TARGETED REVIEW OF SLUDGE AND WATER RESOURCES

OFWAT

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REPORT

FINAL

Submitted by:

Cambridge Economic Policy Associates Ltd

CONTENTS

ACRONYMS

Acronym	Expansion
BOD	Biochemical oxygen demand
Capex	Capital expenditure
CEPA	Cambridge Economic Policy Associates
CHP	Combined heat and power
COD	Chemical oxygen demand
EA	Environment Agency
FTE	Full time equivalent
G/NMEAV	Gross / net modern equivalent asset value
H/CCD	Historic / current cost depreciation
IRC	Infrastructure renewals charge
M&G	Management and general
Opex	Operating expenditure
PR14/19	Price review 2014/2019
RAG	Regulatory accounting guidelines
RAWG	Regulatory accounting working group
RCV	Regulatory capital value
STC	Sludge treatment centre
STW	Sewage treatment works
Totex	Total expenditure
WaSC	Water and sewerage company
WIP	Work in progress
WoC	Water only company

EXECUTIVE SUMMARY

Objective

Ofwat's goal is to deliver significant benefits to customers through greater efficiency and potentially greater competition. A key step in achieving this goal is the possible removal of sludge and water resource activities from the single wholesale water and wastewater price controls, and the creation of separate sludge and water resource price controls for its 2019 price review (PR19). Ofwat is developing its policy in this area under the Water 2020 programme. In order to set effective price controls, high quality cost and revenue data is required from companies for both recent past and future years. This data needs to be robust on an individual company basis but must also be comparable across companies.

Ofwat appointed Cambridge Economic Policy Associates (CEPA) to help it understand whether, and the extent to which, sludge and water resource cost and revenue data is robust and comparable across the ten water and sewerage companies (WaSCs). It has already mandated accounting separation and has provided guidance, via regulatory accounting guidelines (RAGs) on how this is to be achieved. This review considers how effective this approach has been in operation and makes recommendations for improving consistency.

Approach

In order to ensure structure and consistency the project has been underpinned by use of a standard questionnaire. A template version of which was provided to the companies initially and then part completed by the project team based on information in the public domain and material held by Ofwat. Each of the WaSCs reviewed its part completed questionnaire and added to it in advance of individual day-long meetings at each company's offices. Following these meetings the questionnaire responses were initially revised by CEPA to reflect its understanding of the discussions and then by each WaSC to confirm the responses and make further additions. This approach was originally piloted with one of the WASCs and then subjected to small refinements as a result.

Ofwat's scope for the work was to only cover the ten WaSCs given time constraints and because they are involved in both water and waste water activities. Through discussions with these ten companies we have gained a good view of potential issues in the water activities across the industry. However we recognise that additional engagement with the water only companies (WoCs) may have highlighted further issues, in particular those which may be company specific. We understand that Ofwat will take forward further engagement with the WoCs and encourage them to participate in upcoming Regulatory Accounting Working Groups (RAWGs) and to respond to future consultations including those on the RAGs.

Findings

Our review finds that all companies have attempted to comply with the RAGs and have made good progress. Nevertheless, there are areas of inconsistency between companies across both water resource and sludge business units. In some cases these arise because one or two companies do not comply with the current RAGs: for example, by placing certain assets or activities apparently in an unsuitable business unit; or on the wrong side of the appointed/non-appointed divide. In others, companies have interpreted the RAGs in different and perhaps unexpected ways: either because current guidance is insufficiently specific, or because the current RAGs do not address particular scenarios. We have also observed examples of companies' selecting differing allocation methodologies or cost drivers. Although different approaches are not necessarily a cause for concern, we have found some instances in which improved coordination across the industry could aid consistency and others in which individual companies take an approach which appears inappropriate. Finally, we have observed some areas in which current RAGs may need to be revised to facilitate separate price controls being set for water resources and sludge.

Where possible, we have tried to give an indication of the materiality of the issues. Further work would be required to accurately quantify the values under consideration in most cases.

The bullets below present a high-level summary of the water resource and sludge accounting issues that have been identified by this review:

- **Water resource boundary issues**. Although the RAGs are broadly clear on the start and end-points of each water business unit, they do not give completely clear direction on some specific cases. As a result the most suitable treatment is currently unclear to companies (e.g. wholly compensating reservoirs without abstraction licences; aquifer recharge schemes; blending). There have also been some instances where we consider the RAGs to be clear, but companies have not allocated costs or assets in a way which is consistent with them (i.e. pumping upstream of impounding reservoirs; pumps which serve multiple business units).
- **Sludge boundary issues**. Companies currently put the boundary between sludge and sewage activities in different places - especially with respect to thickening at standalone sewage treatment works (STW). According to our approximate calculations, the different approaches are likely to be material. The boundary between appointed and non-appointed activities is also interpreted differently (i.e. combined heat and power (CHP) assets; gas to grid; treating waste from other WaSCs; tankered waste). Given the possibility of a separate sludge price control, companies have emphasised the need for consistency among WaSCs and new entrants in the sludge business.

- **Principal user allocation methodology**. Allocation by principal use is currently recommended for splitting values across separate price controls, but some companies also use it to allocate management and general (M&G) assets between business units. Given that M&G asset values are up to 8% of water resource and sludge business unit totals, the difference between the two approaches seems likely to be material and worthy of further consideration.
- **Recharges**. Where one business unit provides a service for another, companies are not always consistent as to whether or not they apply recharges (i.e. water sludge; power savings; sludge liquor treatment). In addition, the content of these recharges and charges from the appointee to associated businesses also vary - often only including elements of direct opex rather than being "fully loaded" to include elements to account for overheads and capital costs (e.g. bulk supplies; 3rd party services; tankered waste).
- **Choice of cost drivers**. Some companies currently use drivers which do not seem to be the most appropriate available (e.g. allocating rates costs based on estimates of employee time spent on activities). There are also opportunities to achieve greater consistency by issuing guidance on preferred cost drivers where, for instance, nine out of ten WaSCs already follow the same approach.

The **modern equivalent asset valuation (MEAV)** aspect of our review found many areas in which companies had adopted different approaches to MEAV calculation or underlying assumptions at the PR09 revaluation. Briefly, these include:

- whether companies assume that modern equivalent assets are built on "greenfield" or existing sites;
- whether the replacement of an asset or a process (including several assets) is considered;
- the choice of "modern equivalent asset" for a certain process - most companies said that their preferred method of treatment had changed in recent years to Advanced Anaerobic Digestion plants, but varied over the desirable mix of Mesophilic Anaerobic Digestion plants, incinerators (which provide resilience) and liming sites (which can be more economical in remote areas);
- whether and how economies of scale should be incorporated into the cost of building modern equivalent assets;
- how M&G assets should be allocated between business units - MEAV variation between companies is currently significantly affected by whether M&G assets are split across units or 100% allocated to the "principal user" unit;
- the difficulty of valuing certain large assets, bespoke to the location, for which little or no recent comparator data exists - particularly for reservoirs;

- how to value abandoned, decommissioned and mothballed assets; and finally,
- whether net MEAV should be calculated with reference to the known age of assets or their condition. For companies following the first approach, different approaches are taken to valuing out of life assets. For companies that take the second approach, there is also variation in the extent of sampling used.

Recommendations

On the basis of our findings we make a series of recommendations corresponding to each of the issues we have identified, including water resources, sludge treatment and disposal, MEAV, and wider issues. Our recommendations are set out in section 4 of this report.

For each water resource and sludge issue we advise on whether a RAG amendment would be needed and whether individual companies would need to be contacted to confirm that they would revise their accounting treatment as suggested.

For MEAV the issue is rather different, as we are not addressing how individual companies report costs today, but instead are considering how greater comparability of approach might be achieved if there is a partial or full revaluation in the future. Our recommendations identify the options and give our provisional view as to which might be preferred. For all MEAV issues, we recommend a joint company / Ofwat working group consider them more fully.

Finally, we make suggestions on the wider issues we have identified during the course of the targeted review.

Next steps

We understand that Ofwat is to issue a consultation paper soon on amending the RAGs to take account of some of the issues discussed in this report. This will concern the 2016-17 reporting year. We also understand that the issues raised will be discussed at the forthcoming RAWG, and that Ofwat will discuss with individual companies those issues we identified which are specific to them.

Ofwat is due to publish a decision document on the regulatory framework for the 2019 price review in May 2016, and will consult further on some issues, for example the boundary between sewage treatment and sludge treatment.

1. INTRODUCTION

1.1. Project scope

Ofwat's goal is to deliver significant benefits to customers through greater efficiency and potentially greater competition. A key step in achieving this goal is the possible removal of sludge and water resource activities from the single wholesale water and wastewater price controls, and the creation of separate sludge and water resource price controls at the Ofwat price review in 2019 (PR19).

Separate sludge and water resource price controls could not only highlight company cost performance by allowing direct comparison with a regulatory "target", but also widen management and investor focus to include revenue and profit for these activities, rather than only cost. Both should encourage efficiency. Furthermore, the introduction of revenue for sludge and water resource activities should, through a link to access prices, foster the development of markets.

In order to set effective sludge and water resource price controls, high quality cost and revenue data is required from companies for both recent past and future years. This data needs to be robust on an individual company basis but also be comparable across companies. If not, there is a danger of the price control being set at the "wrong" level, which would serve to harm markets, encourage regulatory appeals, and ultimately damage trust and confidence in the sector.

Ofwat appointed CEPA to help it understand whether, and the extent to which, sludge and water resource cost and revenue data is robust and comparable across the 10 water and sewerage companies (WaSCs). It has already mandated accounting separation and has provided guidance, via regulatory accounting guidelines (RAGs) on how this is to be achieved. This review has considered how effective this approach has been in terms of data quality and comparability. This report is the key output of the project and contains a series on recommendations on refinements that Ofwat might make to the RAGs from 2016-17 onwards to improve data quality so that robust sludge and water resource price controls could be set. It also raises a number of issues in relation to the calculation of modern equivalent asset valuation (MEAV) and wider issues of relevance to the Water 2020 programme.

1.2. Specific areas of study

In its ITT Ofwat set out particular areas that the study should cover and we have developed these and refined them through a pilot of our approach. The key areas of interest are discussed in Box 1.1 below and they formed the basis of our interview questionnaire, a template version of which is provided in ANNEX A.

Box 1.1: Areas of interest covered by the project

Sludge revenue and non-appointed income

This requirement is for sludge only, and is to understand issues such as:

- Whether there are sludge activities outside of those listed in the appendix to RAG 4.05.
- How and where each company accounts for each type of income arising from sludge activity.
- Whether associated costs are accounted for in the same way as income.
- How company accounting treatments compare.

The purpose of this requirement is to check whether companies are reporting sludge income and costs in the same place, i.e. non-appointed, wholesale appointed and covered by the price control, or wholesale appointed but outside the price control.

Sludge related activities outside the price control

This requirement is for sludge only, and is to understand issues such as:

Where the company already trades in organic waste:

- The commercial relationship between the regulated business and any separate trading companies, or non-appointed business which trades in organic waste.
- How any separate companies are accounted for
- Whether and how revenues and costs associated with these separate companies are shown in the company's appointed or non-appointed business.

For other companies:

- Whether they have a similar trade in organic waste, or are considering entering this trade, and if so, how they account or propose to account for it.

The purpose of this requirement is as for "Sludge revenue and non-appointed income" above.

Reporting of costs

There are separate requirements for sludge and water resources.

For sludge, the requirement is to understand issues such as:

- For co-located sewage treatment works and sludge sites, how each company attributes or allocates power costs between sewage treatment and sludge activities.
- For co-located sewage treatment works and sludge sites, how each company attributes or allocates non-power costs between sewage treatment and sludge activities.
- More broadly, whether reported sludge costs are robust – our suggestion is to check the extent to which each company's costs are directly coded to sludge activities or allocated.
- More about the cost drivers and allocation bases used by different companies.

For water resources, the requirement is to understand issues such as:

- The rules used by each company for treating impounding reservoirs and raw water booster pumping stations and the costs associated with these as being part of the water resource business unit or the raw water distribution business unit.
- The rules used by each company to treating different types of borehole i.e. single, grouped with a raw water pipeline, conjunctive use (i.e. mixed with water from a river or reservoir) and associated costs as being part of water resource, raw water distribution and water treatment business units.

- Whether each company uses the same rules to account for the partial treatment of water.
- For those companies where the expected flow of activities can be reversed, for example where raw or partially treated water is returned to aquifers, rivers or coastal inter-tidal areas for subsequent use or re-use, which business units hold the associated costs.
- More broadly, whether reported water resource costs are robust – our suggestion is to check the extent to which each company's costs are directly coded to water resource activities or allocated.
- More about the cost drivers and allocation bases used by different companies.

As for sludge, if accounting treatments are not robust or inconsistent, it will be harder to set a sensible water resource price control.

Treatment of costs

This requirement is for sludge only, and in cases where companies use the sludge assets of the appointed business for non-appointed purposes, the requirement is to understand the methods used by each company to account for this, and make a comparison across the industry. If treatments are inconsistent, this could lead to costs which are not comparable between companies.

While the RAGs set out principles that companies should use in allocating costs between services and appointed/non-appointed business, it may be the case that companies have differing (but legitimate) interpretations.

MEAV revaluation in 2009

In addition to exploring allocation and accounting issues Ofwat's is interested in gaining a greater understanding of the MEAV analysis used by each of the companies because it is considering how such data might be used in the price controls. Opening asset values and depreciation profiles could be key to setting the possible sludge and water resource price controls at PR19, both from the perspective of markets i.e. setting appropriate revenues and access prices, and also from the perspective of investors concerned about asset value stranding.

The last time that companies carried out a full MEAV revaluation was at PR09 so, for sludge and water resource assets, Ofwat wants to gain an understanding of:

- How the revaluation affected those assets and why.
- The assumptions companies made in 2009, for example on the choice of what constitutes a Modern Equivalent Asset (especially where different to the asset in place) and asset lives (especially where different to engineering lives).
- How the values from 2009 have been rolled forward to 2014-15.

1.3. Approach

In order to ensure structure and consistency the project has been underpinned by use of a standard questionnaire. The questionnaire structure was provided to the companies in template form initially and then part completed by the project team based on information in the public domain and material held by Ofwat. Key data sources are listed in ANNEX B. Our objective was to limit the time that companies had to spend up front revising and / or reformatting readily available information.

Each of the WaSCs then reviewed its part completed questionnaire and added to it in advance of individual day-long meetings at each company's offices between Ofwat, each WaSC and CEPA where their responses were discussed as were any areas of further interest or clarification. Following these meetings the questionnaire responses were initially revised by CEPA to reflect its understanding of the discussions and then by each WaSC to confirm the responses and make further additions. This approach was originally piloted at Wessex and subject to small refinements as a result. This review was not an audit of company information and all information was provided on a "best endeavours" basis. We were principally concerned with company methodologies.

Each WaSC has had access to the final completed version of its individual questionnaire.

The scope of work has covered the 10 WaSCs because they are involved in both water and waste water activities. Through discussions with these 10 companies we have gained a good view of potential issues in the water activities across the industry and a deeper understanding of how the companies operate, in particular around the boundaries between business units. However we recognise that additional engagement with the water only companies (WoCs) may have highlighted further issues, in particular those which may be company specific. Ofwat will take forward further engagement with the WoCs and they are encouraged to participate in upcoming Regulatory Accounting Working Groups (RAWGs) and to respond to future consultations including those on the RAGs.

The subsequent chapters of this report:

- briefly summarise the cost allocation rules and guidance that Ofwat has previously published (Chapter 2);
- explain our findings for each of water resources and sludge (Chapter 3); and
- make recommendations in relation to potential changes to the RAGs and on wider issues related to the Water 2020 programme (Chapter 4).

The report is supported by a series of annexes some of which are commercially confidential and therefore restricted.

2. CURRENT ALLOCATION RULES AND GUIDANCE

2.1. Introduction

In this chapter we summarise the approach to accounting separation that Ofwat has implemented in order to facilitate the possible introduction of separate price controls for each of water resources and sludge. The sections below outline Ofwat's cost allocation principles, the activities to be captured in each of the controls and summarise the RAG descriptions for each activity within the potential control. It may also be useful to note that the original accounting separation guidelines for the June return were quite prescriptive and used activity definitions. As Ofwat moved towards using the RAGs, which have been less prescriptive, some detail may have been lost.

2.2. RAG2

RAG 2.05 sets out Ofwat's cost allocation principles as follows:

- Transparency – costs and revenues apportioned to each service or segment need to be clearly identifiable.
- Causality – costs and revenues are attributed or allocated to those activities and services which cause the cost or revenue to be incurred.
- Non-discrimination – the attribution or allocation of costs and revenues should not favour any business unit or service within the regulated company.
- No cross subsidy between price controls – transfer prices for transactions between price control units should be based on market prices (if a market exists) or cost.
- Objectivity – cost allocation must be fair and reasonable, and not intended to benefit any business unit or service.
- Consistency – costs should be allocated consistently from year to year.
- Principal use – where separate price controls have already been established, capital expenditure and associated depreciation should be directly attributed to a single price control. Where the asset is used by more than one service, it should be reported in the service of principal use with proportionate recharges made to the other services that utilise the asset.

RAG 2.05 also states that the guidance applies to capital costs as well as operating costs. In addition, RAG 2.05 refers to RAG 5, which states that allocated costs between appointed and non-appointed businesses should also include, where appropriate, financing charges. We

understand that Ofwat is to address when and how financing charges should be levied at a future RAWG meeting.

The targeted review was carried out using data for the year 2014-15, when the regulatory accounts were prepared on a current cost basis. Therefore, the references made to depreciation in this report refer to Current Cost Depreciation (CCD). For the year 2015-16, Ofwat has decided that companies will no longer be required to prepare current cost accounts, so companies will instead report only historic cost depreciation (HCD) – see Section 3.7 Wider Issues.

2.3. Water resources

Version 4.05 of the RAGs dated October 2015 provides the following guidance on allocation of water resources costs:

Table 2.1: RAG 4.05 guidance, water resources – abstraction licences

Water resources – Abstraction licences	
Description	This service has been identified separately because of the potential for a market to emerge in the future, which would enable abstraction licences to generate a separate income stream. This service includes activities related to negotiating with third parties to obtain abstraction rights and to agree charges, as well as the annual cost of the licence itself. This service should not include activities that are incurred in choosing abstraction sites, optimising abstraction or ensuring compliance with licence conditions. All such abstraction planning activities and licence administration activities should be included in the 'raw water abstraction' service.
Boundary points	N/A
Unit cost description	Licensed volume available in Ml

Table 2.2: RAG 4.05 guidance, water resources – raw water abstraction

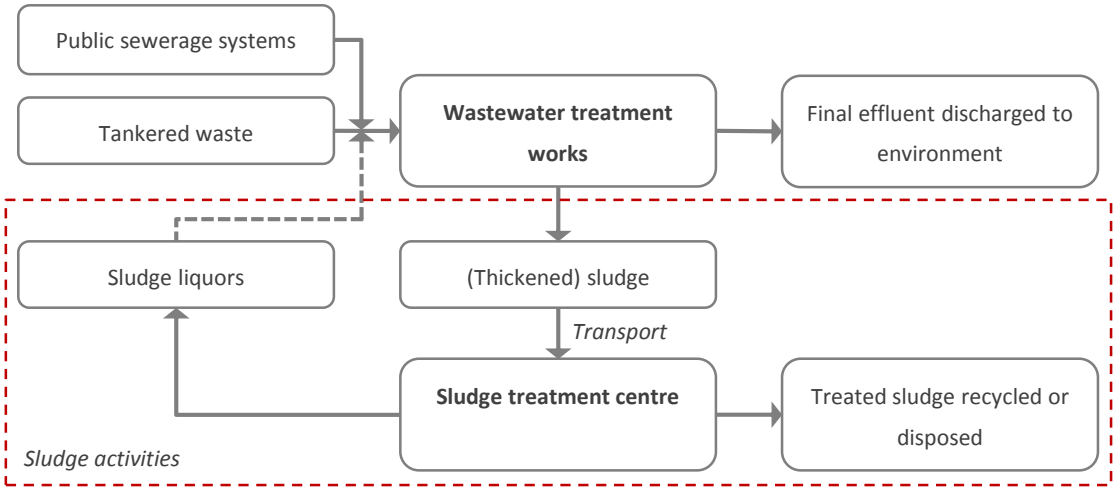
Water resources – Raw water abstraction	
Description	The water abstraction service includes activities related to the identification of new sources, including catchment management, licence management, and the abstraction infrastructure which may include pre-treatment. Pre-treatment processes can vary, from a relatively simple physical separation of the largest impurities, to more complex chemical treatments. It depends on the source of abstraction and on the type of treatment plant to which the raw water is transferred. So, it seems appropriate to combine activities related to abstraction and pre-treatment within the same service. In some circumstances, transport from the water abstraction site is included within the abstraction service rather than in raw water transport, although these costs are expected to be very small. For example, transportation between reservoirs where both reservoirs have an abstraction licence is considered to be part of the raw water abstraction service. But transport which occurs

Water resources – Raw water abstraction	
	between a reservoir with an abstraction licence and a reservoir/storage tank without an abstraction licence would be considered to be part of the raw water transport service. The activities relating to the inspections, operation and maintenance of impounding reservoirs are included in this service.
Boundary points	**Start**: none. **End**: supply of raw and partially treated (non-potable) water through a pump or gravity fed through a valve into the raw water distribution network.
Assets	• Reservoirs and lakes – dams, control rooms, valves, sluices. • Abstraction sites (rivers and boreholes) – pumping equipment, buildings and other sundry equipment at sites. • River abstraction infrastructure – screens, inlet works. • Pipework between raw water sites (pumped storage). • Pumps and valves. • Abstraction meters • Weirs and fish passes • IT assets – abstraction sites control. • Vehicles. • Premises.
Unit cost description	Volume abstracted in Ml.

2.4. Sludge

Ofwat has also considered the activities to be covered by the possible sludge price control. These are highlighted within the diagram below being those activities within the red hashed box:

Figure 2.1: Sludge treatment, transport and disposal value chain



Source: Ofwat

To facilitate accounting separation Ofwat has also produced RAGs for sludge which are reproduced in the tables below:

Table 2.3: RAG 4.05 guidance – imported liquor treatment

Imported liquor treatment	
Description	Includes all activities in transporting and treating liquors at a sewage treatment plant that have been generated during the sludge treatment process. Excludes liquor treatment which is done at a self-contained sludge processing centre.
Boundary points	**Start**: Pipework from sludge treatment process to liquor treatment plant or sewage works. **End**: Discharge of treated liquor to receiving watercourse.
Assets	Liquor pipework from sludge treatment to sewage treatment site. • Liquor plants. • Pumps, valves and other ancillary assets. • Vehicles. • IT assets. • Premises.
Unit cost description	Biochemical oxygen demand (BOD) in tonnes.

Table 2.4: RAG 4.05 guidance – sludge transport

Sludge transport	
Description	This service includes the transport of sludge from the sewage to the sludge treatment plant. All types of transport, and associated fuel costs, are included within this service. However, transport within the treatment plant

Sludge transport	
	or between sludge treatment plants is not included in this service, which is instead an activity of the 'sludge treatment' service.
Boundary points	**Start**: point of discharge of sludge from holding tanks or sewage treatment process into pipework or tankers for transport to sludge treatment processes. **End**: input of sludge into sludge treatment works.
Assets	Pipework from sewage treatment site to sludge treatment site. • Pumps, valves and other ancillary assets. • Vehicles. • IT assets. • Premises.
Unit cost description	Volume transported (m3)

Table 2.5: RAG 4.05 guidance – sludge treatment

Sludge treatment	
Description	This service includes all the activities related to sludge treatment. While different technologies exist for sludge treatment, sludge treatment is defined as a technology-neutral service for the purpose of accounting separation
Boundary points	**Start**: storage of sewage sludge in holding tanks and input into sludge treatment sites. **End**: Point at which the treated sludge is collected for disposal.
Assets	• Pre-treatment sludge blending tanks. • Sludge treatment plants – thickeners, digesters, centrifuges, vacuum presses, belt presses, other dewatering assets, sludge dryers, drying beds. • Composting vessels and facilities. • Incinerators. • Pumps, valves and other ancillary assets. • Treated sludge storage facilities. • Vehicles. • IT assets. • Premises. • Gas treatment and energy generation equipment such as combined heat and power (CHP) plants. • CHP electrical connection to the electricity grid. • Gas connections to gas grid.
Unit cost description	Dried solid mass in tonnes of dried solids (ttds).

Table 2.6: RAG 4.05 guidance – sludge disposal

Sludge disposal	
Description	The collection of treated sludge from collection point, onward transport and disposal to landfill, agricultural land, land reclamation sites and to other end users in various forms including; • treated sludge • incinerated sewage sludge ash, • composted sludge, • sludge cake. Where income is received for treated sludge then this should be shown as 'negative expenditure' in table 4E.
Boundary points	**Start**: Collection from sewage sludge holding tanks at sludge treatment works. **End**: Sludge disposed or recycled to land.
Assets	• Vehicles • IT assets. • Premises. • Landfill sites or sludge tips
Unit cost description	Dried solid mass in tonnes of dried solids (ttds).

2.5. Use of RAGs within the project

Our review has focussed on the interpretation that each of the WaSCs has placed on the current RAGs, areas where the RAGs appear to be being applied incorrectly, and the degree of consistency across the companies. In the subsequent chapters we outline our recommendations and findings.

3. FINDINGS

3.1. Introduction

In this chapter we:

- Highlight the RAG and cost allocation issues we have identified for water resources and sludge, and make proposals in respect of these.
- Show simplified process diagrams, highlighting the areas where boundary issues exist and which give an indication of materiality[1].
- Describe the key issues which would need to be addressed in the event of a future revaluation of sludge and water resources assets, and make proposals where appropriate.
- Comment on the wider issues we have found during the course of the targeted review.

All of the findings can be traced back to the completed questionnaires, as amended for company meetings and subsequent clarifications. ANNEX C, which is partly confidential to Ofwat, summarises the issues found both by category and company, and also shows the issues which apply to all companies, and those which only apply to specific companies. Ofwat has indicated that it will pursue the latter directly with the companies concerned.

3.2. Water resources processes

Consistent with the description in Chapter 2, figures 3.1 and 3.2 below illustrate our understanding of the processes captured within the limits of the water resources business. We highlight within it some of the allocation issues which have emerged as part of this targeted review, which we discussed in the sections above.

[1] We attempt to quantify the materiality of the issues identified throughout this report whenever data availability permits. All estimates of this kind use non-audited information provided to us on a best-endeavours basis. They typically represent just one or two companies and should not be considered representative of all WaSCs (or WoCs which were not part of this review). More work may be required to fully understand the materiality of the issues described, which is outside the scope of this report.

Figure 3.1: Water resources boundaries as per RAG 4.05 and current boundary issues (reservoir without an abstraction licence)

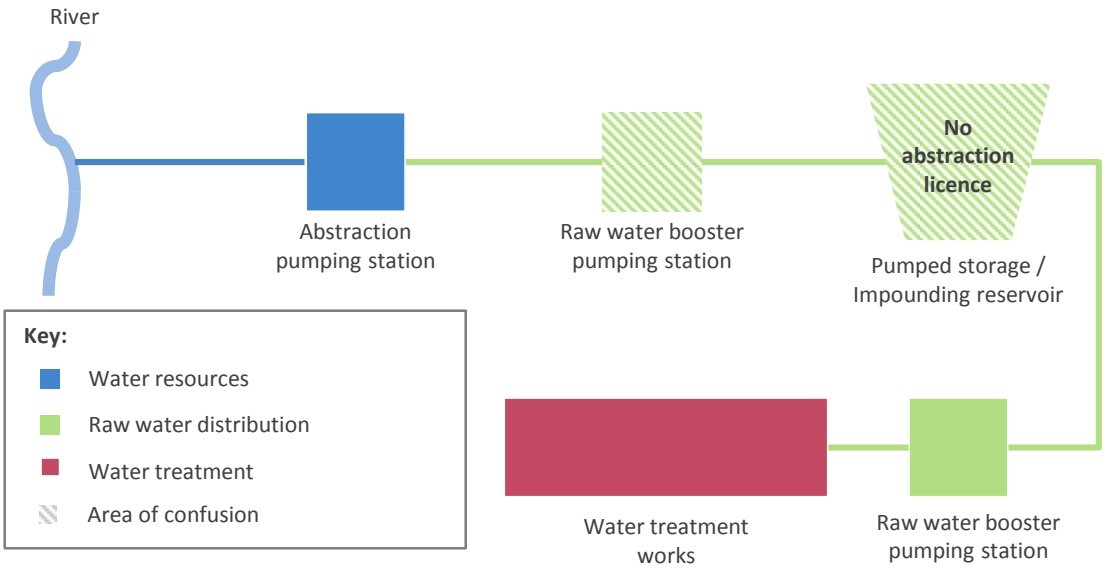
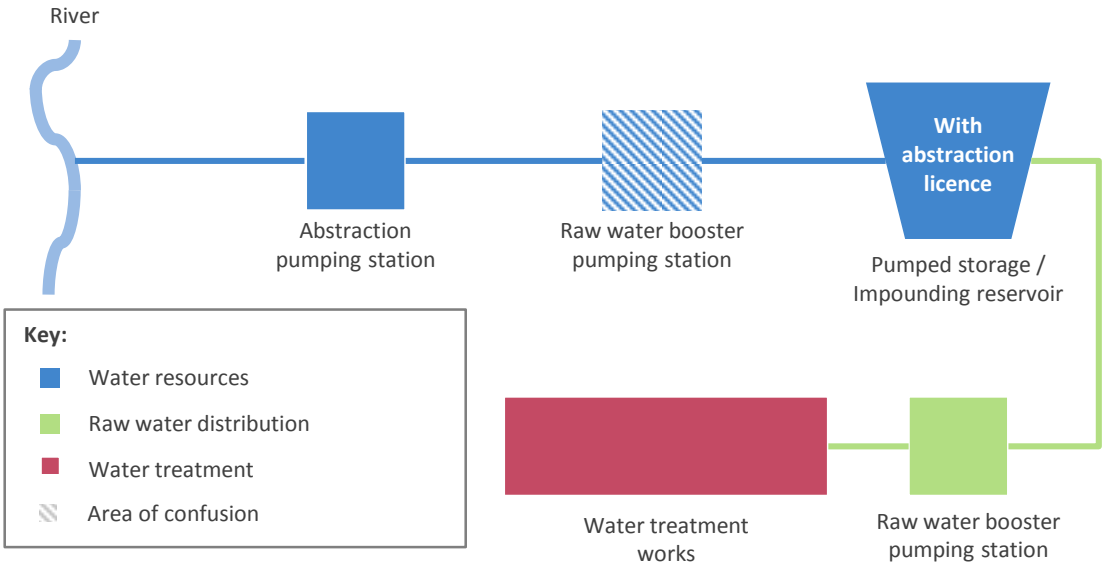


Figure 3.2: Water resources boundaries as per RAG 4.05 and current boundary issues (reservoir with an abstraction licence)



3.3. RAG related issues - Water resources

In our review of the water resources business unit costs, we identified nineteen issues which we discuss briefly in the following section.

Impounding reservoirs and abstraction licences

Certain impounding Reservoirs without abstraction licences are treated by a number of companies as being part of water resources, rather than raw water distribution. To provide an indication of materiality, for one such company, the value of misallocated reservoirs represented 16.6% of the correct gross MEAV (GMEAV) for water resources.

RAG4.05 in its definition of water resources – raw water abstraction does not explicitly state that a reservoir has to have an abstraction licence to be considered part of the water resources business unit. However, RAG4.05 under raw water distribution – raw water storage states that "*Reservoirs that do not have an abstraction licence attached to them and are used to store raw water should be included under water storage*".

We propose that, for clarity, the definition of water resources in RAG4.05 should expressly state that only reservoirs with an abstraction licence attached to them should be included under this heading, and not other types of reservoir (but see an exception below).

One company also commented that the geographical coverage of assets covered by a single abstraction licence had reduced over time, so that in newer licences fewer assets were covered by the same abstraction licence. To the extent that a historic single licence would have covered more than one impounding reservoir, but a new licence would not, the difference could adversely affect comparability between companies.

Wholly compensating reservoirs

Some reservoirs without abstraction licences exist only to provide compensating flows i.e. to keep river levels up, so that water can be abstracted downstream. Water is not taken directly from these reservoirs into public supply.

Under RAG4.05, such reservoirs would clearly fall into the Ofwat definition of raw water storage. However, the purpose of these reservoirs is to enable abstraction to take place elsewhere, it is not for the storage of raw water prior to treatment. This is commonly a condition of a company's abstraction licence or a separate operating agreement arrangement with the Environment Agency (EA).

Under the present RAGs, the costs associated with this compensating water would first of all be in water resources (when initially abstracted), then in raw water storage (in the compensating reservoir), then potentially in water resources again (if abstracted again having been released back into the environment).

The main purpose of the compensating reservoir is to support water resource abstraction. Therefore, we propose that reservoirs which purely provide a compensating role should be

classified as part of water resources, even if they do not have abstraction licences, and that RAG 4.05 be amended accordingly.

Redundant Reservoirs

Across the sector, there are a significant number of redundant reservoirs, which are not used at the present time, and some of which were never used, to put water into public supply.

One company suggested that, if a water resources price control is designed for PR19, it would be advisable to exclude these reservoirs and their associated costs, as they are not linked to the supply of water.

Although these reservoirs do not currently have a public water supply role, we believe that they could potentially have a role in future through water trading, which would suggest no change to their classification.

In any event, the design of the water resources price control for PR19 is outside the scope of this project. However, we accept that it would be advisable for Ofwat to assess whether the level of costs associated with redundant reservoirs is material when setting the possible water resources price control for PR19.

Consequently, we do not propose changes to the RAGs for redundant reservoirs.

Pumping - upstream of impounding reservoirs

RAG4.05 is relatively clear where the costs associated with pumping should sit.

Under water abstraction, RAG 4.05 notes that the activity ends with “supply of raw and partially treated (non-potable) water through a pump or gravity fed through a valve into the raw water distribution network”.

Similarly, under raw water distribution – raw water transport, the activity starts with “raw and partially treated (non-potable) water that has been pumped or gravity fed through an outlet valve.”

Under water abstraction, RAG4.05 also states that transportation between two reservoirs that both hold abstraction licences should form part of water resources.

However, we identified three WaSCs where the above treatment was not wholly followed. In particular pumping upstream of impounding reservoirs with abstraction licences was classed incorrectly as part of raw water distribution, as was pumping between reservoirs with abstraction licences.

We do not propose any changes to RAGs for this issue, but suggest Ofwat may wish to confirm, in due course, that the accounting treatment of pumping costs employed by the companies concerned is now consistent with the RAGs and with a rational basis for disaggregation.

Pumping - borehole cost disaggregation

Another WaSC noted that it had pumps which performed a function for three business units, but only split its costs across the first two, water resources and water treatment, as Ofwat guidance did not cover this case.

We propose that, for clarity, RAG 2.05 specify that where pumps perform functions for two or more business units, that its costs be split across each of them. We also suggest that Ofwat might wish to check with the relevant WaSC that they now disaggregate borehole pumping costs in three business units, where relevant.

Pumping - borehole pumping head and management estimate

Most companies with pumps at boreholes which perform a function for more than one business unit, split the costs between water resources and the other business units based on operational pumping head.

However, three companies used management estimate, which may not be as robust a calculation.

We propose that RAG 2.05 be amended to include operational pumping head as the preferred driver to split power costs, for those pumps which perform a joint function for water resources and at least one other business unit.

Borehole to WTW pipes

One company had placed a length of pipe leading from a borehole in the wrong business unit. Where there was a significant length of pipe from a borehole to a WTW, the costs associated with that pipe were accounted for as water treatment, rather than raw water distribution: contrary to RAG4.05.

We do not propose any changes to RAGs for this issue, but suggest Ofwat may wish to confirm with the company concerned that their accounting treatment of pipes is now consistent with the RAGs.

Aquifer recharge schemes

Aquifer recharge schemes occur where water companies deliberately refill depleted aquifers, for potential future use, either as a means of filtering, or, more commonly to augment groundwater

yields. We identified two WaSCs with these schemes, one of which involved placing treated water into an aquifer (as a small-scale experiment rather than on a recurring operational basis) which had been treated as part of water resources, the other as raw water distribution – raw water storage.

The definition of raw water distribution – raw water storage under RAG4.05 includes "Reservoirs that do not have an abstraction licence attached to them and are used to store raw water should be included under raw water storage."

Therefore, at present, aquifer recharge schemes, even those which augment groundwater yields, should seem to fall under the definition of raw water storage.

However, if adhered to, this would this would lead to costs associated with the initial abstraction being placed in water resources, then into raw water distribution when recharging the aquifer, then, when the water was removed, water resources again. This approach seems unnecessarily complicated and open to varying interpretations.

Moreover, it may be inappropriate to consider aquifers as storing abstracted water in the same way as reservoirs, given that not all of the water inserted will be retrievable. In this sense, aquifer recharge may be considered an activity to support companies' future ability to abstract (i.e a water resource activity).

Therefore, we propose that the costs associated with aquifer recharge schemes which augment groundwater yields are placed entirely in water resources, which should be reflected in RAG4.05.

Other "flow-reversal" schemes

We found one other company that needed to dechlorinate treated water before adding it back to the river, to satisfy EA requirements. This appears to be a one off, historic arrangement, unique within the industry.

The costs associated with this activity sat where they were incurred with no adjustment i.e. in water treatment to add the chlorine, and also in water treatment to remove it.

We do not propose any changes to RAGs for this issue, but suggest Ofwat may wish to confirm with the company that a full opex and CCD charge has passed from water treatment to water resources for this activity.

Blending

We were asked by a WaSC to consider the correct accounting treatment where water passes from a water source, through pipework, to be blended, in a reservoir without an abstraction licence.

In this situation, because the reservoir does not have an abstraction licence, it falls within raw water distribution – raw water storage, so the blending is classified as raw water distribution.

We propose that this should be added as guidance to RAG4.05.

Labour and Maintenance costs

There were a wide variety of approaches to the attribution or allocation of labour and maintenance costs into water resources. For some companies, costs were largely coded directly, whereas for others management estimation was the primary method used.

However, there were two instances where we found an allocation using a weak cost driver:

- Where a company used business unit GMEAV to split over 50% of its labour costs at joint water resources / water treatment borehole sites.
- Where a company placed all labour at joint water resources / water treatment borehole sites in water resources – however, the number of boreholes and the potential cost involved was low.

We propose that Ofwat amend RAG2.05 to issue guidance on cost allocation between water resources and water treatment, including that, unless a better driver can be found, management estimate (a robust centralised process) should be used to allocate site labour.

Cumulo rates

Eight of the ten WasCs split cumulo rates between water business units pro-rata to GMEAV. This approach appears reasonable as the method of assessment is largely linked to a return on assets.

However two companies used alternative approaches that would be expected to lead to a significantly different result:

- One used non-infra GMEAV, which would lead to an unreasonably low allocation on the pipe network under treated water distribution.
- Another placed the whole charge in its water treatment business unit on the principal user basis.

To demonstrate the materiality of these different approaches, table 3.1 below illustrates how the rates charged to the water resource business unit of the two WaSCs noted above would differ if they split water rates pro-rata to GMEAV.

Table 3.1: Impact on water resource opex of allocating water business unit rates pro-rata to GMEAV

2014-15	WaSC 1	WaSC 2
Current rates (% opex)	4.9 (10%)	0.0 (0%)
Basis	Non-infra GMEAV	Allocated to water treatment only
Rates based on water GMEAV split (% opex)	3.4 (7%)	3.1 (6%)

Although the company which used non-infra GMEAV has a rationale for using this as a driver, our inclination is to recommend the driver used by the other eight companies on the basis of consistency. Therefore, we propose that RAG2.05 be amended so that only the whole GMEAV approach can be used.

Management & General asset allocation - principal user

The proportion of water resources net MEAV (NMEAV) which is made up of management and general (M&G) assets varies between 0% and 3.3%, as shown by Table 3.2 below.

Table 3.2: M&G share of water resources NMEAV (anonymised)

2014-15	Proportion of water resources NMEAV from allocations %
WaSC 1	0.0
WaSC 2	0.0
WaSC 3	0.2
WaSC 4	0.3
WaSC 5	0.5
WaSC 6	0.7
WaSC 7	1.1
WaSC 8	1.9
WaSC 9	2.9
WaSC 10	3.3
Average	**1.1%**

The variance is less than for sludge because the net value of water resources assets is typically higher than for sludge, mainly because reservoirs are high value assets that do not depreciate (unlike sludge assets).

We found three aspects of the accounting treatment which also cause variation:

- Most companies allocate a proportion of M&G assets to each business unit, based on a driver (see Management & General allocation - choice of driver below)

- Of these companies, at least one deducts the CCD recharge from the asset which it does not "own", reducing the NMEAV of water resources as a whole.
- Three companies apply the "principal user" approach, advocated by Ofwat for the Retail / Wholesale price control split, under which those business units which do not have principal use of an asset, receive a CCD recharge for their use. For these companies, water resources may not be the principal user for any M&G asset

Ofwat specifies that the "principal user" approach should be applied between the price control units i.e. the four Retail and Wholesale price controls.

We understand that Ofwat will consult in summer on a number of issues, including whether or not the principal user approach should apply to the water resources business unit. We do not propose to anticipate the results of that consultation. However, if it is decided to apply the principal user basis, we suggest that associated guidance should be used to make clear that CCD recharges should not be deducted from assets not owned by that business unit, leaving a negative NMEAV.

Management & General allocation – choice of driver

Whether or not the principal user basis is applied, CCD on M&G assets is allocated between business units.

Two companies split CCD on M&G assets pro-rata to cumulative CCD (which therefore directly links asset age to the split of M&G CCD), one uses NMEAV (which places a high proportion of M&G CCD in the networks), one uses full time equivalents (FTEs), and several split down by type of asset, with much of the CCD split on FTEs or headcount.

Although not a comprehensive quantification of the results provided by the different approaches, to give an indication of the potential materiality of this issue, we found one company where adopting different approaches would cause a variance in the level of CCD charged to the sludge business unit equivalent to over 5% of totex.

Our preferred approach is the last one listed two paragraphs above, given that different types of M&G asset will have different drivers, but most would be expected to be linked to people, rather than assets.

Therefore, we propose that RAG 2.05 be amended so that M&G CCD is disaggregated by type of asset and appropriate drivers used for each, and that cumulative CCD and NMEAV would not seem appropriate.

Third party services - activities

Ofwat examples of Third Party activities are shown in Appendix 1 to RAG 4.05. These include bulk supplies to other water companies and supplies of non-potable water. Income from the recreational use of protected land under the WIA 1991 is classed as income outside the price control, rather than third party income. In contrast, income from the recreational use of protected land beyond the duties imposed by the WIA 1991 is classed as non-appointed income.

Out of the 10 WaSCs we only found five companies with significant levels of third party costs. We found two instances of costs associated with bulk supplies, four instances of costs associated with non-potable supplies, and two cases of costs associated with recreational use of land and one case of costs associated with Section 20 EA operating agreements. This latter treatment is consistent with Appendix 1 to RAG 4.05 describing reservoir operating agreements as an activity outside the price control, and a type of third party cost.

For this last category, we understand that these agreements exist for many companies, although most do not categorise the associated costs as third party costs. This appears a material issue, as the opex cost for a single WaSC was approaching 5% of water resources totex.

It is important for comparability purposes that companies report third party costs on a consistent basis, because Ofwat has historically excluded these costs from its efficiency assessment.

We propose that:

- RAG 2.05 be amended to explicitly state that costs associated with all bulk supplies are shown as third party costs, and provision of non-potable supplies are shown as third party costs.
- Ofwat obtain a legal view as whether S20 operating agreements should be classed as third party activities, then raise at RAWG the issue of accounting for them.
- Recreation activities on protected land under the WIA 1991 be reclassified as third party costs, so they are treated consistently, and excluded from Ofwat's efficiency modelling.

Third party services – cost transfers

In respect of the breadth of costs included as third party costs, there are a wide variety. Some of the activities had direct opex only, some had direct opex plus rates or direct opex plus overhead, others included a capital element, either CCD or a proportion of capex spent in the year.

RAG2 states that "costs should be allocated in relation to the way they that resources are consumed", therefore in the first instance we expect that a fully loaded opex amount be shown as a third party cost, and a fully loaded CCD and infrastructure renewals charge (IRC) amount.

The only exception to applying a fully loaded charge would be where the company is not allowed in the contract with the third party to recover the fully loaded cost, and it is not practical to amend the terms of the contract.

We propose that RAG2.05 be expanded to state that third party costs should be fully loaded, and include CCD and IRC where applicable, except where the terms of the contract state that a lesser amount should be charged to the customer.

Bulk Supply definition

One of the WaSCs questioned whether an arrangement under which a company might provide treated water for a part of a neighbouring company's area, should be classed as a bulk supply in treated water distribution, or whether it should be spread across business units.

At present the company receiving the treated water would code it entirely as treated water distribution. Therefore, the company providing the water should adopt the same consistent accounting treatment.

We propose that RAG 4.05 should be amended to state that a company providing treated water to another company's customers should treat the cost as a third party cost in treated water distribution.

Other cost allocation

We found one instance of chemical costs being coded to water treatment, even where the asset was coded to water resources.

We suggest that Ofwat may wish to check with the company concerned that it has corrected its allocation of costs.

Direct v allocated costs

Although not directly connected to compliance with RAGs and potential changes to RAGs, it is of interest to understand the extent to which the opex in water resources is directly coded or the result of allocation.

The higher the proportion of costs which are directly coded, the more comfortable one would be that the costs in the business unit are robust and not likely to change if, for example, an allocation methodology was amended or the business restructured.

Because EA services charges are a major external direct cost incurred by all companies, which can vary significantly by company, it is of interest to see the numbers both with and without this cost.

Table 3.3 below shows, on an anonymised basis, the proportion of water resources opex which was the result of an allocation, including and excluding EA service charges.

Table 3.3: Water resources opex allocation (anonymised)

Proportion of opex from allocations %	Proportion of opex excluding EA charges from allocations %
12	22
30	58
42	67
47	68
51	71
54	75
55	76
62	77
68	84
73	95
Average: 50	**Average: 69**

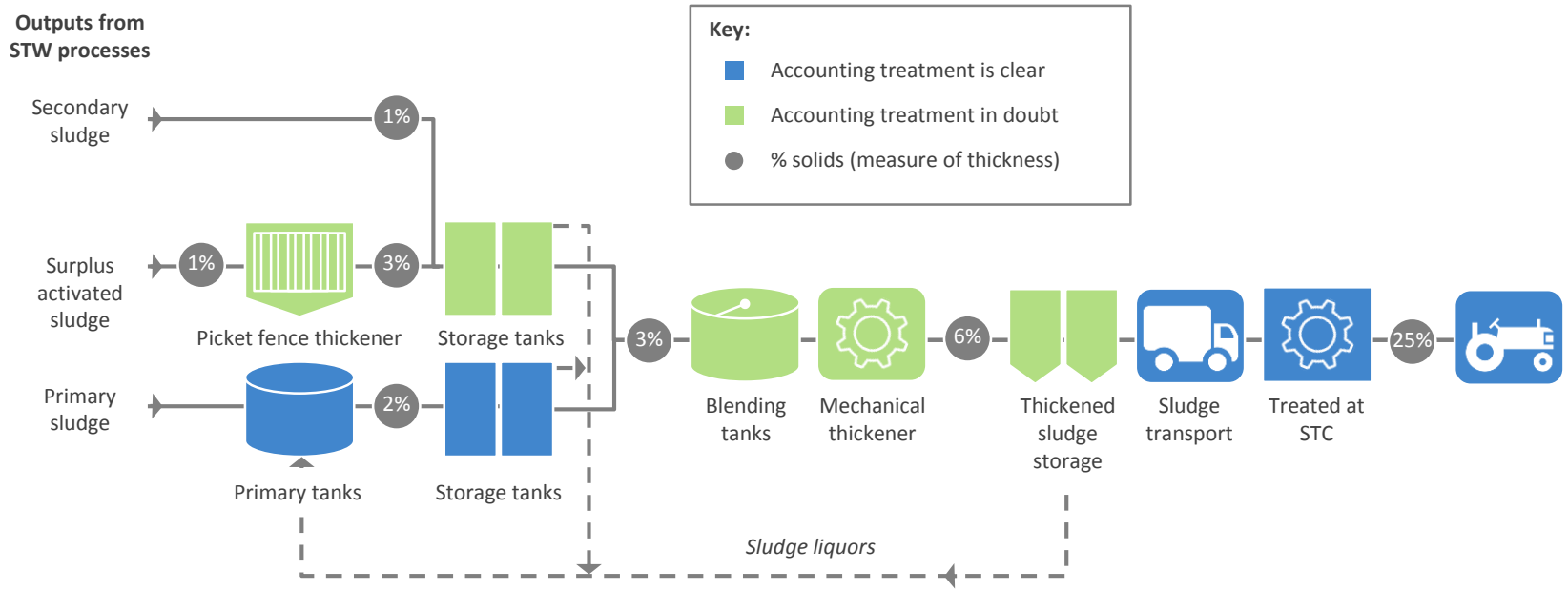
The table shows that, on average, including EA service charges, 50% of water resources opex arose from a process of allocation, rather than being directly coded, with a range from 12% to 73%. Excluding EA service charges the average allocation proportion was 69%, with a range from 22% to 95%.

The proportion of allocated opex is significantly higher for water resources than for sludge, and excluding EA service charges is well over half opex. This suggests that water resources is more integrated with other business units than sludge, which makes it more challenging to have confidence that cost data is both robust and comparable across companies.

3.4. Sludge processes

Consistent with the description in Chapter 2, figure 3.3 below highlights parts of the sludge and sewage businesses for which boundary issues exist. It highlights some of the issues that we have identified and discussed in the sections above.

Figure 3.3: Sewage / sludge boundaries as per RAG 4.05 and current boundary issues



The symbols highlighted in blue represent assets and processes that all WaSCs place in the same business unit, be it sewage treatment or sludge treatment / disposal. The symbols highlighted in green represent those assets and processes where at least one WaSC treats this as part of the sewage treatment business unit, and other WaSCs as part of sludge treatment. The issues are considered in section 3.5 below.

Sludge processes - non-accounting considerations

Our meetings with WaSCs also generated some discussion around issues which, although not directly pertinent to the current exercise, may have some bearing on accounting for sludge in the context of a standalone sludge price review. Several companies expressed concern that there is no industry accepted standard definition for sludge (i.e. with regards to thickness, composition, calorific value, and extent of treatment). Treated sludge is currently required to be at least 99% pathogen free, but other than that the only defining quality of sludge as opposed to sewerage is what assets and processes it has travelled through. Our discussions with sludge asset operators have suggested that the biological content of sludge can be extremely important for sustaining the digestion process, to the point that sludge tankered from a new source can stop the process entirely under some circumstances. The characteristics of post-treatment sludge also varies by the type of treatment (i.e. digested sludge, limed sludge, cake, etc.). The choice of treatment techniques has historically been mostly driven by cost considerations, but we know that some companies have chosen to treat sludge to above and beyond the required threshold to meet demand-side land bank requirements.

3.5. RAG related issues - Sludge

In our review of sludge treatment and sludge disposal business unit costs and revenues, we found twenty-five issues which we discuss in the following sections.

Power – CHP assets

Nine companies place CHP assets in the appointed business and deduct CHP revenues from opex in the appointed business. There is one company where CHP assets are held in an associated company. In this instance, net proceeds from the associated company's gas to grid sales are shared with the appointed company, and deducted from opex. The value of owning CHP assets includes internal cost savings and external revenue - both of which are typically material, as we note in the issues below. The different treatments would therefore be expected to lead to significant comparability issues when comparing assets and costs.

Although legal ownership and consequently accounting treatments differ, there would be expected to be trade-offs between assets and costs. The company where CHP assets are outside the appointed business will, other things being equal, have higher opex than the other companies, but lower capex as it has no CHP assets to maintain. Because Ofwat at PR14 adopted a totex approach to cost assessment, under which distinctions between opex and capex, especially base (maintenance) capex, matter far less than previously, the different ownership and accounting treatment may not affect overall cost assessment significantly at PR19. In addition, to the extent that reported totex is higher or lower in that one company, this could be attributed

to efficiency, it being the companies' choice to hold CHP assets within or without the appointed business.

We conclude that this is an ownership rather than a RAG issue, and so propose no changes to RAGs because of it.

Power – external revenue sharing

Of the nine companies with CHP assets in the appointed sludge treatment business unit, one shares 50% of the external revenue with the sewage treatment business unit, on the basis that sewage treatment provides the "fuel". In contrast, eight companies take 100% of the external revenue in the sludge treatment business unit. So the company which shares external CHP revenue across sewage and sludge currently puts electricity generation and gas-to-grid revenues worth 3.4% of sludge totex into sludge treatment, rather than the 7.0% if it was all taken by sludge treatment.

We see some logic for sharing 50% of external CHP revenue with the sewage treatment business unit, but believe that when the sludge treatment activity becomes open to competition, the value of the fuel will be reflected in the transfer price agreed between sewage treatment and sludge treatment businesses, and that consequently there will be no need to share any element of external revenue. At present, comparability is adversely affected by there being two accounting treatments.

This is a RAG Issue. We propose that RAG 4.05 be amended to state that external revenue from CHP and gas to grid should be netted off opex in the sludge treatment business unit only.

Power – cost savings

Of the nine companies with CHP assets in the sludge treatment business unit, two take 100% of the savings from their own generation to the sludge treatment business, and seven share it with sewage treatment, typically pro-rata to estimated consumption. The cost savings are not immaterial. For example, one of the companies which does not split CHP benefits reported benefits worth 6.6% of sludge totex.

As for external power revenue above, we see some logic for sharing the benefits of own generation with sewage treatment, however, we also believe that if the sludge treatment activity became open to competition, the value of the fuel would be reflected in the transfer price agreed between sewage treatment and sludge treatment businesses, and that consequently there will be no need to share the benefits of own generation. At present, comparability is adversely affected by there being two accounting treatments.

This is a RAG Issue. We propose that RAG 4.05 be amended so that savings in power costs from CHP are netted off opex in the sludge treatment business unit alone.

Sludge product sales

In 2014-15, most companies netted the receipts from sales of sludge cake off the opex of the sludge treatment business unit, however a minority treated it as income, either appointed income or non-appointed income.

The new RAG 4.05, applicable from 2015-16, states that any income from sales of sludge products should be deducted from the sludge treatment business unit's opex, to be included in the income from power generation line.

This is a RAG issue. However, it has been addressed already for 2015-16 so no further action is necessary.

Treating waste from other WaSCs

In 2014-15 there was limited trading in waste between WaSCs, with two companies showing costs and revenues associated with treating waste from other WaSCs as part of the appointed business, and one as non-appointed.

The trade was small in scale in 2014-15, but is likely to grow significantly as the sludge treatment business opens to competition. Therefore, it seems worthwhile to achieve a comparable accounting treatment now, in a manner consistent with the licence.

What is appointed or non-appointed is defined by the licence, not the RAGs, and we believe that treating waste from other WaSCs must fall outside the scope of the appointed business. Although this is not a RAG issue, for clarity we suggest that Appendix 1 to RAG 4.05 should be amended to explicitly show that treating waste from another WaSC is a non-appointed activity.

Tankered domestic and commercial waste – appointed v non-appointed

Of the ten WaSCs, we found that only five treated both domestic and commercial tankered waste in the expected way set out in Appendix 1 to RAG 4.05, i.e. as a non-appointed activity.

The remainder had a combination of accounting treatments, showing either domestic tankered waste, commercial tankered waste or both, as a "normal" appointed activity, or a third party appointed activity. The revenues and, to a lesser extent, costs associated with tankered waste can be significant. For three companies that put tankered waste under the appointee, revenues and costs ranged from 1.9 - 6.6% and 0.2 - 1.6% respectively of sludge totex.

Again, whether an activity is appointed or non-appointed is defined by the licence, not the RAGs. Our understanding is that tankered waste should be considered a non-appointed activity – as shown in Appendix 1 to RAG 4.05. Given this and the other issues around tankered waste (see below), it would be helpful if Ofwat could issue specific guidance on how to account for it, we suggest this should be a part of separate sludge treatment / sewage treatment table in RAG 2.05.

Tankered domestic waste and commercial waste – business unit treatment

The usual approach to handling tankered waste is for the non-appointed business to use the sewage treatment and sludge treatment assets of the appointed business to treat the tankered waste. The appointed business then transfers a suitable element of cost, reflecting operating costs and the use of its assets, to the non-appointed business to reflect this. This has the effect of reducing the operating and capital costs of the appointed business.

In practice, a wide variety of accounting treatments exist. One company calculated an appropriate transfer charge, but treated it as part of appointed revenue, rather than a deduction from appointed opex. Others treat the transfer charge as a deduction from sewage treatment alone, with no deduction from sludge treatment.

We propose that Ofwat issue specific guidance on accounting for tankered waste, stating that the transfer charge be split between negative opex and negative CCD in the appointed business, divided between sewage treatment and sludge treatment and disposal on a reasonable basis. We suggest that this could be done as part of separate sludge treatment / sewage treatment table in RAG 2.05.

Tankered domestic waste and commercial waste – costs included in cost transfer

Of those companies making a transfer of cost from the appointed business, most calculated a proportion of opex including overhead, plus CCD, with three companies using the full Mogden formula. However, some only included opex, with one transferring a very small amount not linked to treatment costs at all.

We believe that the underlying principle should be as set out in RAG2 i.e. that "*costs should be allocated in relation to the way that resources are consumed".* This implies that a reasonable proportion of all costs, opex and CCD, should be transferred from the appointed business.

Although this is a RAG issue, no change to RAG2 would seem to be needed – it seems clear. However, we propose that Ofwat make clear in specific guidance that a "full" opex and CCD recharge should be made from the appointed business, and that the CCD element should not be deducted from appointed business opex, but rather be shown as a CCD recharge. We suggest that this could be done as part of separate sludge treatment / sewage treatment table in RAG 2.05.

Sludge and sewage treatment boundaries – high level

WaSCs place the boundary between sewage treatment and sludge treatment in a number of different places. There seem to be three causes of this:

- Confusion over where the activity of sludge thickening, and the assets of initial sludge holding tanks should sit. In RAG 4.05 sludge holding tanks are mentioned both under sewage treatment and sludge treatment. Because sludge thickening is defined as a sludge treatment activity, some companies follow a complicated chain of activities from sewage treatment to sludge treatment (thickening) to sewage treatment (holding tanks) to sludge treatment (transport to sludge treatment centre (STC)). A company treats any activity from thickening onwards as a sludge activity, even at standalone sewage treatment works (STWs).
- Companies reflecting where the market may lead. Three companies typically treat any activity, even mechanical thickening, at a standalone STW as part of sewage treatment. At co-located STWs and STCs, typically the point of entry of tankers bringing sludge from STWs or the pipe from a holding tank to sludge treatment activities is seen as the start point of the sludge treatment process.
- Due to the complexities above, confusion can occur and at least one company has different definitions of the boundary for assets and opex.

Although it has not been the focus of this review to quantify the value of each of the issues identified, we have some information from one WaSC which would suggest that these boundary issues are material. This company makes an allocation to account for sludge treatment activities occurring on sewage sites which makes up 20% its total sludge treatment opex. The company in question considers all activities at sewage-only sites from thickening onwards to be a sludge activity (as mentioned in the first bullet point above). Therefore, this proportion should be treated as an upper-bound estimate. If this (high) figure is applied across all WaSCs, the value of sludge activities at sewage-only sites across the industry would amount to £157 million.

As an example, for those STWs which produce raw liquid sludge with picket fence thickening or other mechanical thickening, this company allocates 7% of power costs and 30% of other opex to sludge in respect of thickening costs. This allocation is based on a sample of the company's sites.

It is clearly important for setting the possible sludge price control at PR19 and for market development that companies define the sewage treatment / sludge treatment boundary consistently. However, it would seem futile to try to define the boundary without considering the point from which competition will begin.

Ofwat is due to issue a Consultation Paper in summer 2016 on issues including the boundary between sewage treatment and sludge treatment. Once the boundary has been defined / redefined, it would seem sensible to change the RAGs accordingly.

We note that the boundary will only be defined / redefined part way through 2016-17, and that Ofwat was intending to use this year as the first of two to provide information to help set the possible separate sludge price control at PR19. To mitigate against the loss of a year's data, we suggest asking companies to make best endeavours to report 2016-17 on a new standard basis, to give two years' data to set the sludge price control (if approved following consultation). Until a conclusion is reached on any boundary changes, we suggest advising companies to follow current RAGs (i.e. treating the sludge holding tank as the last part of sewage treatment and the pipe/tanker from that tank as the start of sludge treatment - with any mechanical thickening that occurs in or prior to holding tanks included under sludge treatment).

Sludge and sewage treatment boundaries – tankering to STWs

We found that some, very small STWs do not have sludge holding tanks. Instead, their sludge is collected from the primary tanks and removed by tanker to a slightly larger STW which does have sludge holding tanks. The sludge is subsequently tankered on to STCs.

RAG 4.05 mentions a sludge transport activity, but this is from STWs to STCs. The precise activity here – from STW to STW - is not mentioned.

The activity is taking sludge to a sludge holding tank, in effect at the end of a standalone STW. No matter how the sewage treatment / sludge treatment boundary is defined (see above), we propose that this activity should be classified as taking sludge to a sludge storage tank at the end of a standalone STW. Therefore, we propose that RAG 4.05 be amended to state this.

Co-located sites power costs allocation

The robustness of the attribution of sludge power costs between activities at co-located sites varies materially between companies.

Some WaSCs attribute wholly by means of sub-metering and telemetry. Others have sub-metering and telemetry just at their main co-located sites. Others allocate wholly by management estimate.

The extent to which sub-metering and telemetry is used is driven partly by where each company places the sewage treatment / sludge boundary. The more that standalone STW assets and processes are included in sludge activities, the more small sites come partly under sludge treatment where the lack of sub-metering or telemetry mean that it is more likely that management estimate is required.

For those sites where there is no sub-metering or telemetry, the most robust methods of management estimate involved a centralised process, under which assets at co-located sites consuming power are split between business units, with the kW known for each asset. Central and site management then estimate the running hours of each asset so that estimated

consumption for each site and business unit can be calculated. To keep the calculation up to date, the asset data was updated each year, and also the site management estimate of running hours.

We suggest Ofwat issues guidance as part of separate sludge treatment / sewage treatment table in RAG 2.05, stating that if sub metering and telemetry is not used to allocate power costs, that a centralised process for co-located sites with a known power rating for each asset be used, as described above.

Labour and Maintenance costs

We found that asset maintenance costs at almost all companies were directly coded to assets in 2014-15 and so needed no estimation to split by business unit**.** The only company which estimates at present should directly code shortly.

For site labour, companies were more evenly divided between those that directly code and those that use management estimate to place costs in sewage treatment or sludge treatment. Again, this is affected by boundary placement.

We found one incidence of an allocation where the driver used did not seem strong (and two more in water resources). This was a company which used business unit GMEAV to split a proportion of its site labour between sewage treatment and sludge treatment. We believe that a robust centralized process of management estimate would constitute a better basis for the allocation of site labour costs.

We propose that Ofwat amend RAG2.05 to issue guidance on cost allocation between sewage treatment and sludge treatment, including that, where labour cannot be coded directly, management estimate (a robust centralised process) should be used to allocate site labour.

Liquor treatment – cost transfers

Liquor treatment occurs where liquid produced by the sludge treatment process needs to be transferred back into the STW to be treated. Eight of the ten WaSCs make a transfer of cost from sewage treatment to sludge treatment in respect of liquor treatment. These transfers are usually material, ranging from 4.5 - 12.7% of sludge totex for the companies we have data for (as noted below, a lot of the range is explained by differing approaches to calculating the recharge).

We propose that RAG2.05 be amended to (ultimately) provide guidance as to how to calculate the transfer (see below), and that Ofwat confirms with all companies that they make a transfer of costs in respect of liquor treatment, and also apply the guidance.

Liquor treatment – extent of cost transfers

Of the eight WaSCs that make a transfer of cost from sewage treatment to sludge treatment, one did it only for sites that required separate liquor treatment plant, and not for sites where there was no specialised plant treating liquor.

We propose that RAG2.05 be amended to provide guidance as to how and where (i.e. for which type of sites) the cost transfer calculation should be made, and confirm with all companies that the guidance is applied (see below).

Liquor treatment – calculation of cost transfers

Of the seven WaSCs that made a transfer for liquor at co-located sites, the basis for the calculation was always logical, but slightly different. Two performed bottom–up theoretical calculations for ammonia levels, power and oxygen required for treating liquor. Others based it purely on the proportion of ammonia that liquor was responsible for at each site, or the higher of liquor's contribution to chemical / biochemical oxygen demand (COD/BOD) levels at each site. Another proposed to move to purely a volume basis for the calculation. We note that some companies measure the strength of liquors on an ongoing basis, others only on a sample basis.

It is difficult for us to propose a standard calculation, given that the circumstances of each site will be different. However, this would seem an area where the WaSCs could work together to produce a methodology that could be applied in different circumstances – we would expect that the flow and strength (i.e. BOD, COD, ammonia and solid content) of the returned liquor from sludge treatment could be characterised and incorporated into a simplified and consistent calculation. We see no reason why such a methodology should not be developed during 2016-17.

RAG2 states that "*costs should be allocated in relation to the way that resources are consumed*".

We propose that RAG2.05 should be amended to emphasise the need to make a transfer between sewage treatment and sludge treatment for liquor treatment costs, and that the logic behind the transfer should be consistent with RAG 2, making reference to a methodology to be developed during 2016-17.

Liquor treatment – costs included in cost transfers

Of the seven WaSCs making a transfer for liquor at co-located sites, the costs included vary widely.

Some simply transfer an element of power costs (we assume to reflect the extra work an Activated Sludge Plant has to do to treat liquor), others use a wider definition of opex, for example including rates or General and Support costs, three included an element of CCD for the

sites. The CCD element in particular can be substantial: one company made a CCD transfer equivalent to 9.1% of sludge totex in addition to an opex charge of 3.6%.

RAG2 states that "*costs should be allocated in relation to the way that resources are consumed*", therefore we expect that a fully loaded opex transfer be made, and a fully loaded CCD transfer.

We propose that RAG2.05 be amended to provide guidance that fully loaded opex and CCD transfers be made in respect of liquor treatment.

Water Treatment Works sludge – cost transfers

We found that eight WaSCs treat sludge from their water treatment works (WTWs) at their STCs, but only two transfer costs to reflect this.

These costs do not seem as significant in size as for liquor treatment because water sludge volumes are relatively small - one WaSC estimated that water sludge made up 1.2% of total sludge treated (though another company thought it could be anywhere up to 5%). Nevertheless, it is an important point for consistency as presumably WoCs are charged for treatment of their sludge and the recharge, where made, can be non-trivial. For example, the WaSC referenced above currently makes a recharge to water treatment worth 0.9% of sludge totex.

RAG2 states that "*costs should be allocated in relation to the way that resources are consumed*."

We propose that RAG2.05 be amended to emphasise the need to make a transfer of cost from the water treatment business unit to the sludge treatment business unit where STCs treat sludge from WTWs, and for that transfer to be consistent with RAG 2.

Water Treatment Works sludge – costs included in cost transfers

For the two companies that make a cost transfer, the basis of the transfer is different. One company applies it to site opex, the other to site opex, CCD and return.

RAG2 states that "*costs should be allocated in relation to the way that resources are consumed."*

We propose that RAG2.05 be amended to provide guidance that fully loaded opex and CCD transfers be made, where the sludge treatment business treats sludge from the WaSCs WTWs.

Local Authority Rates

We identified six different methods of allocating local authority rates across the waste business units, which are likely to produce materially different answers:

- site level (non-infra) GMEAV;
- business unit non-infra GMEAV;
- business unit non-infra NMEAV;

- a bottom-up theoretical rates calculation per site;
- pro-rata to direct costs; and
- an estimate by management of employee time.

As local authority rates are billed by site and are asset related, the most robust approaches seem site specific and asset related. However, the more sites that are allocated between sewage treatment and sludge treatment, the more onerous site specific approaches will become.

Whether the site specific GMEAV is a practical calculation for most companies depends on where the boundary between sewage treatment and sludge treatment is placed – on which Ofwat proposes to consult in summer 2016.

In the absence of a common boundary, seven of the companies use GMEAV as a driver, albeit calculated in different ways. One company uses an estimate of employee time, which would not appear a robust driver, neither would direct costs. Another company uses NMEAV, which links asset age to the rates allocation.

To demonstrate the materiality of these different approaches, table 3.4 below shows how the rates charged to the sludge business unit of two WaSCs following approaches described above would differ if they split sewerage rates pro-rata to GMEAV.

Table 3.4: Impact on sludge opex of allocating sewerage business unit rates pro-rata to non-infra GMEAV

2014-15	WaSC 1	WaSC 2
Current rates (% opex)	3.9 (9%)	0.0 (0%)
Basis	Non-infra NMEAV	Allocated to sewage treatment & collection only
Rates based on sewerage non-infra GMEAV split (% opex)	2.0 (5%)	0.7 (5%)

Although the company which used non-infra GMEAV has a rationale for using this as a driver, our inclination is to recommend the driver used by the other seven companies on the basis of consistency. Consequently, we propose that RAG2.05 be amended for 2016-17 to provide guidance that only the first, second and fourth methods above should be used to allocate local authority rates costs between sewage treatment and sludge treatment. In addition, if the boundary between sewage treatment and sludge is amended to significantly reduce the number of co-located sites, it may be possible to remove the second option.

Management & General asset allocation – principal user

The proportion of sludge treatment & disposal NMEAV which is made up of Management & General (M&G) assets varies between 8.4% to -1.5% and is shown in Table 3.5 below.

Table 3.5: M&G share of sludge treatment & disposal NMEAV (anonymised)

2014-15	Proportion of sludge treatment & disposal NMEAV from allocations %
WaSC 1	-1.5
WaSC 2	0.0
WaSC 3	0.0
WaSC 4	2.4
WaSC 5	3.3
WaSC 6	4.3
WaSC 7	5.1
WaSC 8	5.2
WaSC 9	7.9
WaSC 10	8.4
Average	**3.5**

The proportion varies for three reasons associated with accounting treatment:

- Most companies do not use the "principal user" basis at this level, and instead allocate a proportion of M&G assets to each business unit, based on a driver (see M&G 2 below).
- Three companies apply the "principal user" approach, advocated by Ofwat for the Retail / Wholesale price control split, under which those business units which do not have principal use of an asset, receive a CCD recharge for their use. For these companies, sludge treatment & disposal may not be the principal user for any M&G asset.
- Of these companies, at least one has deducted the CCD recharge from the asset which it does not "own", leaving a negative NMEAV.

Ofwat does not specify whether the "principal user" approach should be applied between business units under the same price control, only that it should be applied between Retail and Wholesale, because there is a different price control.

We understand that Ofwat will consult in summer on a number of issues, including whether or not the principal user approach should apply to the sludge business unit. We do not propose to anticipate the results of that consultation. However, if it is decided to apply the principal user basis, we suggest that associated guidance should make clear that CCD recharges should not be deducted from assets not owned by that business unit, leaving a negative NMEAV.

Management & General allocation – choice of driver

Whether or not the "principal user" basis is applied, CCD on M&G assets is allocated between business units.

We found that two companies split CCD on M&G assets pro-rata to cumulative CCD (which therefore directly links asset age to the split of M&G CCD), one uses NMEAV (which places a high proportion of M&G CCD in the networks), one uses FTEs, and several split down by type of asset, with much of the CCD split on FTEs or headcount.

Although not a comprehensive quantification of the results provided by the different approaches, to give an indication of the potential materiality of this issue, we found one company where adopting different approaches would cause a variance in the level of CCD charged to the sludge business unit equivalent to over 5% of totex.

Our preferred approach is the last one listed two paragraphs above i.e. the allocation being considered by type of M&G asset, given that different types of M&G asset will have different drivers, but most would be expected to be linked to people, rather than assets.

We propose that RAG 2.05 be amended to provide guidance that M&G CCD is disaggregated by type of asset and appropriate drivers used for each, and that cumulative CCD and NMEAV would not seem appropriate.

Third party services

Whether or not costs are categorised as third party services matters because Ofwat has historically excluded them from its efficiency assessment. So where one company treats an activity as a third party service, and another does not, this affects Ofwat's efficiency assessment.

We only found two unusual accounting treatments in the category of third party services:

- One for Tankered Waste (see Tankered domestic and commercial waste – appointed v non-appointed above).
- One for a special agreement, where the income was treated as appointed income.

Our proposals in respect of Tankered Waste are shown above. In respect of the special agreement, two issues arise.

First, we are not clear whether this should be classed as a third party activity - as a special agreement, Appendix 1 to RAG 4.05 states that it should be considered a principal service and not as third party. However, we understand that similar arrangements for clean water are considered third party services. We suggest that Ofwat consider the legal position before deciding whether and how to amend Appendix 1 to RAG 4.05, and how this agreement should be treated.

Second, there is an interaction with the price control which must be considered, in particular whether the income received, a material amount, should be considered part of appointed revenue.

We do not propose any immediate changes to RAGs for these issues, but that Ofwat consider them further before deciding whether changes are necessary.

Charging for appointed assets

We found a case where charges to third parties for the use of appointed business assets excluded any capital element.

RAG2 states that "*costs should be allocated in relation to the way that resources are consumed*", therefore we expect that a fully loaded opex transfer be made, and a fully loaded CCD transfer.

We do not propose any changes to RAGs for these cases merely that Ofwat check with the company concerned that the fully loaded transfers are made from the appointed business.

Sludge treatment / disposal boundary

We found two instances where the boundary between sludge treatment and disposal was either not clear or had been misapplied:

- At least one case where an incinerator was treated for accounting purposes as part of sludge treatment, where it took fully treated sludge, and its sole function was to dispose of the sludge. This is a substantial asset with a material GMEAV.
- Another case where a company had defined certain assets that should have been classed as relating to treatment, as disposal assets.

Under RAG4.05, incinerators are classed as sludge treatment. The argument for classing incinerators as part of the sludge treatment business unit, is because there is ash left after the sludge cake has been incinerated, and the ash still needs to be disposed of.

The argument for classing incinerators as part of sludge disposal, is that if the sludge is fully treated before reaching the incinerator, and it would be put to land if land was available, then incineration is really a method of disposal. In addition, the amount of ash remaining after incineration is small in relation to the quantity of sludge which enters the incinerator, which would suggest that the sludge had been disposed of rather than treated.

We propose that where incinerators are used purely to dispose of completely treated sludge which would otherwise be disposed of directly to land, RAG4.05 be amended so that they be classed as part of sludge disposal.

For the second case we found, we propose that no changes to the RAGs are needed, but that Ofwat check that the company which had placed sludge treatment assets in sludge disposal, amend its treatment to comply with the RAGs.

Direct v allocated costs

Although not directly connected to compliance with RAGs and potential changes to RAGs, it is of interest to see the extent to which the opex in sludge treatment and disposal is directly coded or the result of allocation. The higher the proportion of costs which are directly coded, the more comfortable one would be that the costs in the business unit are robust and not likely to change if, for example, an allocation methodology was amended or the business restructured.

Table 3.6 below shows, on an anonymised basis, the proportion of sludge treatment and disposal opex which was the result of an allocation.

Table 3.6: Sludge treatment & disposal opex allocation (anonymised)

2014-15	Proportion of opex from allocations %
WaSC 1	18
WaSC 2	30
WaSC 3	39
WaSC 4	43
WaSC 5	46
WaSC 6	48
WaSC 7	50
WaSC 8	52
WaSC 9	66
WaSC 10	68
Average	**46**

3.6. Issues related to calculation of MEAV

Ofwat has recently consulted on the use of replacement cost asset values to set the Regulatory Capital Value (RCV) for potential separate price controls for sludge treatment & disposal, and water resources, which could take effect from 2020 following PR19.

The consultation paper proposed a focussed approach for the sludge price control i.e. using 100% of the NMEAV of sludge assets, so that the RCV would be made equal to depreciated replacement cost.

In contrast, for the water resources price control, the consultation paper proposed an unfocussed approach. This would entail pro-rating the entire water RCV over the NMEAV of the separate water business units. So, if water resources has 10% of the wholesale water NMEAV, then it would take 10% of the wholesale water RCV. Due to RCVs typically being far lower than the NMEAV, for water resources this proposal would lead to RCVs being at a deep discount to replacement cost values.

For both price controls, but especially that for sludge, it is therefore important that the NMEAV data used is robust and broadly comparable across companies. The last MEAV revaluation by companies was for PR09, so during our work, we have discussed with companies those factors which might cause significant differences in their revaluations, as compared to other companies. Some of these factors are physical – for example boreholes have an asset value far below comparable reservoirs – but many are due to companies making different assumptions.

This is not to say that the PR09 revaluations were "incorrect", replacement cost valuations are inherently subjective, and could have a wide range of plausible answers. It is also important to remember that those from PR09 were used for a different purpose to that of today.

Our comments are restricted to those assumptions we found to vary between companies. We have divided them into two sections, those which relate to both the GMEAV and NMEAV, and those which only relate to the NMEAV.

3.6.1. Revaluation assumptions affecting GMEAV and NMEAV

Greenfield v Existing site

At least one of the 10 WaSCs assumed at PR09 that its assets and processes would start again at greenfield sites, rather than being rebuilt at existing sites, which was the general assumption.

At first sight, this would be expected to lead to lower replacement cost values, as starting from a blank piece of paper, rather than a probably cramped existing site, would be expected to bring lower costs. However, the extent to which lower valuations actually arise will be impacted by other factors such as the assumed cost of obtaining planning permission, and for larger assets such as reservoirs, how favourable the ground conditions are.

If carrying out a revaluation today, it would seem more robust and more consistent with previous approaches for all companies to generally assume existing, rather than greenfield sites. One potential exception to this would be where a company has already formally decided (i.e. passed a Board resolution) to close existing sites and replace them with a new greenfield site for economies of scale, probably with new technology.

Process or Asset Replacement

The level at which the revaluation was assumed to occur also differed across companies at PR09, with many assuming that assets would be replaced at an individual asset level, and others made a higher level assumption that processes rather than assets would be replaced.

In principle assuming process replacement should allow for increased use of new technology, and therefore a lower replacement cost, whereas replacing individual assets means that only modern versions of the same assets could be replaced with newer technology, and not the process as a whole.

However, it could be argued that a process based approach, having less of a link to the assets on the ground, could give rise to less robust valuations as they do not represent the reality of asset replacement.

At PR09 there may, in some cases, have been a link to the quality of company's asset data. If asset data were not reliable, it would have been easier to come up a level to process data. However, it is now around seven years since the PR09 revaluation was carried out, and the quality of companies' asset data would be expected to be significantly improved today.

In addition, if only a partial revaluation (i.e. of sludge treatment and water resources) were required, rather than a full revaluation, it would be less onerous to prepare an inventory of individual assets on the ground which belong to each business unit.

If carrying out a revaluation today, the key issue is comparability and what all companies are able to do. The asset based approach is probably closer to the replacement programme that companies actually perform, however, not all companies may be able to carry it out.

Choice of Modern Equivalent Asset

It should be straightforward to state what an existing asset is. However, deciding what the Modern Equivalent Asset would be may not be straightforward, especially where technology has moved forward significantly and new environmental permitting regulations have been introduced since existing assets were built –as for sludge treatment, or where it may be extremely difficult for practical purposes to construct assets of a scale similar to those built historically, such as reservoirs.

In sludge treatment today, most companies said their preferred method of treatment had changed in recent years to Advanced Anaerobic Digestion plants, often with thermal hydrolysis processes at the front end of the plant, which minimises the volume of sludge cake which needs to be disposed of, largely to land, and also maximises energy production available through CHP plants or gas to grid plants. Note that the choice of CHP plant or gas to grid plant can vary

according to factors such as the level of government support (e.g. Renewable Obligation Certificates and the Renewable Heat Incentive) and the distance to a gas main.

Other options in use for sludge treatment are a more established technology, Mesophilic Anaerobic Digestion plants, or liming – adding lime to sludge to kill the pathogens, a technique with lower capital costs but higher opex. Lime stabilisation is becoming an outdated technique as the weight of the post-limed sludge can be increased by 20% to 40% of its initial weight due to the amount of lime that is required to be added in the range 100 to 200kg/tonne of dry solids.

However, in practice, some companies with liming sites stated that they might replace them with another liming site, either to provide resilience i.e. another method of treating sludge, or if sludge volumes in that area were low, and the STWs served were remote from digestion facilities, so making the cost of tankering to a digestion site excessive, and it not being economic to build another digestion plant to serve that area. One company stated that limed sludge was a desirable product for farmers in its geographical area as they valued the lime whereas others stated that there was not much of a market in their area for limed sludge.

If carrying out a revaluation today, companies have a wide choice of technologies for treating sludge, and they could choose to replace existing plant not with one technology but a mix of technologies in different locations. In this event, we do not believe that Ofwat should be prescriptive in telling companies what technologies to adopt, but that companies would need to explain the reasons for the technologies assumed, in particular where they are different to the technology presently used.

A final sludge issue concerns incineration plants, which are costly pieces of plant typically built in the 1990s as an alternative means of disposing of sludge, when it was clear that the route to sea was to be closed off and there were concerns about the future availability of the land-bank. Some of these plants are still in operation, although others have been mothballed or decommissioned as digestion technology has advanced, reducing the volumes of sludge cake which need to be disposed of to land.

It could be argued that incineration plants provide resilience against events which might cause the land-bank to no longer be available, either temporarily or permanently, and against breakdowns of digestion plant. However, the key question for those companies still with operational or mothballed incineration plant is, if their existing plant came to the end of its life, would they replace it with another incineration plant, or would they pursue other means of disposal? Only if they would replace it with another incineration plant would the MEAV be based upon the existing asset. There is limited appetite for these assets in the UK and therefore expertise, maintenance and parts are typically hard to come by and sourced from abroad.

In respect of water resources, there have been no new large reservoirs built in England and Wales for many years, because it is very difficult to promote with contemporary water resources and

environmental regulations, and also expensive. Even to increase capacity at Abberton Reservoir (Northumbrian Water Group – Essex & Suffolk Water) by raising the sides, a process which was completed in 2015, took 20 years. Most of the extended time involved pre-construction activities, to comply with regulations and address stakeholder issues.

What would companies do today if they needed to replace their impounding reservoirs? Boreholes dependent on water resources from underground aquifers are a much less costly source of water (although boreholes are also not suitable in many parts of the country without underground aquifers or suitable rock types). Suitable ground conditions are not available in many parts of the country for reservoir construction and the yield of the major aquifers is constrained by water resources and environmental regulations. Alternatives could be found in water re-use / desalination plants or water efficiency initiatives, but the former are very costly and not available to all water companies, and the latter could not replace the volume of water required due to the marginal yield gains associated with water efficiency activities.

If carrying out a revaluation today, the only reasonable assumption would seem to be that the PR09 assumptions would be used again i.e. that existing reservoirs would be rebuilt on the same site. The extent to which modern construction techniques and materials could or would be used to rebuild reservoirs would need discussion and agreement across the industry, as widely different assumptions were made at PR09.

Boundary Issues

As described earlier in this report, there are boundary issues between sludge treatment & disposal and sewage treatment business units, and water resources and raw water distribution business units. Based on the data we have received from companies, we have not fully quantified the materiality of boundary issues. However, we found one company that was allocating 20% of its opex at STWs to sludge treatment. If anything like that level of GMEAV at its STWs was considered to relate to sludge, then this would be a material amount. For water resources, we found five companies which were treating impounding reservoirs without abstraction licences as part of water resources. Given that at PR09 dams and reservoirs had an average GMEAV of over £20m, changing the classification of reservoirs will change the accounts by tens of millions of pounds.

Whether existing asset valuations are used, or new ones commissioned, it is essential that companies apply the same boundaries.

We understand that Ofwat will issue a Consultation Paper on boundaries by the summer of 2016, the results of which will inform where boundaries are drawn.

Economies of Scale

At PR09 at least one company made a significant downward adjustment to its replacement cost valuation, because it expected it would achieve material economies of scale if it were to replace all its assets in one programme, rather than in a piecemeal fashion – which was the basis on which its unit cost models worked.

This is a logical line of reasoning, but it could be argued that a replacement programme on such a scale would cause skill and equipment shortages, which would drive up unit costs.

If a revaluation were to be performed today, we would not suggest that any adjustment be made to reflect economies of scale. This is because in reality there would not be a simultaneous programme of replacement of all assets across the industry, and if there were, it is not clear whether this would lead to lower or higher unit costs.

Large, bespoke assets

Large reservoirs are especially difficult to value because they are bespoke to the location, and none have been built in recent years, making costings highly theoretical. The consequences in making valuations for reservoirs was clear by the fact that (at least) one company gave its reservoir valuation at PR09 a confidence grade of C3, meaning that it could be out by plus or minus 50%.

Given the size of the NMEAV associated with these assets – the same as their GMEAV as they do not depreciate – if a further revaluation were carried out, it would be essential for companies to adopt a broadly common approach to their valuation.

To achieve that common approach would seem to require the formation of an industry working group, if a further revaluation were needed.

Treatment of M&G assets

The accounting treatment of Management & General (M&G) Assets is especially important in the valuation of the sludge treatment and disposal business unit, because, as shown earlier, M&G assets make up between 8% and -2% of the NMEAV.

There are broadly two causes of the range of figures, one associated with whether companies have adopted the “principal user” approach to M&G assets at a business unit level, the other, for those companies which have not, associated with the choice of driver used to allocate M&G assets across business units.

Three companies apply the “principal user” approach, advocated by Ofwat for the Retail / Wholesale price control split, under which those business units which do not have principal use of an asset, receive a CCD recharge for its use. For these companies, sludge treatment & disposal

may not be the principal user for any M&G asset, which leads to no M&G assets being allocated to sludge treatment.

Of these companies, at least one has deducted the CCD recharge from the asset which it does not "own", leaving a negative NMEAV.

We understand that Ofwat will consult in summer on a number of issues, including whether or not the principal user approach should apply to the sludge business unit. We do not propose to anticipate the results of that consultation, but believe that, if the principal user basis is applied CCD recharges should not be deducted from the asset value in the business unit receiving the recharge, so negative asset values do not result.

Abandoned, mothballed and decommissioned assets

The issue of whether companies include any of abandoned, mothballed and decommissioned assets in their revaluations, and at what value, may seem a minor issue.

However, for expensive, large assets like incinerators and some reservoirs, it could be a significant issue. One company told us that, for historical reasons, over a quarter of the water it holds is in redundant reservoirs, water which is not used for public water supply at the present time. However, these assets could potentially be converted to public water supply purposes in the future if there were business and commercial opportunities to do so through water trading.

If a revaluation were carried out today, the key issue would seem to be, if the asset failed, would the company replace it or not. For abandoned, decommissioned and redundant assets, the assets are clearly not required, so the default response would seem to be no, the asset would not be replaced. However, a different answer could apply to mothballed assets, as the company will have intentionally kept these available for future use.

In the event of a future revaluation, we propose that the valuation of mothballed assets could be issue to be considered by an industry working group.

Treatment of Capital Work In Progress

At any particular point in time, most companies will have capital work in progress (capital WIP), which represents capital projects which are in the course of construction, but not yet finished. One company raised with us the question of whether and how capital WIP should be valued.

In principle, the answer should depend upon whether the capital WIP is in respect of assets which are intended to replace other assets, or not. If it is to replace an existing asset, then only one of these should have a replacement cost value, otherwise there is a double count – both assets are not needed. In contrast if the new project is providing some enhancement capability, then it would appear sensible to attribute value to it.

Again, if a revaluation is carried out in future, it will be highly desirable to obtain a common approach to valuing capital WIP. Our proposal would be that only the enhancement element of capital WIP be valued, to avoid double counts.

3.6.2. Revaluation assumptions affecting NMEAV only

Age or Condition

At PR09 broadly half the WaSCs calculated their net MEAV by reference to the known age of their assets, while the other half calculated it by reference to asset condition. The two approaches would be expected to produce different answers, but one approach would not be expected to always produce a higher NMEAV than the other.

To calculate the NMEAV using the known age of assets is the standard approach used in preparing accounts. In replacement cost terms, if an asset is expected to last 10 years, and is 5 years through that life, then its NMEAV should be 50% of its GMEAV i.e. it is 50% depreciated.

Using asset ages to calculate cumulative depreciation has the advantages of being straightforward to apply and less subjective than the alternative. In addition, if assets lives used for accounting purposes are reasonable, then it will give a reasonably accurate answer. If asset lives used for accounting purposes are not accurate for some assets, then it will not provide a good result, however, companies update asset lives used for accounting purposes to reflect experience.

To calculate the NMEAV using a condition based approach is more complex, costly and subjective. Companies would assess the condition of different types of asset through a sampling approach, and depending on the condition, would then assign a remaining life to that class of asset. If the asset in the example above was found to be in a poor condition, so that it was expected to last only another 2 years, then it would be 80% depreciated, and its NMEAV should be 20% of its GMEAV.

If a revaluation is carried out in future, it will be highly desirable to obtain a common approach to applying either an age based or condition based approach to calculating NMEAV, a matter which should be considered by an industry working group.

Our view if that a condition based approach would be more complex, expensive and subjective than an age based approach, and that, providing accounting asset lives are updated to reflect experience, the latter should also provide a good proxy for remaining life.

Condition grade application

At PR09, companies were required to assess the condition of their assets, and assign them a grade of 1-5, depending on their state, 1 being the highest condition, and 5 the lowest.

Those companies that calculated remaining life based on condition, used these grades to do this. For example, a class of mechanical and electrical kit with a condition grade 2, might be expected to be 35% through its life.

However, companies did not make the same assumptions linking condition grade to remaining life. The company above might assume the asset class was 35% of the way through its life, whereas another company might assume it was only 30%.

Consequently, if condition grades were to be used at a future revaluation to assess remaining life and hence NMEAV, it would be important to establish common assumptions on the impact of condition on remaining life.

Condition sampling

As described immediately above, the condition grade approach to determining NMEAV uses sampling of assets to determine the condition of a class of asset.

Were a further revaluation to occur, it would be necessary to agree what level of sampling was required to give confidence in the result for each asset class across companies. In the case of assets at STCs, because there are relatively few of them, it might be possible to sample all significant assets.

Out-of-life assets

When carrying out a revaluation, some assets will have expired early, before the end of their expected life, others will carry on beyond their expected life – "out-of-life assets".

Out of life assets should have a value under either the age or condition based approaches to calculating the NMEAV – otherwise they are in effect assumed to require replacement immediately. At PR09 some companies placed a value on these assets – typically those companies which had applied the condition based approach, and others did not. However, at least some of those which did not place a value on these assets, did this to avoid charging customers twice for the CCD on them, an issue which is not relevant to the current exercise.

At any future revaluation, we would propose that out-of-life assets are valued, otherwise the valuation would fail to represent the assets on the ground.

Asset age – staggered replacement

Where parts of an asset have been replaced on a staggered basis over time, it may become difficult to assess how old the asset is.

This issue is not relevant under the condition based approach to calculating remaining life, but it would be a relevant consideration under the age based approach.

We are not clear how significant an issue this is, but if widely believed to be material, would suggest it be considered by an industry working group.

3.7. Wider Issues

We have identified wider issues in respect of business boundaries; involving the WoCs in this exercise, potential issues on water revenues, the approach to monitoring companies' reporting generally, and the replacement of CCD with HCD in the regulatory accounts.

In respect of business boundaries, for sludge and water resources, Ofwat is to consult in the summer on these. The result will be key in further developing the RAGs, in line with how competition is intended to develop, and, depending on where boundaries are drawn, could make it easier for reporting to be made more consistent.

For the WoCs, the scope of our work has covered the WaSCs because they are involved in both of the activities that we have studied and we have assumed that they are likely to raise most of the same issues that would have been drawn out through additional engagement with the WoCs.

We understand however that having read this report there may be some issues that the WoCs would wish to raise and we understand that they will have the opportunity to do so via the consultation process that Ofwat is about to commence.

It may be the case that, after the forthcoming consultation, Ofwat will wish to plan a round of visits to the WoCs, in a similar way to the approach with the WaSCs.

In respect of potential issues on water resources revenues, we did not consider these as part of our work. However, given the issues we have found for sludge revenues, for example on tankered waste, it would seem worthwhile to carry out at least a desk-top exercise to see if there could be significant comparability issues here also.

In respect of general regulatory reporting, over recent years Ofwat has moved away from a prescriptive, highly detailed approach, typified by the June Return, towards a more principles based approach. This in turn, especially at a more granular level, has led to concerns over a lack of consistency in reporting, making comparability across companies difficult to achieve, which has implications for the calculation of potential future price controls.

In our view there are some material external charges, such as rates, where Ofwat should specify how they are allocated. There seems no valid reason why companies should use significantly different approaches to allocation, and differences could impact future price control setting. However, for internal costs, methods of allocation could legitimately differ according to company ownership, organisational structure, or outsourcing choices. Therefore, we would not suggest a return to highly prescriptive reporting regime for such costs.

However, it is crucial that companies apply, and can be seen to have applied the principles which have been laid out in RAG2.05, so that for example, the sewage treatment business units of all companies charge their sludge business a fully loaded opex and depreciation charge for liquor treatment.

In our work, we have found cases where costs were treated not in accordance with the RAGs, or allocated using unsuitable drivers, and these have been in place for a number of years. We suggest that some regulatory monitoring would be helpful. For example, in their Accounting Methodology Statements, companies could be required to explain specific details of their approaches to accounting for those areas such as tankered waste, where we have found material variances. In addition, if the process we have been engaged on has been helpful to Ofwat and the companies, we would suggest that it may be helpful to repeat it sporadically.

Our final finding concerns the replacement of CCD with HCD in the regulatory accounts from 2015-16. This has the potential to make reporting data less comparable between companies, as HCD is affected by the price level at the time each asset is acquired. In respect of the issues covered in the targeted review, this could have implications, for example, on the level of recharges between sewage treatment and sludge in respect of the liquor treatment activity.

4. RECOMMENDATIONS

This section summarises the recommendations made for the issues discussed in section 3, separately for water resources, sludge treatment & disposal, MEAV, and wider issues.

For water resources and sludge treatment & disposal, Table 4.1 and Table 4.2 summarise the issues and make recommendations as to whether we believe RAGs need to be amended, and also whether individual companies should be contacted to confirm whether they have revised their accounting treatment as suggested.

For MEAV the issue is rather different, as we are not addressing how individual companies report costs today, but instead, consider how greater comparability might be achieved, if there is a partial or full revaluation in the future, for example to set the RCV for separate price controls. In Table 4.3, we summarise the issue, identify the options and then give our provisional view as to which might be preferred. For all MEAV issues, we recommend a joint company / Ofwat working group consider them more fully.

Finally, Table 4.4 makes suggestions on the wider issues we have found during the course of the targeted review.

Table 4.1: Recommendations - Water issues

Issue	Summary	Amend RAGs	Write to company
Impounding reservoirs and abstraction licences	Different definitions across companies. For clarity, amend definition of water resources in RAG4.05 to state that Reservoirs without an abstraction licence attached to them should not be included under this heading (but see exception below).	Yes	Yes
Wholly compensating reservoirs	Issue raised by company. Amend RAG4.05 so reservoirs which purely provide a compensating role should be classified as part of water resources, even if they do not have abstraction licences.	Yes	Yes
Redundant Reservoirs	Question over how redundant reservoirs should be funded in price controls. No changes to RAGs proposed.	No	No
Pumping - upstream of impounding reservoirs	Company-specific follow-up: Confirm with the companies concerned that their accounting treatment of pumping costs is now consistent with the RAGs.	No	Yes
Pumping - borehole cost disaggregation	Company question over whether pumping costs could be split 3 ways, if the pump performs a function for 3 business units. For clarity, amend RAG 2.05 to specify that this should be done.	Yes	Yes
Pumping - borehole pumping head and	3 WaSCs use management estimate. Amend RAG 2.05 to include operational pumping head as the preferred	Yes	Yes

Issue	Summary	Amend RAGs	Write to company
management estimate	driver to split power costs, for those pumps which perform a joint function for water resources and at least one other business unit.		
Borehole to WTW pipes	Company-specific follow-up: Confirm with the company concerned that their accounting treatment of pipes is now consistent with the RAGs.	No	Yes
Aquifer recharge schemes	Company question. Amend RAG4.05 to place the costs associated with aquifer recharge schemes which augment groundwater yields entirely in water resources, rather than raw water storage.	Yes	Yes
Other "flow-reversal" schemes	Company-specific follow-up: Confirm with the company that a full opex and CCD charge has passed from water treatment to water resources for this activity.	No	Yes
Blending	Company question over how blending in a reservoir without an abstraction licence should be treated. Amend RAG 4.05 to add guidance that this blending be classed as part of raw water storage.	Yes	No
Labour and maintenance costs	2 WaSCs used unusual drivers to allocate site labour at co-located sites. Amend RAG2.05 to issue guidance on cost allocation between water resources and water treatment: unless a better driver can be found, management estimate (a robust centralised process) should be used to allocate site labour at co-located sites.	Yes	Yes
Cumulo rates	2 WaSCs used unusual drivers to allocate cumulo rates. Amend RAG2.05 so that only the whole GMEAV approach should be used.	Yes	Yes
Management & General asset allocation - principal user	Use of principal user basis (used now for separate price controls) gives non-comparable asset information vs plain allocation. Ofwat to consult in summer on whether principal user basis should apply to water resources.	Not yet	No
Management & General allocation – choice of driver	Some drivers used not appropriate. Amend RAG 2.05 so that M&G CCD is disaggregated by type of asset and appropriate drivers used for each, and that cumulative CCD and NMEAV would not seem appropriate.	Yes	Yes
Third party services - activities	Variety of treatments. Amend RAG 2.05 to explicitly state that costs associated with all bulk supplies are shown as third party costs, and provision of non-potable supplies are shown as third party costs; and recreation activities on protected land under the WIA 1991 be reclassified as third party costs, so they are treated	Yes	No

Issue	Summary	Amend RAGs	Write to company
	consistently, and excluded from Ofwat's efficiency modelling. Obtain legal view on whether costs associated with S20 reservoir operating agreements should be classed as third party, and raise at RAWG.		
Third party services – cost transfers	Different elements of costs included. Expand RAG 2.05 to state that third party costs should be fully loaded, and include CCD and IRC where applicable, except where the terms of the contract state that a lesser amount should be charged to the customer.	Yes	Yes
Bulk supply definition	Question from company. Amend RAG4.05 to state that a company providing treated water to another company's customers should treat the cost as a third party cost in treated water distribution.	Yes	No
Other cost allocation	Company-specific follow-up: check with the company concerned that it has corrected its allocation of chemical costs.	No	Yes
Direct v allocated costs	Average allocated costs 50% (69% excluding EA service charges. Range 12% - 73% (22% - 95% excluding EA service charges).	No	No

Table 4.2: Recommendations - Sludge issues

Issue	Summary	Amend RAGs	Write to company
Power – CHP assets	Different ownership model drives asset and accounting differences	No	No
Power – external revenue sharing	One WaSC shares 50% of external power revenue with sewage treatment: amend RAG 4.05 to show all as sludge treatment	Yes	Yes
Power – cost savings	Some WaSCs share with sewage treatment: amend RAG 4.05 to show all as sludge treatment	Yes	No
Sludge product sales	In 2014-15, some WaSCs treated it as income, rather than netting off opex. New RAG in place for 2015-16.	No	Yes
Treating other WaSC waste	Treating as appointed rather than non-appointed: amend Appendix 1 to RAG 4.05	Yes	Yes
Tankered waste – appointed v non-appointed	Wide range of accounting practice: Issue specific guidance stating tankered waste is a non-appointed activity, perhaps as a part of a separate sludge treatment / sewage treatment table in RAG 2.05.	Yes	Yes

Issue	Summary	Amend RAGs	Write to company
Tankered waste – business unit treatment	Often no costs transferred from sludge treatment. Issue specific guidance stating that the tankered waste cost transfer be split between sewage treatment and sludge treatment and disposal, perhaps as part of separate sewage treatment / sludge treatment table in RAG 2.05.	Yes	Yes
Tankered waste – costs included in cost transfer	Wide range of costs transferred from appointed business: Issue specific guidance that "full" opex and CCD recharges should be made, CCD element should not be deducted from appointed business opex, but as a CCD recharge, perhaps as part of separate sewage treatment / sludge treatment table in RAG 2.05.	Yes	Yes
Sludge and sewage treatment boundaries – high level	Consult on boundary issues in summer and change / clarify RAGs accordingly. Tankering from STW with no holding tanks to small STW with holding tanks for storage purposes: Issue amendment to RAG 4.05 to classify as sewage treatment	Not yet	No
Sludge and sewage treatment boundaries – tankering to STWs		Yes	No
Co-located sites power costs allocation	Suggest additional guidance in RAG 2.05, that if sub metering and telemetry is not used to allocate power costs, then a centralised process be used for co-located sites with a known power rating for each asset.	Yes	No
Labour and Maintenance costs	One case of using GMEAV to allocate co-located site labour. Suggest amend RAG2.05 guidance, that unless is a better driver, use robust centralised system of management estimate for allocating site labour.	Yes	Yes
Liquor treatment - cost transfers	Two companies make no cost transfer. Amend RAG2.05 to provide guidance on the need to make a cost transfer.	Yes	Yes
Liquor treatment – extent of cost transfers	One WaSC only transfers cost for one type of site. Amend RAG2.05 to provide guidance for which type of sites to calculate the transfer.	Yes	Yes
Liquor treatment - calculation of cost transfers	Several different bases of calculation. Amend RAG2.05 to provide guidance on how to calculate the cost transfer, making reference to a methodology to be developed by the companies.	Yes	No
Liquor treatment - costs included in cost transfers	Different costs included in the transfer. Amend RAG2.05 to provide guidance that fully loaded opex and CCD transfers be made, consistent with RAG 2.	Yes	Yes

Issue	Summary	Amend RAGs	Write to company
Water Treatment Works sludge – cost transfers	Most WaSCs do not recharge for treating own WTW sludge. Amend RAG2.05 to emphasise the need to make a transfer, and that transfer to be consistent with RAG 2.	Yes	Yes
Water Treatment Works sludge - costs included in cost transfers	Different costs included in the transfer. Amend RAG2.05 to provide guidance that fully loaded opex and CCD transfers be made.	Yes	Yes
Local authority rates	6 different calculations found, 2 of which seem inappropriate. Amend RAG2.05 to provide guidance that site level or non-infra GMEAV bases should be used.	Yes	Yes
M&G asset allocation - principal user	Use of principal user basis (used now for separate price controls) gives non-comparable asset information v plain allocation. Ofwat to consult in summer on whether principal user basis should apply to the sludge business unit.	Not yet	No
M&G asset allocation - choice of driver	Some drivers used not appropriate. Amend RAG2.05 so that M&G CCD is disaggregated by type of asset and appropriate drivers used for each, and that cumulative CCD and NMEAV are discouraged.	Yes	Yes
Third party services	Company-specific follow-up: obtain legal view on whether the special agreement should be considered a principal service or not, and whether and how Appendix 1 to RAG 4.05 should be changed. Consider whether income should be treated as appointed and liaise with company.	Not yet	Yes
Charging for appointed assets	Company-specific follow-up: check that the fully loaded transfers are made from the appointed business.	No	Yes
Sludge treatment / disposal boundary	Amend RAG4.05 so that, where incinerators are used purely to dispose of completely treated sludge which would usually be disposed of to land, they be classed as part of sludge disposal. Company-specific follow-up: check that the company which had placed sludge treatment assets as sludge disposal, moves them.	Yes	Yes
Direct v allocated costs	Average allocated costs 43%, range 18% - 66%.	No	No

Table 4.3: Recommendations - MEAV issues

Issue	Summary	Preferred option
Greenfield v existing site	At PR09 at least 1 WaSC used a greenfield approach. In theory the greenfield approach may be expected to be a lower cost, as starting from a blank piece of paper, rather than a cramped existing site (although this is not always the case as it does not always look to optimise ground conditions to reduce cost). However, assuming that assets will be constructed on existing sites may be more realistic.	Existing site – seems more grounded in reality, consistent with most WaSCs' previous practice. Possible exception where company has formally decided to close existing sites and replace with a greenfield site, probably with new technology.
Process or asset replacement	Process level should allow for greater use of new technology, as can replace a whole process not just individual assets with modern equivalents. But asset level replacement is closer linked to what companies do in reality.	Asset level is more grounded in reality, but at PR09 not all WaSCs' asset data was good enough to do this. However, that was 7 years ago, data should have improved and if there is a revaluation covering only certain assets, preparing an asset inventory should be easier.
Choice of Modern Equivalent Asset	For sludge treatment, 3 technologies are used today: Advanced Anaerobic Digestion, Mesophilic Anaerobic Digestion and liming. Each could be used in certain circumstances e.g. liming provides resilience, and for sludge from a small STW far from an STC, may be the economic option. Re incineration plants, these may provide resilience, but the Modern Equivalent Asset would only be another incineration plant if the company would actually replace it with another. For reservoirs, no large ones built in England & Wales for decades, as very difficult and expensive to build. Boreholes are a cheaper alternative, but are not possible in many areas, desalination is an alternative, but is costly and not available to all companies.	Give companies the choice of Modern Equivalent Asset at each STC. But companies must justify any change from existing technology at each site. Only value incineration plants with replacement cost of another incineration plant if the company would actually replace it with another. The only assumption that allows comparability across companies would be the PR09 assumption of rebuilding the reservoir on the existing site. Issues over modern construction techniques and materials would need to be addressed by an industry working group.

Issue	Summary	Preferred option
Boundary issues	Boundary issues between sewage treatment and sludge treatment, water resources and raw water distribution are described earlier. Must be broadly common boundaries for a revaluation that is comparable across companies.	Ofwat consultation due summer 2016 to recommend definition / redefinition of boundaries.
Economies of scale	At PR09 at least 1 WaSC assumed a significant downward adjustment, for expected economies of scale for replacing all its assets in one programme. However, could be argued that such a programme would cause shortages and so drive costs up.	No assumption of economies of scale for replacing all assets in one programme. Unlikely to happen in reality, and if it did, it could push costs up rather than down.
Large, bespoke assets	Very hard to value reservoirs as bespoke to location, and none built for many years. At PR09, 1 WaSC said their valuation could be out by +/- 50%.	High GMEAV and NMEAV on these assets. Valuation assumptions would need to be worked through and agreed at industry working group.
M&G assets	M&G assets make up between -2% and 8% of sludge NMEAV, and between 0% and 3% of water resources NMEAV. WaSCs applying the "principal user" approach, typically have no M&G assets in either business unit, others allocate a %, based on different drivers.	The "principal user" approach applies between separate price controls. Ofwat to consult in summer on whether principal user basis should apply to water resources and sludge.
Abandoned, decommissioned and mothballed assets	For incinerators and some reservoirs is a big issue. For abandoned, decommissioned and redundant assets, these are not required, so there should be no value. More difficult to value mothballed assets, as there is an intention to be able to use these.	Abandoned, decommissioned and redundant assets, zero value. For mothballed assets, valuation assumptions would need to be agreed at industry working group.
Capital work in progress (WIP)	Question over the extent to which Capital WIP should be valued.	For capital maintenance projects, propose no capital WIP value, otherwise double count with existing assets. For enhancement projects, seems logical to include capital WIP.

Issue	Summary	Preferred option
NMEAV – age or condition	At PR09 around half WaSCs calculated NMEAV using the actual age of assets, half back-worked age by reference to condition. Age is used in accounts, is straightforward to apply, and less subjective than condition. If asset lives in the accounts are reasonable, the method is reliable. Condition requires asset sampling, is more complex, costly and subjective. But, in theory it should provide an accurate answer, no matter what the accounting lives state.	Propose to use asset age, because it is straightforward to apply, less costly and less subjective than condition. Age is dependent on accounting lives being reasonable – but these should be updated in line with experience.
NMEAV – Condition grade application	At PR09 companies made different assumptions on what remaining life was associated with Ofwat condition grades.	If condition grades were used at a future revaluation, it would be important to make common assumptions on what the life implications of different condition grades – a matter which the industry working group would need to consider.
NMEAV – condition sampling	At PR09 companies made assumptions about the level of sampling they needed to carry out to be confident about the condition of their assets.	If condition grades were used at a future revaluation, it would be important to make common assumptions on the level of sampling required for different assets – a matter which the industry working group would need to consider.
NMEAV - Out-of-life assets	Some assets expire early, some keep working after their expected life ends – "out-of-life" assets. At PR09 some companies valued these, others did not – arguing that customers should not be charged twice for CCD on these assets – an argument which is no longer relevant.	Out-of-life assets have a value, unless they are about to expire, so they should be included in a revaluation.
NMEAV - Asset age – staggered replacement	Where parts of an asset are replaced over time, just how old is the asset?	This seems a theoretical issue, making it difficult to assess how significant it is. Suggest its materiality should be considered by an industry working group.

Table 4.4: Recommendations – wider issues

Issue	Summary
Boundary issues	Our work has shown some considerable variation in the way that different WaSCs implement the current accounting separation boundaries (as defined in the RAGs) between business units. Ofwat is currently developing its policy towards boundary definition for potentially separate sludge and water resources markets, within the Water 2020 programme and will discuss this further in its May decision document. Following this, logically, the RAGs may need to be revised or refined regarding boundaries and perhaps guidance issued, to assist companies in moving towards a consistent interpretation/ application of these boundaries across the industry.
WoC inclusion	The scope of our work has not included the WoCs, partly because the issues they face on water resources should be similar to those of the WaSCs. We understand that, once they have read our report, there may be some issues they would wish to raise and consequently that, following Ofwat's RAG consultation in March, a schedule of WoC visits may be carried out by Ofwat. There will also be the opportunity to engage with Ofwat through a RAGs consultation and RAWG workshops.
Water resources revenues	In respect of potential issues on water resources revenues, we did not consider these as part of our work. However, given the issues we have found for sludge revenues, for example on tankered waste, it would seem worthwhile to carry out at least a desk-top exercise to see if there could be significant comparability issues here also.
General reporting	Ofwat has moved away from a prescriptive, highly detailed approach to reporting towards a more principles based approach. At a granular level, this has led to concerns over a lack of consistency and comparability in reporting, which has implications for setting potential future price controls. For internal costs (i.e. costs originating from within each company - payroll costs are internal costs but local authority rates are not), methods of allocation could legitimately differ according to company ownership, organisational structure, or outsourcing choices. Therefore, we would not suggest a return to a highly prescriptive reporting regime for such costs. However, it is crucial that companies apply, and can be seen to have applied the principles which have been laid out in RAG2.05 so that, for example, the sewage treatment business units of all companies charge their sludge business a fully loaded opex and depreciation charge for liquor treatment. It may be helpful if companies were required to explain specific details of their approaches to accounting in their Accounting Methodology Statements, for those areas where we have found material variances, for example, in how they account for tankered waste. In addition, if the process we have been engaged on has been helpful to Ofwat and the companies, we would suggest that it may be helpful to repeat it at future intervals.
Current cost depreciation v	The replacement of CCD by HCD in the regulatory accounts for 2015-16 has the potential to make reporting data less comparable between companies, as HCD

Issue	Summary
Historic cost depreciation	is affected by the price level at the time each asset is acquired. In respect of the issues covered in the targeted review, this could have implications, for example, on the level of recharges between sewage treatment and sludge in respect of the liquor treatment activity.

ANNEX A TEMPLATE QUESTIONNAIRE

Sludge Revenues and Non-appointed Income

Question	
(1a)	Please explain how the group of companies is structured to carry out all sludge related activities, in particular which legal entities carry out which appointed and non-appointed activities.
Please provide your response below:	

Question	
(1b)	Excluding organic waste imports (i.e. excluding organic waste not received through the sewage network), what activities involving sludge generate cash either for the appointee or associated companies? (Include activities where the cash generated is offset against opex as well as that treated as revenue)
Please provide your response below:	

Question	
(1c)	For each of these activities, describe and quantify for 2014-15 where and how the income and costs (opex and depreciation) are reported. Is it in the appointee or elsewhere, and if in the appointee is it treated as: • Wholesale appointed – in the price control • Wholesale appointed – outside the price control • Non-appointed
Please provide your response below:	
Attachments (supporting evidence)	

Question

Question	
(1d)	For the above activities (question 1b), are you aware of other WaSCs which adopt a different treatment?
Please provide your response below:	

Question	
(1e)	Excluding organic waste imports, are the appointee or associated companies considering carrying out any new activities involving sludge to generate cash, if so, how do you intend to report revenues and costs? (Include activities where the cash generated will be offset against opex as well as that treated as revenue)
Please provide your response below:	

Trading in organic waste

Question	
(2a)	Do the regulated or associated companies import organic waste (i.e. organic waste not received through the sewage network?
Please provide your response below:	

Question	
(2b)	If the *appointee* imports organic waste, describe and quantify for 2014-15 the revenues and costs (opex and depreciation) for the appointee, and state whether they are treated as: • Wholesale appointed – in the price control • Wholesale appointed – outside the price control • Non appointed
Please provide your response below:	
Attachments (supporting evidence)	

Question	
(2c)	If an *associated company* imports organic waste, describe and quantify for 2014-15 the revenues and costs (opex and depreciation) for the associated company and the appointee. For those reported in the appointee, state whether they are treated as: • Wholesale appointed – in the price control • Wholesale appointed – outside the price control • Non appointed

Question
Please provide your response below:
Attachments (supporting evidence)

Question	
(2d)	For the above activities (question 2c), are you aware of any other WaSCs which adopt a different treatment?
Please provide your response below:	

Question	
(2e)	Are the appointee or associated companies considering carrying out any new imports in organic waste, if so, how do you intend to report revenues and costs?
Please provide your response below:	

Reporting of costs – *Sludge*

Question	
(3a)	For co-located sewage treatment works and sludge centres, describe and quantify for 2014-15 how power costs and separate non-power costs (opex and depreciation), are attributed or allocated between sewage treatment and sludge business units.
Please provide your response below:	
Attachments (supporting evidence)	

Question	
(3b)	Other than for those costs covered in 3a above, including General & Support costs, quantify the extent to which the costs (opex and depreciation) reported under sludge in the regulatory accounts for 2014-15, are directly coded or resulting from allocation.
Please provide your response below:	
Attachments (supporting evidence)	

Question	
(3c)	For those costs in 3a and 3b above which arise from a process of allocation, please: • State what drivers are used to allocate which (quantified) costs • Explain why direct coding is not used, the rationale for adopting the allocation drivers used, and quantify these drivers • State if there are any plans either to adopt improved methods of allocation or direct coding

Question
Please provide your response below:
Attachments (supporting evidence)

Reporting of costs – *Water resources*

Question	
(3d)	For impounding reservoirs and raw water booster pumping stations, describe the rules applied for treating the assets and associated costs as part of the water resource business unit or the raw water distribution business unit, and quantify the impact in 2014-15.
Please provide your response below:	
Attachments (supporting evidence)	

Question	
(3e)	For each of single boreholes, grouped boreholes with a raw water pipeline, and conjunctive use boreholes, describe the rules applied for treating the assets and associated costs as part of the water resource, raw water distribution, and water treatment business units, and quantify the impact for 2014-15.
Please provide your response below:	

Question
Attachments (supporting evidence)

Question	
(3f)	For those resources subject to treatment at more than one stage in the process, describe the rules applied for treating the assets and their costs as part of the water resource, raw water distribution and water treatment business units, and quantify the impact for 2014-15.
Please provide your response below:	
Attachments (supporting evidence)	

Question	
(3g)	Where the expected flow of activities can be reversed, e.g. where raw or partially treated water is returned to aquifers, rivers or coastal areas for subsequent use, describe the rules applied for treating the assets and their costs as part of the water resource, raw water distribution and water treatment business units, and quantify the impact for 2014-15.
Please provide your response below:	
Attachments (supporting evidence)	

Question	
(3h)	For any of the activities in 3d to 3g, are you aware of any other WaSCs which adopt a different accounting treatment?

Question
Please provide your response below:

Question	
(3i)	Including General & Support costs, quantify the extent to which the costs (opex and depreciation) reported under water resource in the regulatory accounts for 2014-15, are directly coded or resulting from allocation.
Please provide your response below:	
Attachments (supporting evidence)	

Question	
(3j)	For those costs in 3i above which arise from a process of allocation, please: • State what drivers are used to allocate which (quantified) costs • Explain why direct coding is not used, the rationale for adopting the allocation drivers used, and quantify these drivers • State if there are any plans either to adopt improved methods of allocation or direct coding
Please provide your response below:	
Attachments (supporting evidence)	

Charging for use of appointed business sludge assets

Question	
(4a)	Where sludge assets of the appointed business are used for either the non-appointed business of the appointee, or by an associated company, please quantify for 2014-15 and describe how the appointed business charges for their use.
Please provide your response below:	
Attachments (supporting evidence)	

MEAV revaluation in 2009

Question	
(5a)	At the last full MEAV revaluation at PR09, describe the approach to calculating: • the Gross Replacement Cost of sludge and water resources business unit assets • total accumulated depreciation of sludge and water resources business unit assets • the total life and remaining life of sludge and water resources business unit assets • the valuation of "out-of-life" sludge and water resources business unit assets
Please provide your response below:	
Attachments (supporting evidence)	

Question	
(5b)	Quantify and explain the effect of the PR09 revaluation on sludge and water resource business unit asset values and also on the level of CCD for these activities over the period from 2010-11 to 2014-15.
Please provide your response below:	
Attachments (supporting evidence)	

Question	
(5c)	Quantify and explain those areas of the PR09 revaluation for sludge and water resource business unit activities where it was assumed that the Modern Equivalent Asset was substantially

Question	
	different to the existing asset, and also where asset lives were assumed to be significantly different to engineering lives.
Please provide your response below:	
Attachments (supporting evidence)	

Question	
(5d)	Since the PR09 revaluation, describe the approach to rolling forward Net Replacement Costs for sludge and water resource business unit assets.
Please provide your response below:	

Question	
(5e)	For the net MEAV of the sludge and water resource business unit activities as at 31 March 2015, specify the value associated with assets which belong wholly to the sludge and water resource activities, and that which is the result of allocation. For that which results from an allocation, explain how the assets have been allocated, and provide net MEAV values for each method of allocation.
Please provide your response below:	
Attachments (supporting evidence)	

Question	
(5f)	If there are any reasons why you believe that the appointee's PR09 MEAV revaluation for sludge and water resource business unit assets rolled forward is not comparable with that of other appointees, please explain.
Please provide your response below:	

Any further comments

Please provide your response below:

ANNEX B LIST OF DATA SOURCES USED FOR PRE-POPULATING QUESTIONNAIRES

The questionnaires sent to WaSCs ahead of each site visit were partially pre-completed to reduce the burden of having to re-write information already submitted to Ofwat or in the public domain. This information was primarily collected from the following sources:

- WaSCs responses to the letter dated 19 November 2015 entitled "Water 2020: Water resources and Sludge: income costs, and interactions with non-regulated businesses".
- WaSC Regulatory Accounts for 2014-15, in particular the notes detailing the split of operating costs and replacement cost fixed assets by business unit.
- WaSC Accounting Separation Methodology Statements for 2014-15.
- WaSC Upstream Services Accounting Methodology Statements for 2014-15.
- Ofwat analysis of water resources, sludge treatment and sludge disposal GMEAV, NMEAV at 31.3.15 and also number of sewerage households.

ANNEX C COMPANY-SPECIFIC ISSUES

C.1. Summary

The table below summarises accounting practices encountered during our targeted review which are either incorrect according to current RAGs (i.e. boundary issues or incorrect classification as appointed / non-appointed activities) or inconsistent with good accounting practices (i.e. illogical or inaccurate allocation methods). We propose that Ofwat contact WaSCs individually to ensure that they accommodate each of the issues identified in this table. We list the issues which will require written guidance to all WaSCs in section C.2.

Table C.1: Summary of company-specific accounting issues

Issue	1	2	3	4	5	6	7	8	9	10
Water resources accounting issues										
Impounding reservoirs and abstraction licences			✓	✓	✓		✓	✓		✓
Wholly compensating reservoirs	✓	✓					✓			
Pumping - upstream of impounding reservoirs	✓					✓	✓			
Pumping - borehole cost disaggregation	✓	✓								
Pumping - borehole pumping head and management estimate						✓	✓			✓
Borehole to WTW pipes	✓		✓							
Aquifer recharge schemes						✓				
Other "flow-reversal" schemes									✓	
Labour and maintenance costs									✓	
Cumulo rates		✓		✓						
M&G asset allocation - principal user	✓	✓	✓							
M&G allocation – choice of driver			✓			✓		✓	✓	
Third party services – cost transfers		✓	✓				✓	✓		✓
Other cost allocation				✓				✓		
Sludge accounting issues										
Power - external revenue sharing				✓						
Sludge product sales			✓	✓		✓				
Treating other WaSC waste		✓				✓				
Tankered waste – appointed v non-appointed	✓		✓		✓			✓		

Issue	1	2	3	4	5	6	7	8	9	10
Tankered waste – business unit treatment		✓			✓		✓	✓	✓	
Tankered waste – costs included in cost transfer		✓	✓	✓				✓	✓	
Sludge and sewage treatment boundaries - high level		✓	✓	✓	✓	✓				
Labour and Maintenance costs									✓	
Liquor treatment - cost transfers	✓							✓		
Liquor treatment – extent of cost transfers						✓				
Liquor treatment - costs included in cost transfers		✓			✓				✓	✓
Water Treatment Works sludge – cost transfers	✓		✓	✓		✓		✓	✓	✓
Water Treatment Works sludge - costs included in cost transfers					✓					
Local authority rates		✓	✓	✓		✓				
M&G asset allocation - principal user	✓	✓	✓							
M&G asset allocation - choice of driver			✓			✓		✓	✓	
Third party services		✓		✓						
Charging for appointed assets	✓									
Sludge treatment / disposal boundary							✓		✓	

C.2. Guidance on common issues

Water resource reporting issues

- **Impounding reservoirs and abstraction licences**. RAG4.05 under raw water distribution – raw water storage states that "Reservoirs that do not have an abstraction licence attached to them and are used to store raw water should be included under water storage". For clarity, reservoirs without an abstraction licence attached to them should not be included within water resources with the exception of wholly compensating reservoirs [an amendment to RAG4.05 will be made to classify reservoirs which purely provide a compensating role should be classified as part of water resources, even if they do not have abstraction licences].
- **Pumping - borehole cost disaggregation**. Where a pump performs functions for three business units, its costs should be split across each of them. For clarity, RAG 2.05 will be amended to this effect.
- **Pumping - borehole pumping head and management estimate**. Operational pumping head should be the preferred driver to split power costs for those pumps which perform a joint function for water resources and at least one other business unit. For clarity, RAG 2.05 will be amended to include operational pumping head as the preferred driver.
- **Aquifer recharge schemes.** Under RAG 4.05, these schemes, even where their purpose is to augment yields from aquifers, are classified as raw water storage. The RAG will be amended to clarify that where the purpose of the scheme is to augment yields (rather than using the layers in the aquifer to filter water), its costs should be treated as part of the water resources business unit.
- **Blending**. We were asked by a WaSC to consider the correct accounting treatment where water passes from a water source, through pipework, to be blended in a reservoir, in a reservoir without an abstraction licence. In this situation, because the reservoir does not have an abstraction licence, it falls within raw water distribution – raw water storage, so the blending is classified as raw water distribution.
- **Labour and maintenance costs**. If site labour costs cannot be coded directly and a better driver cannot be found, management estimate (a robust centralised process) should be used to allocate site labour.
- **Cumulo rates**. Cumulo rates should be split between water business units pro-rata to GMEAV since it is largely linked to a return on assets. RAG 2.05 will be amended to this effect.

- **M&G asset allocation - choice of driver**. CCD on M&G assets should be allocated between business units. M&G CCD should be disaggregated by type of asset, using appropriate drivers for each (i.e. split on FTEs or headcount given that different types of M&G asset will have different drivers, but most would be expected to be linked to people, rather than assets). Cumulative CCD and NMEAV are not appropriate drivers.
- **Third party services – activities**. Bulk supplies, the provision of non-potable supplies, and recreation on protected land under WIA 1991 should be treated as third party activities, and RAG 2.05 amended accordingly. Ofwat to consider treatment of S20 reservoir operating agreements.
- **Third party services – cost transfers**. Third party costs should be fully loaded, and include CCD and IRC where applicable, except where the terms of the contract state that a lesser amount should be charged to the customer. RAG 2.05 will be amended to this effect.
- **Bulk supply definition**. A company providing treated water to another company's customers should treat it as a third party cost in treated water distribution. RAG 4.05 will be amended to this effect.

Sludge reporting issues

- **Power – cost savings.** Many companies share with sewage treatment the saving in external power costs arising from the CHP assets of the sludge business. Please place the whole saving in external power costs in the sludge treatment business – in time the value of the "fuel" will be reflected in the transfer price agreed between the two businesses.
- **Power – external revenue sharing.** As for power cost savings, please place 100% of the value of CHP external power sales as part of sludge treatment.
- **Sludge product sales.** As indicated by the new RAG 4.05, please net receipts from the sale of sludge cake off the sludge treatment business unit's opex.
- **Treating other WaSC waste**. For clarity, Appendix 1 to RAG 4.05 is being amended to explicitly show that treating waste from another WaSC is a non-appointed activity. This is in response to the need for comparable accounting treatment between companies in anticipation of increased waste trading, and in a manner consistent with the licence. Please ensure that treating other WaSC waste is accounted for as a non-appointed activity.
- **Tankered waste – appointed v non-appointed**. Companies should ensure that domestic and commercial tankered waste is treated as a non-appointed activity, as set out in Appendix 1 to RAG 4.05.

- **Tankered waste – business unit treatment**. Some companies do not transfer the costs associated with processing tankered waste from sludge treatment. Tankered waste costs should be split via transfers between sewage treatment, sludge treatment and disposal.
- **Tankered waste – costs included in cost transfer**. Some companies that make a cost transfer from the appointed business only include opex. RAG2 stipulates that "costs should be allocated in relation to the way that resources are consumed". This implies that a reasonable proportion of all costs, opex and CCD, should be transferred from the appointed business. The CCD element should not be deducted from appointed business opex, but rather be shown as a CCD recharge.
- **Sludge and sewage treatment boundaries – tankering to STWs.** Where tankering sludge from very small STWs without holding tanks to other STWs with holding tanks i.e. for storage purposes, please treat as sewage treatment – RAG 4.05 to be amended accordingly.
- **Co-located sites power costs allocation.** Additional guidance in RAG 2.05, that if sub metering and telemetry is not used to allocate power costs at co-located sites, then a centralised process be used, using a known power rating for each asset and estimates of asset running time from central and site management.
- **Labour and Maintenance costs**. If site labour costs cannot be coded directly and a better driver cannot be found, management estimate (a robust centralised process) should be used to allocate site labour, rather than, for example, GMEAV.
- **Liquor treatment - cost transfers**. All companies should make a cost transfer from sewage treatment to sludge treatment in respect of sludge liquor.
- **Liquor treatment - extent of cost transfers**. The cost transfer should include not just costs associated with specialised liquor treatment plants, but also for those STCs where sludge liquors are returned into the normal STW assets.
- **Liquor treatment - calculation of cost transfers**. A number of different calculations are performed at present, but it is difficult for us to propose a standard calculation because circumstances are different at each site. We propose that the WaSCs work together to produce a common methodology in 2016-17, to reflect the flow and strength of sludge liquors.
- **Liquor treatment - costs included in cost transfers**. Cost transfers in respect of sludge liquor should include fully loaded opex and CCD costs, consistent with RAG2.
- **Water Treatment Works sludge – cost transfers**. Where water sludge undergoes treatment an appropriate cost transfer should be made, consistent with RAG2.

- **Water Treatment Works sludge - costs included in cost transfers**. Water sludge transfers should include fully loaded opex and CCD cost components.
- **Local authority rates**. When allocating local authority rates between business units, site level or non-infra GMEAV bases should be used (as opposed to non-infra NMEAV or an estimate of employee time).
- **M&G asset allocation - choice of driver**. CCD on M&G assets should be allocated between business units. M&G CCD should be disaggregated by type of asset, using appropriate drivers for each (i.e. split on FTEs or headcount given that different types of M&G asset will have different drivers, but most would be expected to be linked to people, rather than assets). Cumulative CCD and NMEAV are not appropriate drivers.
- **Sludge treatment / disposal boundary.** Where incinerators are used purely to dispose of completely treated sludge which would be fit to be taken to land, they should be classed as part of sludge disposal, and RAG4.05 amended accordingly.