement of stable serviceability for the sewerage infrastructure subservice. The funding allowed at PR09 is summarised in the table below.

Table 10.1: PR09 provision for Total capital maintenance expenditure in AMP5 for sewerage infrastructure sub-service (2012-13 prices; March 2013 COPI)

Expenditure	2010-11 (£m)	2011-12 (£m)	2012-13 (£m)	2013-14 (£m)	2014-15 (£m)	Total AMP5 (£m)
FD09	40.1	36.9	44.9	46.8	46.1	215.0

Source: Table 1, TW Exhibit 127.

Limb (ii)

- 10.8 As far as we are aware, we have taken all the steps that could reasonably be required. We have delivered our overall capital maintenance programme as set out in our 2009 Final Business Plan which has included each of the activities described in TW Exhibit 127 and referred to by Ofwat in its Draft IDoK Determination.⁸⁹ The Draft IDoK Determination did not identify any steps that Thames Water has failed to take. As a result, we do not believe that this item can qualify as an RCC.

⁸⁸ Licence Condition B Part IV, Clause 13.1, definition of a “relevant Change of Circumstance” (3).
⁸⁹ Draft IDoK Determination, page 82.



Limb (iii)

- 10.9 The table below compares the actual expenditure on wastewater serviceability to the PR09 allowance:

Table 10.2: Total capital maintenance expenditure in AMP5 (2012-13 prices; March 2013 COPI)

Expenditure	2010-11 (£m)	2011-12 (£m)	2012-13 (£m)	2013-14 (£m)	2014-15 (£m)	Total AMP5 (£m)
AMP5 current view	27.5	44.7	73.3	55.4	67.2	268.0
FD09	40.1	36.9	44.9	46.8	46.1	215.0
Variance	(12.6)	7.8	28.3	8.6	21.0	53.1

Source: Table 1, TW Exhibit 127.

Note: 2010-11 to 2012-13 AMP5 expenditures are actuals; 2013-14 and 2014-15 are forecasts.

- 10.10 It can be seen from the table that the total spend in the AMP on wastewater network capital maintenance will be £53.1m (2012-13 prices) above that provided for at PR09. This is consistent with our Line 3 of Table 3 of our August Submission, net of income.
- 10.11 It is clear, therefore, that Limb (iii) is not met in this case: the Draft IDoK Determination has not demonstrated that Thames Water has spent less than Ofwat allowed for in PR09 in relation to attaining a stable sewerage infrastructure serviceability assessment. Indeed, the Draft IDoK Determination accepts that Thames Water has increased investment towards achieving the required outputs:

“Thames Water has now increased investment levels further, and has advised [Ofwat] that it is seeking to return its serviceability performance for sewerage infrastructure to stable in 2013-14 and 2014-15”.⁹⁰

C Ofwat has mischaracterised the company’s serviceability performance

- 10.12 The Draft IDoK Determination states that:

“...Thames Water assessed the performance of its sewerage infrastructure as being marginal in 2011-12 and 2012-13, so that it failed the relevant output targets for these years”.⁹¹

- 10.13 This statement is not correct: we assessed performance to be ‘stable’ in 2011-12 and ‘marginal’ in 2012-13. Indeed, this information was submitted to Ofwat through our annual

⁹⁰ Draft IDoK Determination, page 83.

⁹¹ Draft IDoK Determination, page 81.



KPI dashboard. We also provide, on a voluntary basis, an annual 'Serviceability Report' to Ofwat to provide further information on this assessment. The report provided to Ofwat in June 2012 explained the basis for the stable serviceability assessment for 2011-12.⁹²

10.14 In its Draft IDoK Determination, Ofwat also states that:

"The serviceability assessment for the wider sewerage infrastructure sub-service is measured according to performance measures across six specific areas governed by their own 'control limits'. For two of these control limits – 'flooding other causes' and 'pollution incidents' – Thames Water's performance was worse than the permitted upper control limit in 2011-12 and 2012-13. It was this under-performance against the control limits in these two specific areas that led to the company's overall output failure (that is, the marginal assessment for the sewerage infrastructure subservice overall) in 2011-12 and 2012-13".⁹³

10.15 The upper control limit for the pollution incident measure is 147 incidents,⁹⁴ whereas we achieved a level of 130 incidents against this measure in 2011-12. The Draft IDoK Determination, therefore, incorrectly stated that Thames Water's performance for the pollution incident measure was worse than the permitted upper control limit in 2011-12.

D The shortfall value applied by Ofwat is disproportionate

10.16 At PR09, six water and sewerage companies had not achieved their serviceability targets.

- Veolia Central – marginal water infra
- Dwr Cymru – marginal water non infra
- Northumbrian – marginal sewerage infra
- Southern – marginal water non infra
- Veolia Central – marginal water non infra
- United Utilities – marginal sewerage non infra

10.17 Ofwat applied shortfall adjustments to only the first two of these six companies. The maximum level of penalty applied was 8.5% of the relevant 2004 assumption for the sub-service. Shortfall values applied were between £10m and £15m (in 2007-08 prices).⁹⁵

⁹² "Report on Serviceability for the year 2011-12", Thames Water, 2012.

⁹³ Draft IDoK Determination, pages 81-82.

⁹⁴ Letter from Mark Worsfold to Nick Fincham, "Review of serviceability indicator for pollution incidents for 2010-15", Ofwat, 27 March 2015.

⁹⁵ PR09/38: Serviceability outputs for PR09 final determinations, Ofwat, 10 December 2009, p3.



- 10.18 In its draft determination, Ofwat has assumed a total shortfall value of £24.4m for the period 2010-11 to 2012-13, allocated as £2.0m for 2011-12 and £22.4m for 2012-13. The price limit assumption for sewerage infrastructure serviceability was £215m.
- 10.19 Ofwat has therefore applied a penalty equivalent to 0.9% of the price limit assumption for 2011-12 and 10.4% of the price limit assumption for 2012-13. This gives an overall shortfall value for the first three years of the AMP period of 11.3%. This is materially above the maximum penalty applied for similar failures in the previous AMP period for the full AMP period (8.5%), as set out above. In addition, in its Draft IDoK Determination, Ofwat states that *“The maximum scale of any shortfall is 50% of the investment in the sub-service, allocated between each year and in accordance with the sub-service measures”*,⁹⁶ which implies that the maximum penalty for a failure in any one of the five years of the price control period should be 10% of the total for the AMP. Ofwat has, therefore, also exceeded its own maximum shortfall of 10% of the price limit assumption for any given year.
- 10.20 Ofwat also stated in its Draft IDoK Determination that:
- “The scale of adjustment in each measure within the sub-service is based upon the extent of under-performance in the area concerned”*.⁹⁷
- 10.21 We do not accept that the scale of the shortfall is proportionate to the extent of under-performance. Given a maximum shortfall value of 10% of the price limit assumption for any given year, it seems extreme to apply in excess of this value for 2012-13, when the majority of the control measures were within normal control limits (and therefore not regarded as ‘marginal’) and just two measures were outside of control limits and regarded as ‘marginal’ rather than the worst level of performance – ‘deteriorating’.
- 10.22 It is also the case that performance of the collapses indicator, the ‘key indicator’⁹⁸ in the basket of measures for sewerage serviceability as defined by Ofwat,⁹⁹ was well within control limits for the period in question.
- 10.23 We do not accept that an adjustment of this magnitude would be proportionate.
- 10.24 Furthermore, it is clear from Ofwat’s methodology that serviceability performance is intended to be assessed at the periodic review, having regard to performance over the AMP as a whole. We see no reason, therefore, why Ofwat should depart from this practice in this case.

⁹⁶ Draft IDoK Determination, page 84.

⁹⁷ Draft IDoK Determination, page 84.

⁹⁸ Ofwat states in Annex 1 of RD 15/06 – Our process for assessing serviceability (page 5) that *“...for each sub-service there is a key indicator that we place particular reliance on, in guiding our overall assessment, as set out below... For the infrastructure sub-services, we take particular account of the asset performance indicators burst mains (water service) and sewer collapses (sewerage service). These indicators are particularly important in informing future service capability, and in our view provide the clearest evidence about the quality and extent of a company’s interventions to maintain the long-term integrity of its assets”*.

⁹⁹ See: RD15-06, Annex 1, page 5.



E The correct calculation of the shortfall would fail the materiality assessment

10.25 The Draft IDoK Determination does not explain the calculation used to derive the shortfall value it arrives at. Although we subsequently requested an explanation,¹⁰⁰ Ofwat has declined to provide this because:

*“If Ofwat were to share the detail by which it has calculated serviceability shortfalls beyond the principles that it has stated in PR09/38, then it could both prejudice the principles of the risk based review and could potentially create an uneven playing field compared to other companies submitting plans”.*¹⁰¹

10.26 By not sharing this information, we consider that Ofwat is not adhering to the ‘principles of better regulation’.¹⁰² In particular, Ofwat’s decision is not transparent with regard to the methodology it has applied. We do not, therefore, have the information necessary to provide a full and proper response to this item.

10.27 Ofwat has invited the company to make its own assessment of any shortfall value for failure against serviceability targets:

*“The company may wish to consider its own assessment and valuation of any shortfall and whether it wishes to present a counter-proposal for shortfall given its performance in this area”.*¹⁰³

10.28 In the time available we have made our own preliminary calculation of the shortfall value which should apply. We do so without prejudice to the company’s position that serviceability performance does not qualify as a relevant change of circumstance.

10.29 We have based our calculation on the principles that Ofwat adopted at PR09, which it applied to serviceability performance over AMP4¹⁰⁴. On this basis, the shortfall value which should be applied for the period 2010-11 to 2012-13 is £5.4m and £9.7m for the AMP period in total. Both figures are less than 2% of the relevant service turnover. It should not, therefore, be included in an IDoK. We would be happy to share our shortfall calculations with Ofwat if this would be useful.

¹⁰⁰ TW Exhibit 144

¹⁰¹ “Ofwat response 8”.

¹⁰² Five principles were identified by the Better Regulation Task Force in 1997 as the basic tests of whether any regulation is fit for purpose. These were: proportionality, accountability, consistency, transparency and targeting. The Legislative and Regulatory Reform Act 2006 was passed to establish statutory principles of good regulation based on the work of the task force. The Act obliges regulatory bodies to have regard to the principles and a code of practice.

¹⁰³ Ofwat response 8 to Thames Water request for clarification on draft determination (TW Exhibit 144), 18 October 2013.

¹⁰⁴ As set out in PR09/38 - Serviceability outputs for PR09 final determinations, 10 December 2009; and in PR09/06 - Setting price limits - logging down and shortfalling, 27 November 2007.



Section 11

Conclusions

A Introduction

11.1 For the reasons set out in this document, we do not believe the Draft IDoK Determination represents an appropriate balance for Thames Water or our customers. In summary, we do not agree with the Draft IDoK Determination because:

- it is not in the long-term interests of our customers (nor indeed in the long-term interests of customers of other companies regulated by Ofwat), principally because it is contrary to the terms of the regulatory contract established at PR09;
- it is legally and procedurally flawed; and
- it is based on incorrect analysis and assumptions.

11.2 We summarise below the key reasons behind each of these points.

B The Draft IDoK Determination is not in the long-term interests of customers

11.3 We explained in our IDoK application that Ofwat's provision for IDoKs was part of the regulatory determination that Thames Water and Ofwat agreed at PR09. IDoKs form part of the risk mitigation mechanisms that ensure companies' financial exposure remain at appropriate levels, which is reflected through the allowed costs of capital, while achieving a reasonable sharing of risk with customers. This is explicit in the PR09 documentation.¹⁰⁵

11.4 These mechanisms, and the stability of the regulatory framework, serve to keep the cost of financing low. We would be concerned if these mechanisms were seen to be not working as intended, as this could have adverse consequences for the stability of the sector and its attractiveness to future investors. We constructed our IDoK application to fit firmly within the PR09 regulatory agreement, but also to achieve a reasonable balance with customers given the wider AMP5 financial context.

¹⁰⁵ Future Water and sewerage charges 2010-15: final determinations", Ofwat, 2009. See, for example pages 8 and 120.



11.5 In addition:

- any perceived failure of the IDoK mechanism would increase perceived regulatory risk amongst both debt and equity investors leading to higher cost of capital for the sector;
- basing regulatory decisions on the extreme assumptions Ofwat has adopted in its Draft IDoK Determination would remove the incentives on companies to put forward proposals that provide a proper balance of interests for customers;
- if companies had less confidence in the IDoK mechanism they would have a greater incentive to appeal price control decisions rather than trusting in Notified Items;
- if companies had less confidence in the IDoK mechanism, companies would be incentivised to build potential but uncertain cost rises into future Business Plans, rather than relying on alternative mechanisms if (and only if) the cost rises occur, resulting in higher prices for all customers; and
- Ofwat has adjusted the TTT costs despite a rigorous regulatory governance programme and no less than seven signatures from senior Ofwat officials stating that the costs are correct;
- because of the way capex is treated in price controls, implementing the Draft IDoK Determination would lead to higher prices for our customers in the long-term than our proposed IDoK.¹⁰⁶

C The Draft IDoK Determination is legally and procedurally flawed

11.6 The Draft IDoK Determination is legally and procedurally flawed because:

- Ofwat failed to meet the 14 day deadline to submit counter-items for Thames Water's IDoK application, and its notice of 13 September 2013 constitutes a separate stand-alone IDoK which cannot be aggregated to Thames Water's application for the purposes of the materiality assessment;
- Ofwat has failed to allow sufficient time for customers, stakeholders and Thames Water to respond adequately to the Draft IDoK Determination;
- Ofwat changed the scope of Thames Water's IDoK without considering the additional four upward items in our application (Counters Creek, Shaft G, CRC Charges and TTT non-land costs);
- the proposal to include rental income as part of RCC2 is based on an incorrect interpretation of the relevant statute and Thames Water's licence;
- Ofwat has incorrectly rejected Thames Water's downwards item in respect of AMP5 sewer flooding;

¹⁰⁶ This is because customers pay for an additional year's worth of financing costs if logging up occurs at PR14 rather than one year earlier through an IDoK.



- Ofwat incorrectly included the Deephams item as it fails the triviality assessment;
- the serviceability item does not meet the legal requirements to be included in an IDoK as an RCC (and Ofwat has not provided any evidence that it can meet the requirements); and
- if calculated correctly, the serviceability item would not pass the Triviality assessment.

D The Draft IDoK Determination is based on incorrect analysis and assumptions

11.7 The assumptions in the Draft IDoK Determination are extreme and include factual errors because:

- the treatment of Keltbray and Chambers Wharf TTT land costs is not correct;
- the inclusion of land rental costs double counts this revenue;
- the assessment of the extent to which bad debts have increased as a result of the economic downturn is implausible and inconsistent with expert evidence;
- the assessment of the extent to which bad debts have increased as a result of the economic downturn incorrectly ignores the Atypical write-off of bad debt that was explicitly as a result of the economic downturn;
- PwC has applied the “quantile regression” technique to a model specification that does not control for heterogeneity (i.e. does not include the ‘fixed effects’ techniques). If we instead applied PwC’s approach to CEPA’s model specification (which includes these ‘fixed effects’ techniques), we find a coefficient that is broadly comparable with CEPA’s results;
- PwC has not correctly followed the approach set out in its report in its own modelling, and, if it had, it would not have drawn the conclusions it does. Indeed, it would have found that there was no material difference between its results and that of CEPA;
- the EIUC charges in the Draft IDoK Determination do not reflect the actual invoiced costs;
- the efficiency challenges to private sewers costs are not self-consistent and are, in any event unwarranted;
- Ofwat has misunderstood the £63-£67 private sewer costs and the resultant calculations are flawed;
- efficiently incurred costs directly associated with the transfer of private sewers have been incorrectly excluded;
- assumptions used in the calculations relating to the private sewer item are not supported by the evidence available;
- the unit rates used for the assessment of the costs of sewer flooding are not consistent with Ofwat’s own guidance;



-
- the revised assessment of the number of sewer flooding outputs is arbitrary and directly contradicts existing contractual obligations;
 - the assumption that the Deephams project is behind schedule is not correct;
 - the assumed expenditure profile for the Deephams project contrary to the contractual framework for the project;
 - the Draft IDoK Determination mischaracterises our 2011-12 service as “marginal” when it was in fact “stable”;
 - Ofwat’s position on serviceability is disproportionate and inconsistent with precedent; and
 - some of the calculations relating to private sewers use the wrong source data and/or the wrong denominators.¹⁰⁷

¹⁰⁷ Ofwat stated in “Ofwat response 12”, Ofwat, 21 October 2013 that “*The reason you have not been able to reproduce the results shown in Figure 2 is due to errors in our own calculations. Principally these relate to: i) the erroneous inclusion in the denominator of lengths of gravity sewer and rising main that are forecast to transfer to companies when the supplementary transfer is implemented ie S6014 (2013-14) & S6016 (2014-15), and ii) neglecting to update the Table 5 source data following the receipt of responses to queries raised regarding the August data submission*”.



Appendix A

List of exhibits

- A.1 Throughout this document we make reference to Exhibits previously provided to Ofwat as part of our IDoK application or through subsequent discussions. We also draw on new Exhibits we have attached with this response. We provide a summary of these new Exhibits below.

Exhibit number	Exhibit
TW Exhibit 148	“Regulatory uncertainty and the cost of financing”, Frontier Economics.
TW Exhibit 149	“Atypical bad debt write offs made by Thames Water in 2010/11”, FTI.
TW Exhibit 150	“TDX additional commentary”, TDX.
TW Exhibit 151	“Additional EA invoice”, EA.
TW Exhibit 152	“Water Resources Group meeting note”, Thames Water.
TW Exhibit 153	“Email from EA regarding abstraction charges”, EA.
TW Exhibit 154	✂
TW Exhibit 155	“Serviceability performance report 2010-11”, Thames Water.
TW Exhibit 156	✂



Appendix B

Additional information relating to Thames Tideway Tunnel land

B.1 The Draft IDoK Determination applied challenges to land-related costs we reported as incurred in 2010-11 and 2011-12. Specifically, Ofwat said:

*“We have applied small challenges to the actual expenditure claimed by Thames Water for 2010-11 and 2011-12. In reconciling actual expenditure to that already reported to us, we identified that the acquisition costs (including fees and stamp duty) for Chambers Wharf and Keltbray (Dormay Street) were overstated in the application compared with that previously reported to us. So, we have reduced our view of Thames Water’s efficient land acquisition costs in 2010-11 and 2011-12 by £0.047 million and £0.003 million respectively, relative to its application. We will discuss this issue with Thames Water”.*¹⁰⁸

B.2 In making these adjustments, we understand Ofwat assumed that land acquisition costs reported in our IDoK application of ₤ in 2010-11 and ₤ of costs in 2011-12 related solely to Chambers Wharf and Keltbray respectively. This is not correct because:

- costs for both sites are spread over a number of years; and
- costs related to other acquisitions (such as advisory costs) fall within these two years.

B.3 We provide a detailed breakdown of these costs in TW Exhibit 156. In summary:

- The ₤ of land acquisition costs in 2010-11 comprises:
 - ₤ of costs related to Chambers Wharf site acquisition (₤ of Chambers Wharf costs occur in other years); and
 - ₤ of land acquisition costs related to other sites.
- The ₤ of land acquisition costs in 2011-12 comprises:
 - ₤ of costs related to Keltbray site acquisition (₤ of other costs occur in other years); and
 - ₤ of land acquisition costs related to other sites.

B.4 Furthermore, current land-related costs (reported in our IDoK application) have changed slightly since they were shared with Ofwat in the 2011 correspondence referred to in the

¹⁰⁸ Draft IDoK Determination, page 23.



Draft IDoK Determination. This reconciliation is also set out in \times . In summary, the differences are:

- Chambers Wharf costs are now \times lower, due to the removal of indemnity insurance and the inclusion of higher legal fees; and
- Keltbray acquisition costs are \times higher due to increased legal fees associated with a related collaboration agreement with London Borough of Wandsworth.

B.5 This information is in line with the costs included in our application and should, therefore, allow Ofwat to reach the same conclusion as Thames Water as to the proper amount to be included in the IDoK.



Appendix C

Additional information relating to bad debt

- C.1 This information relates to the reproduction of PwC's bad debt analysis which supports the Draft IDoK Determination. This appendix supports the statements made in Section 5 of this response.
- C.2 Table C shows the estimated quantile and Ordinary Least Squares ("OLS") regressions for three models:
- the pooled model used by PwC in their quantile regression;
 - the Local Authority (LA)-dummy variable model used by CEPA; and
 - the LA plus time dummy variable model that takes time differences into account, on the basis that PwC tested and found time specific effects to be significant.¹⁰⁹
- C.3 Table C shows that, when the same model specification is used with a quantile regression approach, the deprivation coefficient of the OLS regression models does not reduce in any discernible way (indicating that the presence of outliers, if there are any, does not affect the OLS model estimates), and in fact the quantile coefficient is higher than CEPA's coefficient.¹¹⁰
- C.4 As shown in Table C, the explanatory power of the regressions (shown by R-squared) increase as LA dummies are added and then when time dummies are added. But, as we show in Section 5, we have improved even further upon this analysis by also controlling for the effects of autocorrelation due to the potential omission of an explanatory variable.

¹⁰⁹ We note that there is a difference between the interpretation of the fixed and time effects in an OLS regression model and in a quantile regression. They cannot be interpreted the same way: adding panel and time dummies to a quantile regression is not equivalent to estimating a quantile model with fixed effects (see David Powell, 2012, "Unconditional Quantile Regression with Panel Data with Exogenous or Endogenous Regressors", Rand Labor & Population, WR-7 10-2, The Rand Corporation).

¹¹⁰ We refer here to CEPA's ED I model approach (see TW Exhibit 58).



Table C: Quantile versus OLS regression – Deprivation coefficients, confidence intervals and R-squared

Model	Quantile	OLS
Pooled, no LA or time effects (PwC)	0.752***	0.781***
95% confidence interval	(0.400; 1.105)	(0.614; 0.948)
R-squared ⁺⁺	0.284	0.282
LA dummies (CEPA)	4.872***	4.429***
95% confidence interval	(3.016; 6.729)	(3.486; 5.373)
R-squared ⁺⁺	0.466	0.472
LA + time dummies	2.554 ⁺	2.815***
95% confidence interval	(-0.715; 5.823)	(1.531; 4.100)
R-squared ⁺⁺	0.852	0.840

Source: FTI Consulting. ***: coefficient is significant at the 1% level, all standard errors are robust, +: the t-ratio is 1.54, significant at 12.5%. ++ For the OLS regressions, we report adjusted R-squares. The R-squared are not comparable between quantile and OLS regressions.



Thames Water Utilities Ltd
Clearwater Court
Vastern Road
Reading
Berkshire RG1 8DB



October | 2013

The impact of the deterioration in economic circumstances on Thames Water's bad debt

Final - Confidential

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Glossary

AMP4	Asset Management Plan 4: 2005/06 to 2009/10
AMP5	Asset Management Plan 5: 2010/11 to 2014/15
CAGR	Cumulative Aggregate Growth Rate
CY	Calendar Year
DCLG	Department for Communities and Local Government
FTI Consulting	FTI Consulting LLP.
FY	Financial Year
LA	Local Authority
LSOA	Lower – Layer Super Output Area
NI	Notified Item – in this report, typically refers to Ofwat’s Notified Item regarding Bad Debt (see 1.4)
RCC	Relevant Change of Circumstances
SC	Serial Correlation
Thames Water	Thames Water Utilities Limited
WOC	Water Only Companies

1. Introduction and summary of conclusions

Introduction

- 1.1 This report has been prepared for Thames Water Utilities Limited (“Thames Water”) in connection with their recent submission to Ofwat requesting an Interim Determination of K (“the IDoK submission”). We were asked originally to review the analysis underpinning that portion of the IDoK submission that relates to increases in household bad debts. We were requested subsequently to perform the analysis independently so as to verify the extent to which the increases in Thames Water’s bad debt costs can properly be demonstrated to have arisen as a result of the deterioration in economic conditions in Thames Water’s operating area.
- 1.2 Our conclusions are summarised at the end of this section, and explained in greater detail within the body of the report.

Restrictions

- 1.3 This report has been prepared solely for the benefit of Thames Water for the purpose described in this introduction. In all other respects, this report is confidential. It should not be used by any other party for any purpose or reproduced or circulated, in whole or in part, by any party without the prior written consent of FTI Consulting.
- 1.4 FTI Consulting accepts no liability or duty of care to any person other than Thames Water Utilities Ltd. for the content of the report and disclaims all responsibility for the consequences of any person other than Thames Water Utilities Ltd. acting or refraining to act in reliance on the report or for any decisions made or not made which are based upon the report.

Background

- 1.5 In 2009 Ofwat set the price controls applying to the water industry in England and Wales for Asset Management Plan 5 (“AMP 5”, 2010-2015). These controls may be adjusted under specific circumstances before the end of the period through a process known as an Interim Determination of K (“IDoK”). Both the water companies and Ofwat have the right to trigger an IDoK process, provided certain relevant criteria are met.¹ Those criteria vary depending on whether the item in question is a Notified Items (“NI”) or a Relevant Change of Circumstances (“RCC”).

¹ Ofwat, Letter to Regulatory Directors 13/10: Interim Determinations 2010-2015: http://www.ofwat.gov.uk/publications/rdletters/ltr_rd1310idok.

1.6 When setting the price controls in 2009, Ofwat stated that:

“For the purpose of this determination, Ofwat has assumed that there will be no net increase above the 2008-09 reported numbers in Bad Debt and Debt Management Costs.

Any Net Increase which relates to households is a Notified item PROVIDED THAT:

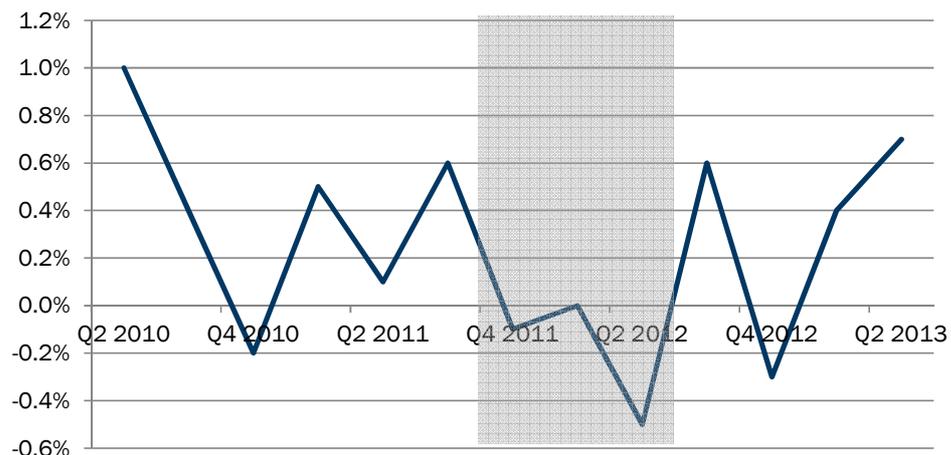
(i) the company provides information documenting the Net Increase to the reasonable satisfaction of Ofwat;

(ii) the company provides evidence to the reasonable satisfaction of Ofwat that the Net Increase reasonably relates to a significant deterioration in economic circumstances affecting the company’s operating area relative to 2008-09; and

(iii) the company demonstrates to the reasonable satisfaction of Ofwat that it has pro-actively applied best practice within a coherent strategy on debt prevention and management to maximise cost-effective revenue collection. This strategy on debt collection and management should include (without limitation) tariff design, billing, revenue collection and debt recovery.”

1.7 The UK economy was in recession from the second quarter of 2008 until the third quarter of 2009 (18 months) and again from the fourth quarter of 2011 until the second quarter of 2012 (9 months). Even in those periods in which the growth in GDP has been positive, it has generally been below 1% across the period, as shown in the figure below.

Figure 1: UK GDP % growth quarter-on-quarter (shaded area indicates recession)



Source: ONS Second Estimate of GDP series

- 1.8 During AMP5 Thames Water has experienced a substantial increase in bad debts – from just over £20 million in FY 2008/09 to just over £60 million in FY 2010/11. Debt written off has been, and is expected to remain, above the levels applicable to the reference year. The current forecast for bad debt costs across the remainder of the AMP5 period implies a five-year total figure of £270 million. As shown in the table below, that is some £164 million in excess of the amounts assumed by Ofwat.

Table 1: Total net increase in real² household debt written off by Thames Water in AMP5 compared to the reference year FY 2008/09 (£ millions, 2012/13 prices)

	Reference year		AMP5					Total
	2008-09	2010-11	2011-12	2012-13	2013-14	2014-15		
Bad debt cost	21.3	60.6	23.4	71.3	57.5	57.7	270.4	
Assumed cost	21.3	21.3	21.3	21.3	21.3	21.3	106.5	
Increase		39.3	2.1	50.0	36.2	36.4	163.9	

Source: Thames Water, FTI Consulting calculations. Please note figures are deflated using the ONS GDP deflator. Debt written off in 2009/10 amounted to £21.1 million. All figures include accruals and debt related to Water Only Companies. Figures from 2013/14 onwards are forecasts.

- 1.9 The measure used above for the actual cost of bad debts is for debts written off, and includes accruals and debt related to Water Only Companies (“WOC”). Disaggregated data for accruals and WOC debt, however, is not available. Our analysis is therefore based on debts written off, excluding movement in accruals and debt related to WOCs. This data is available at a postcode level. The average difference between these two measures is 11% across the AMP 5 period, as shown in the table below.

² Real figures have been obtained dividing nominal values by the GDP deflator published by the ONS in their National Accounts figures (last updated on 26 September 2013). The GDP deflator has the following values: FY 2006/7 – 86.44; FY 2007/08 – 88.61; FY 2008/09 – 91.10; FY 2009/10 – 93.61; FY 2010/11 – 96.06; FY 2011/12 – 98.26; FY 2012/13 – 100; 2013/14 – 102.30; 2014/15 – 104.24. See <https://www.gov.uk/government/publications/gdp-deflators-at-market-prices-and-money-gdp-march-2013>.

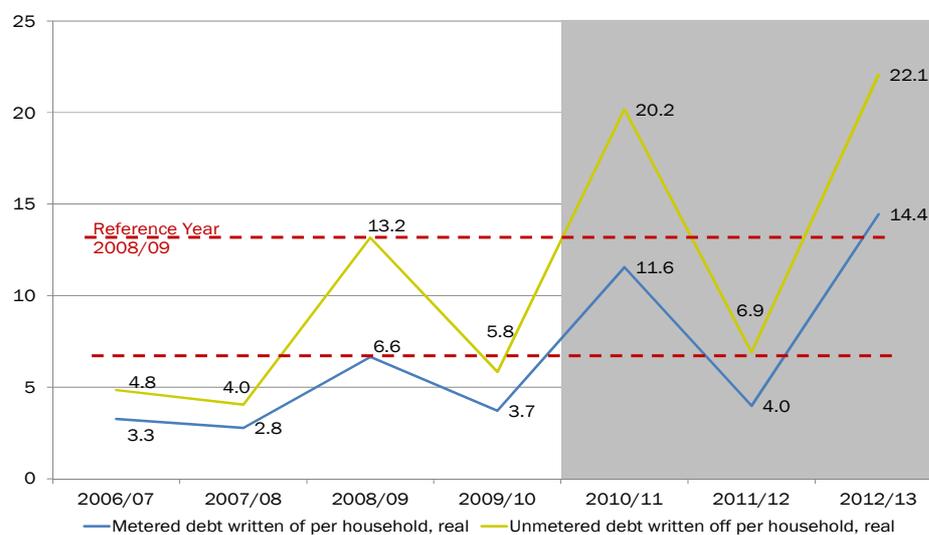
Table 2: Difference between write-offs excluding accruals and WOCs and write-offs including accruals and WOCs (£millions, 2012/13 prices)

	2010-11	2011-12	2012-13	Total
Write-offs excl. accruals and WOCs	56.3	19.4	63.9	139.7
Accrual movement and WOCs	-4.3	-4.0	7.4	
Write-offs including accruals and WOCs	60.6	23.4	71.3	155.3
Write-offs including accruals and WOCs / Write-offs excluding accruals and WOCs	108%	120%	112%	111%

Source: Thames Water

- 1.10 Average write-offs per household are significantly higher for unmetered households than for metered households. However average write-offs per household grew faster for metered households than for unmetered households between 2012/13 and the reference year. The main reason for this difference is simply that unmetered write-offs per household started from a higher base in the reference year.

Figure 2: Metered and unmetered debt per household written off by Thames Water, (£millions, 2012/13 prices)



Source: Thames Water

Limitations to the scope of our work

- 1.11 This report contains information obtained or derived from a variety of sources. Except where indicated, FTI Consulting has not sought to establish the reliability of those sources or verified the information provided.
- 1.12 No representation or warranty of any kind (whether express or implied) is given by FTI Consulting to any person (except to Thames Water Utilities Ltd. under the relevant terms of our engagement) as to the accuracy or completeness of this report.
- 1.13 This report is based on information available to FTI Consulting at the time of writing of the report. We accept no responsibility for updating the report or informing any recipient of the report of any such new information.

Structure of this report

- 1.14 The way in which bad debts arise, both in practical and accounting terms, is discussed in **Section 2** of this report. There are implications for the form of analysis that is required to assess the linkage between economic circumstances and the costs of bad debts experienced by Thames Water.
- 1.15 **Section 3** sets out our choice of a measure of economic effects against which to model Thames Water's bad debt costs. The model that we have used is then described in **Section 4**, and the results of our analysis are set out in **Section 5**, which also summarises the implications for the extent to which Thames Water's increased levels of bad debt costs over the AMP 5 period are properly included in an IDoK.

Summary of conclusions

- 1.16 We have used *deprivation* to model changing economic circumstances because it measures reflects changes at a household level that are most likely to result in non-payment of water bills.
- 1.17 Our extension of the deprivation series shows that there has been a significant deterioration – an increase in deprivation - in the Thames Water operating area since 2008/09.
- 1.18 We have used data on deprivation and bad debt written off at the local authority level over time to produce a panel data set for the purposes of our analysis. The model that we have used relates deprivation to bad debts written off with a lag of two years. Our estimates show that a one-percentage point increase in deprivation increases bad debt write-offs by £3.53 per household customer.

- 1.19 Over the AMP5 period, Thames Water expects an additional £67.5 million of bad debt write-offs (in 2012/13 prices) over and above those implied by the 2008/09 reference year, *excluding* those attributable to customers of WOCs. The equivalent figure in respect of customers of the WOCs is £4.2 million, for an aggregate of £71.7 million.
- 1.20 Of this, we estimate that 81.5%, or £58.4 million is properly attributable to the deterioration in economic circumstances. The 95% confidence interval is from £37.1 million to £79.9 million.

2. Bad debt

2.1 In this section we consider:

- the nature of bad debt;
- how it is affected by economic circumstances; and
- the timing of those effects.

What is bad debt?

2.2 Debt arises, in accounting terms, when amounts owed are not paid by the date on which payment is due. The provision that Thames Water makes in respect of overdue amounts – the bad debt provision – is estimated based on established default probabilities for debts of a given age and a given type. Bad debt is *written off* by Thames Water at the end of a structured process of attempted debt collection involving internal collection procedures and external collection agencies.

2.3 The typical causes of bad debts are:

- bankruptcy, insolvency or liquidation;
- leavers, i.e. people moving out of properties and not settling outstanding bills;
- customers unable to pay bills (due to low income) or unwilling to pay; and
- deceased customers.

2.4 The period that elapses between a bill being raised and the associated debt being written off varies according to a categorisation of reasons for default, as set out below:

Table 3: Summary of write-off procedures for different types of bad debt

Type of debt	Typical time to write-off	Explanation
Bankruptcy, insolvency, liquidation	< 12 months	Thames Water advised by administrator that there are insufficient funds to pay debt
Leavers	12 - 18 months	Varies with difficulty of locating individual concerned at their new residence
Unable or unwilling to pay	Can be 30 - 36 months	Extensive debt collection procedure: detailed in IDoK
Deceased	< 12 months	Thames Water advised by executor

Source: Thames Water

- 2.5 Related to typical collection times we note that in FY2011/2012 an additional debt collection step was introduced to improve debtor recovery. This resulted in a delay in write offs for that year, which was caught up in FY 2012/13.
- 2.6 According to section (ii) of the NI, Thames Water needs to provide evidence that the net increase in bad debt expected for AMP5 “*reasonably relates to a significant deterioration in economic circumstances affecting the company’s operating area relative to 2008-09*”.
- 2.7 Economic circumstances are defined as:
- the current level and predicted future changes in key drivers of the economy: the aggregate demand and supply of goods, labour, credit and money;
 - in the geographic areas of concern; and
 - that are (substantially) outside of the control of Thames Water.
- 2.8 These key drivers are typically measured by GDP, wages and unemployment rates, interest rates, and inflation and exchange rates.
- 2.9 When economic circumstances deteriorate, an increase in unemployment *and* a fall in wages and income may lead to:
- (i) an increase in bankruptcies;

- (ii) an increase in population transience (churn):
 - customers leave houses as they cannot pay mortgages or have their homes repossessed; and
 - customers move to more affordable accommodation;
 - (iii) an increase in customers unable or unwilling to pay their bills,
- all of which can contribute to an increase in bad debt.

2.10 The labour market does not immediately reflect a change in the wider economy, for reasons to do with *economic frictions*:³

- hiring and firing parts of a workforce is expensive, so firms will wait to see how long a downturn might last and how severe it might be;
- trade unions may oppose the firing of workers or a reduction in real wages, and take steps to delay or halt the process; and
- minimum wages may prevent wages falling to their 'natural' level.

2.11 The lapse of time between the cause of a downturn and a change in the labour market can therefore be of some length.

2.12 This motivates our use of Deprivation Indices, which capture a change in economic circumstances at a late stage in the process, when the fall in GDP actually affects households, and is discussed in the following section.

Summary

2.13 Bad debts arise for several different reasons, and this affects how long it takes for the debt to be written off.

2.14 A deterioration in economic circumstances can cause an increase in bad debt due to an increase in unemployment and a decrease in household income, affecting bankruptcies, population transience and the number of households unable or unwilling to pay.

2.15 The time elapsed between the cause of a downturn and the related effect on households can be substantial. This lag has implications for the form of analysis required to address the question of the effects on the level of bad debts, which we address in the next section.

³ For a discussion of frictions in economics, see Keith Griffin, 1993, "Friction in economics" in Nordal Åkerman, ed. *The necessity of friction*, Physica-Verlag HD.

3. A measure of significant deterioration in economic circumstances

3.1 In this section we consider:

- the rationale for using deprivation as our measure of significant deterioration in economic circumstances in Thames Water's area;
- the data available on this measure;
- the replication and extension of this measure to 2012/13; and
- the demonstration of significant deterioration in economic circumstances in Thames Water's area during AMP5 with respect to the reference year.

Why use deprivation?

3.2 The purpose of this report is to relate *deterioration in economic circumstances in Thames Water's operating area* to a net increase in Thames Water's *bad debt from households*.

3.3 The ideal measure of deterioration in economic circumstances for this task would therefore:

- capture the effects of economic deterioration on households;
- be available at a geographically disaggregated level that appropriately reflects Thames Water's operating area; and
- be consistently available for AMP5 and relevant preceding years.

3.4 Economic deprivation indices measure the number (or proportion) of households who are in very difficult circumstances, such as being unemployed, unable to work, or on very low incomes. This is an accurate way of estimating the *population at risk of not paying their water bills*.⁴

3.5 Additionally, the indices (and underlying data) are available at the level of a very small geographical area: the Lower-layer Super Output Area ("LSOA"), which is comprised of 1000 to 3000 individuals. This means that not only we can accurately reflect Thames Water's operating area but we can also exploit a large amount of information accounting for the significant differences in prosperity even in neighbouring areas.

⁴ It is, however, a much less accurate way of estimating the population transience and churn in the housing market caused by a deterioration in economic circumstances. There are no data on population transience in Thames Water's area that could be used for our analysis. We will discuss the consequences of this in Section 4.

- 3.6 We can therefore be more precise in our estimates of the effects of an economic depression on debt, and also have more confidence in those estimates.
- 3.7 Finally, the index is available for a long time period between 1999 and 2009 and its underlying components are available until 2011 or 2013.

Sources of data

- 3.8 In 2012, the Department for Communities and Local Government (“DCLG”) published a data series⁵ measuring economic deprivation for every LSOA in England for 1999-2009. This represents, at the time of writing, the largest and most consistent data series measuring deprivation. The authors constructed two measures: an ‘income domain’ and an ‘employment domain’.
- 3.9 The **income domain index** represents the proportion of people aged under-60 in an area who are living in low income households. A low income household is one where there are individuals claiming either Income Support or Income-based Jobseeker’s Allowance. In 2003, Child Tax Credits were introduced, which altered eligibility for these benefits without changing fundamental deprivation. The effects of this change have been removed from this index to reflect the underlying fundamental deprivation and ensure consistency with previous years.
- 3.10 The **employment domain index** represents the proportion of working-age people that are involuntarily excluded from the labour market. The index is calculated by summing all of the individuals claiming one of four benefits: Jobseekers Allowance, Severe Disablement Allowance, Incapacity Benefit and Employment and Support Allowance (from 2009)⁶ and then dividing it by the non-prisoner population.
- 3.11 As noted earlier, the DCLG dataset ends in 2009⁷, whilst our analysis requires the data to cover AMP5⁸. In the following, we set out our approach to extend the available series

⁵ “Tracking economic and child income deprivation at neighbourhood level in England: 1999 to 2009” which forms part of the series of reports on English indices of deprivation.

⁶ Employment and Support Allowance is being introduced to replace Severe Disablement Allowance and Incapacity Benefits, with individuals on the older benefits being subjected to a review, after which they are moved onto either Employment Support Allowance (if disabled) or Jobseeker Allowance (if not considered to have a disability).

⁷ The 2010 publication of English Indices of deprivation is based on 2008 data and a different methodology, and it is not compatible with the continuous 1999-2009 dataset. For more details, see “Comparisons with the Indices of Deprivation” in the report “Tracking Economic and Child Income Deprivation at Neighbourhood Level in England, 1999-2009”, DCLG 2012.

⁸ As it will be explained later, due to the observed lag structure between deprivation and debt written off, the analysis requires the deprivation measure up to 2012/13.

to the relevant period.

Replication and extension of the deprivation index

3.12 Our approach can be summarised as follows:

- we set out to replicate the income domain and the employment domain of the economic deprivation index using the underlying statistics⁹ that the DCLG use to construct these indices;
- the income domain index, however, cannot be replicated because the DCLG does not publish the complex algorithms necessary to remove the distorting effects of the Child Tax Credits;
- we successfully replicated the employment domain index, using the underlying LSOA-level data on the benefit series that compose the domain;
- we then extended the employment domain to 2012/13.

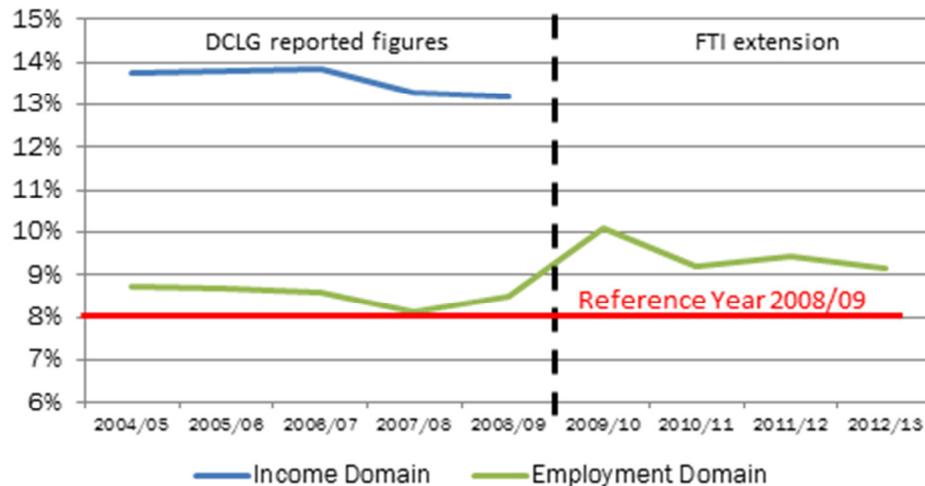
The employment domain is a good measure of deterioration in economic conditions

3.13 The economic deprivation index comprises the income and employment domains. The employment domain is a good measure of deprivation, and therefore of deterioration in economic conditions, for the following reasons:

- because it is highly correlated with the income domain – the correlation between the two for the period 1999 to 2009 is 89%. The employment domain therefore captures a large proportion of the variation in the income domain;
- the DCLG publishes the employment domain separately, enabling us to construct a consistent time series; and
- the use of one domain avoids the potential issues of double counting (a household counted as doubly deprived) or a cancellation effect (where one domain obscures deprivation in another).

⁹ We replicated the numerator of the employment domain for the four quarters of 2009; the average difference between our figure and those published for that year by the DCLG was less than one individual, and in less than 1% of LSOAs was there a larger (>15 individuals) difference.

Figure 3: Employment and income domain; average deprivation across Thames Water's LSOAs



Source: DCLG, FTI calculations

- 3.14 Figure 3 shows that our measure of deprivation, the employment domain, increases significantly in FY 2009/10 and remains above the reference level during the portion of AMP5 for which data are available.

There is a significant deterioration in economic conditions in the areas served by Thames Water

- 3.15 We have used the extended employment domain to assess whether a significant deterioration of economic conditions has occurred in Thames Water's operating area in AMP5, compared to the reference year.
- 3.16 We performed a regression analysis to establish that the increase in the employment domain post FY 2008/09 is statistically significant. The form of the regression is simple with deprivation as the dependent variable and a post-2009 dummy¹⁰ as the independent variable:

¹⁰ The post-2009 dummy is a variable equal to one during the AMP5 period, and zero otherwise. Its coefficient measures the extent to which, on average, deprivation is higher after FY 2009/10 than before.

Table 4: Results of significant deterioration regression

Variable	Coefficient	Standard Error	T-statistic	p-value
Constant	0.0863	0.00023	367.5	0
Post-09 Dummy	0.0083	0.00042	19.6	0

Source: FTI Consulting

- 3.17 The post-09 dummy is highly significant, which demonstrates that a significant deterioration (increase in deprivation) has taken place since 2008/09.

Summary

- 3.18 We have used deprivation to model changing economic circumstances because it measures changes at a household level that are most likely to result in non-payment of water bills.
- 3.19 We have used the employment domain in our analysis because it enables us to accurately replicate and extend the data, captures almost all of the movements in the overall deprivation index and is concentrated on households in the most difficult circumstances.
- 3.20 The data is available on a very granular geographical basis, enabling a larger sample for analysis.
- 3.21 There has been a significant deterioration in the Thames Water operating area since 2008/09.

4. Model

4.1 In this section we consider:

- the data that we have used for modelling the relationship between deprivation and bad debt;
- the econometric model;
- statistical testing; and
- the model results.

Data for modelling the relationship between deprivation and bad debt

4.2 Thames Water provided us with figures on the debt written off in each LSOA¹¹ that it serves, further split by metered and unmetered properties for each financial year 2006/07 to 2012/13. The data excludes written off bad debt by households served by water-only companies, and accruals, and is in nominal values.

4.3 This was accompanied by data on average bill size, similarly split by metered and unmetered properties. The same data has been provided to Ofwat.

4.4 Thames Water also provided us with figures on the number of households (properties) it serves in each LSOA, for the period 2006/07 – 2012/13 and forecasts for 2013/14 – 2019/20.

4.5 The employment domain of the DCLG deprivation dataset published in 2012 provided data up to calendar year (“CY”) 2009. The values for 2006 to 2009 were used to produce series for Financial Year 2006/07-2008/09 by weighting 75-25. For example, the FY 2007/08 values are three-quarters of the CY 2007 values and one-quarter CY 2008.

4.6 Extending the employment domain out to 2012/13 required claimant count data and

¹¹ There are 5,595 LSOAs in the data files we received from Thames Water, mapping to 70 LAs. Thames Water informed us that it serves 98 LAs but that it does not bill households directly in 24 of them (and therefore does not have bad debt data) and that in the other four LAs (Barking and Dagenham; South Northamptonshire; Tewksbury; and Wychavon) the bad debt data are not available (and in any case the bad debt level would be insignificant). Of the 5,595 LSOAs, 224 have missing population data and could not be included in the analysis. As a result, four LAs had to be dropped because they had at least one year with zero properties (and typically most years): Hertsmere; Reigate and Banstead; Grensham; and Tonbridge and Malley. This meant we had an LA sample size of 66 LAs.

population estimates at the LSOA level. The claimant count figures for the four benefits listed above are available on a quarterly basis from the Department of Work and Pensions. For each financial year, the four observations (May, August, November, and February) were averaged for each benefit, and then summed across all four benefits. This gave the number of people claiming unemployed-benefits averaged across the year¹² for each LSOA and for FY 2009/10, 2010/11, 2011/12 and 2012/13. This ensured our work was consistent with the previous series by DCLG.

- 4.7 The Office of National Statistics publishes mid-year population estimates for each LSOA, and this is available up to mid-year 2011. At the Local Authority level, however, it is possible to find population growth figures up to mid-year 2012, so applying this growth uniformly across the LSOAs in each Local Authority produced estimates of mid-year 2012 population at the LSOA level.¹³

Aggregation to Local Authority level

- 4.8 We estimate the relationship between bad debt level and deprivation at the level of the Local Authority¹⁴ ("LA"). There are 66 LAs in our datasets. We have three datasets: all households; metered households; and unmetered households.
- 4.9 For the number of properties and bad debt, the LA figure is simply the sum of the LSOAs in each LA.
- 4.10 For average bill size and deprivation, the LA statistic is an average of the relevant LSOAs, weighted by the number of properties in each LSOA that Thames Water serves. Therefore, *the deprivation statistic does not represent deprivation in the LA, but instead deprivation in the local authority as it affects Thames Water's customers.*
- 4.11 This aggregation excluded those LSOAs where there were data issues, typically as a result of serving very few (0-5) properties or having non-existent debt information. This affected just under 4% of LSOAs, concentrated in four clusters in Croydon, Merton, Sutton and Reigate & Banstead Local Authorities.

Other data

- 4.12 Where it was necessary to convert an LSOA code to a Local Authority (i.e. match which LA it belonged to), this was done using the data from the Deprivation Index (EID 1999-2009).

¹² It was also rounded to the nearest person.

¹³ The mid-2012 population estimates were used to construct the index for FY 2012/13.

¹⁴ The local authority is the administrative area of local government in the UK. There are c. 330 and include districts and London boroughs.

- 4.13 This was supplemented by a table of significant classification changes that occurred in 2011 at the time of the census. This was used in a few cases where the LSOA had changed code as a result of geographical changes between 2001 and 2011. The data came from the Geoportal maintained by the Office of National Statistics.

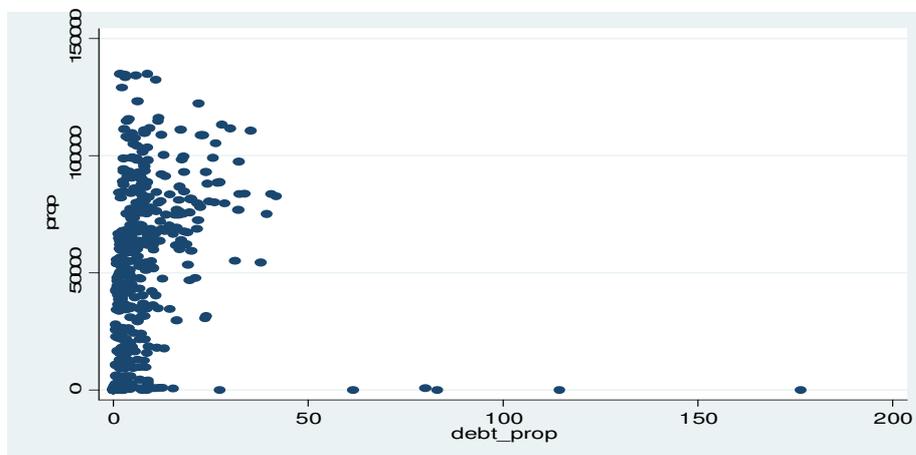
Econometric model

- 4.14 We have used the LA dataset described above to estimate the relationship between real average written off bad debt per household¹⁵ and deprivation, for all households combined, and for metered and unmetered households separately.
- 4.15 Each dataset contains information on 66 LAs for the period between FY 2006/2007 and FY 2012/13 inclusive (seven years), for a total of 462 observations. Technically, the datasets are panels with dimension 66 (the number of LAs, or cross-sectional groups) by 7 (the number of time periods). We have therefore used panel data techniques in our modelling. In particular, we have used a **fixed effect model**, where the impact of time-invariant effects peculiar to each LA is accounted for by dummy variables.¹⁶
- 4.16 There is a certain amount of “noise” (variability) in the data, as the number of households (properties) served by Thames Water varies widely by LA. The presence of such noise would compromise the precision of the econometric model. In particular, there are a number of LAs with high values of debt per household; all these LAs have very low numbers of households, as shown in Figure 4.

¹⁵ The figures are in real terms, deflated to 2012/13 prices using the GDP deflator.

¹⁶ A dummy variable is a variable that is equal to one for a given LA, and zero otherwise. We have tested for whether the fixed effects specification is preferable to the alternative (called a random effect specification) using the standard Hausman test. The fixed effect model is preferable according to this test.

Figure 4: Scatterplot of Average debt per household (£, 2012/13 prices) and number of properties 2006/07-1012/13



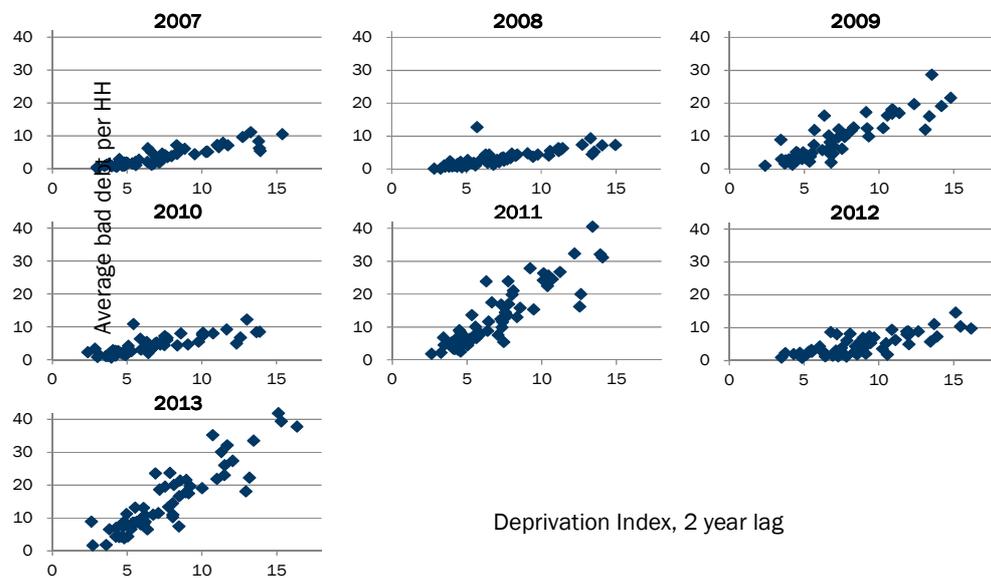
Source: FTI Consulting. Data from Thames Water, DCLG and ONS

- 4.17 In an ordinary regression model, each observation (each LA) is given equal weight in the estimation process, independently of the number of households it contains. However, as an observation in this dataset can represent a few properties or tens of thousands of properties, we use sampling weights to ensure proper representation of LAs in the estimation and reduce noise in the data. This is a standard procedure.
- 4.18 We therefore use the number of properties (households) variable served by Thames Water to weight the observations and estimate a **weighted fixed effect regression model**. The advantage of using this model is that it includes all the data and is not skewed by potential outliers.
- 4.19 We have sought to model the relationship between the average bad debt written off per household by Thames Water and our proxy measure for economic circumstances, the deprivation index. As discussed in Section 2, it takes time before bad debt is written off, and this means that although deprivation *in any given year* affects the likelihood of people not paying their bill *in that year*, the amount due will not be written off for some time.
- 4.20 This implies that current levels of deprivation are not suitable to explain current levels of bad debt write-offs. In developing our model, we have tested for the optimal lag structure and we have found that a two-year lag suits the data best:¹⁷ **average bad debt written off per household is best explained by deprivation recorded two years before.**

¹⁷ This is based on comparisons of the explanatory power of the model.

4.21 Figure 5 demonstrates the strong positive linear relationship between average bad debt per household and the two year lag of deprivation for the combined dataset,¹⁸ where “2007” in the figure refers to FY 2006/07, “2008” refers to FY 2007/08 and so on. Within each year the relationship is very consistent, the data are tightly aligned: there are no discernible outliers. However, across years the gradient (the coefficient for deprivation) changes significantly; being highest in 2008/09 (“2009”), 2010/11 (“2011”) and 2012/13 (“2013”).

Figure 4: Scatterplot of Average debt per household (£, 2012/13 prices) and two year lag of deprivation



Source: FTI Consulting. Data from Thames Water, DCLG and ONS

4.22 Figure 5 shows that the gradient of the relationship between (written off) bad debt and the two year lag of deprivation changes over time. This is not surprising, given the shape of the write-off series shown in Table 5: there is a strong indication of year-specific effects in the bad debt data, reflecting for example the delay in writing off bad debt and the subsequent catch-up in 2011/12 and 2012/13.

4.23 Table 5 shows that the average bad debt per household varies significantly by year. This pattern is typically also reflected across each LA.

¹⁸ The figures exclude the outliers identified in Figure 4, i.e. those LAs with debt per household higher than £50. There are five such LAs: no. 7000089, with three properties; no. 7000098, with two properties; no. 7000211, with five properties; no. 7000228, with 14 properties; and no. 9000029, with 824 properties.

Table 5: Local Authority average bad debt per household: descriptive statistics (£, 2012/13 prices)

Year	Average	Standard deviation
2006/07	3.1	2.8
2007/08	2.8	2.5
2008/09	7.7	6.6
2009/10	3.9	2.8
2010/11	12.2	9.4
2011/12	4.4	3.2
2012/13	14.5	10.3

Source: FTI Consulting. Data from Thames Water, DCLG and ONS

- 4.24 In order to account for the data patterns discussed above, we have estimated weighted fixed effect models with time effects,¹⁹ and we have allowed for two separate slopes:
- one slope for the two years 2006/07 and 2007/08; and
 - a separate slope for the remaining time period.²⁰
- 4.25 We have also estimated our models without data from 2006/07 and 2007/08; that is, we have also estimated models starting in 2008/09, in order to assess whether the relationship between deprivation and bad debt changes pre- and post-recession, and whether changing the sample period affects the size of the estimated impact.
- 4.26 We have estimated the models for metered and unmetered customers separately, and for the combined sample.

¹⁹ Time effects are individual dummy variables specified as follows: the dummy for 2006/07 is equal to one for all 66 observations (one for each LA) corresponding to 2006/07 and to zero otherwise; likewise for all other years.

²⁰ The model that separates the slopes for 2006/07 and 2007/08 from that for the remaining period starts in 2006/07 and covers the seven periods up to 2012/13 included. The coefficient for the change in slope in 2006/07-2007/08 is highly significant, and the explanatory power of the model increases substantially with respect to a model that estimated a single slope coefficient over the whole period. We note that we could separate the slope further for those three years of AMP5 that are included in the data (2010/11 and 2012/13) which appear to have a larger slope. This would result in a larger effect of deprivation on bad debt for those years. However, we know that the weaker relationship in 2011/12 is due to the delay in write-offs, which affected all Thames Water customers. The stronger relationship in 2012/13 is the catch-up effect. For this reason, we prefer to have a single, average slope rather than time-varying slopes.

Statistical tests

- 4.27 Model validation is an important aspect of any applied analysis. This is because the validity of the results depends on whether the assumptions underlying the regression model are correct or not.²¹
- 4.28 When we test for serial correlation (“SC”),²² we find the following results:

Table 6: Tests for Serial Correlation

Starting Year and P-value	Unmetered	Metered	Combined
2006/07	There is SC	There is no SC	There is no SC
P-value	0.00	0.44	0.20
2008/09	There is SC	There is SC	There is SC
P-value	0.00	0.00	0.00

Source: FTI Consulting. A P-value of less than 0.1 indicates that SC is present. We used the xtserial command in Stata to test for Autocorrelation using the standard Wooldridge test for SC in panel data.

- 4.29 These results are unusual: SC does not usually appear in, or disappear from a model when the sample period is changed, as it happens for the sample of Thames Water’s metered customers. Moreover, given the small number of time periods used in the analysis (seven or five), the P-value of the test for the combined sample is not high enough to warrant ruling out SC altogether for the sample starting in 2006/07 – especially since we know that *there is* SC in the unmetered household results.

²¹ We have corrected for heteroscedasticity using a robust covariance matrix (we used the “robust” command in Stata). The significance tests for the model are therefore correct. We note that correcting for heteroscedasticity has a very small impact on the standard errors: all variables remain highly significant. We have also tested for cross-sectional dependence, using Pesaran CD test. A standard Stata command to correct for cross-sectional dependence does not exist. There is a user-generated compatible program, xtsc, that corrects the covariance matrix. The command, however, is user generated – it has not been included in Stata yet and it has not been checked for robustness or reliability. Moreover, it needs to be used with caution in panels with a short time dimension, such as our panel (see: <http://www.stata-journal.com/sjpdf.html?articlenum=st0128>). Moreover, the command cannot be used with both weights and fixed effects. The Stata command xtpcse, which produces covariance matrices that are robust to heteroscedasticity and cross-sectional dependence, can also correct for serial correlation. However, its estimation method is the GLS (generalised least squares); this is a random effect, not a fixed effects model.

²² Serial correlation occurs where the error terms of the model are correlated between periods.

- 4.30 One of the main reasons for the presence of SC is that there is a *trended* variable that strongly affects bad debt write-offs but is not included in the regression.²³ The effect of this variable is clearly stronger from the beginning of the recession (FY 2008/09) onwards. The variable omitted from the model is churn in the housing market, a variable for which no data exist. Churn is related to economic conditions but may be partly unrelated to employment deprivation, as during a recession families may experience a drop in income and move to rental properties, or move to cheaper areas, or even lose their house without being unemployed, and therefore on unemployment benefits.²⁴
- 4.31 Correcting for SC produces more precise estimates of the effect of a worsening in economic conditions on Thames Water's bad debt write-offs with respect to the reference year. We have therefore estimated models that corrects for SC²⁵ when necessary: the models for unmetered and combined samples for both the modelling periods; and the metered sample for the period 2008/09 onwards. Estimation results
- 4.32 Table 7 presents the estimation results for the combined sample of metered and unmetered households. As expected, not correcting for SC in the model specification that starts in 2006/07 under-estimates the effect of deprivation on Thames Water's written off bad debt. Once the correction is applied, the effect is consistent regardless of the starting date of the estimating sample.
- 4.33 The corrected results show that a 1% increase in deprivation increases average bad debt written off per household by £3.59 (for the sample starting in 2006/07) or £3.527 (for the sample starting in 2008/09). The results also show that the effect of deprivation on bad debt is lower before 2008/09 by £1.065.

²³ When an important explanatory variable is omitted from a regression model, its effect on the dependent variable becomes part of the error term. Hence, if the omitted variable has a positive correlation with the dependent variable, it is likely to cause error terms to be positively correlated with each other.

²⁴ Since we know that there is a variable that is omitted from the model, we know that the model is misspecified. We have not run functional form tests (such as the Ramsey RESET or the link test). We note that these tests are not directly applicable to the fixed effect panel data model unless one uses the within estimator.

²⁵ The correction for SC was performed using Stata's *xtregar* command, which allows for fixed effects and removes the serial correlation between the current errors and those in the precedent year from the model. This command does not adjust the standard errors for heteroskedasticity or cross-sectional dependence; it is not possible to remove autocorrelation and adjust for these at the same time. However, heteroskedasticity and cross-sectional dependency only impact the significance of the estimated coefficients (which is very high, and remains high with and without the robust covariance matrix) and not the coefficients themselves. Therefore removing autocorrelation is a priority.

Table 7: Model results: combined metered and unmetered household²⁶

Start date:	2006/07	2006/07	2008/09 ²⁷
Deprivation two years before			
overall effect	2.184***	3.590***	3.527***
difference in 2006/07-2007/08	-1.246***	-1.065***	-
Fixed Effects	YES	YES	YES
Time Effects	YES	YES	YES
Sample size	462	330	264
Between R2	0.526	0.771	0.766
Within R2	0.826	0.786	0.782
Correction for SC	NO	YES	YES
Modified Wald test for heteroscedasticity	32,000 ⁺	n.a.	n.a.
Pasaran CD test	12.740 ⁺⁺	n.a.	n.a.
Robust SE	YES	NO	NO

Source: FTI Consulting. *** indicates that the coefficient is significant at the 1% level. + indicates that heteroscedasticity is present; ++ indicates that cross-sectional dependence is present

4.34 Table 8 presents the estimation results for the sample of unmetered households. Once again, the effect is consistent regardless of the starting date of the estimating sample. The results show that a one percentage point increase in deprivation increases average bad debt written off per unmetered household by £3.248 (for the sample starting in 2006/07) or £3.135 (for the sample starting in 2008/09).

²⁶ The overall R² for the models with one, two and three lags are equal to 0.272, 0.361 and 0.124 respectively for the model starting in 2006/07. For the model starting in 2008/09 (before correcting for SC), the overall R² for the models with one, two and three lags are equal to 0.259, 0.362 and 0.04 respectively.

²⁷ For the model without the SC adjustment, we record the following statistics. Modified Wald test for heteroscedasticity: 88,639. Pesaran CD test for cross-sectional dependence: 10.94. The coefficients remain significant when a robust covariance matrix is computed.

Table 8: Model results: unmetered household

	Start date:	2006/07	2008/09
Deprivation two years before			
overall effect		3.248***	3.135***
difference in 2006/07-2007/08		-1.302***	-
Fixed Effects		YES	YES
Time Effects		YES	YES
Sample size		320	256
Between R2		0.711	0.706
Within R2		0.781	0.777
Correction for SC		YES	YES
Robust SE		NO	NO

Source: FTI Consulting. *** indicates that the coefficient is significant at the 1% level.

- 4.35 Table 9 presents the estimation results for the sample of metered households. As expected, the model specification that starts in 2006/07 and is not corrected for SC (because there appears to be none) under-estimates the effect of deprivation on Thames Water's metered bad debt write-offs for the period starting in 2008/09.
- 4.36 The results for that period show that a one percentage point increase in deprivation increases average metered bad debt written off per household by £3.450.

Table 9: Model results: metered household

Start date:	2006/07	2008/09
Deprivation two years before		
overall effect	2.409***	3.450***
difference in 2006/07-2007/08	-0.989***	-
Fixed Effects	YES	YES
Time Effects	YES	YES
Sample size	462	264
Between R2	0.388	0.737
Within R2	0.747	0.731
Correction for SC	NO	YES
Robust SE	YES	NO

Source: FTI Consulting. *** indicates that the coefficient is significant at the 1% level.

- 4.37 We note that the impact of economic conditions on bad debt, as measured by our SC models, is remarkably similar, independently of whether the starting period is 2006/07 or 2008/09, and of whether metered or unmetered households are considered. The models account for cross-sectional heterogeneity (by using fixed effects), and for time-period heterogeneity (by using time dummies); they also correct for the effects of auto-correlation, which is at least partly due to the fact that population transience has been omitted from the model.
- 4.38 On the basis of our analysis, we conclude that in evaluating the amount of Thames Water's overall bad debt write-off costs that is caused by a deterioration in economic conditions, it is most appropriate to use the impact estimated using the combined model for the period 2008/2009 to 2012/13 inclusive.

Summary

- 4.39 We have used data at the LA level to estimate the impact of the deterioration in economic conditions on Thames Water's bad debt write-offs.
- 4.40 We find that the relationship differs before and after 2008/09, the reference period for the IDoK.
- Our estimates show that a one percentage point increase in deprivation increases bad debt write-offs by £3.53 per household customer.

5. Assessment

5.1 In this section we consider:

- Thames Water's bad debt write-off figures; and
- the extent to which cost associated with bad debt written off by Thames Water over the AMP5 period is properly attributable to the deterioration in economic conditions.

Figures for bad debts written off

5.2 The data on bad debt written off that we have received from Thames Water are in nominal values (£current). Tables 10a and 10b show the *real*²⁸ household debt written off by Thames Water over the AMP5 period, and its net increase with respect to the reference year, 2008/09. Figures for 2013/14 and 2014/15 are Thames Water's estimates.

5.3 Table 10a shows write-offs, excluding WOCs, of £241.3 million over the AMP5 period, an aggregate increase of £67.5 million over the equivalent costs in the reference year. Write-offs related to WOCs are £29.0 million, an increase of £4.2 million over the reference year (Table 10a).

Table 10a: Real household debt written off by Thames Water: (£millions, 2012/13 prices)

	Reference year	AMP5					Total
	2008-09	2010-11	2011-12	2012-13	2013-14	2014-15	
Real household debt written off excluding accruals and WOCs	34.8	56.3	19.4	63.9	50.9	50.7	241.3
Difference with respect to reference year		21.6	-15.3	29.1	16.2	16.0	67.5
Real WOC debt written off	5.0	4.4	4.9	6.3	6.6	6.9	29.0
Difference with respect to reference year		-0.5	-0.1	1.3	1.6	1.9	4.2

Source: Thames Water, FTI Consulting calculations. Please note figures are deflated using the ONS GDP deflator. Figures from 2013/14 onwards are forecasts.

²⁸ See footnote 2 for an explanation of how the real values have been computed.

Table 10b: Real household debt written off by Thames Water (£ millions, 2012/13 prices)

	Reference year	AMP5					Total
	2008-09	2010-11	2011-12	2012-13	2013-14	2014-15	
Real household debt written off including WOCs, excluding accruals	39.7	60.8	24.3	70.2	57.5	57.7	270.4
Difference with respect to reference year		21.0	-15.5	30.4	17.7	17.9	71.5
Real household debt written off including accruals and WOCs	21.3	60.6	23.4	71.3	57.5	57.6	270.4
Difference with respect to reference year		39.3	2.1	50.0	36.2	36.4	164.0
Ratio between debt written off excluding and including accruals	0.54	1.00	0.96	1.02	1.00	1.00	1.00

Source: Thames Water, FTI Consulting calculations. Please note figures are deflated using the ONS GDP deflator. Figures from 2013/14 onwards are forecasts.

- 5.4 Table 10b shows that during AMP5, Thames Water's total write-offs, including accruals and WOCs, are £270.4 million, an increase of £164.0 million over the equivalent cost in the reference year.
- 5.5 The difference between total write-offs (£270.4 million) and write-offs excluding accruals and WOCs (£241.3 million) is £29.1 million. Of this, £29.0 million relates to WOC (Table 10a). The remaining £100,000 is the net change in accruals over AMP5.²⁹
- 5.6 We have estimated our econometric model using write-off figures that exclude accruals and WOCs. Our measure of the proportion of write-offs that is explained by the deterioration in economic circumstances therefore refers to the £67.5 million figure.

Estimate of debt attributable to changes in deprivation

- 5.7 Our modelling (Table 7) has shown that a one percentage point increase in deprivation yields on average a £3.527 increase in bad debt written off per household.
- 5.8 For each year of AMP5, we multiply this figure by the change in the deprivation index

²⁹ Because of the small size of the change in accruals during AMP5 we do not consider accruals in our estimates of write-offs related to economic conditions.

with respect to the reference year³⁰ and then by the number of households (properties), to obtain the change in Thames Water's bad debt write-offs (excluding accruals and WOCs) attributable to the recession. Using our econometric estimates, we also produce a 95% confidence interval for the write-off figures. The calculations are shown in Appendix 1.

- 5.9 We have also estimated the amount of WOC-related write-offs during AMP5 that is attributable to the deterioration in economic conditions.
- 5.10 The table below summarises our results. It shows our estimate of the bad debt write-offs (excluding those attributable to WOCs) that can properly be attributed to the effects of the deterioration in economic circumstances amounts to £55 million across the AMP5 period. This is equivalent to 81.5% of the additional debt written off.
- 5.11 Applying the same percentage (81.5%) to WOC-related write-offs, we calculate that £3.4 million of these are due to the deterioration in economic conditions (Table 11). Together the total amounts to £58.4 million.

Table 11: Estimates of debt write-offs attributable to the deterioration of economic circumstances over the AMP5 period (£ millions, 2012/13 prices)

		95% confidence interval
1. Bad debt write-offs due to the deterioration of economic conditions during AMP5. Excluding accruals and WOCs.	£55.0m	(£34.9m - £75.2m)
2. Total bad debt write-offs during AMP5 with respect to the reference year. Excluding accruals and WOCs.	£67.5m	
3. Proportion of written off bad debt that is explained by the deterioration in economic conditions. Excluding accruals and WOCs	81.5%	
4. WOCs bad debt write-offs during AMP5 with respect to the reference year	£4.2 m	
5. WOCs write-offs due to economic conditions [=3 * 4]	£3.4m	
6. Total debt write-offs, including WOCs, due to economic conditions [=1 + 5]	£58.4m	(£37.1m - £79.9m)

Source: FTI Consulting.

³⁰ The reference year is 2008/09. In that year, bad debt was a function of deprivation in 2006/07. We have therefore calculated the differential with respect to the 2006/07 deprivation figure (which is 8.1%). The results are almost identical if we use the 2008/09 deprivation figure (which is 8.1%) as the base.

Summary

- 5.12 Over the AMP5 period, Thames Water expects an additional £67.5 million of bad debt write-offs (in 2012/13 prices) over and above those implied by the 2008/09 reference year, *excluding* those attributable to customers of WOCs. The equivalent figure in respect of customers of the WOCs is £4.2 million, for an aggregate of £71.7 million.
- 5.13 Of this, we estimate that 81.5%, or £58.4 million is properly attributable to the deterioration in economic circumstances. The 95% confidence interval is from £37.1 million to £79.9 million.

Appendix 1 Calculations of bad debt write-offs caused by the deterioration of economic conditions during AMP5.

Table A1: Calculation of bad debt write-offs due to the deterioration of economic conditions during AMP5

Deprivation			Coefficient			Properties		Valuation		
Year	Index	[A] Difference 2006/07	[B1] Lower 95% CI	[B2] Point estimate	[B3] Upper 95% CI	Year	[C] Properties	[D1] = [A]*[B1]*[C] Lower 95% CI	[D2] = [A]*[B2]*[C] Point estimate	[D3] = [A]*[B3]*[C] Upper 95% CI
2006/07	8.0%					2008/09				
2007/08	7.6%					2009/10				
2008/09	8.0%	0.0%	2.235	3.527	4.819	2010/11	3,409,787	198,966	314,043	429,056
2009/10	9.7%	1.7%	2.235	3.527	4.819	2011/12	3,447,073	13,186,745	20,813,700	28,436,366
2010/11	8.8%	0.8%	2.235	3.527	4.819	2012/13	3,454,066	6,186,426	9,764,534	13,340,630
2011/12	9.1%	1.1%	2.235	3.527	4.819	2013/14	3,493,479	8,458,147	13,350,173	18,239,448
2012/13	8.9%	0.9%	2.235	3.527	4.819	2014/15	3,545,465	6,843,419	10,801,519	14,757,392
Total								£34,873,703	£55,043,970	£75,202,892

Source: DCLG, Thames Water³¹, FTI Consulting analysis

³¹ Property figures for 13/14 and 14/15 are forecasts.



Regulatory uncertainty and the cost of financing

A REPORT FOR THAMES WATER

August 2013

Regulatory uncertainty and the cost of financing

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Executive Summary

We have been asked by Thames Water to review the evidence on the impact that changes in regulatory uncertainty can have on the cost of financing investment in a utility sector such as the water industry.

Our main findings are summarised here.

Role of regulation in the cost of financing

There are two main routes through which regulation affects the cost of finance.

- First, the **system of regulation** will affect the risk profile of companies, e.g. price cap or rate of return regulation.
- Second, **regulatory actions**, that either increase or lower uncertainty about how the system of regulation will work in future, can alter the risks faced by companies.

The importance of regulatory risk is well accepted by regulators and Government. For example, the Government's principles for economic regulation, published in April 2011 states, among other things, that the framework for economic regulation should provide a stable and objective environment enabling all those affected to anticipate the context for future decisions and to make long term investment decisions with confidence.

The Competition Commission in the recent Phoenix Natural Gas price determination identified that an increase in regulatory uncertainty could affect i) the cost of debt through a possible downgrade to the credit rating, ii) an increase in the cost of equity and iii) the willingness to invest, particularly in greenfield investments.

The 2013 Water UK investor survey identified that regulatory risk was, by a significant margin, the most important risk factor identified by investors.

Evidence on the scale of the impact on the cost of finance

We have reviewed the literature of empirical and event studies relating to regulatory risk. These studies show that the impact on the cost of financing from regulatory actions can be significant and that regulatory uncertainty is associated with an increase in the cost of finance.

We have also developed a model that estimates the impact of increased regulatory discretion on the cost of finance. This is based on the published methodologies from rating agencies used to determine the credit rating (and hence cost of debt) of utilities.

The Table below summarises the potential scale of the impact of an increase in regulatory uncertainty. The different sources of evidence provide a wide range in terms of the potential impact. It indicates that the impact on the cost of debt could be up to 0.5% while the impact on the cost of equity could be as much as 1%. Overall the impact on the cost of capital could lie between 0.5% and 1.0% which represents a significant increase in the cost of financing utility infrastructure projects.

Table 1. Summary of impacts on cost of finance

Source of evidence	Channel of impact	Impact on cost of finance
Existing academic research on regulatory risk	Cost of equity – based on wider studies	0.41% – 1.19%
	Cost of equity – based on water industry study	0.31% – 0.56%
	Cost of debt	0.05% – 0.20%
Modelling of impact	Cost of debt	0.10% – 0.47%
	Cost of equity	0.08% – 0.71%
	WACC (post-tax)	0.09% – 0.57%

Source: Frontier analysis

1 Introduction

We have been asked by Thames Water to review the evidence on the impact that changes in regulatory uncertainty can have on the cost of financing investment in a utility sector such as the water industry.

In this paper we describe how regulatory uncertainty will influence the cost of finance. We then consider the evidence for the scale of the impact based on a review of academic literature and modelling based on credit rating agencies methodologies for assessing risk.

The remainder of the paper is organised as follows:

- **Section 2** describes the link between regulatory uncertainty, risk and the returns required by investors.
- **Section 3** assesses how regulators from different sectors have considered the issue of regulatory uncertainty.
- **Section 4** summarises the evidence on quantifying the impact of regulatory risk on the cost of finance, based on a review of academic and empirical studies and illustrative modelling based on credit rating agency methodologies.

Supporting evidence is provided in the annexe to the report.

2 Relationship between regulation and risk

In this section we explore the links between regulation, risk and return. It describes the mechanisms through which regulation affects the risk faced by debt and equity investors and considers the importance of regulation relative to other risk factors for investors in utilities.

2.1 Introduction to risk and return

The cost of capital represents the minimum rate of return firms must pay in order to attract capital from investors. As such, it is recognised widely as the rate of profit that firms operating in a competitive market could be expected to earn. The rate of return earned by firms in competitive markets could, in any given year, deviate from the cost of capital. However, *on average*, firms in such markets could be expected to cover their cost of capital.

The cost of capital needs to cover the risks (and opportunity costs) borne by investors in the business. A return that just covers the cost of capital is therefore commensurate with a normal economic return. Regulatory allowances of the cost of capital aim to ensure that the firm can cover its expected financing needs in order to undertake efficient investments and asset maintenance that sustain the provision of services.

The cost of capital is typically measured by the Weighted Average Cost of Capital (WACC). WACC has two basic components:

- the cost of equity capital; and
- the cost of debt capital.

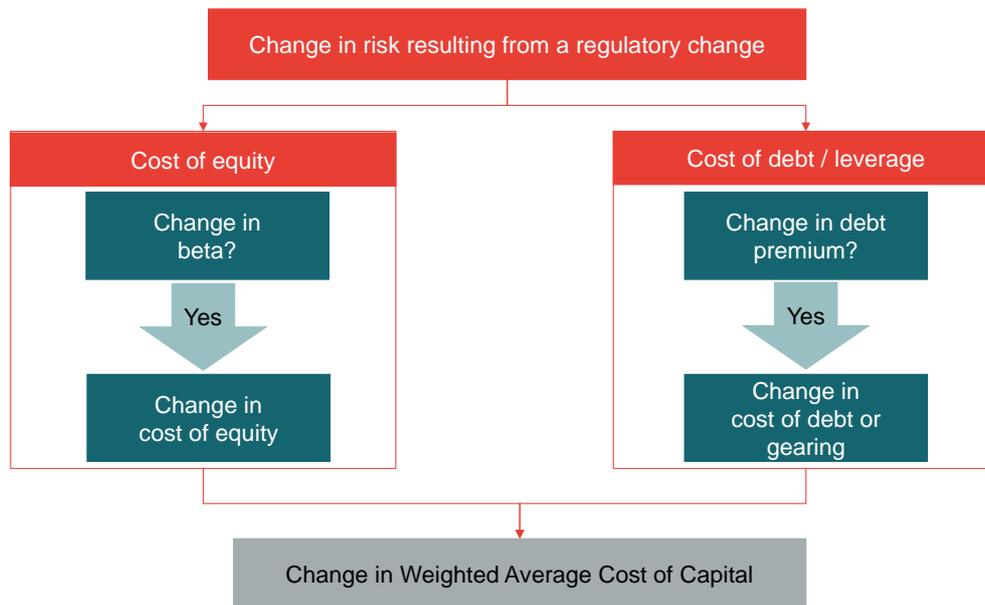
The cost of equity is the expected rate of return required by investors in equity that compensates them for the risk they bear, and the opportunities they forgo by committing funds to the firm. The cost of debt measures the expected cost of borrowing to the business. The WACC calculation weights these two components according to the proportion of debt and equity capital within the business's financing structure, i.e. its gearing.

Changes in risk can affect equity investors and debt investors via different channels. In order to understand the full implications of a regulatory change on the cost of capital, it is necessary to understand the impact on the cost of equity and the cost of debt separately.

2.1.1 Channels for transmitting changes in risk to the WACC

Figure 1 illustrates how a regulatory change could flow through to WACC by altering a risk parameter within the cost of equity (beta) and/or a risk parameter within the cost of debt (the debt premium).

Relationship between regulation and risk

Figure 1. Channels for transmission of risk changes to the WACC

Source: Frontier Economics

The cost of equity to be used in the WACC formula is usually estimated using the Capital Asset Pricing Model (CAPM). The CAPM formula to be applied for this purpose is:

$$\text{Cost of equity} = \text{Risk-free rate} + \text{Beta} \times \text{Equity risk premium}$$

The risk-free rate represents the return on a completely riskless asset and is generally proxied by the yield on government securities. The equity risk premium measures the premium (over and above the risk-free rate) that investors might expect to earn by investing in a fully diversified portfolio of all risky assets in the economy (i.e. “the market”). Beta measures the responsiveness of the company’s equity returns to changes in overall market returns. It therefore captures the riskiness of the equity invested in the company. A change in regulatory circumstances that alters the risk that equity investors expect to bear will feed through to the cost of equity by causing the beta to change.

The cost of debt may be represented as follows:

$$\text{Cost of debt} = \text{Risk-free rate} + \text{Debt premium}$$

The debt premium reflects, among other things, the credit risk of a company. Any regulatory change that alters the riskiness of a company’s debt will do so by altering the debt premium. A company’s credit risk depends, in part, on its capital structure (i.e. gearing level). In general, the higher the level of gearing, the greater is the credit risk and, therefore, the higher is the cost of debt.

In practice, a company's debt is observable directly, for example by examining the yields on bonds issued by the firm. However, a company's cost of equity cannot be observed in the same way. It needs to be estimated using asset pricing models such as the CAPM.¹

The foundation of all these asset pricing models is the risk-return trade-off, which says that, all else being equal, the greater the risk borne by investors, the higher the returns they expect in exchange for supplying capital. CAPM, which is the principal asset pricing model used by UK regulators, including Ofwat, is built on the risk-return trade-off.

2.1.2 Diversifiable vs. non-diversifiable risks

One of the key insights provided by the CAPM is that only non-diversifiable risks should matter to investors. Therefore, investors should only expect to be compensated for risks that they cannot eliminate by holding a well-diversified portfolio of assets.

While this principle is correct, there can be confusion and a lack of clarity when CAPM is applied about how different risks should be classified. It is common to hear practitioners discuss diversifiable and non-diversifiable risks as binary, non-overlapping concepts.

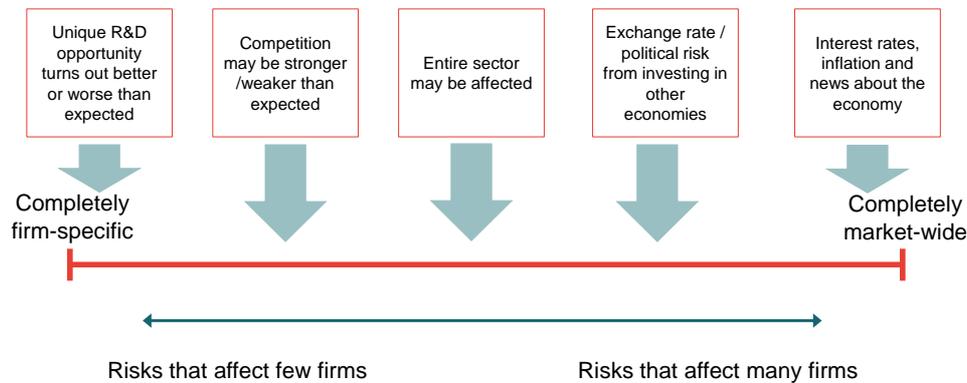
Regulators often cite this insight from the CAPM as a reason why many of the risks that companies feel are important and real as risks that should be regarded as irrelevant for the purposes of setting allowed rates of return. For example, Ofwat stated, in its consultation paper on future price limits:

“In our discussion paper on ‘Financeability and financing the asset base’, which we published in March 2011, we said that where companies receive a strong reward for being the best, we will consider whether there is a case for a symmetrical, strong penalty if a company’s performance is significantly worse than its peers and (or) it is failing to deliver the outcomes customers want. We consider that an increased and more symmetrical range of possibilities is a diversifiable risk for investors so should not affect the cost of capital.”² (emphasis added)

A more useful way of thinking about the risks that real businesses face is in terms of points along a *spectrum*, as represented in **Figure 2**.

¹ Other asset pricing models considered by UK regulators include the Fama-French three-factor model, and the Dividend Growth Model.

² Ofwat, Future Price Limits – a consultation on the framework, page 32

Figure 2. Spectrum of risks

Adapted from: Damodaran (2001), *Corporate Finance: Theory and Practice*, chapter 6.

Located at the extremes of this spectrum are purely diversifiable risks and purely non-diversifiable risks. However, it is unusual for risks faced by companies to lie at one extreme or the other.

An example of a very firm-specific risk could be the risk that an R&D opportunity that is available to only one firm in the market turns out to be more or less successful than expected. From the perspective of investors, this risk should be largely diversifiable because it only affects one firm. However, it is impossible to say that the risk is *completely* diversifiable because the unanticipated success or failure of the initiative could have its origins in factors outside the control of the firm, and these factors may also impact on other firms (albeit in different ways).

Slightly further along the spectrum may be risks arising from competition between a small number of firms (e.g. a few firms may be in a race to win a supply contract, but only one of these competitors will be successful). An equity investor may largely eliminate this risk by holding shares in a number of competing businesses. Again though, the success or failure of individual competitors may depend, at least partly, on macroeconomic factors that also influence the performance of the economy more generally. This element may be non-diversifiable, even with a very wide investment portfolio.

Further still to the right along the spectrum may be risks that affect a whole industry (e.g. the change to an industry-wide regulatory regime). Again, these risks may be partially diversified. However, the underlying source of the risks affecting the industry in question may be more economy-wide in nature.

The vast majority of the risks that businesses face lie between the extreme ends of the spectrum described above. For this reason, **when regulators evaluate how business risks will influence the allowed rate of return they set, the**

reasonable presumption is that at least some element of these risks are non-diversifiable.

2.2 Role of regulation in the cost of financing

This section considers how regulatory action, and regulatory design, can influence the cost of capital by altering the risks faced by businesses. In this regard, there are two distinctions to be made:

- First, the **system of regulation** may, itself, impose a certain risk profile on companies. By way of illustration, we explain how a system of incentive regulation could give rise to a very different cost of capital than would a system of (US-style) rate-of-return regulation.
- Secondly, **regulatory actions**, that either increase or lower uncertainty about how the system of regulation will work in future, can alter the risks faced by companies. This would include regulatory reform processes such as *Future Price Limits* and *RPI-X@20*. We provide a discussion of the economic consequences of **regulatory risk**.

2.2.1 The system of regulation can influence risk and the cost of capital

A company's risk profile can be influenced by the nature of the regulatory system it faces.³ To help illustrate this concept we discuss the effect of two alternative systems of regulation — rate-of-return and price-cap — on firms' cost of capital. In this section we present both the theoretical intuition and empirical evidence on this issue.

Rate-of-return regulation and price-cap regulation could be viewed as two extremes of a spectrum of possible regulatory systems. Under pure price-cap regulation, prices are set for a number of years, based on a forecast of efficient costs. If a company manages to reduce costs below these forecast levels, it may keep the profits from doing so for the remainder of the control period. Therefore, price-cap regulation provides firms with incentives to improve efficiency. At each periodic price review, the regulator resets its forecast of efficient costs, informed partly by outturns from the previous period. This has the effect of passing on some of the benefits from efficiency gains through to customers.

³ See, for example, Parker, D. (2003), 'Performance, risk and strategy in privatised, regulated industries: The UK's experience', *International Journal of Public Sector Management* 16(1), 75 – 100; Wright, S., Mason, R., Miles, D. (2003), 'A study into certain aspects of the cost of capital for regulated utilities in the U.K.', a *Smith & Co. Ltd. report to the OFT and U.K. economic regulators*; Guthrie, G. (2006), 'Regulating infrastructure: the impact of risk and investment', *Journal of Economic Literature* XLIV, 925–972.

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The efficiency incentives provided by a price-cap system exposes regulated firms to cost outturns deviating from forecasts. In order to be compensated for this risk, investors will demand a higher rate of return, which will be reflected in a higher cost of capital. This is supported by empirical evidence, as shown below.

In addition, the length of time between regulatory reviews can affect systematic risk, as shown by Gandolfi *et al* (1996).⁴ Using a conceptual model, and simulated data, they show that under a price-cap system, shortening the price control period reduces companies' betas because prices are re-set more frequently. This effectively 'buffers' firms against cost shocks. As the control period is lengthened, the exposure to cost risk increases, thus driving betas up.

These different regulatory systems create different risk-sharing arrangements between the firm and consumers, and different incentives for the firm. Firms under price-cap regulation tend to be exposed to higher systematic risk than those under rate-of-return regulation. This intuition has been confirmed by empirical research by Alexander *et al* (1996), and Alexander and Irwin (1996), who compare asset betas under different regulatory systems, varying from close to pure price-cap regulation to those close to pure rate-of-return regulation.⁵ They find that companies facing incentive-based regulatory systems tend to have higher asset betas than those that do not.

2.2.2 Regulatory action can alter the risk faced by companies

Apart from the broader regulatory system itself, the actual behaviour of the regulator within a given system can influence the risks borne by the regulated firm and investors. There are a number of reasons why regulatory risk can be correlated with market risk. In periods of unfavourable economic conditions, regulators might be less inclined to raise allowed rates of return to regulated firms in order to avoid increasing the burden on consumers.⁶ This would cause regulatory actions to be correlated with general macroeconomic conditions. This in turn will mean that the effect of regulatory decisions will be difficult to diversify, so such changes will affect the cost of capital.⁷

⁴ Gandolfi, Jenkinson and Mayer, 1996. 'Regulation and the cost of capital.' *Working Paper, School of Management Studies*, University of Oxford.

⁵ Alexander, I., Mayer, C., Weeds, H. (1996), 'Regulatory structure and infrastructure firms: an international comparison', *World Bank Policy Research Working Paper* 1698; Alexander, I., Irwin, T. (1996), 'Price caps, rate-of-return regulation, and the cost of capital', *World Bank* note number 87.

⁶ In fact, an asymmetry may arise because pressure from consumer groups and industrial customers may make it difficult for regulators to raise prices in bad times, and the regulator could justify disallowances of price increase

⁷ Burkhard, p., 2010. 'Regulatory risk and the cost of capital. Determinants and implications for rate regulation. Springer Berlin- Heidelberg 2010. Pp. 37

In relation to the impact of regulatory actions on company risk, it is useful to distinguish between two categories for regulatory action.

- First, predictable regulatory changes can increase the correlation of the regulated firm with market risk. This is not necessarily a source of harm for society. For example, regulatory action that introduces competition into a sector may increase the risks faced by firms regulated within that sector, but the change may nevertheless raise overall welfare to society.
- Second, regulatory action can create uncertainty about how the system will work in future. This is potentially more harmful to society. Unpredictable regulatory conduct can create uncertainty for firms and, ultimately, for investors. Depending on the source and nature of the uncertainty, this could raise the firm's cost of capital.

The effect of predictable regulatory change

Predictable regulatory change can alter company risk by altering the sensitivity of firms' allowed cash flows (and, therefore, returns) to market movements. For example, the introduction of a set of rules designed to help manage the impact of market shocks on the business (e.g. price control reopeners) could be expected to lower the systematic risk of businesses, provided that investors are clear about how these rules will work. Clarke (1980) examines how the introduction of the fuel adjustment clause (FAC) affected the systematic risk of electric utilities in the 1970s.⁸ The FAC was a mechanism that allowed US regulated utilities to pass through increased cost of fuel automatically by adjusting the price of electricity charged to consumers. Clarke finds that the systematic risk of firms that were able to use the FAC decreased by approximately 10%.

Several empirical studies find significant effects of regulation on the regulated firms' cost of capital. Trout (1996)⁹, Archer (1981)¹⁰ and Dubin and Navarro (1982)¹¹ compared utilities in different US states, to investigate the effect of variations in state-level regulations on the cost of capital. These regulations can differ in terms of known rules around the length of regulatory lag between reviews or the use of automatic adjustment clauses for certain cost components. A favourable regulatory climate is associated, among other things, with a shorter

⁸ Clarke, R., G., 1980. 'The effect of fuel adjustment clauses on the systematic risk and market values of electric utilities.' *The Journal of Finance*, vol. 35, no. 2, pp. 347-58.

⁹ Trout, R., R., 1979. 'The regulatory factor and electric utility common stock investment values.' *Public Utilities Fortnightly*, November 22 1979, pp.28-31.

¹⁰ Archer, S., H., 1981. 'The regulatory effects on cost of capital in electric utilities.' *Public Utilities Fortnightly*, February 26 1989, pp. 36-9.

¹¹ Dubin, J., A., and Navarro, P., 1982. 'Regulatory climate and the cost of capital. In: regulatory reform and public utilities', ed. By Michael A. Crew, Boston/Dordrecht/London 1982, 141-66.

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regulatory lag and higher cost pass-through. All these studies find that regulatory climate has a significant effect on the cost of capital.

The effect of regulatory changes that increase uncertainty

Uncertainty over the future expected behaviour of the regulator can also affect the cost of capital for the regulated firm. A number of studies have examined the effect of regulatory uncertainty.

- Antoniou and Pescotto (1997) examined the effect of the 1987 and 1992 UK general elections on the beta of BT. They found that in the build-up to the 1987 election, there was a statistically-significant increase in BT's beta, whereas in the lead-up to the 1992 election they detected a statistically-significant reduction in BT's beta, despite a Conservative win on both occasions and a stronger threat from Labour in 1992. They argue that the difference in results could be explained by a change in Labour's intentions towards BT between the two elections.
- Buckland and Fraser (2001) studied the impact of the 1992 UK general election on the betas of 12 regional electricity companies, which were privatised in 1990. The Conservative victory at those elections was one of the more unexpected results during the 20th century and in the month leading up to the election on 10 April, speculation of a Labour victory was intense. Buckland and Fraser found statistically-significant evidence of the betas of the RECs rising significantly during this period, peaking on the day of the election, in anticipation of stricter regulation to come. This would have had the effect of raising the RECs' costs of capital, all else being equal.
- Brunekreeft and McDaniel (2005) look at policy uncertainty which impeded investment incentives in the electric power industry in the US in the late 1990s.¹² They find that investments were at their lowest during the period after plans for deregulation in the sector were underway, but before definitive commitments were made (1997 to 1999). Investments then rebounded when the regulator (the FERC) published its orders (after 2000). This evidence suggests that the industry was waiting for the regulatory uncertainty to pass before making investments. These results are supported by the findings by Billingsley and Ullrich (2011).¹³

The empirical results of these and other studies are considered in Section 4 and Annexe 1.

¹² Brunekreeft, G., McDaniel, T. (2005). 'Policy uncertainty and supply adequacy in electric power markets', *Oxford Review of Economic Policy* 21(1).

¹³ Billingsley, R. S., Ullrich, C. J. (2011), 'Regulatory uncertainty, corporate expectations and the postponement of investment: the case of electricity market deregulation', *working paper*.

2.2.3 Water UK investor survey evidence

The 2013 Water UK Investor Survey¹⁴ gathered information from 79 financial market participants, covering the following groups:

- listed equity investors in the water sector;
- unlisted equity investors in the water sector;
- debt investors holding water company bonds;
- bank lenders to the sector; and
- other representatives of the investment community, including credit rating agencies and analysts.

The survey covered a number of topics covering investor objectives, impact of financial market developments and changes in the perception of risk in the sector.

In one of the questions investors were asked to identify the top three risks facing the water sector. Investors identified five main risks: regulatory, political, inflation, operational and climate. By far the most important of these was regulatory risk. **Table 2** shows the proportion of investors from each category that identified regulatory risk as the most important risk. Overall, roughly 93% of the investors stated that regulatory risk was the top risk in the sector.

Table 2. Importance of regulatory risk to water sector investors

	% Identifying Regulatory Risk as a Top 3 risk		
	1st	2nd	3rd
List equity investors	100%	-	-
Unlisted equity investors	97%	3%	-
Banks	86%	14%	-
Bondholders	83%	11%	-

Source: Water UK Investor Survey 2013

The survey also asked investors about their perception of the licence modification process that took place in 2011 and 2012. Ofwat had consulted on changes to water company licences that would have introduced greater discretion regarding the future regulation of the sector (specifically the proportion of

¹⁴ “2013 Survey of Investors in the water sector”, A report by Indepen for Water UK, June 2013.

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revenue covered by price cap regulation and the future basis for indexing the asset base). The proposals caused concern for investors and companies and were subsequently revised. The investor survey asked whether the proposals had made the industry more or less attractive to investors. The results, shown in **Table 3**, show that a large majority of investors considered that the process had made the sector less attractive.

Table 3. Impact of licence modification proposals

	Made the sector less attractive	No difference	Made the sector more attractive
List equity investors	90%	10%	-
Unlisted equity investors	97%	3%	-
Banks	67%	33%	-
Bondholders	69%	31%	-

Source: Water UK Investor Survey 2013

These results from the investor survey highlight that changes to regulation are seen as a highly significant risk factor for investors in regulated utilities.

3 Regulators' approaches to regulatory uncertainty

Regulators acknowledge that regulation can influence risk, and many have formalised policies to ensure that adaptation of the regulatory system is done in such a way as to minimise uncertainty and regulatory risk. Below, we survey some relevant examples of such policies.

3.1 Ofgem's RIIO framework

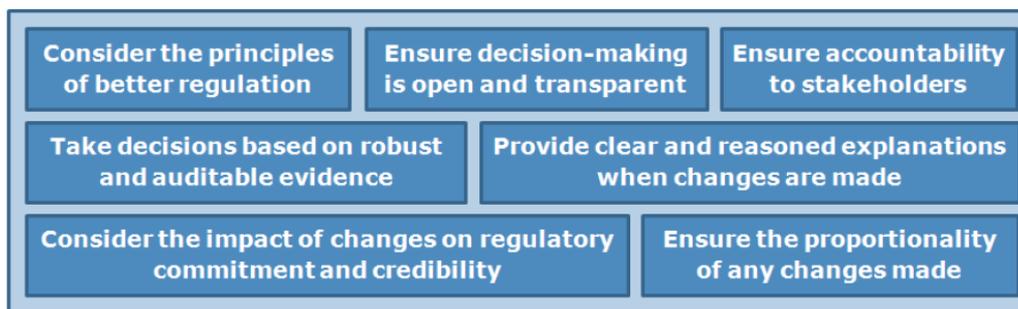
In October 2010 Ofgem completed RPI-X@20, a comprehensive review of the system used to regulate energy networks in Great Britain. As a result of this review, Ofgem decided it would move to a new system of regulation known as RIIO¹⁵

Ofgem expects the RIIO model to be long-lived, but that it may need to be adapted over time in order for it to remain fit for purpose. Crucially, Ofgem recognised explicitly that along with the benefits that come with an adaptable system:

"...there are potential downsides in terms of the impact on regulatory commitment and certainty. We will therefore be transparent about how adaptation could take place. We will seek to ensure consistency with the principles of better regulation when making any modifications to the RIIO model."

The principles of better regulation referred to by Ofgem are summarised **Figure 3** below.

Figure 3. Principles to adopt in adapting the RIIO model



Source: Ofgem (2010), *Handbook for implementing the RIIO model*, 4 October, p.12

These principles are all designed to minimise regulatory uncertainty.

¹⁵ Ofgem (2010), 'Handbook for implementing the RIIO model', 4 October

In order to satisfy these principles, Ofgem made the following commitments:

- publication of reports following price control reviews summarising lessons learned, including the effectiveness and transparency of the process and recommendations for future reviews;
- ongoing monitoring and publication of company performance in delivering against primary outputs and of the rewards they have earned from doing so; and
- adopting best practice knowledge retention procedures, including keeping and sharing records of data, discussions, and decisions from one review to the next.

Commitments of this kind can be important but though it should be noted that they cannot address all concerns relating to regulatory risk.

3.2 Competition Commission – Phoenix Natural Gas

In February 2012 Phoenix Natural Gas Limited (PNGL) rejected the price control proposed by the Northern Ireland energy regulator (UR). UR subsequently referred the price control to the Competition Commission (CC) to investigate whether the price control conditions operated against the public interest. The dispute was focussed on UR's proposal to write off approximately 25% of PNGL's regulated asset base (RAB).

PNGL argued that this proposal to be unexpected, unjustified, and contrary to the principles of incentive regulation, since it retrospectively altered the previously agreed value of PNGL's asset base. UR argued that it was acting in line with regulatory practice, and protecting the interests of customers, by removing "unspent allowances" from the asset base after 5 years.

The CC¹⁶ found that UR's proposal had not been adequately signalled and that the rationale for it was not sufficiently well communicated or understood. Changes to the regulatory framework that were enacted in this way *"would lead to a perception of regulatory uncertainty, as investors may assume that UR's future actions could be unpredictable....Investors may anticipate that in addition to normal commercial risks there could be greater uncertainty in the future about the regulatory environment, and thus increased risks that returns on investment will not be realized in the way or to the extent that is expected. This is likely adversely to affect investment decisions in the future."*

The CC identified the ways in which customers could be harmed by retrospective interventions in the long-run. It highlighted three possible mechanisms by which

¹⁶ Competition Commission, Phoenix Natural Gas Limited price determination, November 2012.

the willingness to invest and the cost of finance could be adversely affected by UR's proposals:

- The credit ratings agencies may “view the regulatory regime as less favourable and, as a result, may demand higher credit metrics for a given credit rating, which may lead to a downgrade of a company’s debt. This may have the effect of decreasing the amount of debt that a company can have in its capital structure and/or increasing the cost of the company’s debt, both of which could lead to an increase in the overall WACC.”
- Equity investors may consider that the regulatory regime is less attractive, and as a result “may increase the return that they require for investing in a given project. This may have the effect of increasing the required rate of return, in particular for greenfield investments”.
- Finally, a perception of regulatory uncertainty may deter investment “if companies are unable to form judgements or are very uncertain of what the regulatory environment will be and if, how or when they will receive a return on investments”.

Therefore the CC considered that regulatory uncertainty would affect both the cost of debt and the cost of equity. It stated that “any effects on the cost of equity could be long-lived because the investment community may be expected to take into account UR’s track record over a relatively long time period when investing in infrastructure assets with a similarly long life.” [para 8.94]

The CC did not quantify the scale of the impact of regulatory uncertainty on the cost of capital. Nevertheless it concluded that “it is our judgement that these effects could be significant. As an illustrative example, applying a 50 basis point uplift to the cost of capital to NIE’s and PNLG’s combined RABs of approximately £1.8 billion would equal £9 million a year. This does not take into account any effects on other regulated investments and on future greenfield investments.” [para 8.99]

3.3 Reform of aviation regulation

In the Impact Assessment of the recent Civil Aviation Act the Department for Transport considered the effect that the proposals could have on regulatory risk and the cost of capital.

“Another way in which the new regime could lead to improved regulatory outcomes and reduced consumer detriment is by reducing the cost of capital. The cost of capital allowance that is factored into the price cap reflects the return that investors demand to compensate them for the risks of investing in airports. Reductions in risk will reduce this cost, as investors will accept a lower return for a less risky investment. Removing the automatic referral of every price control decision to the CC, introducing rights for airport operators to challenge regulatory decisions on their merits and introducing a financing duty for the regulator should deliver improved certainty (and therefore reduced risk) for investors, and it is therefore possible that the reforms could lead to a reduction in the cost

Regulators’ approaches to regulatory uncertainty

of capital. By applying very modest reductions to the current cost of capital, we are able to illustrate the scale of potential benefits to passengers (or put differently the potential reduction in consumer detriment) that could be delivered by the new regime. Airport operators have indicated that they believe many elements of reform will reduce the level of regulatory risk, which could have a positive impact on the cost of capital.” (emphasis added)

The Impact Assessment assumed that the impact of reduced regulatory risk could lower the cost of capital by 0.05%, although it recognised the difficulties in applying a precise estimate.

“The precise impact on the cost of capital that could be achieved by the reforms is extremely difficult to accurately predict in advance, particularly since much depends on the reaction of investors and there is no past empirical evidence from other regulatory regimes or internationally which disaggregates the impact of similar regulatory reform. However, the proposed measures are widely perceived by stakeholders to clarify the approach of the regulatory regime, and a moderate net reduction in perceived risk is therefore entirely possible. We reflect this by assuming an average reduction of 0.05% in the cost of capital across the three regulated airports”

3.4 Department for Business Innovation and Skills

In April 2011¹⁷ the Government set out principles and commitments for effective economic regulation. These principles apply to Ofwat as well as a number of other UK regulators. The principles set out by the government were: (pp.4-5).

- Economic regulators should have adequate discretion to choose the tools that best achieve these outcomes.
- The framework for economic regulation should provide a stable and objective environment enabling all those affected to anticipate the context for future decisions and to make long term investment decisions with confidence.
- The framework of economic regulation should not unreasonably unravel past decisions, and should allow efficient and necessary investments to receive a reasonable return, subject to the normal risks inherent in markets.
- The framework of economic regulation needs capacity to evolve to respond to changing circumstances and continue to be relevant and effective over time.

The government noted that:

¹⁷ BIS (2011), ‘Principles for Economic Regulation’, April 2011.

“Inevitably, these principles will sometimes come into conflict. For example, ensuring a system that is adaptable and fully coherent with Government policy may present a challenge to maintaining its stability and predictability. A successful regulatory framework requires an appropriate balance to be struck between the principles.” (p.5)

On the principle of *predictability* the government said:

“Economic regulation plays a significant role in establishing the terms under which investment is made. Efficient investment is an important part of promoting the long-term interests of consumers. It is important that the regulatory frameworks avoid adding undue uncertainty to the business environment. (Emphasis added)

To a large extent this is achieved by building a stable and transparent regulatory environment with a long track record of consistent regulatory decision making. A history of rational regulatory decisions, which can be objectively justified, creates an expectation that a narrow set of outcomes will follow a given set of circumstances. This in turn will help both investors and consumers to predict regulatory decisions. On the other hand, piecemeal, ad hoc or unanticipated changes in policy or regulatory responsibilities are likely to erode investor confidence and increase the cost of capital. (Emphasis added)

...

A balance needs to be struck between the principles of predictability, adaptability and coherence. In order to maximise the benefits from a stable regulatory system Government should offer a credible commitment to restrain itself, as strategic visions should not be changed too frequently and should be updated according to a pre-announced calendar. (Emphasis added)

The Government can also play an important part by ensuring it assesses the effect on investor confidence when considering changes to the regulatory frameworks. (Emphasis added)” (pp.8)

In relation to the principle of predictability, the government made the following commitment:

“The Government will have particular regard to the effect on investor confidence when assessing changes to the regulatory policy and regulatory frameworks. This will be addressed in the impact assessments of any proposed changes.” (p.9)

3.5 Summary

In summary, this section has shown that importance of regulatory certainty to achieving efficient financing costs is also supported by the statements and policies adopted by regulators’ and Government.

4 Evidence on the scale of impact on the cost of finance

The previous two sections have argued that regulatory actions, and regulatory design, can affect the cost of capital. In this section we consider the likely scale of any impact on the cost of capital. We have considered evidence from two main sources:

- First, the empirical evidence on the impact of regulatory actions on the cost of finance. This is based on a review of published research in the form of event studies. The focus of the research is on regulated sectors in the UK and the USA.
- Second, an assessment based on a model of how regulatory uncertainty feeds into the assessment of credit ratings and therefore onto the cost of finance through impacts on either the cost of debt or the level of gearing.

4.1 Evidence from event studies

We have reviewed the relevant empirical research studies on the impact on financing costs of regulatory changes and regulatory uncertainty. The evidence from these studies is summarised below on both the cost of equity and the cost of debt. A summary of all the reviewed studies is provided in Annexe 1.

4.1.1 Cost of equity

Results from published studies

There are a number of published event studies that have examined how regulatory changes have affected the betas of companies (i.e. within the CAPM structure) or the volatility of equity returns. These studies have focussed on the following types of events that affect the risk faced by regulated industries:

- regulatory price control decisions;
- announcements relating to changes in future regulatory policy;
- announcements relating to possible regulatory actions or behaviour;
- government decisions or consultations relating to the regulated sector (i.e. introduction of competition); and
- political events (i.e. general elections) that relate to possible changes in government policy.

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The detail of the methodology used to estimate the impact varies from paper to paper. The general approach is to estimate a time-varying model for the beta of the utilities and then to include dummy variables to capture the impact of specific evidence. The estimation can be done individually for each specific event or estimated in a more general form. A similar econometric approach is adopted by the models that consider the impact on equity volatility rather than the CAPM beta.

A summary of the most relevant event studies on the cost of equity is provided in **Table 4**.

Table 4. Event studies of regulatory uncertainty on the cost of equity

Study	Description	Range of estimated impacts ¹⁸
Antoniou and Pescetto (1997)	The study considered the impact of around 30 regulatory and policy announcements affecting BT	Average absolute change in cost of equity = 1.1% Range of impacts: 1.6% to 1.4% (based on 10 th and 90 th centiles)
Pescetto (2008)	The study considered the impact of 116 regulatory announcements affecting the water industry in England & Wales	Range of impacts: 0.31% to 0.56%
Paleari and Redondi (2005)	The study considered the impact of 30 regulatory and policy announcements on the betas of Regional Electricity Companies (RECs)	Average absolute change in cost of equity = 0.3% Range of impacts: -0.44% to 0.3% (10 th and 90 th centiles)
Buckland and Fraser (2001)	The study estimated the impact on REC betas of events during the 1992 General Election	Average absolute change in cost of equity = 1.0% Range of impacts: 0.05% to 4.25%
Robinson and Taylor (1998a)	The study examines the impact of 30 significant regulatory events on the expected volatility of RECs' share returns before and after the regulatory events. They find that regulatory actions marking the start of a consultation on regulatory policy, had a negative effect on RECs' returns.	39 out of 58 regulatory events showed a significant and persistent increase in equity volatility
Robinson and Taylor (1998b)	The study considered impact on volatility of regulator's announcement of reopening the REC price control in March 2005.	Share price volatility increased significantly for 8 out of 12 of the RECs and that this higher volatility persisted afterwards.

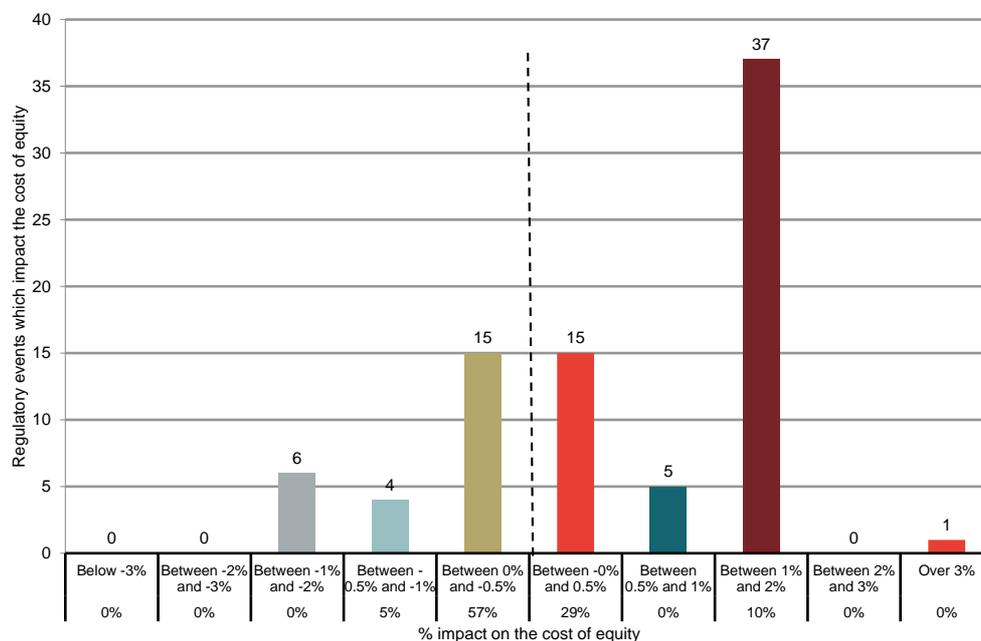
Source: Frontier analysis

¹⁸ We have converted the estimated changes in beta into impact on the cost of equity using standard assumptions for the equity risk premium. These are set out in Annexe 1.

These studies indicate that the impact of regulatory events on the cost of equity for utility companies can be significant. The two studies by Robinson and Taylor looked at the impact on equity volatility rather than CAPM betas. However, there is strong conceptual and empirical support that any increase in volatility will translate into an increase in required returns.

Figure 4 below show the distribution of the impacts from three of the studies combined: Antoniou & Pescetto (1997), Buckland & Fraser (2001) and Paleari & Redondi (2005). These studies cover a range of regulatory announcements and political events. The Figure shows that a significant proportion of the events had an impact on the cost of equity of more than 1%¹⁹.

Figure 4. Impact on cost of equity – summary of event studies



Source: Frontier analysis

In **Table 5** we summarise the evidence from these studies on the absolute change in the cost of equity arising from the events (i.e. treating equally the decreases and increases in the cost of equity). It shows that the average impact was 0.87% and the interquartile range is 0.41% to 1.19%.

¹⁹ These have been calculated using general assumptions of a 5% equity risk premium.

Table 5. Impact on cost of equity – summary of event studies

	Change in the cost of equity
Mean of absolute changes	0.87%
Lower quartile	0.41%
Upper quartile	1.19%

Source: Frontier analysis

The Pescetto (2008) study was focussed on the water industry and looked at the impact of a number of regulatory announcements in the period 1989 to 1995. The impact on the cost of equity of the significant events was in the range 0.31% to 0.56%.

4.1.2 Cost of debt

The existing research on the impact of regulatory uncertainty on the cost of debt is significantly more limited. The main paper that we have analysed was by Prager and published in 1989²⁰. In this paper the author analysed the impact of specific regulatory policies on the cost of debt for US electric utilities in 1979. He tested the effect of regulatory variables on the cost of debt, measured as the yield to maturity on the firm's debt issues.

The analysis found that regulatory decisions have significant effects on the cost of debt for electric utilities. In particular regulatory factors relating to treatment of construction work in progress, the granting of interim rate relief, and regulatory delay following an application for a rate increase have a strong net impact on the cost of debt.

These results are summarised in **Table 6** below.

²⁰ Prager, A., R., (1989). 'The effects of regulatory policies on the cost of debt for electric utilities: an empirical investigation'. *Journal of Business*, vol. 62, no. 1, pp. 33-53.

Table 6: Impact of regulation on the cost of debt of US utilities, Prager (1989)

Regulatory variable	Expected impact on cost of debt	Change in cost of debt % ²¹
Average length of regulatory lag (per month of increase)	Increase	Range 0.044% to 0.048%
Granting of interim rate relief (which allows the company that has applied for a rate increase to collect higher rates, subject to refund, during the course of the regulatory proceedings)	Decrease	Range: -0.187% to -0.199%
Inclusion of construction work in progress in the rate base	Decrease	Range: -0.148% to -0.208%

This analysis suggests that the scale of impact of regulatory discretion on the cost of debt is between 0.05% and 0.2%.

However, given the limited scope of this evidence we consider that for the cost of debt impact greater weight should be placed on the model of credit ratings outlined below.

4.2 Modelling the impact of increased regulatory risk

The section develops a model to estimate the impact of increased regulatory uncertainty on the cost of finance. The model focuses on the impact of uncertainty on the terms on which water companies will be able to raise debt finance. It is based on credit rating agencies' methodologies for assessing the ratings of regulated utilities.

4.2.1 Regulatory risk in rating methodologies

The model reflects the methodologies published by credit rating agencies, which take into account the level of risk embedded in companies' regulatory framework. Our approach is based on Moody's methodology²² as the agency provides the quantitative elements necessary to model the impact.

The figure below shows that the ratings hinge on four factors:

- **Regulatory environment and asset ownership model**, which reflect the company's expected ability to recover cost in a consistent manner over time.

²¹ Range based on the restricted and unrestricted equations estimated in the paper.

²² Moody's Global Infrastructure Finance, 'Global Regulated Water Utilities – Rating Methodology', December 2009.

Evidence on the scale of impact on the cost of finance

- **Operational characteristics and asset risk**, which reflects the company's capacity to carry out its investment plan.
- **Stability of business model and financial structure**, which capture the exposure of lenders from the company engaging in new or unregulated activities.
- **Key credit metrics**, which account for the financial parameters that best reflects the likelihood of default.

Figure 5. Moody's methodology for rating regulated water utilities

Factor	Weighting
1. Regulatory Environment & Asset Ownership Model	40%
1. a) Stability & Predictability of Regulatory Environment	15%
1. b) Asset Ownership Model	10%
1. c) Cost and Investment Recovery (Ability & Timeliness)	12%
1. d) Revenue Risk	3%
2. Operational Characteristics & Asset Risk	10%
2. a) Operational Efficiency	5%
2. b) Scale & Complexity of Capital Programme & Asset Condition Risk	5%
3. Stability of Business Model & Financial Structure	10%
3. a) Ability & Willingness to Pursue Opportunistic Corporate Activity	3.33%
3. b) Ability & Willingness to Increase Leverage	3.33%
3. c) Targeted Proportion of Revenues Outside Core Water and Wastewater Activities	3.33%
4. Key Credit Metrics	40%
4. a) Adjusted Interest Coverage OR FFO Interest Coverage	15%
4. b) Net Debt to Regulated Asset Base OR Debt/Capitalisation	15%
4. c) FFO / Net Debt	5%
4. d) RCF / Capex	5%

Source: Moody's, December 2009

It is clear that the "Regulatory Environment and Asset Ownership Model" is a key element in the assessment as it makes up 40% of the overall assessment of the credit rating. Therefore a lower score in this area (i.e. increased regulatory risk) results in a worsening of the overall credit rating.

4.2.2 The impact of an increase in regulatory uncertainty

Our model quantifies the cost of the risk inherent to the level of regulatory uncertainty. In Moody's methodology, this risk is captured in the following criteria:

- "Stability and Predictability of Regulatory Environment"; and
- "Cost and Investment Recovery (Ability & Timeliness)".

Our approach therefore involves lowering the score awarded for these elements.

**Evidence on the scale of impact on the cost of
finance**

We have modelled the impact of a change in regulatory uncertainty based around the typical rating position in the England & Wales water industry.

- Over the past few years water companies have typically held credit ratings in the range A3 to Baa2.
- The Stability and Predictability of Regulatory Environment for water companies in the UK is rated Aaa by Moody's.
- The Cost and Investment Recovery factor is rated A by Moody's.

Figure 6 and Figure 7 below show how Moody's scores Stability and Predictability of Regulatory Environment and Cost and Investment Recovery.

Figure 6. Moody's guidelines for Stability and Predictability of regulatory regime

Rating Category	Aaa	Aa	A	Baa	Ba
(a) Stability and Predictability of Regulatory Environment	Regulation is independent, well established (>15 years of being predictable and stable) and transparent (published methodologies clearly define risk allocation between companies and customers and are consistently applied, with public or shared financial model)	Regulation is independent, reasonably well established (>10 years of being predictable and stable) and transparent (published methodologies clearly define risk allocation between companies and customers and are generally consistently applied) Regulatory framework has been mostly predictable and stable in recent years and is supportive of utilities	Regulation is generally independent and developed (published methodologies set out principles of risk allocation between companies and customers and are based on established precedents in the same jurisdiction), and has above average predictability and reliability, although regulatory regime may be sometimes less supportive of utilities Utility regulatory body may be a state commission or national, state, provincial or independent regulator	Regulatory framework is well developed, with evidence of some inconsistency or unpredictability in the framework's application OR Regulatory framework is relatively new and untested, but methodologies are based on established precedents and jurisdiction has history of independent and transparent regulation for other utility services Regulatory Environment may sometimes be challenging or politically charged	Regulatory framework is defined but there is a high degree of inconsistency or unpredictability in its application; tariff setting is subject to negotiation and political interference; there has been a history of difficult or less supportive regulatory decisions; some precedents in the country of predictable regulation for other utility services

Source: Moody's, December 2009

Evidence on the scale of impact on the cost of finance

Figure 7. Moody's guidelines for Cost and Investment Recovery

Rating Category	Aaa	Aa	A	Baa	Ba
(c) Cost and Investment Recovery (Ability & Timeliness)	No regulatory or contractual impediment to adjust tariffs (no approval or reviews required)	Tariff formula allows for timely recovery of operating expenditure including depreciation and a fair return on all investment Depreciation allowance fairly reflects asset consumption All capital expenditure is included in asset base as incurred or fully covered by specific riders/surcharges prior to the next rate case Minimal challenges by regulators to companies' cost assumptions	Tariff formula allows for recovery of operating expenditure including depreciation based on allowances set at frequent price reviews (5-yearly intervals or shorter) and a fair return on all efficient investment Depreciation allowance fairly reflects asset consumption Capital expenditure is included in asset base as incurred or partially covered by specific riders/surcharges prior to the next rate case Opex and capex can be subject to efficiency tests Limited instances of regulatory challenges; limited delays to rate or tariff increases or cost recovery	Tariff formula allows for recovery of operating expenditure including depreciation and return on investment but subject to retrospective regulatory approval or infrequent price reviews (> 5-yearly intervals) Some instances of revenue back-loading (e.g. depreciation allowance set below asset consumption or operating expenditure is capitalised) OR Rate/tariff reviews and cost recovery outcomes are usually predictable, although application of tariff formula may be unclear; potentially greater tendency for regulatory intervention and/or to disallow or delay costs	Tariff formula does not take into account all cost components and depreciation is set below asset consumption Revenues allow coverage of most operating expenditure But investment is not clearly or fairly remunerated OR Rate/tariff reviews are inconsistent, with some history of unwillingness to make timely rate changes

Source: Moody's, December 2009

In order to model the impact of an increase in regulatory uncertainty we have considered two scenarios.

Evidence on the scale of impact on the cost of
finance

- In the first scenario, the Stability and Predictability of Regulatory Environment factor is downgraded from **Aaa** to **Aa** and the Cost and Investment Recovery is downgraded from **A** to **Baa**.
- In the second scenario, the Stability and Predictability of Regulatory Environment factor is downgrade from **Aaa** to **A** and the Cost and Investment Recovery is downgraded from **A** to **Ba**.

We would expect the second scenario to show a greater impact on the cost of finance arising from the change in regulatory uncertainty.

4.2.3 Impact on the cost of capital

To estimate the impact on the cost of capital from a mark-down on the credit rating there are two potential approaches:

- first, estimating the effect of the rating downgrade on the cost of debt finance, assuming that the level of gearing is unchanged; and
- second, assuming that the level of gearing is adjusted downwards in order to restore the credit rating to its previous level.

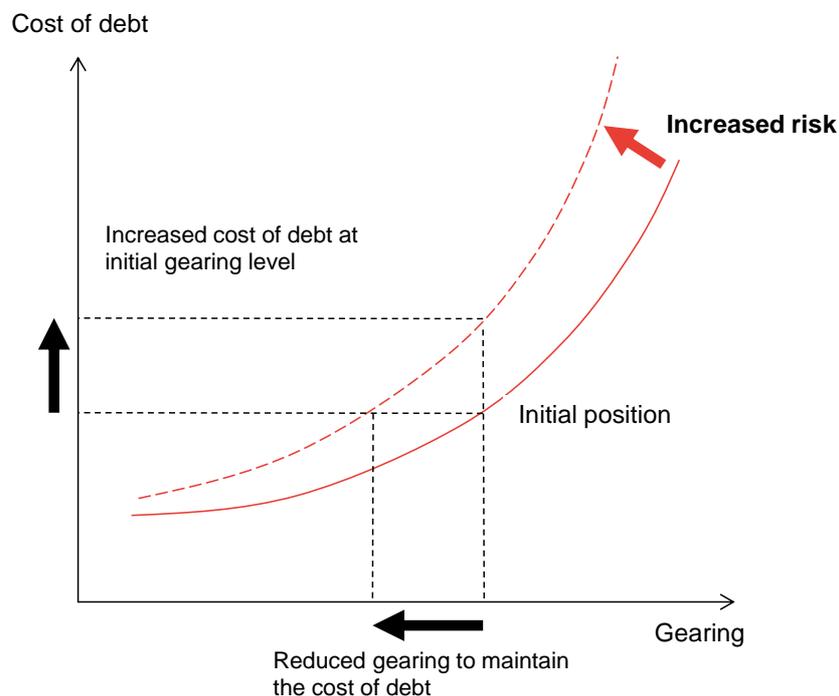
In both cases it is also relevant to consider whether the increase in risk that is captured by the downgrade will have an impact on the cost of equity.

The relationship between the two approaches is illustrated in the Figure below. The Figure shows the relationship between gearing and cost of debt. Each curve represents a given level of risk and an increase in regulatory risk makes the curve move to the left.

The first approach is represented by the vertical shift of the curve and the resulting increase in the cost of debt. The second approach is represented by the horizontal shift as gearing is adjusted to maintain the cost of debt constant.

In this analysis we have focussed on the first approach.

Figure 8. Two approaches to estimating impact of increased risk



Source: Frontier Economics

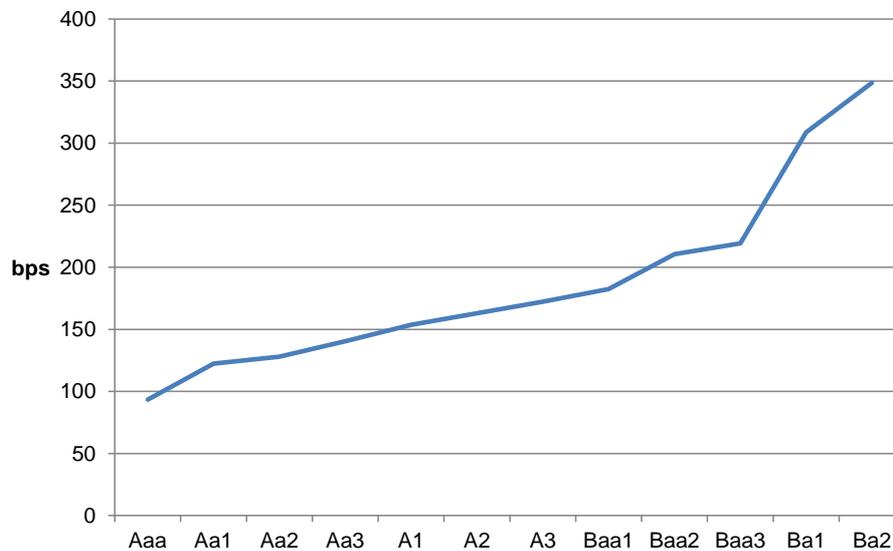
Increase in cost of debt from rating downgrade

The analysis indicates that the increase in regulatory risk would result in a credit rating downgrade of:

- one notch in the first scenario (i.e. from A3 to Baa1); and
- three notches in the second scenario (i.e. from A3 to Baa3).

In order to estimate the impact that this would have on the cost of debt we have used data from a sample of corporate bonds issued by US utilities. The advantage of this data source is that it gives a sufficiently large sample to observe the impact of credit rating on the cost of debt.

**Evidence on the scale of impact on the cost of
finance**

Figure 9. Debt spreads and credit ratings - US utilities (bond maturities 5 to 10 years)

Source: Bondsonline

The chart shows that the debt spread increases consistently as the credit rating worsens. The rate of increase is relatively stable as the rating moves through the investment grade band. It then increases more significantly as the rating moves below investment grade.

Table 7 shows that a one-notch downgrade would increase the cost of debt by 0.1% while a three notch downgrade would result in an increase of 0.47%.

Table 7. Increase in cost of debt for rating downgrade

One notch downgrade from A3 to	Increase in debt spread
Baa1	0.10%
Baa3	0.47%

Source: Bondsonline, Frontier calculations

Impact on the cost of equity

In order to assess the overall impact on the cost of finance we also need to consider the impact on the cost of equity. The analysis above shows that the increase in regulatory risk feeds through the credit rating into a higher cost of debt. The increase in risk will also affect equity investors.

Evidence on the scale of impact on the cost of finance

In terms of estimating the scale of the impact on equity investors one of the main issues is whether the regulatory risk is a diversifiable risk and, if so, whether it therefore has no impact on the return required by equity investors.

There are a number of reasons to consider that the risk will have at least some impact on the cost of equity.

- First, the evidence in Section 2 shows that it is unusual for risks faced by equity investors to be fully diversifiable.
- Second, the evidence from the studies reviewed in Section 4.1 above shows that regulatory risks and events do have material impacts on the observed cost of equity for regulated utilities.

One approach to estimate how the increase in the cost of debt translates into an increase in the cost is to use the Sharpe Ratio. The Sharpe Ratio states the risk premium on an asset is proportional to the volatility of returns (as measured by the standard deviation). Historic data shows that equity returns exhibit a volatility of 1.5 times the volatility of bond returns, this is shown in **Table 8**.

Table 8. Estimates of the Sharpe Ratio for different markets (1900-2012)

Market	Equity returns (standard deviation)	Debt returns (standard deviation)	Sharpe Ratio
UK	19.9%	13.7%	1.45
USA	20.1%	10.3%	1.95
Japan	29.7%	19.9%	1.49
Europe	20.0%	16.9%	1.18
World	17.5%	11.5%	1.52

Source: Credit Suisse Global Investment Returns Yearbook 2013

This indicates that a change in regulatory risk that increased the cost of debt by 0.1% would increase the cost of equity by 0.15%. The Sharpe Ratio approach assumes that there is no benefit from equity diversification and therefore could be treated as a high case estimate. To establish a low case estimate we assume that half of the risk is diversifiable and therefore the increase in the cost of equity in the above example would be 0.075%.

Using this range for the impact on the cost of equity, the overall impact on the cost of finance is shown in **Table 9** below. To weight the impact of the cost of debt and the cost of equity we have used Ofwat's PR09 assumption of 57.5% gearing. The impact on the cost of finance under this approach is between around 0.1% in the low case and 0.5% in the high case.

**Evidence on the scale of impact on the cost of
finance**

Table 9. Impact of increase in regulatory uncertainty on the cost of capital – at constant gearing

	Low case (A3 to Baa1)	High case (A3 to Baa3)
Gearing	57.5%	57.5%%
Impact on cost of debt	0.10%	0.47%
Impact of cost of equity	0.075% - 0.15%	0.35% - 0.71%
Impact on WACC²³	0.09% - 0.12%	0.42% - 0.57%

Source: Frontier Economics

4.3 Summary of evidence on scale of impact

The **Table 10** summarises the potential impact of an increase in regulatory uncertainty. The different sources of evidence provide a wide range in terms of the potential impact. It indicates that the impact on the cost of debt could be upto 0.5% while the impact on the cost of equity could be as much as 1%.

Table 10. Summary of impacts on cost of finance

Source of evidence	Channel of impact	Impact on cost of finance
Existing academic research on regulatory risk	Cost of equity – based on wider studies	0.41% – 1.19%
	Cost of equity – based on water industry study	0.31% – 0.56%
	Cost of debt	0.05% – 0.20%
Modelling of impact	Cost of debt	0.10% – 0.47%
	Cost of equity	0.08% – 0.71%
	WACC (post-tax)	0.09% – 0.57%

Source: Frontier analysis

²³ Impact on the real (vanilla) WACC.

Annexe 1: Summary of event studies on impact of regulatory uncertainty

We have reviewed the relevant empirical research studies on the impact on financing costs of regulatory changes and regulatory uncertainty. The evidence from these studies is summarised below.

*Buckland and Fraser (2001)*²⁴

Buckland and Fraser (2001) studied the impact of the 1992 UK general election on the betas of 12 regional electricity companies (RECs), which were privatised in 1990. The fourth consecutive Conservative victory at those elections was one of the most surprising results during the 20th century. In the lead up to the election, polls had Labour consistently ahead of the Conservative party. Labour had campaigned to impose increased public control over the utilities industries and tighter regulation. In the month leading up to the election on 10 April, speculation of a Labour victory was intense, and Conservative MPs warned their supporters of a possible loss. Buckland and Fraser found statistically-significant evidence of the betas of the RECs rising significantly during this period, peaking on the day of the election, in anticipation of stricter regulation to come. This would have had the effect of raising the RECs' costs of capital, all else being equal.

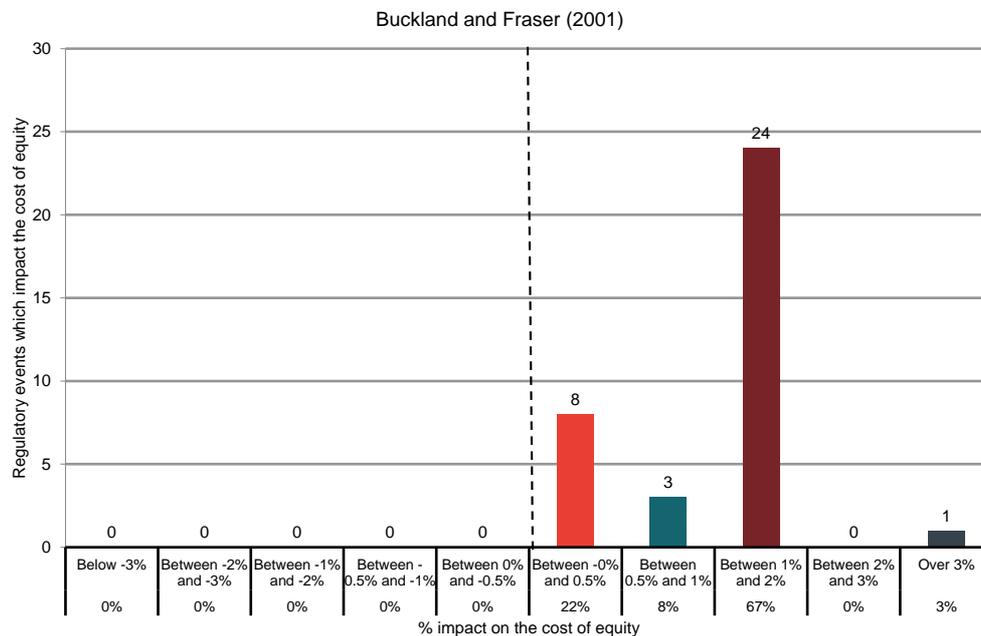
The results are summarised in **Table 11** below.

Table 11: Results from Buckland and Fraser (2001)

Event	Expected impact on regulatory uncertainty	Change in equity beta	Impact on the cost of equity
Exit polls show that Conservative are ahead	Increase	Between 0.01 and 0.85 across RECs	Between 0.05% and 4.25%
Conservative ahead	Increase	Between 0.215 and 0.278 across RECs	Between 1.08% and 1.39%
Results of conservative win confirmed	Increase	Between 0.21 and 0.272 across RECs	Between 1.05% and 1.36%

The distribution of impacts is shown in **Figure 10**. Most of the impacts lie between 1% and 2%.

²⁴ Buckland, R., Fraser, P. (2001), 'Political and regulatory risk: beta sensitivity in UK electricity distribution', *Journal of Regulatory Economics* 19(1), 5-25.

Figure 10. Impact on cost of equity – Buckland & Fraser (2001)

Source: Frontier analysis

Antoniou and Pescetto (1997)²⁵

Antoniou and Pescetto (1997) examined the effect of the 1987 and 1992 UK general elections on the beta of BT. They found that in the build-up to the 1987 election, there was a statistically-significant increase in BT's beta (of 0.21). In the lead-up to the 1992 election they detected a statistically-significant reduction in BT's beta (of 0.17)

In both elections the outcome was a victory for the Conservative Party. The authors argue that the difference in results, in terms of the impact on beta, could be explained by a change in Labour's intentions towards the regulation of telecoms between the two elections. In 1987 Labour's manifesto promised the renationalisation of the telecommunications industry, whereas in 1992 Labour had removed this pledge.

The authors also investigated the impact of a large number of regulatory actions relating to the development of regulation and competition policy as applied to

²⁵ Antoniou, A., Pescetto, G. (1997). 'The effect of regulatory announcements on the cost of capital of British Telecom.' *Journal of Business, Finance & Accounting* 24(1), 1-25.

BT. The paper finds that these events have a material impact on the estimated beta for BT, both positive and negative.

These results are summarised in **Table 12** below. The paper presented the findings in terms of the change in equity beta. For comparability with other evidence we have converted these into an impact on the cost of equity assuming an equity risk premium of 5%.

Table 12: Results from Antoniou and Pescetto (1997)

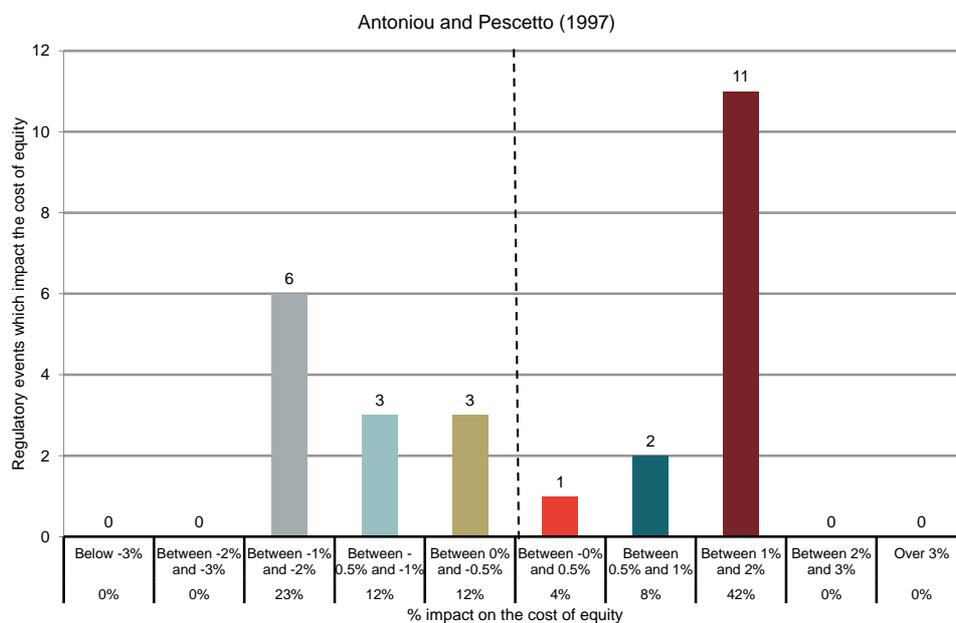
Event	Expected impact on regulatory uncertainty	Change in equity beta	Impact on the cost of equity
1987 UK general election - Labour manifesto pledge to renationalise BT and impose stricter regulation	Increase	0.2122	1.06%
1992 UK general election - Labour expected to win, with a moderately stricter regulation manifesto	Increase	-0.1712	-0.86%
Oftel defers decision on liberalisation proposals	Decrease	0.2722	1.36%
Telecoms industry criticizes Oftel's report into the effectiveness of competition in telephone supply	Decrease	0.1235	0.62%
Oftel to introduce access charges for competitors using BT lines	Decrease	0.0813	0.41%
Oftel changes BT's license for radiopaging	Increase	-0.2026	-1.01%
Government announces regulations liberalising private networks come into effect	Increase	-0.0852	-0.43%
Government unveils far-reaching proposals to increase competition	Increase	-0.0428	-0.21%
Government plans to licence operators who can lease BT/Mercury line in bulk	Increase	-0.0882	-0.44%
UK government licences two new companies to provide satellite services	Increase	-0.1113	-0.56%
Row between BT and Oftel over price increases for residential customers	Increase	0.2019	1.01%
Oftel investigates BT repair charges	Increase	0.1864	0.93%
Bryan Carsberg warns of high costs of some telecommunication services recently introduced by BT	Increase	0.2055	1.03%
Oftel to examine whether BT increases are abuse of dominant position	Increase	-0.3061	-1.53%
Oftel to probe international pricing	Increase	-0.1347	-0.67%
Oftel set to clear BT over special line charges	Decrease	0.2086	1.04%

Annexe 1: Summary of event studies on impact of regulatory uncertainty

Oftel softens BT charges plan	Decrease	0.2718	1.36%
Director General says complaints against BT are hard to probe	Increase	0.3682	1.84%
BT may have to compensate customers over service delays: as quality has improved, there is no need of further regulatory action	Increase	0.2182	1.09%
Minister wants reports on Talkabout after children run up large bills	Increase	-0.3541	-1.77%
Oftel to recommend tougher control on Talkabout service	Increase	-0.3291	-1.65%
Oftel asks for a change in BT billing: separate billing for radio paging customers required	Decrease	0.2641	1.32%
Oftel may introduce penalty on BT due to poor record of repairs and installation for private customers	Decrease	0.274	1.37%
Carsberg calls for more payphones	Decrease	0.2908	1.45%
Safeguards for BT clients demanded by National Consumer Council	Decrease	-0.3283	-1.64%
Oftel reply to minister expressing reluctance to ban Talkabout service	Decrease	-0.3126	-1.56%

The distribution of impacts is shown in **Figure 11**.

Figure 11. Impact on cost of equity – events affecting BT (1997)



Source: Frontier analysis

Annexe 1: Summary of event studies on impact of regulatory uncertainty

*Pescetto (2008)*²⁶

In this study Pescetto examined the impact of 116 regulatory announcements in the water industry between 1989 and 1995. The announcements were grouped in categories covering competition, price of services (decrease and increase), quality of service (decrease and increase). The study used a time-varying beta estimation method to capture the impact of the different categories. It found that announcements relating to competition and to the quality of service had a significant impact on the level of betas.

*Grout and Zalewska (2006)*²⁷

In 1997, the newly elected Labour government proposed a change in the pricing system of all regulated U.K. utilities, from price-cap to explicit profit sharing between companies and customers. This move would have reduced the risk borne by investors. After a period of 25 months, however, the government abandoned the plan. Grout and Zalewska (2006) study the effect of this announcement on regulated firms' betas. They compare the betas of UK regulated companies with those of a control group of similar companies in the U.S. during the period that the proposed change was being considered. In other periods, the paths of the betas of the two groups of companies are very similar.

They find that, during the period while the UK government was evaluating the change, the betas of the two groups of companies followed very different paths. This indicates a large difference in systematic risk between the two sets of companies during the period of regulatory uncertainty. The CAPM beta falls by between 0.2 and 0.4, depending on the model specification.

*Billingsley and Ullrich, 2011*²⁸

The authors look at the deregulation which took place in the U.S. electricity market in the 1990s to examine whether regulatory uncertainty encourages firms to delay capital investment decisions. Looking at ten year plans of future investments in new power generation plants, they find that industry participants reduced their investments in electric power generating assets dramatically in the 1990s, in response to increased regulatory uncertainty and then, just as dramatically, increased investment beginning in 2000 due to the resolution of regulatory uncertainty. The paper provides empirical evidence that regulatory

²⁶ Pescetto, G (2008), "Regulation and systematic risk: the case of the water industry in England and Wales", *Applied Financial Economics* 2008, 18, 61-73.

²⁷ Grout, P. A., Zalewska, A. (2006). 'The impact of regulation on market risk.' *Journal of Financial Economics* 80(1), 149-184.

²⁸ Billingsley, R., S., and Ullrich, C., J., 2011. 'Regulatory uncertainty, corporate expectations and the postponement of investment: the case of electricity market deregulation'. Available at SSRN: <http://ssrn.com/abstract=1944217> or <http://dx.doi.org/10.2139/ssrn.1944217>

uncertainty is significantly and strongly negatively related to planned utility investments.

*Paleari and Redondi (2005)*²⁹

Paleari and Redondi analyse the impact of regulatory events on British electricity companies' abnormal returns, beta, overall risk and market correlation variations. They find that, when regulation becomes stricter, abnormal returns are negative, and betas increase due to both overall risk and increases in market correlation. For example, on 29th January 1993, a Trade and Industry Committee report called for a reduction on the Regional Electricity Companies' return on capital. Average abnormal returns were equal to -2.09% and betas increased by 28.43%. On 26th October 1993 a favourable consultation paper on the REC's assets cost of capital and operating cost was released, company value increased by 0.95% and betas decreased by 7.34%.

The results for the individual events are summarised in the Table below. The impacts in the paper were presented in terms of the percentage change in the equity beta. For comparability with the other evidence we have converted the impacts into a change in the cost of equity. This has been done assuming an equity risk premium of 5% and an underlying equity beta of 0.9.

Table 13: Results from Paleari and Redondi (2005)

Event	Expected impact on regulatory uncertainty	Impact on beta ³⁰	Impact on the cost of equity
Vesting day for Northern Ireland Electricity	Increase	23.63%	1.06%
OFFER releases "Future control of NGC prices"	Decrease	1.08%	0.05%
Director of Electricity calls for a reduction in the nuclear levy	Increase	-6.22%	-0.28%
A consultation paper about the methodologies of regulation is released	Decrease	-4.81%	-0.22%
Offer allows RECs to move into gas-powered generation	Decrease	4.81%	0.22%
Report from Trade and Industry Select Committee calls for	Increase	31.16%	1.40%

²⁹ Paleari, S, and Rodondi, R., 2005. 'Regulation effects on company beta components'. Università degli Studi di Bergamo, Department of Management and Information Technology, series *Economic and Management*, no.2/EM – 2005.

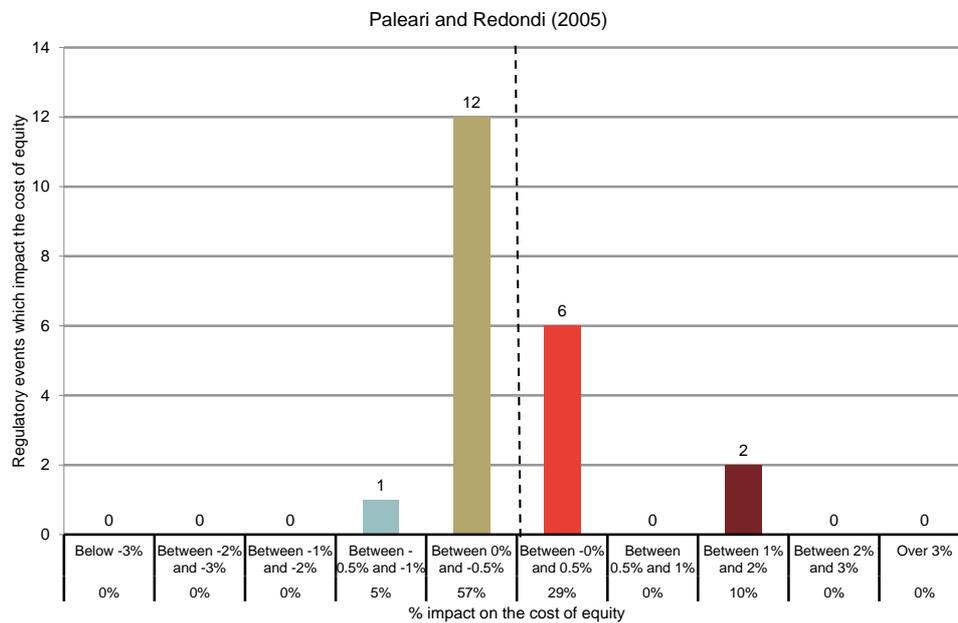
³⁰ Expressed as a percentage change and based on a 3 day estimation window around the event.

Annexe 1: Summary of event studies on impact of regulatory uncertainty

reduction in return on capital			
The revised X factors for the supply business of RECs are fixed	Decrease	-9.76%	-0.44%
RECs accept the price control review	Decrease	-1.45%	-0.07%
A consultation paper on the cost of capital assets valuation and identification of operating cost drivers is released	Decrease	-6.85%	-0.31%
The director of electricity decides not to refer generators to MMC	Increase	6.61%	0.30%
New information about a letter Offer has sent to RECs call for a 10-20% price cut	Increase	-4.30%	-0.19%
New market information anticipating a lenient price review	Decrease	4.26%	0.19%
New market information anticipating price changes between -10% and -15%, then RPI-2 until 2000	Increase	-0.43%	-0.02%
Presentation of the proposal of distribution price control	Decrease	-9.01%	-0.41%
Revised factors for supply and distribution business of SWA and SWN are announced	Increase	0.01%	0.00%
Scottish Hydro Electric announces it will not accept revised price control	Increase	6.51%	0.29%
Offer refers Scottish Hydro proposed price control to MMC	Increase	-1.87%	-0.08%
Report says that Director of Electricity warns that he will review the distribution price	Increase	-14.17%	-0.64%
Director of Electricity announces a price control review	Increase	-1.62%	-0.07%
Offer publishes revisions. X increased from 2% to 3% per year	Decrease	-2.05%	-0.09%

The distribution of impacts is shown in **Figure 12** below.

Annexe 1: Summary of event studies on impact of regulatory uncertainty

Figure 12. Impact on cost of equity – events affecting RECs (2005)

Source: Frontier analysis

*Robinson and Taylor, 1998a*³¹

Robinson and Taylor examine the impact of 30 significant regulatory events on the expectations of investors in the shares of Regional Electricity Companies (RECs). This is done by measuring the expected volatility of RECs' share returns before and after the regulatory events. They find that regulatory actions marking the start of a consultation on regulatory policy had a negative effect on RECs' returns. They find that, in general, any event which raised uncertainty about the regulatory system or increased the possibility of regulatory risk had a largely negative effect on REC's returns. For example, the announcement that the regulator would set new REC price controls on March 7th 1995 had an impulse effect on REC's returns of between -1.63% and -2.25%. Conversely, the performance of the RECs' shares was abnormally strong when actions were taken or external events occurred which diminished uncertainty and perceived regulatory risk.

The removal of regulatory uncertainty heralded by John Major's victory in the Tory leadership election in the summer of 1995 also produced a significant positive effect. This was due to the ending of temporary political uncertainty

³¹ Robinson, T., A., and Taylor, M., P., 1998a. 'The effects of regulation and regulatory risk in the UK electricity distribution industry.' *Annals of Public and Cooperative Economics*, vol. 69, issue 3, pp. 331-46.

concerning the government's position and hence the prospects of imminent regulatory reform.

*Robinson and Taylor, 1998b*³²

In March 1995, the Director General of Electricity Supply released a statement that he intended to review again the price controls on the Regional Electricity Companies, which he had set only eight months before. The authors measure the effects of this intervention on the volatility of stock price returns of 12 UK regional electricity companies. On the announcement of the intervention, the share prices of the Regional Electricity Companies (RECs) fell significantly (by between -4.45% and -10.90%). The results also indicate that share price volatility increased significantly on the day of the announcement for 8 out of 12 of the RECs and that this higher volatility persisted afterwards.

While the CAPM generally considers volatility to be diversifiable, evidence from other models, such as the APT, indicates that share prices volatility significantly affects returns and raises the cost of capital for the regulated firm.

*Clarke, 1980*³³

Clarke examines how the introduction of the fuel adjustment clause (FAC), which allowed U.S. regulated utilities to pass through increased cost of fuel automatically by adjusting the price of electricity charged to consumers, reduced the systematic risk of electric utilities in the 1970s. He finds that the systematic risk of firms which were able to use the FAC decreased by approximately 10%. A decrease in the firm's systematic risk resulting from the use of the FAC will decrease the firm's cost of equity if other things are held constant. If the firm's expected level of profit stays the same, the firm would suddenly offer a chance for investors to get the same expected return for less risk. In this case, however, these gains for stockholders did not materialize, as most of the utilities considered were under considerable financial pressure over the analysed period. The introduction of the FAC just contributed to mitigate such pressure.

³² Robinson, T., A., and Taylor, M., P., 1998b. 'Regulatory uncertainty and the volatility of regional electricity company share prices: the economic consequences of Professor Littlechild.' *Bulletin of Economic Research*, vol. 50, issue 1. pp. 37-46.

³³ Clarke, R., G., 1980. 'The effect of fuel adjustment clauses on the systematic risk and market values of electric utilities.' *The Journal of Finance*, vol. 35, no. 2, pp. 347-58.

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FRONTIER ECONOMICS EUROPE

BRUSSELS | COLOGNE | LONDON | MADRID

Frontier Economics Ltd 71 High Holborn London WC1V 6DA

Tel. +44 (0)20 7031 7000 Fax. +44 (0)20 7031 7001 www.frontier-economics.com



October | 2013

Atypical bad debt write offs made by Thames Water in 2010/11

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Glossary

AMP 5	Asset Management Plan 5: 2010/11 to 2014/15.
Bad Debt Expense	The income statement expense relating to bad and doubtful debts.
Bad Debt Reserve	The balance sheet reserve relating to bad and doubtful debts.
Bad Debt Write Off	The write off of a debt as bad affecting the Bad Debt Reserve and the 'debtors' current asset item.
CIS	Customer Information System.
Draft IDoK Determination	Ofwat's draft determination on Thames Water's IDoK application.
DWP	Department of Work and Pensions.
FD09	Final Determination 2009.
FTI Consulting	FTI Consulting LLP.
IDoK	Interim Determination of K.
IDoK application	Thames Water's application for an IDoK, submitted 9 August 2013.
NI	Notified Item.
PR09	Price control Review 2009.
RCC	Relevant Change of Circumstance.
Thames Water	Thames Water Utilities Limited.
WOC	Water Only Company.

1. Introduction

Introduction

- 1.1 This report has been prepared by Chris Osborne of FTI Consulting LLP ("**FTI Consulting**") on behalf of Thames Water Utilities Limited ("**Thames Water**") in connection with its application to Ofwat for an interim determination to adjust its allowed prices ("**IDoK**"). I have been asked to advise on the appropriateness of certain adjustments to bad debt write offs that have been suggested by Ofwat in its draft determination in relation to Thames Water's IDoK application (the "**Draft IDoK Determination**").
- 1.2 I attach a copy of my qualifications and experience at Appendix 1.

Restrictions

- 1.3 This report has been prepared solely for Thames Water for use for the purpose described in this introduction. In all other respects, this report is confidential. It should not be used by any other party for any purpose or reproduced or circulated, in whole or in part, by any party without the prior written consent of FTI Consulting.

Background

- 1.4 In the price control review in 2009 ("**PR09**"), Ofwat set the price controls applying to the water industry in England and Wales for the period covered by Asset Management Plan 5 ("**AMP 5**", 2010-2015). Under the terms of Thames Water's licence these price controls may be adjusted if there is a material change in a Notified Item ("**NI**") or a Relevant Change of Circumstance ("**RCC**").
- 1.5 In its final determination in setting regulated price limits for AMP 5 ("**FD09**"), Ofwat assumed that bad debt costs would not increase (in real terms) above the levels incurred in 2008/09.
- 1.6 Given the economic uncertainty that existed at the time of PR09, the possibility of adverse economic effects having an impact on bad debt costs was specifically included as a NI. On 9 August 2013, Thames Water submitted an IDoK application that included a claim for increased bad debt costs on this basis (the "**IDoK application**").

Atypical write offs

- 1.7 In its IDoK application and subsequent disclosures to Ofwat, Thames Water noted that the total write-offs relating to household debt in the 2010/11 financial year, included 'atypical' write offs of £29.2 million. It is Thames Water's view that these additional write-offs were made necessary by the continued recessionary environment.
- 1.8 I understand from Thames Water that they undertook a one-off review of outstanding debtors, and that the review identified a number of debts that, although did not meet the criteria generally applied in relation to a write-off, were nevertheless considered to be uncollectable.
- 1.9 In the Draft IDoK Determination, Ofwat suggests that the £29.2 million of atypical debt written off in 2010/11 should not be included in the analysis as it would, in the normal course of business, have been written off earlier; and therefore falls outside of the relevant time period.¹

Conclusions

- 1.10 Ofwat's suggestion is, for reasons set out in the remainder of this report, simply incorrect. On the contrary, the write-offs are atypical because they are made *earlier* than would have been the case in the normal course of business.
- 1.11 For reasons described in Section 2, that ought to be evident simply from the description above, but can in any case be confirmed, as I show in Section 3, by looking at the age profile of the amounts written off, which are *younger* (i.e. written off sooner) than the normal profile of debt written off in the same year.
- 1.12 Ofwat appears to have compounded the error further by assuming that the level of bad debt write-offs in 2013/14 and 2014/15 should be forecast based on the reduced levels of write-offs that they derive for the preceding years by excluding those that are atypical. This is also simply incorrect, for the same reason – the write-offs are atypical in that they are recognised atypically early, rather than atypically late.

¹ Draft IDoK Determination, page 30.

2. Background: accounting for bad debt

Introduction

- 2.1 In this section I set out the relevant aspects of accounting for bad debt in financial statements. I also define the terminology relating to bad debt used in this report.

Accounting for bad debt

What is 'bad debt'?

- 2.2 Thames Water does not always receive full payment for the bills that it sends to its customers. Some of these customers simply refuse to pay ("won't pay"), while others may want to pay, but are unable to for various reasons ("can't pay"). Regardless of the reason for non-payment, the term "bad debt" refers to the amounts billed to customers that is never received.
- 2.3 Due to the uncertainty of the future, at any point in time (including at the time of issuing bills), Thames Water does not know with certainty if a particular customer will eventually pay their bill, or whether the debt will be 'bad'. The level of bad debts therefore has to be estimated based on the information available at the time. Different measures of bad debt include Bad Debt Expenses, Bad Debt Write Offs, as well as non-performing debt (i.e. debt that is currently overdue, but has not yet been formally written off).

Bad Debt Expense

- 2.4 Under UK Generally Accepted Accounting Practices (which, in relation to bad debt, applies to both the statutory and regulatory accounts), Thames Water records an income statement expense item for doubtful debts based on its expectation of the amount of outstanding debt that it will be unable to collect (a "**Bad Debt Expense**"). This is consistent with the accounting principle of 'matching' whereby costs are 'matched' (as best they can be) to the revenues to which they relate.
- 2.5 If estimates of the recoverability of revenue from prior periods change, then these changes will be reflected in the current period Bad Debt Expense. For example, if Thames Water expects a higher rate of bad debt in relation to the previous year's revenue, then this will increase the Bad Debt Expense of the current year as the current bad debt reserve would not be large enough to cover the outstanding debtors from last year.

Bad Debt Reserve

- 2.6 The corresponding accounting entry to the Bad Debt Expense is an addition to the bad debt reserve current liability item on the balance sheet (the “**Bad Debt Reserve**”). The Bad Debt Reserve shows the cumulative reserve booked by Thames Water to cover all outstanding debtors.

Bad Debt Write Offs

- 2.7 When a specific bill is deemed to be irrecoverable in accordance with Thames Water’s write off policy, it is written off as ‘bad’ (“**Bad Debt Write Off**”). When a debt is written off as ‘bad’, the amount is deducted from the Bad Debt Reserve. The debtors current asset balance is also reduced by the same amount.
- 2.8 In general, the likelihood of Thames Water receiving payment is negatively correlated with the length of time the payment has been overdue. In other words, debts that have been overdue for a longer period of time are, in general, ultimately recovered less often than debts that have been overdue for a shorter length of time. The longer a debt has been outstanding, the greater certainty Thames Water has that the debt will be ‘bad’.

Summary

- 2.9 The first point to note is that there is a time lag between the Bad Debt Expense (which creates the Bad Debt Reserve) and the Bad Debt Write Off. Under the accounting principle of ‘matching’, the Bad Debt Expense relates to the expected level of bad debt included in revenue recognised in that period. Bad Debt Write Offs typically relate to debt that has been outstanding for a number of years and therefore was recorded as revenue in previous periods.
- 2.10 The second point to note is that over a long enough period of time the Bad Debt Expense will equal the Bad Debt Write Offs. The Bad Debt Expense is usually a leading indicator for the Bad Debt Write Offs as it relates to the revenue in the current period, whereas the Bad Debt Write Offs usually relate to revenue from previous accounting periods.

3. Comments in the Draft IDoK Determination on atypical write offs

Introduction

- 3.1 In this section I consider comments in the Draft IDoK Determination relating to atypical Bad Debt Write Offs. First, I set out my understanding of the appropriate measure of bad debts to be used in the assessment of the IDoK application. Then I describe the nature of the atypical debt write offs made by Thames Water. Finally I comment on statements in the Draft IDoK Determination relating to the atypical bad debt write offs.

The relevant measure of bad debts

- 3.2 The allowances set at PRO9 in relation to bad debt were for the Bad Debt Expense. Ofwat, however, considers that because water companies do not all use consistent accounting policies when estimating their Bad Debt Expense, the most appropriate measure of bad debts to consider for an IDoK application is Bad Debt Write Offs.²
- 3.3 Given that Ofwat's preferred measure of bad debts for an IDoK application is Bad Debt Write Offs, Thames Water has calculated the Bad Debt Write Off allowances implied by the FDO9 allowances. Ofwat appears to have accepted this approach.³ I note that, if this is not Ofwat's position then it is unclear what the relevant baseline debt costs for assessing an IDoK application should be.

Thames Water's atypical Bad Debt Write Offs in 2010/11

- 3.4 In 2010/11, Thames Water undertook a one-off review of outstanding debtors which identified a number of debts that, although did not meet the criteria generally applied in identifying Bad Debt Write-Offs, were nevertheless considered to be uncollectable. These atypical write-offs were defined as 'Recessionary' and included:⁴
- (1) £32.4 million of 'Final debt' i.e. where the customer has vacated a property and efforts to locate the customer or secure payment had been unsuccessful.

² Draft IDoK Determination, page 29.

³ Draft IDoK Determination, page 27.

⁴ See Appendix 2.

(2) £1.0 million of 'Active debt' i.e. accounts where Thames Water was receiving payments at a rate of £3.25 per week under the Water Direct scheme from the Department of Work and Pensions. Thames Water decided to write off these debts to remove the debt burden from these customers and to help them keep up to date with payments in a more manageable way.

3.5 Of the total £33.4 million of atypical write offs, £29.2 million relates to household debt.⁵

3.6 Thames Water's auditors, KPMG audited the write offs made in 2010/11 and reported them to the Audit Committee and the Board of Directors. There were no audit adjustments reported by KPMG relating to write offs.⁶

Thames Water's atypical and total bad debt write offs from 2007/08 to 2012/13

3.7 As a result of the write offs described above, Thames Water's total household Bad Debt Write Offs for 2010/11, of £58.2 million, included £29.2 million of 'atypical' Bad Debt Write Offs. Table 3-1 shows the atypical Bad Debt Write Offs split by age of debt. The figures do not include write-offs relating to amounts billed by water-only companies ("WOCs") on Thames Water's behalf.

Table 3-1: Atypical write offs in 2010/11 (£ million)

Age of debt written off	Atypical Bad Debt Write Offs in 2010/11	Percentage of total atypical write offs
0-24 months	9.269	32.9%
24-36 months	6.877	24.4%
36-48 months	5.053	17.9%
>48 months	6.996	24.8%
Total	28.195	100.0%

Notes: Rounding differences arise compared to the £29.2 million stated in the June Return as one report uses bottom-up postcode and account level data and Table 6a of the June Return is an annual summary.

Sources: Thames Water.

3.8 Table 3-2 below shows Thames Water's total household Bad Debt Write Offs (including the atypical write offs) from 2007/08 to 2012/13. Appendix 3 shows a reconciliation of the total Bad Debt Write Offs to Table 4 of TW Exhibit 131.

⁵ TW Exhibit 118.

⁶ Auditors' commentary on the June Return, March 2011, KPMG.

Table 3-2: Total household Bad Debt Write Offs (£ million)

	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
0-24 months	0.968	4.159	4.673	14.669	9.186	12.250
24-36 months	3.226	10.532	6.304	12.711	3.596	9.327
36-48 months	4.060	9.720	1.974	11.241	2.532	15.037
>48 months	2.139	7.268	2.623	15.497	3.769	27.288
Total	10.394	31.679	15.574	54.118	19.084	63.901

Sources: Thames Water.

Ofwat's position on atypical Bad Debt Write Offs in the Draft IDoK Determination

3.9 In the Draft IDoK Determination, Ofwat states that:⁷

"The company's figures include an atypical write-off of £29.2 million in 2010-11 (around half of the total write-offs in that year); this was confirmed as atypical in KPMG's agreed upon procedures report for the June return 2011 as it related to a "one-off exercise carried out during the year to write off old uncontrollable debt"." [emphasis added]

3.10 In the above extract, Ofwat asserts that KPMG referred to the debt as "uncontrollable". I have not seen any reference to "uncontrollable" debt in the documents that I have reviewed, I have only seen references to debt that was deemed "uncollectable".⁸ I therefore consider this reference to "uncontrollable" debt to be an error by Ofwat.

3.11 Notwithstanding the above, the Draft IDoK Determination also states:⁹

"...in the normal course of business, this debt [the atypical write offs] would have been written off prior to 2010-11, and as such would be outside of the period being reviewed in this application."

"Excluding this atypical one-off amount, recalculating the final determination allowance and adjusting Thames Water's claim for 2013-15 accordingly (the projected 2013-15 data was based on an average of write-offs for the period 2010-13), results in a reduction to the overall increase in write-offs from £162.3 million to £102.5 million."

⁷ Draft IDoK Determination, page 30.

⁸ Auditors' commentary on the June Return, March 2011, KPMG, page 22.

⁹ Draft IDoK Determination, page 30.

3.12 Examining the extract above, Ofwat’s position appears to be that three adjustments are required in respect of the atypical write offs:

- (1) removing the atypical write offs from the total debt written off, as it should have been written off prior to 2010/11 and therefore would fall outside of the relevant time period of the IDoK application;
- (2) adjusting the FD09 allowance; and
- (3) adjusting Thames Water’s forecast Bad Debt Write Offs for 2013/14 and 2014/15.

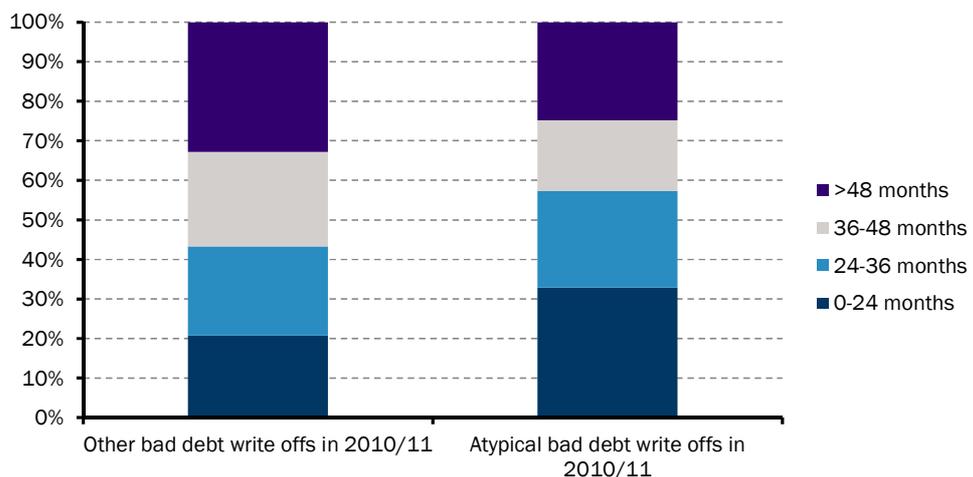
3.13 I have reviewed Ofwat’s reasoning and analysis and consider each of the adjustments suggested above to be inappropriate for the reasons described below.

Atypical write offs do not fall outside the relevant time period

3.14 I understand that Thames Water’s debt write off policy has not changed during AMP 5.¹⁰ For any debt write offs to be ‘atypical’, it must be the case that they do not yet qualify to be written off under the general write off policy (otherwise they would not be atypical). Therefore atypical write offs are debts that are written off *earlier* than they would qualify to be written off under the general bad debt policy. Ofwat’s position in the Draft IDoK Determination, however, assumes that the atypical bad debt write offs were occurring *later* than they should have occurred in the normal course of business.

3.15 Figure 3-1 shows the age profile of bad debts written off in 2010/11.

Figure 3-1: Age profile of bad debts written off in 2010/11



Sources: Thames Water.

¹⁰ TW Exhibit 118.

- 3.16 Figure 3-1 shows that the average age of the debt that was atypically written off was lower than for the other bad debts written off in 2010/11. Figure 3-1 also shows that a greater proportion of the atypical write-offs were from 'younger' debt age categories.
- 3.17 In summary, the atypical write offs occurred *before* they would have done under Thames Water's general debt write off policy and therefore do not fall outside the relevant period being reviewed in Thames Water's IDoK application.

Adjustments to the FD09 allowance are inappropriate

- 3.18 In the Draft IDoK Determination, Ofwat suggests that it has recalculated the FD09 allowance for bad debt costs.¹¹ Table 3-3 shows my understanding of the adjustments Ofwat has made to Thames Water's calculation. Although I have not been able to exactly replicate Ofwat's calculation, I consider any remaining differences to be immaterial.

Table 3-3: Ofwat's calculation of Thames Water's variance in bad debt costs

	2010/11	2011/12	2012/13	2013/14	2014/15	AMP 5 total
Revenue written off	58.2	23.0	71.3			
Less: atypical write offs	(29.2)					
Adj. revenue written off	29.0	23.0	71.3			
Forecast write offs				41.1	45.1	
Total write offs	29.0	23.0	71.3	41.1	45.1	209.5
FD09 allowance	20.3	21.1	21.6	22.1	22.0	107.2
Variance	8.7	1.8	49.7	18.9	23.1	102.3

Notes: *Outturn prices.*

Sources: *Draft IDoK Determination, FTI analysis.*

- 3.19 My analysis suggests that, contrary to Ofwat's comments in the Draft Determination, it did not actually adjust the FD09 allowance in its calculation. Even if Ofwat had adjusted the FD09 allowance for bad debts that it considers would have been written off prior to 2010/11 in the normal course of business, I consider that such an adjustment would be inappropriate.
- 3.20 As explained above, the atypical Bad Debt Write Offs occurred *earlier* than they would have under Thames Water's general write off policy and therefore would not have affected the bad debt cost baseline of 2008/09 used in the FD09 allowances.

¹¹ Draft IDoK Determination, page 30.

- 3.21 This is supported by Figure 3-1, which shows that around 30% of the atypical Bad Debt Write Offs in 2010/11 were less than 24 months old. First, it is not possible to write off debts before customers have even been billed. Second, aggressive write off policies (i.e. writing off debts as 'bad' earlier) may not be consistent with Ofwat's position in relation to bad debt management as rigorous debt collection strategies will naturally require a longer period of time to pursue until they have been exhausted.

Adjustment to Bad Debt Write Off forecasts are inappropriate

- 3.22 Ofwat adjusts Thames Water's forecast Bad Debt Write Offs for 2013/14 and 2014/15 downwards from around £58 million to around £40-45 million. I note from Table 3-3 and Table 22 of the IDoK application that a significant portion of the difference in the estimated variance is due to Ofwat's adjustment of the forecast write offs.

- 3.23 I consider these adjustments inappropriate for two reasons.

- (1) Even if Ofwat's position is that the timing of the atypical write offs should be adjusted to reflect when they would have occurred 'in the normal course of business', I note that this would have been *after* 2010/11 and most likely in 2011/12 and 2012/13. The atypical write offs would have therefore arisen in the relevant period for Thames Water's IDoK application anyway. Adjusting the forecasts downwards for write offs that would have occurred in the relevant period anyway is counterintuitive.
- (2) Ofwat's forecast Bad Debt Write Offs are not consistent with Thames Water's recently increasing Bad Debt Expense. As explained in Section 2, the Bad Debt Expense and the Bad Debt Write Offs are equal over time and the Bad Debt Expense is usually a leading indicator for the Bad Debt Write Offs. Thames Water's household Bad Debt Expense increased in 2012/13 to £82.3 million from £60.6 million in 2011/12.¹² This suggests that Thames Water's future Bad Debt Write Offs are likely to increase and therefore that Ofwat's forecast Bad Debt Write Offs may be too low.

¹² Thames Water annual report 2012/13, page 118; and Thames Water annual report 2011/12, page 116.

Appendix 1

Qualifications and experience of Chris Osborne

Chris Osborne is a Fellow of the Institute of Chartered Accountants in England and Wales and a Senior Managing Director at FTI Consulting, where he is the European head of its Economic and Financial Consulting, and Forensic and Litigation Consulting practices. Prior to this, Chris was the European Managing Director in LECG Limited and was the head of Arthur Andersen's Economic and Financial Consulting Group. Chris has over 25 years' experience in bringing economic and financial analysis to complex commercial and regulatory disputes.

During the course of his career Chris has worked on regulatory issues in the water, electricity, gas, media, post, rail and telecoms sectors, working for regulators, incumbents and new market entrants, in the UK and more widely in Europe. Chris has been involved in over 150 cases of litigation and arbitration, covering loss of profits claims, post-acquisition disputes, insurance claims and restrictive trade practices. He has also worked on business strategy issues for a variety of companies.

He has given oral evidence on over 20 occasions - in the UK's domestic courts, as well as in London, Paris, Stockholm, Geneva and Singapore in ICC, UNCITRAL and ICSID arbitrations. He has also given evidence in the US Tax Courts, in the US-Iran Tribunal, in the then Restrictive Trades Practices Court and in front of the then Monopolies and Mergers Commission.

Appendix 2

Extract from Thames Water's "Bad Debt Provision Judgement Paper"

- A2.1 In 2010/11, Thames Water undertook a one-off review of outstanding debtors which identified a number of debts that, although did not meet the criteria generally applied in identifying Bad Debt Write-Offs, were nevertheless considered to be uncollectable. These write-offs were defined as 'Recessionary' and comprised write-offs in the following debt segments:¹³

Final Debt – Trace & Collect Process. If an account enters debt recovery as a piece of 'closed/final' debt, ie the customer has vacated a property and after internal letter/dial strategy has failed to locate the customer or secure payment, then the final debt is referred to a specialist Trace & Collect agency. There are currently two agencies that will work this debt, attempting to trace goneaway customers to a new address and will commence a letter/dial strategy based on the information they find. In March 2011 £32.4m of final debt [was] deemed uncollectable and was written off.

Active Debt – DWP. Whilst we receive payments for this debt, at the current rate of £3.25pw in some cases this will take years to be liquidated. As a 'one off' exercise, a decision was made to rid many of these customers of this added debt burden and enable them to keep up to date with payments in a more manageable way. In March 2011 £1.0m of DWP active debt was written off.

Not all write offs were actioned before year end due to system capabilities, therefore an accrual of £4m has been posted. A further accrual of £7m was posted to cover write offs that had been actioned in the system by the 31st March but were done after CIS [Customer Information System] closed on the 25th March.

- A2.2 I understand that, for reporting purposes, Thames Water's Customer Information System ("CIS") reports on the last Friday of the month and posts to the general ledger. Any items processed in CIS between the last Friday of the month and the end of the month are posted to the general ledger the following month. Thames Water makes 'accruals' for these items.

¹³ Thames Water (2011) Bad Debt Provision Judgement Paper, March 2011, page 10.

Appendix 3 Reconciliation of Bad Debt Write Offs to TW Exhibit 131

A3.1 Table A3-1 below shows a reconciliation of the Bad Debt Write Off data used in this report and Table 4 of TW Exhibit 131.

Table A3-1: Reconciliation of total household Bad Debt Write Offs to Exhibit 131 (£ million)

	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
0-24 months	0.968	4.159	4.673	14.669	9.186	12.250
24-36 months	3.226	10.532	6.304	12.711	3.596	9.327
36-48 months	4.060	9.720	1.974	11.241	2.532	15.037
>48 months	2.139	7.268	2.623	15.497	3.769	27.288
Total	10.394	31.679	15.574	54.118	19.084	63.901
Accruals	16.460	(16.460)	(1.116)	(0.100)	(1.700)	1.250
WOCs	3.347	4.532	5.167	4.423	5.619	6.268
Rounding differences	(0.213)	(0.269)	(0.068)	(0.092)	(0.075)	(0.064)
Sub-total	29.989	19.482	19.557	58.349	22.928	71.355
Table 4 Exhibit 131	30.026	19.393	19.771	58.212	22.970	71.345

Notes: The line item 'Rounding differences' refers to differences arising due to one report using bottom-up postcode and account level data and Table 6a of the June Return being an annual summary.

Sources: Thames Water.

Water Resources Task and Finish Group
 Water UK, 1 Queen Anne's Gate
 14.00 -16.00 3 June 2013
 Draft Action Notes

Present:

Carol Skilling	Defra	Mike Pocock	Affinity Water
Christine Tuckett	EA	Lester Sonden	Sutton & East
Pauline Smith	EA	Chris Lambert	Thames Water (Chair) ¹

Rachel Wright	Ofwat (phone)
Luke de Vial	Wessex Water (phone)
Karen Gibbs	CCWater (phone)

Apologies:	Trevor Bishop	EA
	Sarah Mukherjee	WaterUK
	Mike Cook	Anglian Water

1.	<p>EIUC Update and the RSA process</p> <p>The future of the EIUC is uncertain given the status of the scheme in the draft Water Bill. Responses to Defra's consultation have flagged that essentially removing section 61 will remove the security for water companies that funding will be included in Ofwat's baseline to compensate for loss of an abstraction licence. Defra has indicated that it does not see this as an issue because it has the power to instruct Ofwat to include compensation in its FD. However, some companies remain concerned that this will still be a largely discretionary process and consequently there is a risk that adequate funding will not be secured.</p> <p>If the EIUC is removed the status of the existing accumulation fund was uncertain, and whether there would be any refunds to companies. The EIUC had not been funded through price limits. Rachel Wright agreed to check Ofwat's view on this matter.</p> <p>No deterioration linked to RSA process – if a water company is intending to increase abstraction under an existing licence the extent of, and accountability for determining any investigations required to support this action is uncertain. The EA will have originally undertaken an evaluation of the environmental impact when first determining the licence and would have again assessed licences at full yield under CAMS. The need for clarity of the requirements at an industry level</p>	Rachel Wright
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¹ Attended on behalf of Yvette de Garis

	<p>was discussed as well as the accountability for determining the work. Luke de Vial agreed to circulate the note of a meeting that had taken place with Trevor Bishop where the requirements had been discussed. Pauline Smith clarified that the accountability for defining the requirements remained with the EA and it was a matter of timing and prioritisation of resources on other areas that was probably leading to any current uncertainty. It was agreed that the EA would review the note to give clarity on the risk assessment process where there may be issues of deterioration. The EA is not looking for companies to repeat any work that the EA has already undertaken as part of the RSA process. The importance of water companies ensuring proactive dialogue with the local Agency teams was stressed.</p>	<p>Luke de Vial</p> <p>Pauline Smith</p>
2.	<p>No deterioration guidance</p> <p>The EA is not expecting to issue any further guidance in the WRPG on the no deterioration policy. If companies are required to undertake any investigations in AMP6 they should include requests for funding in PR14 Business Plans. Companies should request local EA regions to confirm any requirements in writing to provide evidence in support business plans.</p>	
3.	<p>Water quality implications for WRMPs</p> <p>A recent meeting of water company representatives with DWI colleagues confirmed that the DWI no deterioration clause might be breached if as part of a new bulk supply water is transferred from an area with an undertaking to one without. Mike Pocock is currently finalising minutes of this meeting which will shortly be circulated to members of the Water Resources network to provide clarity on DWI expectations. Inevitably there will be further work for companies to undertake between draft and final plans to provide the appropriate risk assessment to reassure DWI that mitigation measures would be undertaken to minimise any potential water quality risk.</p>	<p>Mike Pocock</p>
4.	<p>Draft WRMPs</p> <p>Carol Skilling reported that all companies had submitted their WRMPs and only one company had not yet published its plan for consultation. Representations were being received by Defra and these would be passed on to companies as they are received. Carol asked that if companies received representations direct that did not appear to have been copied to Defra these should be forwarded on to Defra. Carol also provided initial feedback on matters of generic concern that had emerged from an overview of draft WRMPs but clearly stated that the magnitude and significance of these matters was not clear and that she was simply reporting matters that might be of concern.</p>	

	<p>i) Defra has engaged Colin Fenn to review levels of service and related cost implications from draft WRMPs to support the impact assessment of the resilience clause in the draft Water Bill. This work had shown that only 40% of companies had included information in their plans relating to the reference case levels of service. Carol indicated that if there were similar levels of departure from the Guidelines in other aspects of the plans this may be a cause for concern.</p> <p>ii) Following public consultation, companies must set out in their Statement of Response how plans have changed, and not what will be changed. Carol felt companies already appreciated this but stressed the point to be very clear.</p> <p>Companies requested notification from both Defra and the EA as soon as possible if any matters of concern were noted during the ongoing review.</p>	Carol Skilling
5.	<p>BP and WRMP timelines</p> <p>Submission of PR14 Business Plans has been brought forward to December 2013 and as such potentially undermines the previous hard work that had been undertaken to try and get the WRMP and BP timetables as aligned as closely as possible. Following submission of companies' Statement of Response it will take 6-8 weeks for the EA to submit its Advice Report to Defra. Given the need to ensure a consistent review by the EA it was seen that there is little benefit to water companies in submitting their Statement of Response early – this would be unlikely to facilitate a quicker response from the EA. It was agreed that the best way to ensure as much alignment as possible between WRMPs and BPs was to maintain the existing process of open and ongoing dialogue between companies and regulators.</p>	
6.	<p>Potential WRMP19 project</p> <p>A very positive meeting between companies and the EA to review the WRMP process had occurred in May. Pauline Smith confirmed that Halcrow's final report reviewing the WRMP process was expected in June/July. Pauline will update the group on progress. Looking ahead to WRMP19 it was confirmed that a UKWIR project to review deployable output methodology was going ahead which would be a useful building block for WRMP19. Pauline confirmed that Stuart Sampson is in the process of setting up a meeting to bring together a group of industry representatives to update the Guideline and this will include a review of the Tables given the problems encountered at the draft stage. She explained that as many companies had developed work arounds for the Tables given the spreadsheet errors the EA might not make substantial changes so as to avoid invalidating the actions</p>	Pauline Smith Pauline

	companies had taken themselves to sort the situation. Pauline expected that the meeting would occur before the end of June with a range of industry representatives and would prompt Stuart on progress.	Smith
7.	<p>Drought terminology and links to code of practice work</p> <p>Pauline Smith outlined the findings of the EA's customer research undertaken following the 2012 drought. In light of feedback from customers the EA has developed a colour code to classify drought and associated management activity in the UK. In overview the code is Green – normal; Yellow – alert/recovery; Amber – major drought, and Red – severe drought (beyond what is normally experienced in the UK). A temporary use ban would equate to amber code. The EA is keen to see the UKWIR Code of Practice update reflect the colour coding as much as possible to ensure consistency in customer communication. Pauline agreed to circulate more details of the EA customer research to the URWIR project steering group members in advance of the next steering group conference call on 5 June.</p>	Pauline Smith
8.	<p>AOB</p> <p>The following items were raised:</p> <ul style="list-style-type: none"> i) Abstraction Reform Project – Defra consultation will take place at the end of the 2013. Luke de Vial is a member of the Abstraction Reform Advisory Group and the next steering group meeting is 12 June. ii) EA charges have been published for 2013/14 but there did not appear to be any increase in the EIUC or Standard Unit Charge. Chris Tuckett agreed to check this and advise whether there had been an omission. iii) CCWater had also undertaken research following the 2012 drought and had discussed with the EA a possible dissemination event covering both pieces of work. In the meantime it was agreed to share the unpublished version of the research with the UKWIR project steering group updating the existing code of practice. Karen Gibbs will call Pauline Smith to discuss a dissemination event. 	Chris Tuckett Karen Gibbs

TDX Comments on Ofwat's Draft Determination of TW's IDoK Application

As indicated, Ofwat's assessment of the efficiency of TW's bad debt management practices is summarised on pages 38-41 of their report.

Their summary focuses on 3 key observations based on information contained in the more detailed PwC report:

Ofwat Summary Observation 1:

"The first relates to what it calls 'decisive recovery action', which relates to the action water companies take to trace and pursue outstanding payments. Some water companies will not write off absconded debtors and will periodically run a trace for these debtors on a 'no find no fee' basis. Thames Water's IDoK states that debts are written off when "collection methods have been exhausted". There is no evidence presented in the submission or the TDX report that accompanied the submission that suggests Thames Water is carrying out the same level of active tracing as some of its peers. The evidence that PwC reviewed suggests that Thames Water could be doing more to trace and pursue such debtors."

TDX Comments

TDX examined TW's approach to the collection of absconded and gone-away debt as part of our research and found it to be robust and in-line with peers.

As summarised on Page 66 of our report, the scope of the work TDX were asked to undertake by TW included reviewing the activities of their outsourced Debt Collection Agencies (DCAs). We established that TW utilises a 3 tier placement strategy with short placement lengths and recall periods and a commission based fee structure used to incentivise DCAs. The 3rd placement is a purely field based stage with a focus on visiting the property to perform door-step collections or to understand the circumstances of the property/debtor (e.g. is it still occupied and, if so, who lives there?) to determine the most appropriate strategy.

Where a customer has vacated a property leading to the account being closed or finalised, TW undertake a series of internal activity (letters and outbound dialling) and then utilise the services of an external credit bureau's specialist trace product to try and establish a forwarding address.

Where the internal collections activity is unsuccessful these accounts are placed with specialist trace and collect agencies who are remunerated on a commission basis based on monies collected. These agencies will typically retain and work these accounts for a period of 9-12 months after which they will be returned to TW and considered for write-off if the agencies collections efforts have not been successful.

The introduction of the external credit bureau trace product to append forwarding addresses and enable more effective collection of final debt was introduced in 2010 as an enhancement to the final debt process, as highlighted on pages 14 and 80 of the our report.

Ofwat Summary Observation 2:

"The second relates to the consequences of non-payment for customers, with some water companies sharing data with credit bureaux, which impacts the credit rating of delinquent debtors. On the basis of the evidence provided, Thames Water does not currently follow this practice. TDX does highlight that this is an activity that Thames Water plans to introduce in the future, along with a new debt management system"

TDX Comments

A finding of our report was that TW is not currently sharing data with the credit bureaux (which means that TW can't currently default customers on the credit bureaux for non-payment of bills, unlike some of its peers). That said, TDX concluded that TW has established plans in place to implement credit bureaux reporting during the next AMP period as referenced on slides 20, 21, 55 and 60 of our report.

Furthermore, as part of our research we did undertake a review of TW letters and other debtor communications and found that "...Progressive letters are of escalating tone with the statement of intent clearly outlining the course of action TW will follow in order to collect the debt" (see page 37 of our report).

Examples of the escalation of tone we evidenced included the threat of legal action (and the associated impact this could have on credit worthiness, requirement to pay costs/fees, potential application of enforcement options etc) and the referral of accounts to DCAs. Therefore, overall, in our opinion the threat of negative impact on a debtors position is clearly articulated through the current communications and the planned implementation of credit bureaux reporting will only strengthen this.

Owat Summary Observation 3:

"The final point is that by writing off debt too soon and not sharing data with credit bureaux, Thames Water is sending out a message to its customers that there may be "no consequences of non-payment"

TDX Comments

As detailed in our response to Observation 1 above, we found that TW's approach to attempting to trace absconded debtors and collect from them prior to write-off was robust and comprehensive.

Equally, as detailed in our response to Observation 2 above, whilst we acknowledge that TW is not currently sharing data with credit bureaux (although plans are in place) it is clearly articulating the negative consequences of non-payment in all of its communications with debtors

TDX were asked to review the adequacy of TW's write-off policy. To support this assessment we referred to the KPMG Benchmarking Study undertaken in May 2012 which confirmed that the period within which TW write-off accounts is in-line with a number of their peers (see pages 62-64 of our report).

TDX Comments on Detailed PwC Bad Debt Report

TDX has also spent some time reviewing PwC's detailed report which independently assesses TW's management of bad debt

General comments

- An important caveat to our comments is that TDX are unfamiliar with the precise scope of what PwC were asked to do and how they went about it. We're assuming that their conclusions were arrived at without engaging in direct discussion with TW so we can understand how one of their recommendations would be a requirement for a more in-depth assessment underpinned by more detailed quantitative/qualitative data points.
- Whilst TDX did reference cross industry best practice data points when undertaking our research, we focused on a comparison of TW versus its water industry peers on the basis that this was the most meaningful benchmark in the context of the scope of work we were asked to undertake.
- TDX are not familiar with the framework PwC have used for evaluating TW's approach to managing debt although it appears to focus on an examination of 3 broad practices (i.e. encouraging positive payment practices, supporting customers in need and addressing poor payment practices) and 19 underlying 'evaluation areas'. We used a different framework to review TW, as described in our report, which makes a direct comparison to PwC's findings difficult. It's also hard for us to critique PwC's framework without a more detailed understanding of how it's been put together and the detail behind each of their evaluation areas but we do have one general observation based on what is contained within their report. Two of the specific evaluation areas included in PwC's framework (i.e. Nudge Marketing and Sharing Success Stories) appear to be included primarily on the basis that both are used extensively by Public Sector organisations. In TDX's experience, Public Sector organisations are not generally exemplars for debt collection best practice (having not invested in this area to the same level as financial services organisations and, to a lesser extent, Telcos and Utilities). Furthermore, from what we understand of these two evaluation areas, in our experience, they are not central/material to effective debt recovery.

Comments specific to PwC Evaluation Areas

We've focused our comments here on those evaluation areas where the PwC report indicated that there was insufficient information to assess TW (or where they felt TW rated below water industry peers)

- **Accurate Data/KYC** – On slide 60 of our report we refer to TW's consistent use of internal and external data throughout the billing process in order to enhance the efficiency and effectiveness of collections activity (e.g. agent data capture at point of debtor interaction, use of tele appends, trace services, previous payment data, availability of analytical data warehouse etc). We did not observe any poor/absent practices that could lead to data inaccuracies. We agree that the sharing of data with the credit bureaux represents an opportunity for TW but believe this is most relevant to the 'Consequence' evaluation criteria.
- **Automatic Payment** – During our fieldwork TDX observed that TW's Direct Debit penetration stands at ~50-51% and is promoted at every opportunity (i.e. website, written comms and conversations with customers/debtors). On page 35 of our report we provide some further detail on instalment payment methods as follows "All key payment methods are offered to TW customers. Dates for payment are negotiable and DDS are set-up to the customers preferred date. It was observed that these dates plus any delays in setting up the payments are clearly communicated to customers". On the same page of our report we also acknowledge the fact that TW will, where necessary, seek to obtain an attachment of benefits through the DWP.
- **Nudge Marketing/Sharing of Success Stories** – As per the final bullet point in the previous section, in our experience these two evaluation areas are not central/material to effective debt collection in the water industry.
- **Early Identification & Intervention** - TDX comment on the fitness for purpose of TW's overall debt collection process on Page 59 of our report. On pages 30 – 33 we provide numerous examples of the lengths TW go to ensure they are pro-actively contacting debtors in-line with Ofwat debt collection guidelines (Principle 1). Furthermore, on slides 41-44 we provide examples of the methods that TW employ to ensure that debtors circumstances are taken into account wherever possible (in-line with Principle 4 of the Ofwat guidelines). As described on slides 23- 26 of our report, customer risk scores based on historic payment performance are used to determine the appropriate strategy at the point a customer enters collections. For example, this approach provides a means of immediately distinguishing between the low risk/good customers and the high risk/poor customers in order to apply relevant/proportionate strategies.
- **Clarity of purpose & direction** – From what we observed, overall TW has a clear strategy for debt prevention/management and a fundamentally sound approach to billing & collections practices which is broadly in-line with its peers. As for the previous point, at a high level slides 23-26 describe our key observations around current approach. Whilst not called out explicitly on the 'Information Sources' slide of our report (Slide 8), as part of our work we did review a sample of TW's letters and spend time with agents listening to selected calls (referred to throughout the section from slide 29-50 but in particular on slides 37 and 38). We can therefore confirm that letters and other communications with the debtor do clearly set out the consequences of inaction. At different stages of the process previous payment performance together with external data appends will be used to segment customers and tailor the resulting strategies (slide 60 refers to some of the sources used).
- **Relevant debt escalation** – We refer to the fact that TW apply a segmented collections approach with clear escalation of tone/content on our assessment overview (slide 20 – Strategy & Segmentation). We provide examples of how this works in practice on slides 23-26 which clearly show, for example, how the higher risk accounts will be accelerated to legal action and DCA. We reviewed a sample of TW's letters and listened to a sample of calls to ensure that this segmented/escalating approach was followed through in execution.
- **Decisive recovery** – Comments made in relation to the three previous points are also relevant to this point. The PwC report findings also indicate that TW's apparent willingness to write-off absconded debtors may contribute to them not being comparable to best peers on this evaluation area. As detailed in our comments on Ofwat's Summary Observation 1 (above) we found TW's approach to tracing absconded debtors to be robust and comprehensive. Furthermore, as detailed in our comments on Ofwat's Summary Observation 2 (above) we found TW's approach to write-off to be in-line with industry peers.

- **Consequence** – As called out in our comments on Ofwat's Summary Observation 2 (above) TDX agrees that TW cannot currently threaten/follow-through on defaulting a non-payer with the credit bureaux, although this is in plan. Having reviewed a sample of TWs written comms and listened to a sample of calls we can however confirm that the consequences of non-payment are applied consistently in all interactions with debtors (including the potential impact on a debtor's ability to obtain credit in some of the legal communications).
- **Persistent/Unyielding** – TDX's observations on TW's overall collections and recovery process are summarised on slides 23-26 of our report, with further detail referenced throughout. As covered previously, TW undertake significant trace efforts (involving the use of specialist credit bureau data and specialist trace agencies) prior to exhausting activity on absconded debtors. Also, as previously indicated, we found TW's write-off policy to be in-line with the majority of water industry peers. TW is consistently applying the threat of all of the consequences currently at its disposal for persistent non-payment and the additional threat of default will be added when available. TW's use of a three tier external DCA placement strategy (plus Trace & Collect specialists) is a more sustained/robust approach to recovering monies against the hardest to collect cases than we have seen employed by a number of its water industry peers.

TDX Group

TDX Group is data driven business specialising in providing creditors the platforms, tools and services to optimise returns from their debt portfolios. We are a trusted partner for many blue chip organisations across a wide range of industry sectors including financial services, telecoms, energy, media, water and public sector and our intermediary position ensures our clients benefit from proprietary analytics and data reporting, enabling better strategies and results.

Through TDX's day-to-day operation and previous engagements we have debt liquidation data gained from placing £13.1bn of debt on our recoveries platform and having £8.4bn of debt under management. We also have detailed operational debt collection process and performance data collected by undertaking over 30 deep-dive consultancy projects for major creditors in the UK and internationally.

TDX's Advisory team is a dedicated team of consultants and analysts with many years of debt industry experience. The team has undertaken six operational/strategic reviews for water companies (and many similar reviews for creditors across other sectors) and has developed established frameworks for benchmarking creditors' debt management strategies and operational capabilities against peers and best practice.

Invoice

Environment Agency
Income Department 311
P.O. Box 263
Peterborough
PE2 8YD
FSC–Income@Environment–agency.gov.uk

Vat No : GB 662 4901 34
Invoice No : 1158646
Date : 18–OCT–13
Page No : 1/1

Attn: Accounts Payable
THAMES WATER UTILITIES LTD
PAYMENTS AND COMPLIANCE
BERKSHIRE COURT
C/O BLAKE HOUSE, MANOR
FARM ROAD
READING BERKSHIRE RG2 0JN

Customer No 9627 – T00000003A
Payment Terms EA DD 2A 13/14
Due Date / Amount 15–NOV–2013/845,679.26 15–FEB–2014/845,679.26

Invoice for fees payable in respect of WATER ABSTRACTION LICENCES due under The Water Resources Act 1991.

Line	Description	Total GBP
001	Invoice fees payable in respect of Water Abstraction Licences due under The Water Resources Act Amendment of compensation charge only for financial year 2013/14 See schedule for individual additional licence eiuc charge	1,691,358.52
	VAT: Outside Scope	0.00
	Total (GBP)	1,691,358.52

Charge = Volume x Source x Season x Loss x Standard Unit Charge x Pro Rata Days (x Customer Agreements). EIUC = Environmental Improvement Unit Charge
This invoice does not relate to the supply of goods or services and no purchase order is provided. You may be operating illegally due to non payment.

***** PRINT BATCH CONTROL *****

Printing Option Selected: Print Selected Invoices

Control Count: 1

1 Separate Transactions

Control Amount: 1691358.52

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