

IAP Technical Annex 5

Targets, controls, markets and innovation



1.SRN.CML.A1

Ofwat action	How we have responded
<p>The proposed split of fixed and variable revenues for the bio-resources revenue control has not been sufficiently evidenced, particularly where cost lines are partly incremental and partly fixed. We are also intervening to ensure that the bioresources revenue adjustment is set on a broadly comparable basis to avoid setting revenue controls that may distort the development of trades. We will set out our view in the draft determinations based on the updated tables bio 1, Bio3 and Bio4. We will treat the funding of the 2020 RCV (run-off, returns and tax) as fixed for these purposes, along with revenues to recover local authority rates; some fees; and a proportion of direct and indirect costs of bioresources treatment and transport.</p>	<p>Plan updated</p>

Our detailed response

We have split the costs of bio-resources between variable and fixed on the following basis:

Variable costs

We have defined variable costs as costs that are affected by sludge volumes. This includes all power, chemicals, direct labour, fuel, treatment costs and transportation.

Fixed costs

On the basis that we would need to maintain the bio-resources assets to treat sludge, regardless of volume we have assumed that all capital expenditure (maintenance and enhancement) is a fixed cost.

In addition, based on guidance provided by Ofwat on 15 March 2019, we have treated all the RCV related revenue components as fixed together with local authority rates, indirect operating costs (overheads) and direct service contracts.

Financial information

The table below shows a detailed breakdown of the PAYG for bio-resources (row 1 of table Bio4), together with an expansion of the costs reported as other operating expenditure in line 7.

CMI.A1.Table 1 – Bio 4 row 1 - Detailed analysis of PAYG

		Bio-resources total costs Bio 4					
A	Operating expenditure	2020-21	2021-22	2022-23	2023-24	2024-25	2020-25
1	Power	-1.850	-1.654	-1.204	-1.987	-2.502	-9.196
2	Income treated as negative expenditure	-3.002	-2.685	-1.954	-6.286	-9.991	-23.918
3	Service charges / Discharge Consents	0.001	0.001	0.000	0.001	0.001	0.003
4	Bulk discharge	0.000	0.000	0.000	0.000	0.000	0.000
	Other operating expenditure						
5	~ Renewals expensed in year (Infrastructure)	0.000	0.000	0.000	0.000	0.000	0.000
6	~ Renewals expensed in year (Non-Infrastructure)	0.000	0.000	0.000	0.000	0.000	0.000
7	~ Other operating expenditure excluding renewals	18.371	16.150	11.745	22.247	29.537	98.051
8	Local authority and Cumulo rates	0.870	0.780	0.574	0.964	1.223	4.411
9	Total operating expenditure (excluding third party services)	14.390	12.592	9.162	14.939	18.269	69.351
10	Third party services	0.000	0.000	0.000	0.000	0.000	0.000
11	Total operating expenditure	14.390	12.592	9.162	14.939	18.269	69.351
B Capital expenditure							
12	Maintaining the long term capability of the assets ~ infra	0.000	0.000	0.000	0.000	0.000	0.000
13	Maintaining the long term capability of the assets ~ non-infra	10.338	12.101	16.055	11.511	10.325	60.330
14	Other capital expenditure ~ infra	0.000	0.000	0.000	0.000	0.000	0.000
15	Other capital expenditure ~ non-infra	0.316	0.440	1.073	0.799	0.174	2.802
16	Infrastructure network reinforcement	0.000	0.000	0.000	0.000	0.000	0.000
17	Total gross capital expenditure excluding third party services	10.654	12.541	17.127	12.310	10.499	63.132
18	Third party services	0.000	0.000	0.000	0.000	0.000	0.000
19	Total gross capital expenditure	10.654	12.541	17.127	12.310	10.499	63.132
C Totex							
20	Grants and contributions ~ operating expenditure	0.000	0.000	0.000	0.000	0.000	0.000
21	Grants and contributions ~ capital expenditure	0.000	0.000	0.000	0.000	0.000	0.000
22	Totex	25.044	25.133	26.289	27.249	28.768	132.483

CMI.A1.Table 2 – Other operating expenditure - Detailed analysis

		Other operating expenditure analysis					
Variable	Staff (direct, net of capitalisation)	1.529	1.367	0.995	1.645	2.073	7.609
Variable	Sludge Transport and Disposal (direct)	5.531	4.948	3.603	5.949	7.496	27.527
Variable	Fuel	0.080	0.072	0.052	0.086	0.108	0.398
Variable	Chemicals	2.038	1.823	1.327	2.190	2.759	10.137
Fixed	Indirect opex costs	3.014	2.697	2.047	3.378	4.082	15.219
Fixed	Direct Service Contracts	0.873	0.781	0.569	0.938	1.182	4.344
Variable	Other PAYG (opex) - principally contractors	5.306	4.462	3.152	8.060	11.836	32.816
	Total other operating expenditure	18.371	16.150	11.745	22.247	29.537	98.050

These costs have then been allocated to variable and fixed, based on the definition at the start of this document. This results in the detailed analysis below.

CMI.A1.Table 3 – Bio 4 row 29 - Detailed analysis of variable costs

		Bio-resources variable costs Bio 4					
A	Operating expenditure	2020-21	2021-22	2022-23	2023-24	2024-25	2020-25
1	Power	-1.850	-1.654	-1.204	-1.987	-2.502	-9.196
2	Income treated as negative expenditure	-3.002	-2.685	-1.954	-6.286	-9.991	-23.918
3	Service charges / Discharge Consents	0.000	0.000	0.000	0.000	0.000	0.000
4	Bulk discharge	0.000	0.000	0.000	0.000	0.000	0.000
	Other operating expenditure						
5	~ Renewals expensed in year (Infrastructure)	0.000	0.000	0.000	0.000	0.000	0.000
6	~ Renewals expensed in year (Non-Infrastructure)	0.000	0.000	0.000	0.000	0.000	0.000
7	~ Other operating expenditure excluding renewals	14.483	12.672	9.129	17.931	24.272	78.487
8	Local authority and Cumulo rates	0.000	0.000	0.000	0.000	0.000	0.000
9	Total operating expenditure (excluding third party services)	9.632	8.333	5.971	9.658	11.779	45.373
10	Third party services	0.000	0.000	0.000	0.000	0.000	0.000
11	Total operating expenditure -variable	9.632	8.333	5.971	9.658	11.779	45.373

B	Capital expenditure						
12	Maintaining the long term capability of the assets ~ infra	0.000	0.000	0.000	0.000	0.000	0.000
13	Maintaining the long term capability of the assets ~ non~infra	0.000	0.000	0.000	0.000	0.000	0.000
14	Other capital expenditure ~ infra	0.000	0.000	0.000	0.000	0.000	0.000
15	Other capital expenditure ~ non~infra	0.000	0.000	0.000	0.000	0.000	0.000
16	Infrastructure network reinforcement	0.000	0.000	0.000	0.000	0.000	0.000
17	Total gross capital expenditure excluding third party services	0.000	0.000	0.000	0.000	0.000	0.000
18	Third party services	0.000	0.000	0.000	0.000	0.000	0.000
19	Total gross capital expenditure - variable	0.000	0.000	0.000	0.000	0.000	0.000

C	Totex						
20	Grants and contributions ~ operating expenditure	0.000	0.000	0.000	0.000	0.000	0.000
21	Grants and contributions ~ capital expenditure	0.000	0.000	0.000	0.000	0.000	0.000
22	Totex - variable	9.632	8.333	5.971	9.658	11.779	45.373

CMI.A1.Table 4 – Other operating expenditure - Variable cost analysis

	Other operating expenditure analysis						
Variable	Staff (direct, net of capitalisation)	1.529	1.367	0.995	1.645	2.073	7.609
Variable	Sludge Transport and Disposal (direct)	5.531	4.948	3.603	5.949	7.496	27.527
Variable	Fuel	0.080	0.072	0.052	0.086	0.108	0.398
Variable	Chemicals	2.038	1.823	1.327	2.190	2.759	10.137
Fixed	Indirect opex costs	0.000	0.000	0.000	0.000	0.000	0.000
Fixed	Direct Service Contracts	0.000	0.000	0.000	0.000	0.000	0.000
Variable	Other PAYG (opex) - principally contractors	5.306	4.462	3.152	8.060	11.836	32.816
	Total other operating expenditure	14.483	12.672	9.129	17.931	24.272	78.487

CMI.A1.Table 5 – Bio 4 row 28 - Detailed analysis of fixed costs

		Bio-resources fixed costs Bio 4					
A	Operating expenditure	2020-21	2021-22	2022-23	2023-24	2024-25	2020-25
1	Power	0.000	0.000	0.000	0.000	0.000	0.000
2	Income treated as negative expenditure	0.000	0.000	0.000	0.000	0.000	0.000
3	Service charges / Discharge Consents	0.001	0.001	0.000	0.001	0.001	0.003
4	Bulk discharge	0.000	0.000	0.000	0.000	0.000	0.000
	Other operating expenditure						
5	~ Renewals expensed in year (Infrastructure)	0.000	0.000	0.000	0.000	0.000	0.000
6	~ Renewals expensed in year (Non-Infrastructure)	0.000	0.000	0.000	0.000	0.000	0.000
7	~ Other operating expenditure excluding renewals	3.888	3.478	2.616	4.317	5.265	19.563
8	Local authority and Cumulo rates	0.870	0.780	0.574	0.964	1.223	4.411
9	Total operating expenditure (excluding third party services)	4.758	4.259	3.191	5.281	6.489	23.978
10	Third party services	0.000	0.000	0.000	0.000	0.000	0.000
11	Total operating expenditure - fixed	4.758	4.259	3.191	5.281	6.489	23.978
B Capital expenditure							
12	Maintaining the long term capability of the assets ~ infra	0.000	0.000	0.000	0.000	0.000	0.000
13	Maintaining the long term capability of the assets ~ non-infra	10.338	12.101	16.055	11.511	10.325	60.330
14	Other capital expenditure ~ infra	0.000	0.000	0.000	0.000	0.000	0.000
15	Other capital expenditure ~ non-infra	0.316	0.440	1.073	0.799	0.174	2.802
16	Infrastructure network reinforcement	0.000	0.000	0.000	0.000	0.000	0.000
17	Total gross capital expenditure excluding third party services	10.654	12.541	17.127	12.310	10.499	63.132
18	Third party services	0.000	0.000	0.000	0.000	0.000	0.000
19	Total gross capital expenditure - fixed	10.654	12.541	17.127	12.310	10.499	63.132
C Totex							
20	Grants and contributions ~ operating expenditure	0.000	0.000	0.000	0.000	0.000	0.000
21	Grants and contributions ~ capital expenditure	0.000	0.000	0.000	0.000	0.000	0.000
22	Totex - fixed	15.413	16.800	20.318	17.591	16.988	87.110
A Other building block elements - all fixed							
2	Pension deficit repair contributions ~ bioresources	0.231	0.225	0.220	0.214	0.209	1.099
3	Run off on post 2020 investment ~ bioresources	0.558	1.832	4.022	5.692	5.697	17.801
4	Return on post 2020 investment ~ bioresources	0.176	0.579	1.271	1.798	1.800	5.624
5	Run off on RPI inflated 2020 RCV ~ bioresources	10.160	9.241	8.404	7.644	6.952	42.401
6	Return on RPI inflated 2020 RCV ~ bioresources	2.235	2.033	1.849	1.682	1.529	9.328
7	Run off on CPIH inflated 2020 RCV ~ bioresources	10.090	9.088	8.185	7.373	6.640	41.376
8	Return on CPIH inflated 2020 RCV ~ bioresources	3.188	2.871	2.586	2.329	2.098	13.072
9	Current tax ~ wholesale wastewater bioresources	0.118	0.287	0.108	0.301	0.738	1.552
10	Re-profiling of allowed revenue ~ wholesale wastewater bioresources	-0.238	1.103	0.052	-0.617	-0.363	-0.063
11	PR14 reconciliation adjustments ~ revenue	0.000	0.000	0.000	0.000	0.000	0.000
	Total fixed costs	41.931	44.059	47.015	44.007	42.288	219.300

2.SRN.CMI.A2

Ofwat action	How we have responded
<p>The company should provide a commitment to provide a detailed work programme by end August 2019 to assure us that the company will deliver appropriate drainage and wastewater management plans. The programme should ensure that the company can prepare and consult on its first drainage and wastewater management plan no later than the summer of 2022 to enable revised plans to be prepared in early 2023 to inform PR24 business plans.</p>	<p>Accepted</p>

Our detailed response

Introduction

Through this response we confirm our commitment to provide a detailed work programme for the delivery of Drainage and Wastewater Management Plans (DWMPs) by the end of August 2019. This programme will set out, in detail, our plan to deliver and consult on the suite of DWMPs covering the entire Southern Water operating area by 2022-23 in time for the PR24 business plan.

Our DWMP will become central to the achievement of a suite of performance commitments and other goals in the medium to long term. We already have an existing plan for delivery, but we have taken the opportunity to review these plans following the IAP. Our submission in August will be updated to take account of recommendations from this review. This document describes:

- How we believe that DWMPs are central to planning for and delivering the objectives for wastewater and drainage in the South East by Southern Water and our partners
- Our existing approach to:
 - The DWMP management framework;ea
 - Involving partners and stakeholders; and,
 - Using GIS visualisation to support partnership working and communications.
- Our current programme for DWMP delivery
- The nature of a DWMP pilot (currently underway on the Isle of Wight) through which we are refining our approach during 2019
- Projects and initiatives completed which form an evidence base for our future drainage and wastewater strategies
- The outputs of a third-party review of the suitability of our DWMP plan, including recommendations to inform the future development of the programme, undertaken post-IAP

We are developing our DWMP strategy based on the recently published guidance from Water UK and our ongoing involvement in their Implementation Group.

DWMP at the centre of drainage and wastewater planning in the South East

We provide wastewater services to around 4.6 million customers in Kent, Sussex, Hampshire and the Isle of Wight. Our region has a wealth of natural beauty, with over 80 bathing waters, 3,400 km of river, four Areas of Outstanding Natural Beauty (AONB) and the South Downs National Park. A core focus of our wastewater service is to protect and further improve these natural assets, whilst continuing to build operational resilience



in the face of high population growth and increasingly extreme weather. To plan drainage and wastewater investments properly we welcome the integrated and partnership focused approach provided by the DWMP framework.

We are already progressing a number of transformation initiatives which are addressing long-term planning challenges to support growth whilst protecting and enhancing the environment and benefitting customers in the South East, being: Sustainable Drainage 2030, Catchment First, Resource Hubs, Target 100, Environment+, Operational Excellence.

DWMPs provide the means, and the collaborative environment, for bringing these initiatives together so that we can plan in a more integrated manner to deliver long term benefits for our customers and the environment. Especially important is the necessity to work with a diverse range of partners such as: Lead Local Flood Authorities, local authorities, the Environment Agency, Highway Authorities, Internal Drainage Boards, National Parks, developers, community and resident groups, parish councils, and Regional Flooding and Coastal Committee representatives.

Within our PR19 Business Plan (See *BP_Ch12_Wholesale Wastewater_Pg206*) we set out our ambitious long-term goals for wastewater in 2040:

- Make flooding from sewers the exception, delivering resilience against more extreme weather through our sustainable drainage approaches
- Achieve our ambition of zero pollution, with predictive analytics and automated control of our sewerage network as standard
- Return all our rivers and coasts close to their natural state (where cost effective)
- Bring all 83 bathing waters up to excellent standard (working collaboratively and with continuing customer support)
- Fully-develop our Resource Hubs: recycling waste to provide power, heat, water, natural fertiliser and minerals to benefit local communities and the environment.

DWMPs are a key enabler in helping us achieve these goals by:

- Establishing a systematic understanding of our wastewater services and system risks across our operational region and the wider South-East.
- Considering long-term impacts on drainage within river catchments (such as growth, climate change and technology)
- Strengthening our structured and auditable approach to identifying and developing robust, investment plans, that meet stakeholder requirements and deliver best value for customers
- Facilitating partnership-working with specific regard to plans made by other risk management authorities for sustainable drainage, flooding and pollution management
- Co-creating plans and solutions that are aligned with other organisations' planned investment in water quality, flooding and drainage, and supporting economic growth, community resilience,
- Providing a comprehensive integration with existing risk and resilience systems and from PR24 forming the basis of future business-as-usual wastewater asset and investment planning activities.

Our approach

Our approach to the DWMP management framework and organising level 2 DWMP regions

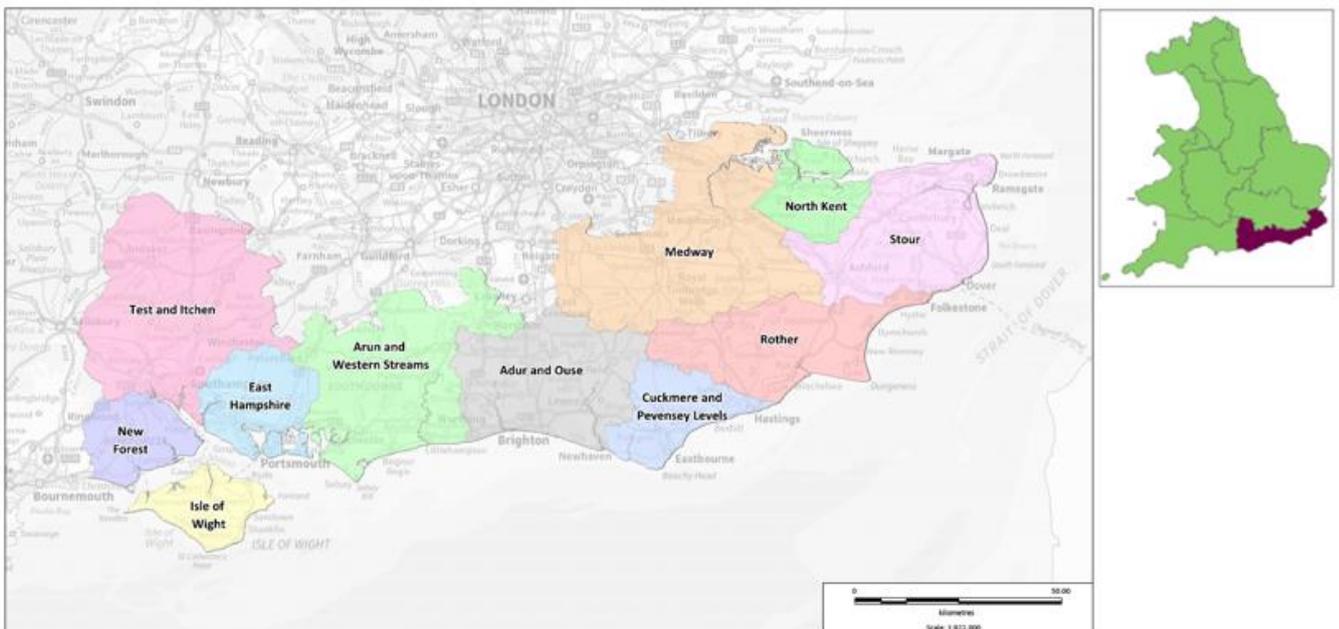
Our DWMPs will conform to the management structure recommended in the document A framework for the production of Drainage and Wastewater Management Plans (Atkins – September 2018). This sets out a management structure with three levels of planning:

1. **Level 1** – overarching company level DWMP providing a strategic, long term plan for drainage and wastewater resilience and long-term investment planning
2. **Level 2** – detailed local plans aligned to individual River Basin Districts (RBD), describing strategic drivers for change and providing strategic context for detailed system assessments taking place at Level 3
3. **Level 3** – system level plans for wastewater treatment works and the sewerage network system, including profiles for each wastewater catchment in the form of Drainage Area Plans (DAPs) and Surface Water Management Plans (SWMPs)

We have already invested heavily in Drainage Area Plans and other plans at the level 3 scale and hence our approach will be to draw upon these existing plans during the first round of DWMPs. Our focus for the DWMPs is to complete the suite of plans and fill the existing gaps at the level 2 and level 1 planning scales.

We will complete eleven level 2 DWMPs and one level 1 plan to provide coverage of the whole of our operational area as illustrated in *CMi.A2.Figure 1 – Map showing our planned catchments for Level 2 DWMP*. We will align our strategic planning areas with the Water Framework Directive and the Floods Directive RBD catchments. This ensures that our DWMP is integrated with the objectives and actions of these statutory plans. We will draw upon our base of existing plans to provide the detailed information expected at level 3 in the DWMP framework to support the development of the level 2 and level 1 plans. We will review and prioritise 365 identified drainage areas as part of a risk based catchment screening exercise. To support this activity we have a strong and up-to-date library of 130 hydraulic models and robust performance data.

CMi.A2.Figure 1 – Map showing our planned catchments for Level 2 DWMP



Our approach to involving our partners

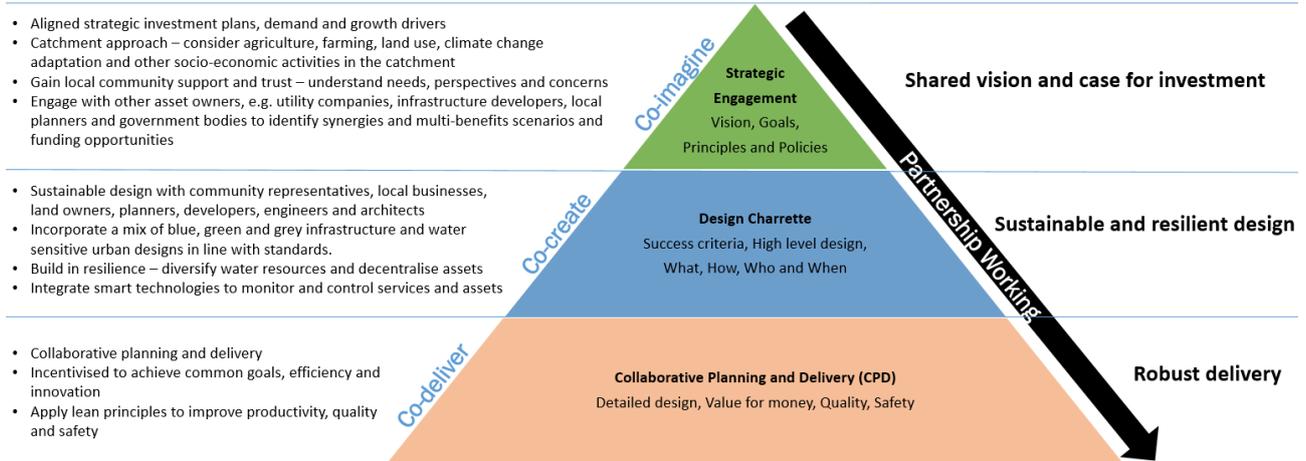
We intend to effectively engage with customers and local groups in identifying and prioritising planning objectives and the risks and interventions developed to mitigate them.

Our programme is based upon our commitment to meaningfully engage with the existing Lead Local Flood Authorities and the other risk and catchment management authorities in each county to develop plans for each of the level 2 river catchments, with additional consultation throughout their development. As plans progress, we will produce the regional level 1 document with our Customer Challenge Group and the Regional Flood and Coastal Committee. The final public consultation will provide customers and the public with an opportunity to have their say on all the level 1 and 2 plans before they are finalised and published.

Our partnership approach is shown in *CMI.A2.Figure 2 – Partnership approach to water catchment growth planning and delivery*.

CMI.A2.Figure 2 – Partnership approach to water catchment growth planning and delivery

Drivers	
No spare capacity in network	Ofwat’s D-mex developer satisfaction score
Cost reduction	Resilience – climate change, growth



The paramount importance of proper engagement with our partners and other risk management authorities has been substantively built in to our delivery programme (shown below *CMI.A2.Figure 2 – Proposed DWMP delivery programme*) which recognises and allows sufficient time for meaningful engagement activities. We are planning to stagger the development of regional plans evenly across our counties, with appropriate resource to ensure effective engagement with partner organisations. The timeframe set out in our programme is specifically targeted to allow us to use the outputs as the basis for PR24 business planning.

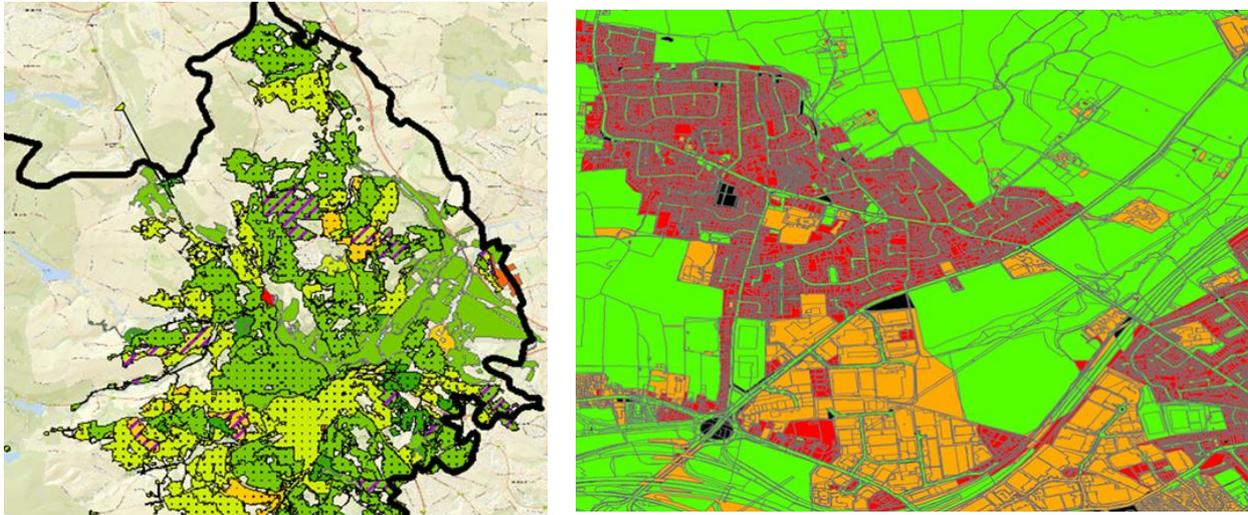
We will incorporate lessons learned from our stakeholder engagement work into our DWMP planning and delivery process. In order to ensure our plans are, and continue to be, reflective of the needs of our customers and stakeholders, we will continue to engage with the planning and development community throughout its production.

Our approach to sharing outputs

We recognise the importance of effective mapping and visualisation technologies to help communicate current drainage and wastewater risks and how these might change in the future. Visualisation options are currently being reviewed as part of ongoing pilot studies (e.g. *CMI.A2.Figure 3 – Example visualisations showing a sub-catchment capacity assessment (left) and differential suitability for SuDs technologies (right)*). This will help us engage with professional partners and also effectively communicate with customers.

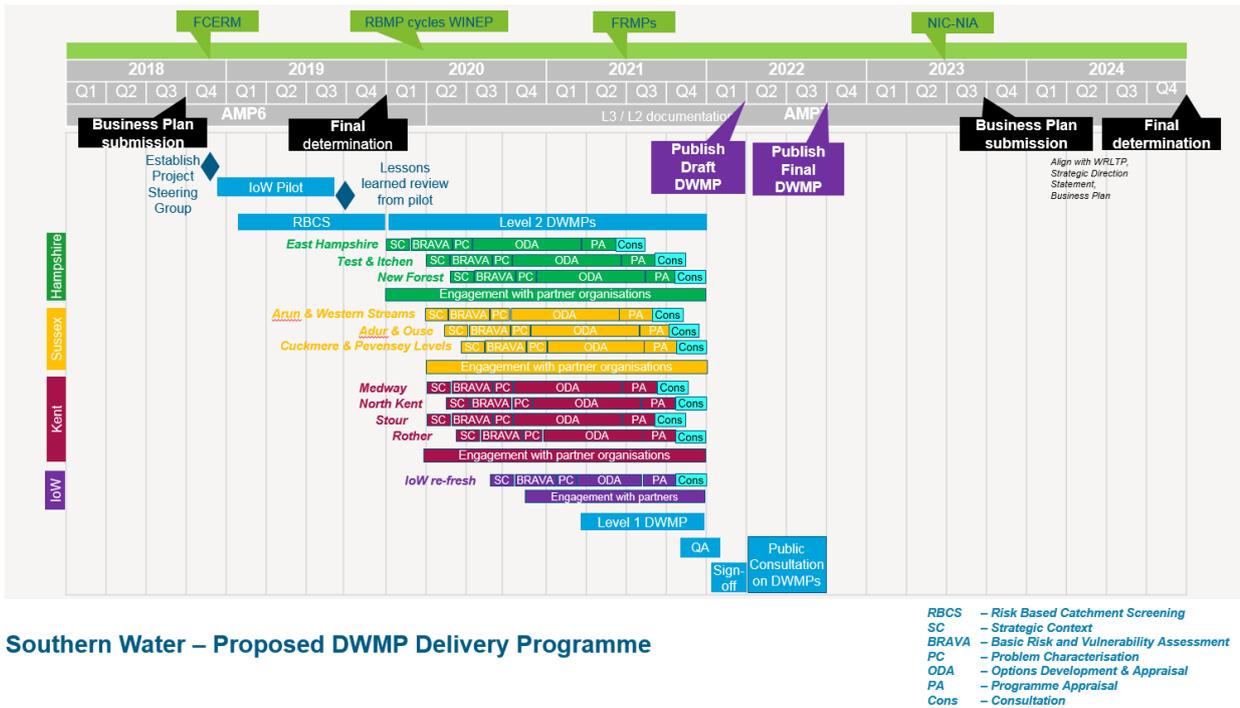
The selected distribution and visualisation technologies will need to bring together our own asset data, information on drainage capacity, water quality information, results from model simulations, operational data and data from partners. Mapping current and future risks will help us understand the root causes of problems and point towards solutions which can be delivered through time using an adaptive pathways approach and in partnership with others.

CMI.A2.Figure 1 – Example visualisations showing a sub-catchment capacity assessment (left) and differential suitability for SuDs technologies (right)



Outline programme for DWMP delivery

CMI.A2.Figure 2 – Proposed DWMP delivery programme



Southern Water – Proposed DWMP Delivery Programme

- RBCS – Risk Based Catchment Screening
- SC – Strategic Context
- BRAVA – Basic Risk and Vulnerability Assessment
- PC – Problem Characterisation
- ODA – Options Development & Appraisal
- PA – Programme Appraisal
- Cons – Consultation

Owat requires water companies to have the first round of DWMPs completed by summer 2022. Our outline programme to deliver the DWMPs to this timetable is illustrated in *CMI.A2.Figure 4 – Proposed DWMP delivery programme*. It shows delivery of DWMPs in separate streams for Hampshire/Isle of Wight, Sussex and Kent and will be refined based on learning experiences from others in the industry and our Isle of Wight pilot, currently underway. This is a challenging programme, and is dependent upon our main partners being able to commit the time and resources to work with us to develop the DWMPs. We have mitigated this risk with early engagement to ensure that stakeholders are resource ready.

Within the execution phase for each catchment we have allowed adequate time for strategic context definition, baseline risk and vulnerability assessment (BRAVA), options development and appraisal, and at least two rounds of internal and external stakeholder engagement activities per river basin catchment.

This programme will be reviewed for our August 2019 submission.

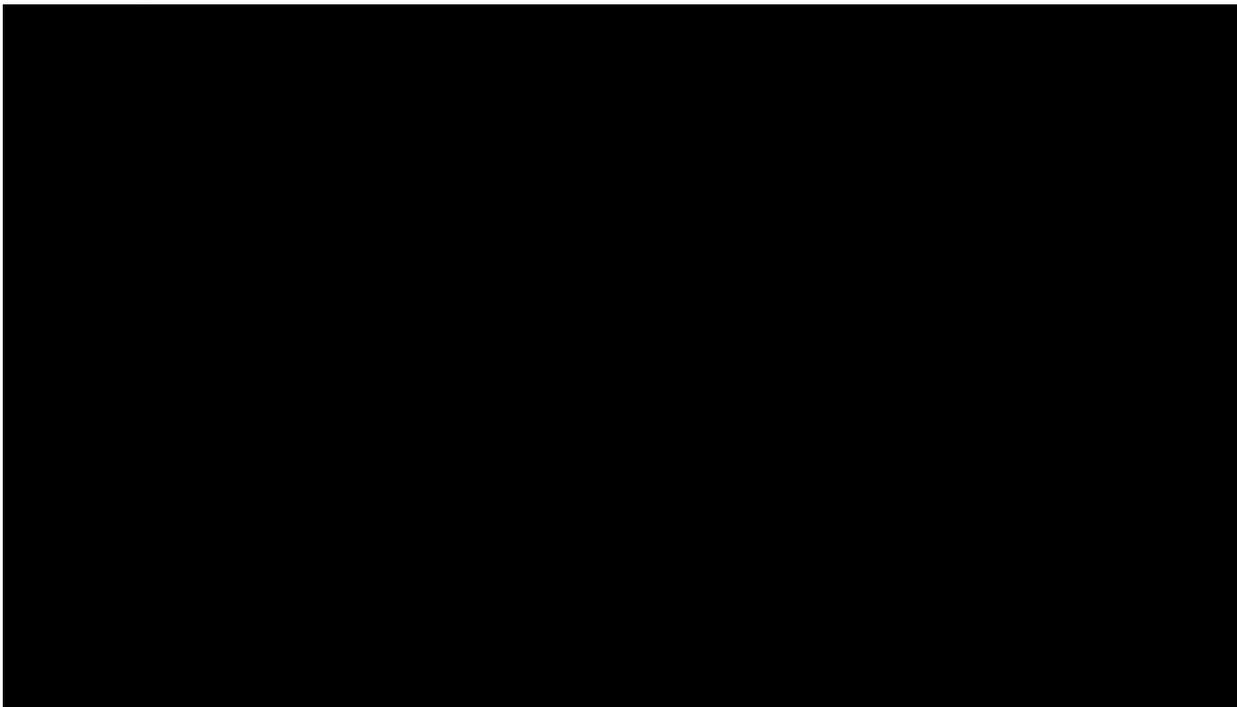
Southern Water DWMP Pilot

We are currently testing and developing our approach to the DWMP in a pilot study covering the Isle of Wight which is due to be completed in September 2019. This area was chosen because it is a discrete geographical area with one unitary authority and provides a good size and level of complexity for rapid learning. We will use the wastewater modelling outputs from a newly developed DAP for the [redacted] catchment to understand current and future risks. The Isle of Wight is characterised by a mix of urban, rural and coastal drainage issues which are representative of much of the South East. This further demonstrates the scalability of insights gathered during the pilot. See *CMI.A2.Figure 5 – IOW River Basin District*.

The pilot remains on track for delivery in September 2019.



CMI.A2.Figure 3 – IOW River Basin District



We are engaging with Atkins, the authors of the DWMP framework, to provide a level of governance on the Isle of Wight pilot. This will ensure that the framework is applied as intended and will also result in useful lessons learned and advice being fed back to the Water UK implementation group as part of the framework's continuous improvement.

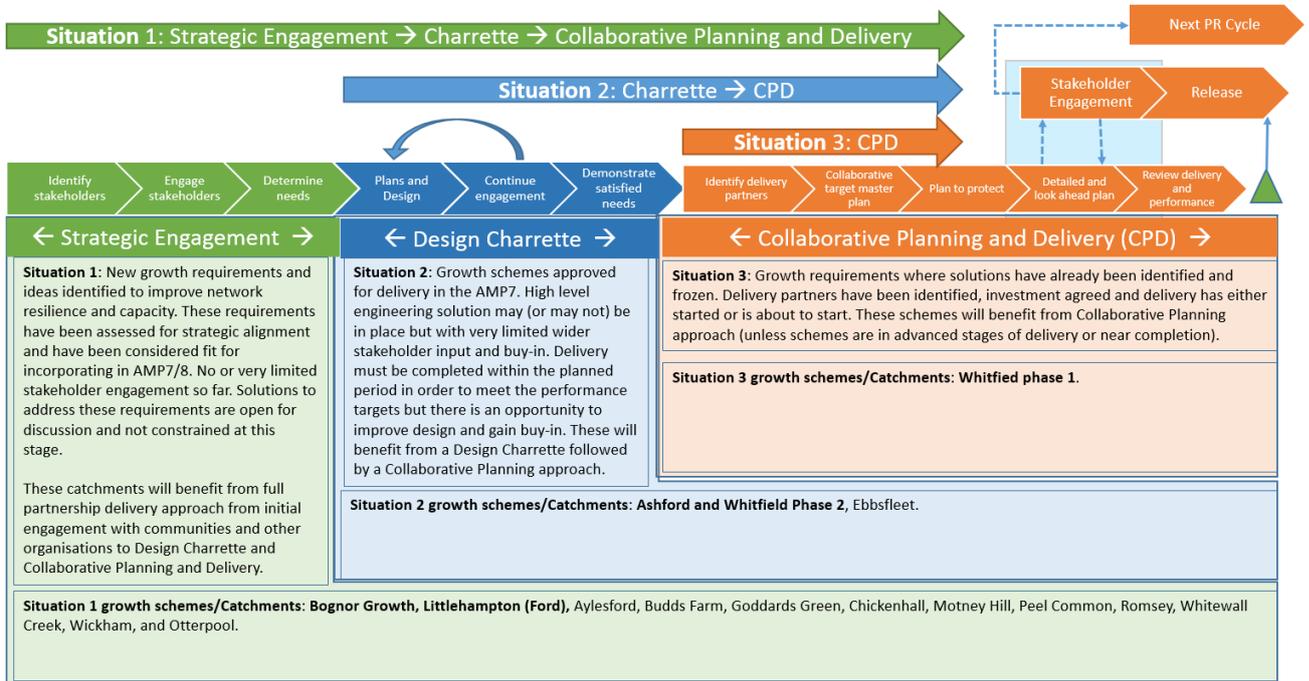
Work undertaken to date

Our experience and recent work across a number of initiatives is informing our approach to developing the DWMP. We are also working closely with Water UK and other water companies as part of the Drainage and Wastewater Management Plan (DWMP) Implementation Group. Below we list examples of work we have recently completed.

- We are building on existing stakeholder engagement activity. For example, in 2017 we organised and chaired a Growth and Development Insight Building workshop which was attended by 17 delegates from local developers, planning authorities, and other representatives of the planning and development community, as well as 13 Southern Water representatives and independent facilitators. The workshop was designed to encourage active participation from partner organisations, allow for open and honest discussions, create and share insights in partnership, and act as a catalyst for ongoing dialogue to support a transformation in the way the company approaches growth and development – both in the short and long term. As a result of this session, we are currently re-engineering our developer led processes as part of the wider transformation programme. A follow up developer-focussed session is planned for 30th April 2019.
- During AMP6 we have tested a more collaborative approach to longer-term infrastructure planning, adopting charrette style workshops, see *CMI.A2.Figure 6 – Typical AMP6 Stakeholder Engagement plan*. Our charrettes are collaborative planning sessions in which local authority representatives, developers, regulatory bodies, community groups, highways authorities, local flooding associations, and local residents are invited to collaborate on a vision for investment and development. These sessions (organised to date in our Paddock Wood and Lidsey drainage catchment areas) have provided a forum for shared idea generation and have offered the advantage of providing us with immediate feedback on

our proposed design solutions. Through running charrettes we have encouraged partners to co-create development and investment plans and have attempted to foster an ethos of shared ownership. The approach was positively received by the local authorities, Environment Agency representatives, and developers who attended.

CMI.A2.Figure 4 – Typical AMP6 Stakeholder Engagement plan



- We have completed a comprehensive analysis following the requirements of the 21st Century Drainage Programme (21CDP) Capacity Assessment Framework. This shows where our drainage network has capacity on a sewer by sewer basis.
- We are an early adopter of the tools of the 21CDP Storm Overflow Assessment Framework having completed compliant assessments for all 1032 of our overflows against the high-spilling criteria and having completed spring and autumn invertebrate sampling. This shows us where we have frequently operating sewer overflows that will need to be addressed through the DMWP process.
- We have completed 21CDP compliant analysis against the wastewater resilience metric which shows us the number of customers who are exposed to flood risk from our systems in an extreme weather event. [Note: Additional information can be found in IAP_TA 3_Delivering Outcomes for Customers_OC.A25 and IAP_TA 3_Delivering Outcomes for Customers_OC.A26 referring to 'Resilience to a storm'.]
- We have historically invested heavily in our library of hydraulic models and have completed 103 drainage area plans which cover 80% of our customers. This library of models will be the basis for the DWMP stage where we evaluate current and future risks. Outputs from the models have been instrumental in our collaborations with Lead Local Flood Authorities in the development of Surface Water Management Plans.
- We developed three Drainage Strategies (following the Drainage Strategy Framework methodology) in North-East Kent, Sidlesham and Wickham, working with the Environmental Agency (EA) and local authorities.
- We have showcased effective storm water removal techniques and benefits in the high-profile Portsmouth Flood Alleviation Scheme. The scheme has delivered flow reductions of 6,000 litres per second to the combined sewer system in storm conditions which is approximately equal to 1/3 of total storm flows. The learning from this project will be used to inform similar strategic solutions considered in DWMPs throughout the South East to improve the resilience of communities to climate change.



- We have a successful Fats, Oil and Grease (FOG) campaign which directs education at sub-catchments with known flooding, blockage and pollution issues.
- We have mobilised local authorities, parish councils, and our delivery partners and have established a joint delivery board to oversee the progress of an ongoing network growth scheme in Ashford in Kent. Aimed to facilitate open, early, and continuous engagement, the board has created an open and collaborative forum in which to review project milestones and deliverables.
- We are currently trialling greater use of network monitoring and predictive analytics, as we move to a smart network. We plan to roll this out into high-risk catchments and pumping stations in AMP7, extending into the wider network in AMP8. Our DWMPs will embrace the opportunity to improve performance and resilience through use of these technologies.

Assurance on the proposed delivery plan

We have taken the opportunity, post IAP, to carry out a third-party review of our DWMP plan and approach. The review activity has been led by Elliot Gill, chair of the Chartered Institution of Water and Environmental Management (CIWEM) Urban Drainage Group and Technical Director with consultants Stantec. Elliot developed his feedback based on interviews with Southern Water staff and reviews of our existing company DWMP proposals. The aims of this review were to:

- Gain independent insight on the approaches being adopted by others to establish industry best practice and identify improvements that can be used to enhance our planned approach
- Confirm that our approach will put the DWMP at the heart of our asset and infrastructure planning process, taking full account of the organisational, cultural, and business systems changes required
- Ensure lessons learned from the development of the WRMP are applied

The results of this 3rd party review are presented in full below.

Independent review

“The Southern Water DWMP plan is in development but key fundamentals are already established and are noteworthy for being aligned with industry good practice:

1. *Southern Water has recognised the opportunity provided by DWMP to coordinate a range of drainage and wastewater treatment initiatives whether these address network capacity, operations and maintenance or customer engagement and behaviours. It is important that DWMPs become the basis for planning all activities in drainage and wastewater and address multiple future pressures such as ageing infrastructure, customer behaviours, population growth, urban creep, new development and climate change. In making an explicit link between DWMPs and performance goals for the 2040s, Southern Water will retain a strategic and long term focus on the plans which will help avoid short termism.*
2. *Southern Water’s proposals for partnership working are informed by its previous innovative use of the Charette format and pro-active engagement with developers. They are also pragmatic by building on established sub-regional multi-agency forums such as River Basin Planning groups. This will reduce the burden of additional meetings and activity on hard-pressed third parties. It is noted that planning authority staff are not routinely involved in existing forums and will need to be included in engagement around DWMP issues.*

3. *Southern Water has a robust library of hydraulic models and previously developed Drainage Area Plans covering a high percentage of the population served. This asset management capability will be highly valuable in developing the BRAVA stage of the DWMP without recourse to the construction of new analysis tools. However, it should be noted that coverage of surface water drainage networks and the use of flood extent modelling and mapping is limited. Future DWMP cycles will be enhanced if Southern Water can improve its understanding of how surface water drainage assets function and the consequences of flooding from all sources. Southern Water should consider extending their modelled population coverage using a risk-based evaluation arising from DWMPs.*
4. *Southern Water's strategy to pilot their DWMP approach on the Isle of Wight is sensible. Lessons learned will be invaluable in developing a detailed programme and budget for delivery of the remainder of the DWMP programme, starting in 2020. It will also be a testing ground for partnership working, the presentation of BRAVA results and refining the level of detail necessary to develop drainage and wastewater strategies.*
5. *Southern Water's progress in completing an analysis of more than 1000 overflows under the Storm Overflow Assessment Framework methodology will be very valuable in understanding data uncertainty and prioritising critical overflows.*

Following discussions with Southern Water, aspects of their DWMP delivery plan were considered less mature and some opportunities were not yet being fully realised. Progress to address these issues is recommended for the delivery of a successful DWMP programme which has meaningful regional impact and uses Southern Water's resources most efficiently.

It is recommended that the Isle of Wight pilot is continued to be used to develop and refine Southern Water's approach in these areas whilst also taking account of national good practice. This will then directly inform the development of more detailed proposals for presentation in August 2019 to Ofwat.

1. *Southern Water need to develop a systematic approach for using BRAVA outputs (and other information) to identify the root cause of future (and current) risks and suitable strategies to manage them. The approach needs to be transparent so that partners and customers can comprehend the decision-making process, constraints and opportunities. It also needs to be appropriately risk-based so that focus is on the highest risk areas and resources are used efficiently.*
2. *Visualisation techniques using web-enabled GIS datasets combining asset data, model results, telemetry data, land uses and third-party information are very powerful aids and can show patterns, dependencies and opportunities. Using such tools in partnership with others can accelerate system understanding and the identification of solutions. Southern Water should adopt industry good practice by developing their plans in this direction.*
3. *Southern Water need to further consider what level of detail constitutes a strategic and long-term drainage and wastewater plan which can be explained at DWMP levels 3, 2 and 1, be useful for partners but also a seamless bridge to 'wastewater network plus' aspects of the future PR24 business plan. Concepts of what is understood by a Level 2 and Level 1 plan at a strategic (rather than tactical) level require development.*
4. *DWMPs have a key role in 'place-making' strategies for future communities. For example, the desire to value green infrastructure and open water in urban areas is an opportunity when adapting drainage and wastewater infrastructure. Southern Water's DWMP strategy ought to be engaging with regional planners and businesses to explain this opportunity and ensure it is seized upon in DWMPs. A first step will be to market this opportunity to partners in the coming weeks using*

appropriate non-technical literature and materials so that they can understand how they might benefit from full engagement with the DWMP process led by Southern Water.

5. *DWMPs include many uncertainties from questions over the pace and location of development, the remaining life of assets, future water consumption patterns, climate change and the robustness of modelling results. Plans need to be sufficiently agile to accommodate this uncertainty and include strategies for data and monitoring which will flag-up when key thresholds are exceeded, indicating a new course of action. Southern Water should address their approach to uncertainty through all stages of DWMP as this will direct resources to reducing uncertainties where this is most valuable and encourage the use of modern 'adaptive pathways' planning techniques.*
6. *Southern Water might consider including Natural Capital Accounting methods in the appraisal of options and strategies within DWMPs. The company is piloting Natural Capital Accounting in three catchments in AMP7 and it would be sensible to frame alternative drainage and wastewater strategies through this lens too, not least because this supports engagements with partners concerned with enhancing natural capital in the South East.*

The DWMP framework is inspired by the long established and statutory Water Resource Management Plan (WRMP) approach. Southern Water might wish to consider where linkages need to be made between the two plans, whether this is in simply the use of terminology and common presentation or to identify opportunities for wastewater reuse to meet drinking water demands. Southern Water is already embracing an Integrated Water Management Approach, so it is natural to embed this philosophy within the development of drainage and wastewater plans. Thinking of treated wastewater as a resource to either augment natural river flows or supplement drinking water sources will influence future strategy on the number, distribution and type of treatment facilities.”

(Third party review of DWMP approach, Stantec Inc, February/March 2019)

3.SRN.CMI.A3

Ofwat action	How we have responded
<p>The company has not provided information or provided insufficient detail of the arrangements for risk sharing with customers relating to the development of large new water resource options (██████████ plant and ██████████). The company should develop appropriate risk sharing arrangements or provide further detail to ensure that customers are adequately protected from large scale risks. In relation to the development of ██████████ reservoir to facilitate new supplies to the company, please explain how the proposed commercial arrangement would protect customers over the longer term.</p>	<p>Further information provided</p>

Our detailed response

1. The company should develop appropriate risk sharing arrangements or provide further detail to ensure that customers are adequately protected from large-scale risks.
2. In relation to the development of ██████████ reservoir to facilitate new supplies to the company, please explain how the proposed commercial arrangement would protect customers over the longer term.

We have provided our response in two parts

1. Proposed ODI and commercial agreement with Portsmouth Water for ██████████
2. Proposed ODI for ██████████ ██████████

Part 1 – protection of customers against large scale risks

We had included two new large-scale water resource options in our Business Plan (*BP_CH11_Wholesale Water_Pg170_5*). Following the IAP feedback we have taken the following actions:

- The costs of developing ██████████ have been removed from our plan with a view to working up a regional solution(s) as part of the strategic regional group, and our response is covered in *IAP_TA6_Securing cost efficiency_SRN.CE.A3*; and
- We have continued to develop the structure and terms of our potential collaboration with Portsmouth Water (“PW”) on ██████████

In the case of ██████████ we are in the position of being the “end customer” to PW as part of our proposed water trading arrangements. We are not, as it is proposed, in direct control of the costs of development or the long-term operations of the reservoir. At this stage, we are forecasting to incur £5m of costs that would be paid to PW during AMP7. This amount will change as discussions with PW continue. We will discuss the details of this specific project in more detail in Part 2 of this response.

In general, and in other circumstances, when assessing the development of large new water resource options we would look to protect customers in the following ways:

- **Costs:** Where size allows we would commit to progress a dual track approach that compares DPC with building under the Regulatory Asset Base (RAB) model;
- **Uncertainty:** Where scope / need / cost is uncertain we would develop through an ODI-based approach mechanisms to ensure that risks are appropriately managed for customers, and money is passed back to customers. There is uncertainty about the final project structure and costs in the case of ██████████ and choice of scheme and options. We have therefore provided example ODIs for

both [REDACTED] and [REDACTED] and will develop them further as certainty about both schemes increases. We are anticipating that Ofwat will NOT include them in our draft determination at this stage.

- **Efficiency:** We would propose under any procurement model, an element of risk sharing with our customers with the “default” approach for assessment would be the current wholesale totex menu regime, with residuals being addressed by ODIs.

We recognise that Ofwat will want to satisfy itself that any arrangements established with PW work to the benefit of the customers of both water companies in the long term. We acknowledge that Ofwat will need to be confident that the risks associated with the construction and operation of HT are allocated to the appropriate party.

New ODIs

We will develop an ODI to protect customers in the event of non-delivery of HT, or in the event that payments to Portsmouth Water are less than is allowed for in the determination. We are working with PW to develop a Heads of terms and preferably a draft agreement that will show how the project will work. We anticipate this agreement containing incentives for PW and its contractors to deliver on time and to efficient cost, with appropriate risk sharing for all parties involved, not just our customers. We will propose a draft ODI to protect customers from under-delivery of the [REDACTED] [REDACTED] plant.

We will commit to implementing the ODI proportionate to the extent that [REDACTED] is funded in the final determination. We will not know this by 1st April 2019, as the proposal is subject to a new competitive process, required by Ofwat. We have therefore proposed two placeholder ODIs (for both [REDACTED] & [REDACTED] [REDACTED]) as part of our IAP submission (please see supporting information *IAP_TA11_Targets, controls, markets and innovation_Large New Water Resource Schemes* [REDACTED] and *IAP_TA11_Targets, controls, markets and innovation_Large New Water Resource Schemes* [REDACTED]).

Part 2 – Proposed commercial agreement for the [REDACTED] reservoir

Introduction

We are collaborating with Portsmouth Water (PW) in order to design, develop and construct a new reservoir at [REDACTED] near Portsmouth. This reservoir and associated network interconnections and re-enforcements by both companies will support a new bulk supply from Portsmouth Water to Southern Water (SW) of up to 21 MI/day. PW are developing other sources that will support another new bulk supply of 9 MI/day, making 30 MI/day in total. Together with transfers already in place or being commissioned, PW will transfer a total of up to 60 MI/day to SW by 2030. For convenience in this response, [REDACTED] “the reservoir” or similar terms, refer to the total of both new bulk supplies (30MI / day), as it is intended they will be covered by the same or very similar agreements and priced in the same way.

Timing

The purpose is to support the resilience of supply to our customers in West Hampshire including Southampton, Andover and Winchester. We now have large sustainability reductions in place in our abstraction licences and a legally binding agreement (under Section 20 of the Water Resources Act 1991) with the EA. We will implement this in line with the ‘Long-term Water Resources Scheme’ set out in our Final Water Resources Management Plan 2019 (WRMP19). This will remove the supply-demand deficit created by the sustainability reductions. Our revised draft WRMP19 sets out a number of schemes which remove the majority of the deficit by 2027-28 and the remaining deficit by 2029-30. In addition the Section 20 agreement expires in 2030. This agreement states:

“The Company will use all best endeavours to implement the long-term scheme for alternative water resources (“the Long-term Water Resources Scheme”) set out in its Final Water Resources Management Plan (“WRMP”) 2019, as may be revised by future water resource management plans. For the avoidance of doubt the Long-term Water Resources Scheme will be Strategy A in the Company’s draft WRMP 2019, in which the company is statutorily required to engage. Strategy A as set out in Annex 9 to the Draft WRMP 2019. One of the objectives of Strategy A as currently proposed is for the Company not to require the [REDACTED] and [REDACTED] Surface Water Drought Order or Permit after 2027 and only to require the [REDACTED] Surface Water Drought Order or Permit after 2027 in extreme drought events (1 in 500 year drought severity).”

The long term schemes referred to in the agreement are those in our Draft WRMP, which shows all the schemes being delivered by March 2027. In our revised draft WRMP the final new supply from Portsmouth of (21 Ml/day, resulting from the [REDACTED] development) is due to be delivered by March 2029 but this is not finalised.

See also IAP_TA6_Securing Cost Efficiency_CE.A3 within SRN.CE.A3, about the proposed [REDACTED] plant at [REDACTED], where we refer to this agreement, and have supplied a copy in our supporting information. Both [REDACTED] and [REDACTED] are important components of our plans to re-dress the supply and demand deficit in West Hampshire.

The proposed model

Under the [REDACTED] project PW are proposing to build a new reservoir, connected to their water supply network, that would be used to create headroom that would allow the provision of increased bulk supplies to Southern Water. Both SW and PW are working collaboratively towards the development of a long term solution that will protect customers and ensure a resilient water supply in the South East. From a Southern Water perspective we see two elements to this project:

1. Construction of the new [REDACTED] Reservoir; and
2. Agreeing the costs and terms of the long term agreement, potentially a bulk supply agreement (BSA)

PW are proposing to finance, design, build, test, commission, operate and maintain the [REDACTED] Winter Storage Reservoir (and certain other associated infrastructure). These costs, for both the construction of the reservoir, and the BSA proposed by PW, will be reflected in the charges payable by SW to PW. It is agreed, at this moment in time, between both parties that the benefits of more resilient supply under drought conditions will accrue in the great majority to Southern Water customers, not PW’s customers.

The proposed commercial model is that the charging arrangements will use the existing regulatory building block approach to determine the pricing that SW will pay to PW, and will use the existing totex cost sharing mechanisms to share cost risks between SW customers and PW investors.

PW will separately account for all the costs of the project on its RCV (or if not the actual RCV some equivalent, e.g. a “shadow RCV”), and SW will pay based on a charge for return on capital, a charge for depreciation / amortisation, and a volumetric charge to cover opex and maintenance. The payment from SW to PW will be deducted from the revenue allowance calculation in PW’s final determination.

SW will apply to Ofwat to have a matching amount included in its final determination, so that revenue is collected from our customers and passed to PW. The agreement will provide for an operating agreement whereby SW will be entitled to a bulk supply of 30M/l day in pre-defined circumstances, so that the great majority of the benefits are received by our customers. At this stage the proposed structure is indicative as the commercial discussions will be progressing beyond 1 April 2019.

The indicative project terms

It is proposed that charges will be split in to a Capacity Charge (reflecting all development, capital, finance and other costs related to the reservoir) and a Volumetric Charge (payable based on the incremental cost per m³ supplied) for water from the point of bulk supply. The charging regime is being developed to protect and prioritise the interests of the customers of both PW and SWS. In particular the proposed charging regime will:

- Protect PW customers from expenditure on [REDACTED] as we are seeking an agreement with PW and matching determinations. Revenues received by PW will be netted off PW's wholesale revenue, and an equivalent amount will be collected by SW from our customers to cover the payment;
- Protect SW customers from inefficiency, by mirroring the outcomes of the usual key regulatory building blocks as a feature of the charging structure. Those costs that Ofwat deems to be efficient in respect of the reservoir will be the costs passed through to SW customers via the Capacity Charge. The Volumetric Charge will similarly be based on incremental costs of operation and supply, with SW customers paying only those costs strictly related to operation and supply of water via the reservoir;
- Share risk appropriately, by mirroring existing regulatory mechanics such as the totex cost sharing incentive within the charging structure, while the reservoir is under construction, providing incentives for PW to build on time and on budget.

Heads of Terms

SW and PW are working on draft heads of terms of agreement, which will become the basis for the long-term project structure. At the time of submission of the IAP response, the Heads of Terms are still subject to negotiation and legal agreement, so all the contents of this response are subject to negotiation, and legal review. Nevertheless it is expected the Heads of Terms will cover the following key areas:

- **Duration:** The current proposal by PW is that SW will enter into the project for 80 years. This has benefits for both sets of customers, however over such a long period changes in circumstances will necessitate a mechanism to allow for potential future flexibility.
- **Commencement:** In order to fund construction PW would like to receive charges from 1 April 2020. The commencement of water supply is planned to be April 2029, subject to agreement.
- **Ownership and operation:** PW will own and operate the reservoir, and will manage bulk transfers of water to SW.
- **Compensation:** Compensation for SW will apply, most likely in the form of liquidated damages, in the event that water is not supplied in accordance with the agreement after April 2029. There will be compensation on termination for PW in the event the project is cancelled for reasons not in their control, so that financing can be procured by PW on an efficient basis.
- **Water Supply:** It is proposed that water will be transferred between the networks of PW and SW, at a point or points of interconnection in the west of PW's region, nearest to SW's centres of population and demand. The medium to long term reservation of water and day to day management of water flows will be covered by an operating agreement.

Protecting our customers in the long term

There are multiple provisions in the proposed commercial agreement that will protect our customers in the long term, ensuring that the project will represent value for money for them, and that suitable remedies are available in the event of inefficient delivery or operation.

This is in addition to the primary purpose of the project, which is to protect the resilience of our customers' water supply, particularly during times of scarcity and drought.

- **Duration:** a long-term contract will reduce the annual size of the capacity charge, and hence minimise the annual impact on bills. It will provide drought benefits in the long term, and we will seek options for renewal on expiry. It is intended that the element of the capacity charge attributable to amortisation of the RCV will reduce the value of the RCV to zero over the life of the contract, meaning there is no residual asset value for Southern Water customers to pay.
- **Financing:** the project structure will allow for the construction costs to be funded at efficient rates.
- **Cost efficiency:** the proposal is that PW will use NEC contracts to share pain/gain with their contractors. The remaining PW share would be allocated “50/50” between their investors and our customers as per the current wholesale totex menu framework.
- **Delay:** there will be financial incentives for PW to complete delivery of the reservoir and bulk supply in time for us to meet our legal agreement with the EA (*IAP_TA11_CE_Agreement with EA on abstraction reductions*).
- **In service – availability / performance:** we will seek to specify a mechanism where PW is incentivised to operate the bulk supply effectively, and maximise the availability of water, particularly in a drought, once the reservoir is built.
- **Resilience:** we will interconnect with PW’s network, not directly with the reservoir. While the reservoir is necessary to create sufficient headroom in PW’s network to enable them to trade water with us, there are multiple sources connected to their network and we would not be entirely dependent on the availability or capacity of the reservoir alone to fulfil the bulk supply. We are asking PW to design the reservoir and associated interconnection to be resilient in a 1 in 200 year drought, and we have asked them to understand and share with us availability in a 1 in 500 year drought.
- **Matching ODIs:** when we have more certainty over the costs and the proposed delivery model, we will introduce ODIs to protect our customers that match as closely as practicable the terms of payments in the commercial agreement. For instance, in the event the project is delayed and SW received payments we would expect the ODI to pass these on to customers. In the event of non-delivery of the reservoir, or the performance of the reservoir to less than its design standards, we would similarly expect an ODI to pass the appropriate share of these payments to customers.

Next steps

Discussions with PW continue on the project structure. We will update Ofwat between submission of the IAP response and draft determinations in July, and again between draft and final determinations. We will also update Ofwat on request.

Our aim is to deliver a resilient water supply that is currently almost 30% cheaper than the next available alternative. In order to protect our customers, given the complexity of this project resulting from our being a customer to PW, we would seek to agree with Ofwat a project structure that allowed for PW’s efficient costs to be reflected in our customers’ bills. We are seeking to achieve a structure that puts no customers at any disadvantage versus the counterfactual situation that we would be undertaking this project for ourselves. The clear advantage of this structure is the ability of the project to meet our customers’ needs within our timeframe and cost efficiency.

4.SRN.CMI.A4

Ofwat action	How we have responded
The company should update its bid assessment framework document to provide greater clarity on the process for appeals and explain how the process ensure that there is no bias in the assessment.	Plan updated

Our detailed response

We have updated the Bid Assessment Framework (please see supporting information *IAP_TA11_Targets, controls, markets and innovation_4 Water Resources Bid Assessment Framework*) to explain the process for appeals and to ensure there is no bias in the assessment.

5.SRN.CMI.A5

Ofwat action	How we have responded
<p>A summary of the key elements of the Peacehaven Indirect Potable Water Reuse scheme. This should include all of the relevant scheme information including but not limited to the key deliverables.</p> <p>A summary of the projected scheme costs clearly identifying the costs for each phase of the scheme by year. These should clearly identify the incremental costs to Southern Water.</p> <p>An economic analysis of the scheme including a Net Present Value analysis using the standardised assumptions provided in Table A. This analysis should clearly identify any additional benefit to customers of progressing this scheme outside of DPC.</p>	<p>Further information provided</p>

Our detailed response

As requested, we are providing a summary of Peacehaven Indirect Potable Water Reuse scheme, forecast costs, and an economic analysis of the Value for Money (VfM) of delivering this scheme through DPC. We have included full details on this assessment and other supporting information in an additional document *IAP_Ta11_Targets, controls, markets and innovation_DPC additional evidence*.

Note that this scheme is currently in our Water Resource Management Plan (WRMP) as a strategic alternative and where specific costs and years are referenced, those reflect respectively our best current estimate of those costs and the years in which the scheme was originally scheduled for delivery.

Summary of key elements of the scheme:

- This was a joint scheme with South East Water which we proposed in our draft WRMP
- The aim was to recycle effluent from the Peacehaven Waste Water Treatment Works (WwTW) which has recently been completed. The most appropriate reuse scheme would be to the non-tidal [REDACTED] (approximately 16km inland).
- The scheme would function through construction of a new Water Supply Works (WSW) or upgrade of an existing WSW along the non-tidal [REDACTED] supported by the discharge of recycled wastewater from Peacehaven WwTW. The new WSW or upgraded SEW [REDACTED] WSW would then supply potable water to either the Sussex North WRZ or the Sussex Brighton WRZ.
- 20 Ml/d would be used by Southern Water, 30 ML/d by South East Water (SEW)
- Multiple variants of this scheme were considered in the optioneering phase. We have described the selected variant below
- Scheme includes:
 - Tertiary treatment / polishing at Peacehaven WwTW
 - Pipeline to near [REDACTED] WSW
 - Upgrade [REDACTED] WSW (South East Water)
 - Pipeline from [REDACTED] to support Sussex North or Sussex Brighton Water Resource Zones (WRZs)
- This scheme was included in our draft WRMP but removed in the final WRMP:
 - After making our water efficiency targets more aggressive, we no longer have a driver for the scheme
- SEW has likewise indicated that they do not need the scheme any more after incorporating more ambitious leakage and water efficiency targets however they have incorporated it as a strategic alternative to Arlington Reservoir. For more details see SEW’s Statement of Response.

- The scheme was part of our draft WRMP, however due to a reduction in supply demand/challenge in our Central Area and South East Waters (SEW) Resource Zone 2, this effectively removed the need for the scheme in AMP7 and potentially AMP8. It was subsequently removed from our revised WRMP (and from the SEW WRMP) as there are more cost effective schemes which meet the reduced supply/demand deficit (details of the economic modelling behind this can be found in Annex 9 of the Revised Draft WRMP - <https://www.southernwater.co.uk/media/1317/annex-9-strategy-for-the-western-area.pdf>).
- We may need this scheme in future periods, especially if [REDACTED] is not possible. We have provided a Value for Money assessment for the scheme in line with Ofwat’s request.
- The original scheme was likely to impact Lewes Downs Special Areas of Conservation (SAC), several Sites of Special Scientific Interest (SSSI), visual amenity of South Downs national park and several irreplaceable habitats
- Since the draft WRMP19 and representations made by Natural England, the treated water pipeline route for Peacehaven WwTW indirect potable reuse option has been reviewed and completely re-routed to avoid impacting receptors including the Lewes Downs SAC, irreplaceable priority habitats, visual amenity of the South Downs National Park, Clayton to Offham Escarpment SSSI.
- As a result of this significant change to the pipeline route, the identified environmental effects of the pipeline component of the scheme have substantially reduced although there is still some pipeline construction required further east within the South Downs National Park which we cannot avoid. However, the revised scheme will ensure there is only one construction corridor required within the South Downs National Park, thereby minimising impacts.
- Additionally, there is some uncertainty surrounding the operational effect of increased flows on aquatic ecology in the water body receiving the highly treated effluent from the Peacehaven WwTW scheme, with the potential risk of Water Framework Directive (WFD) status deterioration. If this alternative scheme was required to be developed, further investigations would be required to assess these potential impacts in more detail, and if necessary develop appropriate mitigation measures if a WFD status deterioration risk was confirmed.

Projected scheme costs:

- Our projection for the scheme capex costs is shown below in *CM1.A5.Table 1 – Peacehaven projected capital costs*. Note that the timeline here reflects the original timing for AMP7 delivery from our dWRMP. The scheme is not currently in our AMP7 plan but we have retained it as a strategic alternative to be considered for later periods.

CM1.A5.Table 1 – Peacehaven projected capital costs

Year	20/21	21/22	22/23	23/24	24/25	25/26	26/27	Total
Period	AMP7					AMP8		
Activity	Surveys, outline design, consents				Construction			
Construction year	1	2	3	4	5	6	7	
Capex (D&B) 17/18 (£m)	5	5	5	5	26	26	26	96

* Figures are rounded to the nearest £m

We forecast the following costs for replacing life expired elements (lifecycle capex / LCC) over the first 25 years in *CM1.A5.Table 2 – Peacehaven projected lifecycle capex cost (LCC)* below.



CMI.A5.Table 2 – Peacehaven projected lifecycle capex costs (LCC)

Year post construction	LCC expenditure forecast (£m)
10	0.185
15	2.553
20	33.652

We forecast an annual fixed opex of £0.304m and a variable opex of £0.086m per % of utilisation. Our central forecast is that this resilience scheme will be utilised at an average of 5% over its lifetime and we have therefore forecast an annual variable opex cost of £0.431m.

This information is summarised below in *CMI.A5.Table 3 – Peacehaven projected whole life costs (WLC)*.

CMI.A5.Table 3 – Peacehaven projected whole life costs (WLC)

Capex (£m)	Fixed annual opex (£m)	Utilisation (lifetime average) (%)	Variable annual opex (£m)	LCC to 25 years (£m)	WLC (£m)
96	0.304	5	0.431	36	159*

* Undiscounted basis

Value for Money assessment using Ofwat standard assumptions:

We have conducted a Value for Money assessment using the standard assumption ranges given by Ofwat to Southern Water in Table A [HV1] (Page 4) of its IAP detailed actions for Direct Procurement for Customers <https://www.ofwat.gov.uk/wp-content/uploads/2019/01/Southern-Water-Direct-procurement-for-customers-detailed-actions.pdf>. The NPV to customers is shown below. For more details on how our model was constructed, how we derived the benchmark cost of debt, and a review of how we carried out the technical assessment, please see the attached document (*IAP_Ta11_ Targets, controls, markets and innovation_DPC additional evidence*)

We evaluated two delivery options for Peacehaven:

- A Late DPC
- A Design & Build (D&B) – our main counterfactual

We will continue to evaluate variations on these (as we have done for [REDACTED]) to determine an optimum delivery strategy.

CMI.A5.Table 4 – Peacehaven delivery options NPVs below shows that, based on current analysis, the D&B option is not more cost effective than the DPC baseline and therefore we cannot reject this scheme as a DPC candidate.

CMI.A5.Table 4 – Peacehaven delivery options NPVs

Customer NPV	Central case (£m)	Relative to DPC Late baseline (%)
DPC – Late	89	
Design & Build	92	+3

For more information on how we have undertaken this analysis, derivation of key assumptions, customer bill impact, and sensitivity testing of the key assumptions, please see the attached document (*IAP_Ta11_Targets, controls, markets and innovation_DPC additional evidence*)

There are variations of this scheme which are technically suitable for DPC and if those variations are selected for delivery then the scheme is a candidate for DPC.

6.SRN.CMI.A6

Ofwat action	How we have responded
<p>A summary of the key elements of the [redacted] Industrial Reuse scheme. This should include all of the relevant scheme information including but not limited to the key deliverables.</p> <p>A summary of the projected scheme costs clearly identifying the costs for each phase of the scheme by year. These should clearly identify the incremental costs to Southern Water.</p> <p>An economic analysis of the scheme including a Net Present Value analysis using the standardised assumptions provided in Table A. This analysis should clearly identify any additional benefit to customers of progressing this scheme outside of DPC.</p>	<p>Further information provided</p>

Our detailed response

As requested, we are providing a summary of [redacted] Industrial Reuse scheme, forecast costs, and an economic analysis of the Value for Money (VfM) of delivering this scheme through DPC. We have included full details on this assessment and other supporting information in an additional document *IAP_Ta11_ Targets, controls, markets and innovation_DPC additional evidence*.

Note that this scheme is currently in our WRMP as a strategic alternative and where specific costs and years are referenced, those reflect respectively our best current estimate of those costs and the years in which the scheme was originally scheduled for delivery.

Summary of key elements of the scheme:

- [redacted] Marchwood WwTW has a Dry Weather Flow (DWF) of c.13MI/d in a dry year (2011). This option proposes tertiary treatment of 9MI/d wastewater to a standard suitable for industrial use at [redacted]. This would free up supply from [redacted] Surface Water that would otherwise be required to be available.
- Scheme components
 - Additional tertiary treatment
 - Pipeline + pumps to [redacted]
 - [redacted] will do demineralisation at their end (not part of our scheme)
- The option was part of our draft WRMP, however after further modelling, a slightly larger [redacted] plant at [redacted] was found to be more cost-effective and offered better value to customers. It was subsequently removed from our revised WRMP (details of the economic modelling behind this can be found in Annex 9 of the Revised Draft WRMP - <https://www.southernwater.co.uk/media/1317/annex-9-strategy-for-the-western-area.pdf>). However we are continuing to pursue this option as a strategic alternative to [redacted].

Projected scheme costs:

Our projection for the scheme capex costs is shown below in table *CMI.A6.Table 1– [redacted] projected capital costs*.

Note that the timeline here reflects the original timing for delivery from our WRMP. The scheme is not currently in our AMP6 or AMP7 plans but we have retained it as a strategic alternative, to [redacted].

CMI.A6.Table 1 – [REDACTED] projected capital costs

Year	19/20	20/21	21/22	22/23	23/24	24/25	Total
Period	AMP 6	AMP 7					
Activity	Surveys, outline design, consents			Construction			
Construction year	1	2	3	4	5		
Capex (D&B) 17/18 (£m)	2	2	2	15	15		37

* Figures are rounded to the nearest £m

We forecast the following costs for replacing life expired elements (lifecycle capex) over the first 25 years in CMI.A6.Table 2 – [REDACTED] projected lifecycle capital costs.

CMI.A6.Table 2 – [REDACTED] projected lifecycle capital costs

Year post construction	LCC expenditure forecast (£m)
10	0.380
15	1.027
20	11.683

We forecast an annual fixed opex of £0.228m and a variable opex of £0.011m per % of utilisation. Our central forecast is that this scheme will be utilised at approximately 100% of its design capacity over its lifetime and we have therefore forecast an annual variable opex cost of £1.054m.

This information is summarised below in CMI.A6.Table 3 – [REDACTED] projected whole life costs.

CMI.A6.Table 3 – [REDACTED] projected whole life costs

Capex (£m)	Fixed annual opex (£m)	Utilisation (lifetime average) (%)	Variable annual opex (£m)	LCC to 25 years (£m)	WLC (£m)
37	0.228	100	1.054	14	83

* Undiscounted basis

Value for Money assessment using Ofwat standard assumptions:

We have conducted a Value for Money assessment using the standard assumption ranges given by Ofwat in table A of its IAP detailed actions for DPC. The NPV to customers is shown below. For more details on how our model was constructed, how we derived the benchmark cost of debt, and a review of how we carried out the technical assessment, please see the attached document (*IAP_Ta11_ Targets, controls, markets and innovation_DPC additional evidence*)

We evaluated two delivery options for [REDACTED]

- A Late DPC
- A Design & Build (our main counterfactual)

We will continue to evaluate variations on these (as we have done for [REDACTED]) to determine an optimum delivery strategy.

CMI.A6.Table 4 – [REDACTED] delivery options NPVs below shows that the D&B option is not more cost effective than the DPC baseline and therefore we cannot reject this scheme as a DPC candidate.

CMI.A6.Table 4 – [REDACTED] delivery options NPVs

Customer NPV	Central case (£m)	Relative to DPC Late baseline (%)
DPC - Late	55	-
Design & Build	57	+2

For more information on how we have done this analysis, derivation of key assumptions, customer bill impact, and sensitivity testing of the key assumptions, please see the supporting document (*IAP_Ta11_Targets, controls, markets and innovation_DPC additional evidence*)

Our view is that due to the small size of this project it may not be suitable for DPC but we are continuing to review both DPC and other non-traditional delivery options for this scheme.

7.SRN.CMI.A7

Ofwat action	How we have responded
<p>A summary of the key elements of the Inter-zone transfers (Hampshire) scheme proposed for AMP7 and AMP8. This should include all of the relevant scheme information including but not limited to the key deliverable.</p> <p>A summary of the projected scheme costs clearly identifying the costs for each phase of the scheme by year. These should clearly identify the incremental costs to Southern Water.</p> <p>An economic analysis of the scheme including a Net Present Value analysis using the standardised assumptions provided in Table A. This analysis should clearly identify any additional benefit to customers of progressing this scheme outside of DPC.</p>	<p>Further information provided</p>

Our detailed response

As requested, we are providing a summary of the Inter-zone transfers (Hampshire) scheme and forecast costs. As discussed with Ofwat, we have revisited our technical separability analysis of this scheme and provided additional information as to why it is not technically suitable for DPC. As agreed with Ofwat, we are therefore not providing a VfM analysis of this scheme.

Note that after discussions with Ofwat we have agreed that we do not need to supply a VfM analysis for the Hampshire Grid transfers scheme

We have included full details on this assessment and other supporting information in an additional document *IAP_Ta11_ Targets, controls, markets and innovation_DPC additional evidence*.

Summary of key elements of the scheme:

- The Hampshire Grid has two key components:
 - ██████████ plant (see *IAP_TA5_ Targets, Controls, Markets and Innovation_CMI.A8*)
 - A complex set of additional transfer pipes between our existing WSWs, reservoirs, neighboring water supply companies, and consumers
- No individual transfer pipeline is at or near the £100m threshold and a single small pipeline is unlikely to be efficiently operable by a CAP so we have selected a subset of pipelines scheduled to be constructed at around the same time which may be a candidate for DPC.
- These are:
 - The Southampton Link Main (Testwood to Otterbourne via ██████████)
 - Otterbourne to ██████████/Andover (via ██████████)
- Cost also includes blending tanks, control systems, and pumps on existing Southern Water sites
- These schemes are scheduled for AMP7/8 delivery
- If DPC was found to be suitable for these schemes then other pipeline upgrade schemes could potentially also be included into the DPC

A diagram in the attached document (*AP_Ta11_ Targets, controls, markets and innovation_DPC additional evidence*) shows the overall grid scheme in the context of existing assets, highlighting the selected grid components.

Projected scheme costs:

Our projection for the scheme capex costs is shown below in CMI.A7.Table 1.

CMI.A7.Table 1 – Hampshire Grid projected capital costs

We forecast the following costs for replacing life expired elements (lifecycle capex) over the first 25 years in CMI.A7.Table 2 – Hampshire Grid projected lifecycle capital costs (LCC) below.

CMI.A7.Table 2 – Hampshire Grid projected lifecycle capital costs (LCC)

Year post construction	LCC expenditure forecast (£m)
10	N/A
15	2.858
20	13.3

We forecast an annual fixed opex of £0.447m and a variable opex of £0.025m per % of utilisation. Our central forecast is that this resilience scheme will be utilised at approximately 5% of its design capacity over its lifetime and we have therefore forecast an annual variable opex cost of £0.128m.

This information is summarised below in *CMI.A7.Table 3 – Hampshire Grid whole life costs*.

CMI.A7.Table 3 – Hampshire Grid whole life costs

	£m	£m	£m	£m	£m	£m
£m						
£m						
£m						
£m						

Value for Money assessment using Ofwat standard assumptions:

At IAP Ofwat indicated that we had not provided sufficient evidence to reject this scheme as a DPC candidate and asked us to supply additional information on the scheme and to carry out a VfM calculation using their standard assumptions.

We revisited our technical assessment of this scheme and have supplied detailed and comprehensive additional information on how we carried out our technical assessment. We have confirmed our previous decision that while long distance, discrete water transfer schemes may well be suitable for DPC, this is not such a scheme and it would not be a good candidate for DPC.

At a series of bi-lateral meetings with Ofwat, we shared this evidence and reached an agreement that we would not need to carry out a VfM analysis of this scheme.

For more details on our technical assessment, see the attached document (*IAP_Ta11_ Targets, controls, markets and innovation_DPC additional evidence*).

8.SRN.CMI.A8

Ofwat action	How we have responded
<p>A summary of the key elements of the [REDACTED] plant proposed for AMP7 and AMP8. This should include all of the relevant scheme information including but not limited to the key deliverables.</p> <p>A summary of the projected scheme costs clearly identifying the costs for each phase of the scheme by year. These should clearly identify the incremental costs to Southern Water.</p> <p>An economic analysis of the scheme including a Net Present Value analysis using the standardised assumptions provided in Table A. This analysis should clearly identify any additional benefit to customers of progressing this scheme outside of DPC.</p>	<p>Further information provided</p>

Our detailed response

As requested, we are providing a summary of the [REDACTED] plant scheme, forecast costs, and an economic analysis of the Value for Money (VfM) of delivering this scheme through DPC. We have included full details on this assessment and other supporting information in an additional document *IAP_Ta11_Tar* *Targets, controls, markets and innovation_DPC additional evidence*.

Note that this scheme is currently not in our PR19 plan while we consider options for meeting out statutory requirements less expensively and where specific costs and years are referenced, those reflect respectively our best current estimate of those costs and the years in which the scheme was originally scheduled for delivery.

Summary of key elements of the scheme:

- [REDACTED] would be a sea water reverse osmosis [REDACTED] plant with an initial design output of 75 MI/day, potentially upgradeable to a larger capacity at a later point should this become necessary
- The plant is required for resilience and is not expected to operate at full capacity during non-drought conditions
- The scheme would also include water mineralisation and other water treatment to produce drinking water and pipelines to the Isle of Wight, to the nearby [REDACTED] refinery, and to Testwood WSW
- We decided on a [REDACTED] plant after excluding other options for addressing the drought condition supply deficit we will face in Hampshire after our abstraction from sensitive chalk streams reduces in 2027
- Other schemes we have considered, some of which might deliver water more cheaply, will not be ready for 2027
- Strategic regional solution development – Ofwat have identified from the plans that at least one strategic supply solution is required over the next 5-15 years to secure drought resilience in the south-east. The strategic regional solution development allocation is to allow the delivery of consistent and transparent investigations, planning and development of strategic options with the overall aim of optimum solutions being construction ready by 2025. The company's allocation is made on the basis of having clear deliverables and customer protection for the gated delivery of the development of [REDACTED] **reservoir, a regional transfer from Thames Water, and [REDACTED] / local transfer schemes.**
- **Our abstraction license changes are now in place and are effective immediately:** On 25th February 2019 we received revised abstraction licenses from the EA, giving effect to substantial sustainability reductions. The revised licenses impact our ability to abstract water in drought conditions from the rivers [REDACTED] and [REDACTED]. Both of these rivers are critical to the supply of water for our customers in the West Hampshire area including Southampton, Winchester and Andover.

- We will have an increased dependence on drought permits and drought orders until long term solutions are implemented
- As a result of the 2018 public enquiry on the abstraction reductions, we have a **legally binding agreement with the EA** in which we undertake not to require the [REDACTED] and [REDACTED] Surface Water Drought Orders or permit after 2027 and only to require the [REDACTED] Surface Water Drought Order or Permit after 2027 in 1:500 year drought scenarios.
- **We accept the issues identified in the IAP** on the need to identify the right strategic water resource solutions in the south east, while we and all other companies have statutory obligations under the WRMP. We will fully participate in the collaboration with 5 other companies, and other third parties as appropriate, and will use common approaches to identifying options, applying the proposed gateway process, and any mechanisms that result to provide development funding on an individual company or joint company basis.
- Ofwat’s wording in its IAP reports directed to each company was that, having been through a commonly agreed gateway process, the preferred solutions would be “**construction ready by 2025**”. However, as a result of the binding nature of our agreement with the EA to remove the need for drought permits and orders by 2027, we have no choice but to go faster than this. We need one or more solutions that are ready to deliver water by April 2027, and we consider it very unlikely that significant new assets could be built and commissioned in the time between the start of AMP8 and our deadline.
- In addition, our understanding of the timing of the [REDACTED] reservoir development is that there is no possibility that it would be available in time to help meet our deadline.
- **We need to be construction ready by 2023** and have developed plans to be ready using either a DCO (Development Consent Order) or a non-DCO approach
- Regional alternatives:
 - Since receiving the feedback on the IAP on 31 January 2019, we have written to the five other companies (Thames, Anglian, Severn Trent, United Utilities, Affinity) submitting a joint response to see if they could identify one or more alternatives to [REDACTED] covering both supply and demand that could be in place within our timeframe. We asked for responses prior to 1 April if possible.
 - We have received responses from several companies. In the event that these requests for information identify alternatives that could be viable, it is our intention to use the process created by the group of six companies to establish it (or them) as alternatives to [REDACTED] as currently identified in the collaborative model.
 - We have also written to all our neighbours with a similar request, to see if they could supply water that would meet the same needs and to the same timeframe as the proposed [REDACTED] plant. These companies are: South West (including Bournemouth Water), Wessex, Portsmouth, Sutton and East Surrey, and South East. We have also written to an organisation that is not a water undertaker, that wishes to remain anonymous for now. We may extend the request to other groups and stakeholders that are not water undertakers.
 - For more details see *IAP_TA5_Targets, controls, markets and innovation_CMI.A3*
- In addition to reviewing additional demand management options and engaging with neighbouring water companies, we are considering a number of strategic alternatives to [REDACTED]:
 - [REDACTED] (IOW) [REDACTED]
 - [REDACTED] Water Reuse
 - [REDACTED] Water Reuse
 - [REDACTED] Water Reuse
 - [REDACTED] Reuse
- We would need a combination of multiple schemes to meet the 75MI/day that would be produced by [REDACTED]

Projected scheme costs:

Our projection for the scheme capex costs is shown below.

CMI.A8.Table 1 – [REDACTED] projected capital costs

[REDACTED]								
[REDACTED]	[REDACTED]					[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]					[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]								
[REDACTED]								

We forecast the following costs for replacing life expired elements (lifecycle capex) over the first 25 years:

2.5% annually of the net direct works value (value of the capex constructed not including, design, overhead, etc.) of the M&E components which is £1.745m and 0.5% of the civils components which is £0.277m

We forecast an annual fixed opex of £0.767m and a variable opex of £0.185m per % of utilisation. Our central forecast is that this resilience scheme will be utilised at a 20% “minimum sweetening flow” of its design capacity over its lifetime and we have therefore forecast a lifetime variable opex cost of £3.7m.

This information is summarised below.

CMI.A8.Table 2 – [REDACTED] whole life costs

[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]

Value for Money assessment using Ofwat standard assumptions:

We have conducted a Value for Money assessment using the standard assumption ranges given by Ofwat in table A of its IAP detailed actions for DPC and the assumptions derived from our market engagement exercise. The NPV to customers is shown below. For more details on how our model was constructed, how we derived the benchmark cost of debt, and a review of how we carried out the technical assessment, please see the attached document (document *IAP_Ta11_ Targets, controls, markets and innovation_DPC additional evidence*).

We evaluated four delivery options for [REDACTED]:

- A Late DPC
- An Early(ish) DPC



- A Design & Build (our main counterfactual)
- A Design, Build, & Operate

The table below shows that the most cost beneficial options for our customers were the DPC options.

The most cost beneficial option is the early(ish) variant of DPC. Note that there was some reluctance from our RFI respondents to take on development risk which is why we have tested an earlyish variant, however this may also prove unacceptable to suppliers. We will continue to refine our DPC delivery model for [REDACTED] to find the right risk balance

CMI.A8.Table 3 – [REDACTED] delivery options NPVs

Customer NPV	Central case (£m)	Relative to DPC Late baseline (%)
DPC - Late	237	-
DPC – Early(ish)	224	-5
Design & Build	272	+13
Design, Build, & Operate	262	+11

For more information on how we have done this analysis, derivation of key assumptions, sensitivity testing of the key assumptions, and management considerations for [REDACTED] please see the attached document (*IAP_Ta11_ Targets, controls, markets and innovation_DPC additional evidence*)

We carried out a market engagement exercise and found ample market interest to deliver [REDACTED] as a DPC project.

Based on the evidence available to us, our current position is that [REDACTED] is a good candidate for DPC.

One remaining concern is that, in optimising our water resources investment programme, we reduced the initial design capacity of [REDACTED] from 100MI/d to 75 MI/d with the intention of specifying a readily upgradeable design. This would give us the option of increasing capacity to 100 MI/d or beyond if needed in the future for a moderate incremental cost. Initial indications are that this is easy if the option is in the first few years of the operational phase of the contract and becomes increasingly more challenging the further in the future the expansion is required up until the point where the contract expires when it is contractually simple as the upgrade works could be carried out as part of a new DPC contract. We are continuing to consider this issue.

In response to Ofwat challenges, we have removed [REDACTED] from our AMP7 plan while we consult with neighbouring water companies to determine if they have a cheaper way to supply us with the necessary capacity by 2027 which is the point at which we are legally obligated to reduce our abstractions from a number of chalk streams in Hampshire.

9.SRN.CMI.A9

Ofwat action	How we have responded
The company should explain how it will work together with neighbouring companies to explore strategic water resource options and knowledge sharing on demand-side measures.	Further information provided

Our detailed response

Summary

We propose a ‘four-point’ approach which will ensure close collaborative working with neighbouring companies and significantly improved inter-regional co-operation:

1. Building a framework to **review strategic water resources options** identified in the IAP process with Thames Water, Affinity, and Anglian Water to align with Ofwat’s proposed gateway approach. This will also engage all the Water Only Companies (WOCs) in our region. This is referred to below as the Strategic Water Resources Group.
2. Building a framework to **share/transfer knowledge** between companies with an emphasis on Demand Management.
3. Developing **Regional Resilience Plans**, which will include co-ordinating the development of the south east Regional Resilience Plan and ensuring a single unified approach agreed by all companies in the south-east
4. Developing the **capability, usability and visibility of the water resource market** in the South East, which will include engaging customers, major industries and the agricultural sectors.

We are currently in the process of sharing this approach with the Water Resources South East (WRSE) group, Anglian Water, United Utilities, Severn Trent, major industries and agricultural users.

Each point of the approach and associated timescales are described in more detail below:

Strategic Water Resources Group

In order to build a strategic framework for water resources in the south-east we have co-ordinated with Thames Water, Affinity, United Utilities, Severn Trent and Anglian Water with support from WRSE to establish the following development programme:

- First formal meeting to agree forward programme **(March 2019) - Complete.**
- Setup joint working groups for the individual schemes each with clear Terms of Reference (TOR) regarding how decisions will be made within and between these groups **(March 2019) - Complete.**
- Agree a gated process, the deliverables, timings and expenditure allocations at each gate. **(March 2019) - Complete.**
- Develop ODI-type mechanisms to allow allocated funding to be recovered by customers in the event of the scheme not progressing through each gate and for the non-delivery or late delivery of outputs - agreed in principle **(March 2019) – Complete.**

For further details of the above actions please refer to *IAP_TA6_Securing Cost Efficiency_CE.A3*.

We have a particular challenge in our Western Area, whereby the changes to our abstraction licences on the [REDACTED] and the [REDACTED] (as confirmed by the Secretary of State on 25 February) would result in a significant supply-demand deficit during a severe drought of approximately 188 MI/d. The outcome of the Public Inquiry in March 2018 was a Section 20 Agreement between Southern Water and the Environment Agency (EA), whereby we have a commitment to implement a 'Long-term Water Resources scheme' as set out in our WRMP in order to resolve the deficit by 2027.

The timescales as proposed for the gated process are unlikely to facilitate a solution which meets this need, and therefore we are undertaking the following additional actions:

- We issued a Request For Information (RFI) to all neighbouring Water Companies (including Water Only Companies) requesting potential alternative sources of supply which could fulfil the following criteria:
 - >20 MI/d available in a 1 in 200 year drought.
 - Could be construction complete by September 2026 (then allowing a 6 month period for commissioning and programme float).
 - Are not already in our Water Resource Management Plan 2019.
 - Are not currently subject to any form of sustainability reduction investigation through WINEP or other statutory mechanism.

RFI responses were received by **(April 2019) - Complete.**

- Undertake revised water resource and network hydraulic modelling based on RFI responses and present back the options to the Strategic Water Resources Group. This will include a full review of options previously considered in the Revised Draft WRMP and all RFI alternative sources of supply. A preferred set of options will be proposed and reviewed as per the groups agreed TOR **(June 2019)**.
- Formally review the revised options to meet the needs imposed by the Section 20 Agreement and consider for gateway approval **(July 2019)**. This will include a high-level cost loaded construction programme for the Western Area including all options. This will provide important context for the OFWAT Draft Determination.

It is proposed that future governance for the revised set of schemes is agreed in July 2019 once the gateway decisions have been made and compliance with the March 2027 deadline is assured.

Knowledge Sharing Framework

Our proposal is for a series of quarterly workshops and symposia, to share latest thinking on topics such as leakage reduction, water efficiency, metering, water trading, and new water resources. This would be co-ordinated by Water Resource South East (WRSE) and would also include jointly funded research & development programmes approved on an annual basis. The key enabling steps are set out below:

- Initial invitation to:
 - All south-east water companies
 - Representatives from other regional groups
 - OFWAT
 - Environment Agency
 - Consumer Council for Water
 - Academic institutions
 - Subject Matter Experts from consultancy and contractors

Initial meeting facilitated by WRSE, to set out terms of reference for the Framework and agree dates for Framework Development Workshops (**April 2019**). This workstream includes:

- Catchment
 - Competition and markets
 - Demand and forecast
 - Drought
 - Leakage
 - Modelling
 - Options (including transfers and water trading)
 - Resilience
 - Water efficiency
 - Innovation
- Framework Development Workshops: Agree research/knowledge sub-group composition and leadership. Once research sub-groups are agreed, all parties to propose and agree research topics for next quarter. Also agree common training and knowledge transfer sessions for next quarter (**July 2019**).
 - Report and recommendations from Framework Development Workshops issued in advance of review with WRSE and key stakeholders (**August 2019**).
 - Meeting facilitated by WRSE to agree Framework Programme for AMP7 and sign-off of proposals from the Framework Development Workshops (**September 2019**).
 - First quarterly review meeting (**December 2019**).
 - End of year report prepared and issued to stakeholders. This will summarise the output of the research from the previous year including any regionally scalable benefits and a summary of training programmes delivered. Crucially, it will also review regional progress against the long term demand management target (**February 2020**).
 - End of Year review meeting (**April 2020**) with full review of progress against the Year 5 milestones. The above cycle then repeats for Year 2.

Regional Resilience Plans

We will work together, through the WRSE regional group, to co-ordinate the development of the next set of options required for the Regional Resilience Plan, WRMP24 and the next Business Plan submission.

The regional group will co-ordinate the working groups for each of the strategic options and develop a series of methodologies to ensure that all the schemes are priced to the same level of detail.

The regional group will produce an integrated timetable (by July 2019) for developing the next plans including when statements of need will be published; when the first round of the regional modelling will be produced; when regional plans will be published and when company specific plans will be produced and consulted on.

The delivery plans will also be developed to the same level of detail so that the specific environmental and planning application issues for each plan can meet the expected Ofwat proposed gateway process.

An initial programme for these activities is set out below:

- **December 2020:** complete work on methods and approaches, to then focus on data generation collection;



- **August 2021:** lock down data inputs for the first round of modelling, including information from third parties and the National Framework. These may be updated for the revised draft plan in 2022.
- **April 2022:** conclusion of modelling to provide evidence for the plan
- **June 2022:** publication of regional plan & drafting of companies WRMPs
- **November 2022:** publication of draft WRMPs
- **March 2023:** rerun of regional model based upon consultation responses
- **April 2023:** Statement of Response and revised draft WRMP
- **September 2023:** draft Business Plan submission

This co-ordinated approach will ensure that the plans are coherent, consistent and have selected the preferred set of plans using a robust decision mechanism.

Developing the Water Resource Market

We will also provide greater clarity on our areas of water surplus and deficit and enable neighbouring companies and the wider market to bid to supply new water sources or demand reduction measures, through an easy to use web enabled application. We will undertake the following steps to initiate this process:

- Publish our Water Resource Market Information Tables by Water Resource Zone (WRZ). These will be published with an updated Bid-Assessment Framework. (April 2019).
- Update website and external communications to make it clear we are interested in hearing from anyone who has a water resource, including not just major industry/agriculture users but anyone who has a water resource such as a lake or borehole which could be commercially utilised to supplement our current sources of water (June 2019).
- Undertake an initial review of bid and trade offers made to feed into the review of options in our Western Area to meet the Section 20 requirement (June 2019).
- Develop our approach to bi-lateral markets to allow third party providers/independent providers or other 'out of our area' water companies to contract directly with retailers in the business market to supply water within our supply area. We will set out an access pricing structure so that new providers can have access to our distribution system (subject to meeting our water treatment and quality requirements). Our access pricing will reflect the cost of the use of our distribution system and will be set at WRZ level. Access pricing will become relevant when the bi-lateral market opens, and we have assumed that this will be in 2022 (as per OFWAT's own assumptions). We will then publish this on our website and the new web portal (December 2019).
- Update website to include a new interactive Water Market Portal, this will digitise all the market information tables into geo-spatial data, include non-commercial details of existing trades and network access costs/requirements. This will also include an enquiry portal for potential bidders/traders and include progress tracking to ensure transparency between Southern Water and interested parties (February 2020).
- We propose to develop this portal into a live regional trading website (co-ordinated through WRSE) which will be ready to go live in mid-2022 to coincide with the opening of the bi-lateral markets.

10. SRN.CMI.B1a

Ofwat action	How we have responded
The company should provide further information on potential bioresources trades with other companies.	Further information provided

Our detailed response

Summary of response

In preparation for the September submission we conducted an extensive review of our opportunities to engage in bioresources trading. Although a summary of this work was included within the September Business Plan submission (*BP_TA.12.BR01_pg32-35*), this response provides a much fuller account of the work done in this area. Our review was based on an assessment of:

- The wholesale market
- The capabilities of neighbouring Water and Sewerage Companies
- The preferences and intentions of stakeholders, and 3rd party and non-water industry waste management operators and service providers

The review activity helped us to arrive at the conclusions presented in the September submission and summarised below:

- We are actively engaging with regulators and stakeholders to address existing regulatory constraints, which are restricting opportunities for the co-treatment of sewage sludges and sludges from other organic sources.
- Our review process identified specific opportunities to trade sludge with our neighbouring WaSCs, primarily to address short-term treatment capacity shortfalls and interruptions to supply related to planned maintenance and plant failure.
- We have understood stakeholder and 3rd party requirements and have identified opportunities to work together to co-locate waste management services within known constraints. We have established working groups to develop these opportunities.

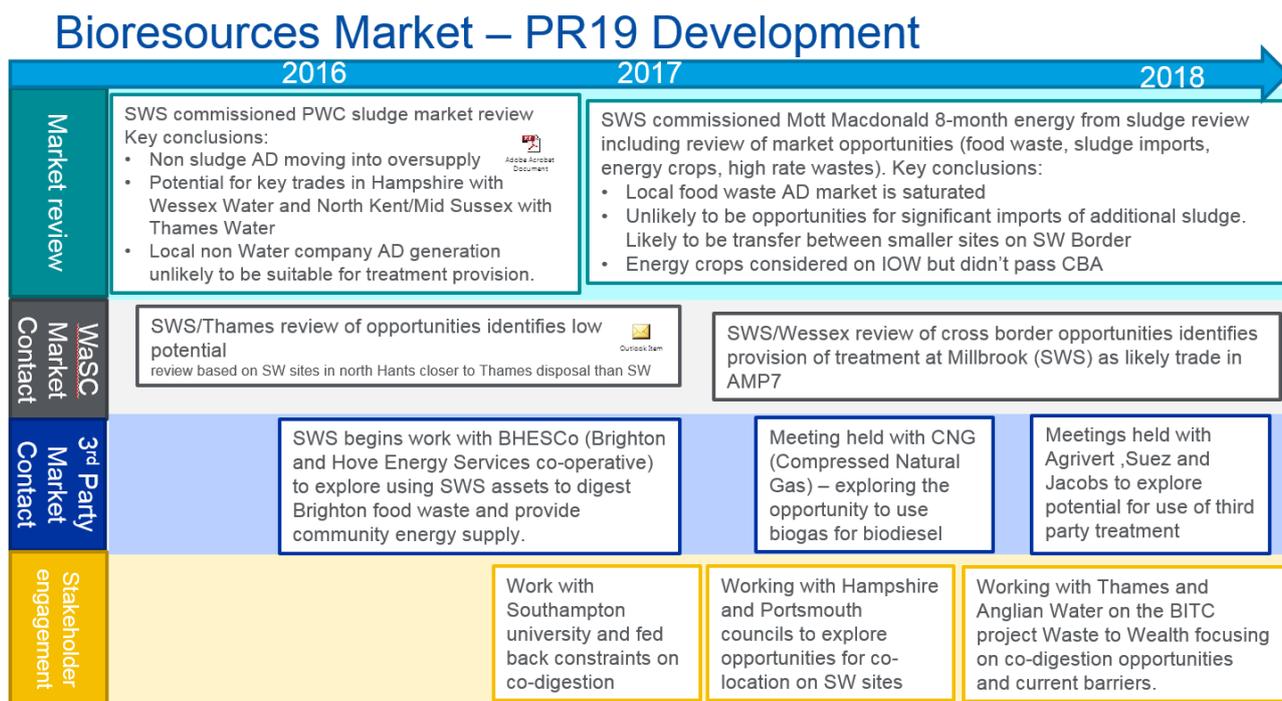
Evidence for conclusions drawn and presented in the September submission is provided below. We take this opportunity to demonstrate the development of Bioresources market opportunities for PR19, and present a summary of review activities concerning the wholesale market, our neighbouring water and sewerage companies, and stakeholders and third parties.

Development of Bioresources Market Opportunities for PR19

The sludge market engagement scenarios described in the September submission (*BP_Ta12.BR01_Bioresources Market - PR19 development*) were drawn from a short list of options, generated through a structured market assessment programme that considered our potential for participating in trading activities in terms of: creating value for customers and third party service providers, economic viability, and existing regulatory frameworks concerning recycling sewage sludges.

Our PR19 Bioresources market development activity is shown in *CMI.B1a.Figure 1 – Bioresources Market - PR19 development*.

CMI.B1a.Figure 1 – Bioresources Market - PR19 development



Summary of findings – Market review

During the development of the PR19 business plan we conducted market reviews from which we gained the following insights or validated existing understanding.

- The non-sludge anaerobic digestion (AD) market in the UK has experienced rapid growth but now appears to be moving into oversupply.
- In parallel, UK municipal food waste feedstock supply has slowed as the proportion of households with separate food waste collections has plateaued, especially in the South-East where domestic waste collection policies constrain the availability of feedstock.
- It is not possible under current regulatory systems to introduce mixed wastes along with sewage sludge into an anaerobic digester and for the resulting co-digestate to be spread on agricultural land as fertiliser or soil improver. The resulting co-digestate would not be covered either by the regulatory regime governing the production and use of sewage sludge digestate or by the regime governing the production of other kinds of digestate. It would therefore remain 'waste' and remain governed by waste

management controls. There is no industry accepted quality standard by which this product could be judged suitable for application to agricultural land.

- Due to the current regulatory restrictions concerning co-digestion, opportunities to diversify feedstocks are limited for both water industry and non-water industry waste management service providers. This is influencing the main commercial AD operators in the Southern Water region who, like us, are currently assessing their opportunities to trade in sewage sludge. We are in dialogue with the commercial AD operators in the South-East to obtain further assurances that this understanding remains current.

In summary, we have identified the commercial AD service providers operating within our region and have engaged with them to assess their appetite for trading in sewage sludge or AD capacity, which has on all counts been deemed as low at this point in time. To further test this understanding, in 2019 we commissioned the University of Sussex to conduct a survey into sludge trading opportunities in the South East and will look to the results of the study when they become available towards the end of 2019. To unlock these constraints over the longer term we are actively supporting the Environment Agency's Sludge Strategy Water Company Shaping Group, this is described below.

We believe localised partnerships provide the best opportunities at this point, for example waste management collaborations with local and district authorities and the Brighton and Hove Energy Services Co-operative (BHESCO) described below.

Summary of findings – Neighbouring Water and Sewerage Companies

The factors described above serve to limit the clear opportunities to substantively enter and lead in non-conventional sludge market trading activities. Given that sludge treatment is fundamentally a local market the best opportunities for cooperation and competition are inevitably concentrated around Sludge Treatment Centres (STCs) located close to water company perimeter borders.

Consequently, for the September submission we developed the view that in order to maximise value from the sludge market we would first to look to our border WaSCs and work collaboratively to identify opportunities to use trading to address acute capacity shortfalls and improve the resilience of services for customers.

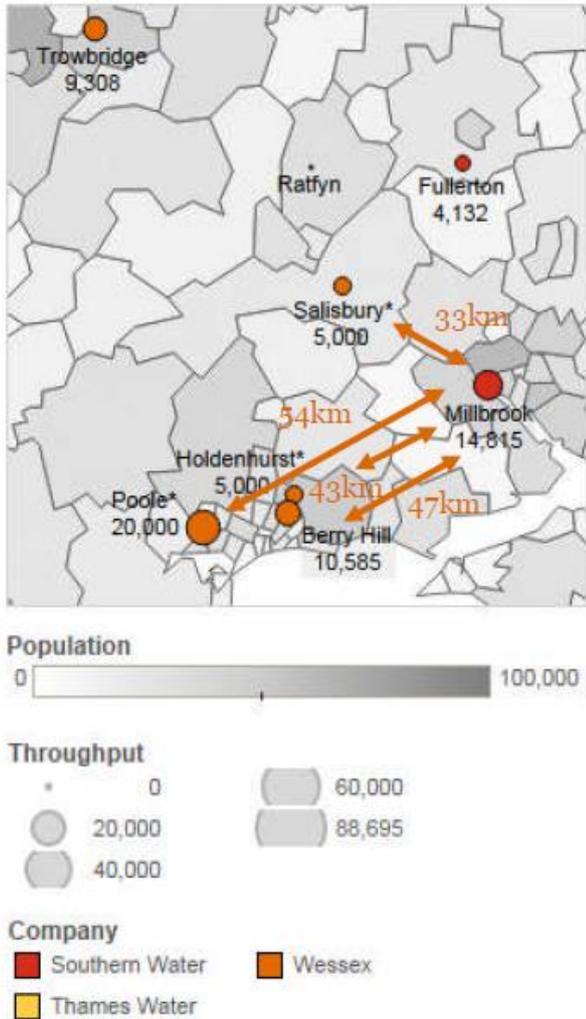
Southern Water shares borders with two other WaSCs. Our western border in Hampshire is shared with Wessex Water and our northern border spanning the length of Hampshire, Sussex and Kent is shared with Thames Water.

Independent examination of the STC portfolio in the South East undertaken by PWC on behalf of Southern Water in preparation for PR19 suggested that (based on distribution of treatment facilities, capacity constraints, and relative distances) competitive dynamics were likely to be strongest in three key locations: Southampton – Poole (Southern Water, Wessex Water), Goddards Green – Crawley (Southern Water/Thames Water), and Gravesend – London (Southern Water/Thames Water).

Subsequently we chose to focus on these three opportunities for the September submission. Since September we have continued developing our sludge trading opportunities with our neighbours and provide the below statements to clarify our revised position.

Southampton – Poole (Southern/Wessex)

CMI.B1a.Figure 2 – Southampton - Poole sludge transfer options



Wessex Water has separated its Bioresources operation from its Wastewater Network + operation and integrated it with its non-regulated energy generation business stream under the GENeco brand. GENeco is financially independent from Wessex Water however its assets and operational areas are co-located with Wessex Water's. Most of the employees of GENeco, including some executives and directors, are former Wessex Water employees. GENeco operates across 12 sites, treating 50% of Wessex's sewage sludge and charging internal gate fees.

The key opportunity to enter into a substantive sludge trading arrangement with Wessex/GENeco is to facilitate the movement of sludge between Wessex Water's Poole STC, and Southern Water's Millbrook STC. During AMP6 Southern Water will deliver an extension at Millbrook STC to provide an additional 6,000 tds sludge treatment capacity to meet population growth and additional sludge arising from quality schemes delivered during AMP5.

The capacity created at Millbrook will not be instantly consumed by sludge growth from within the Southern Water region and the surplus capacity has been offered to Wessex Water. Wessex Water are currently assessing maintenance options affecting their Poole STC and the opportunity to utilise treatment capacity at Millbrook to support temporarily reduced capacity at Poole would benefit both parties. This understanding was arrived at by both Southern and Wessex Water in advance of the

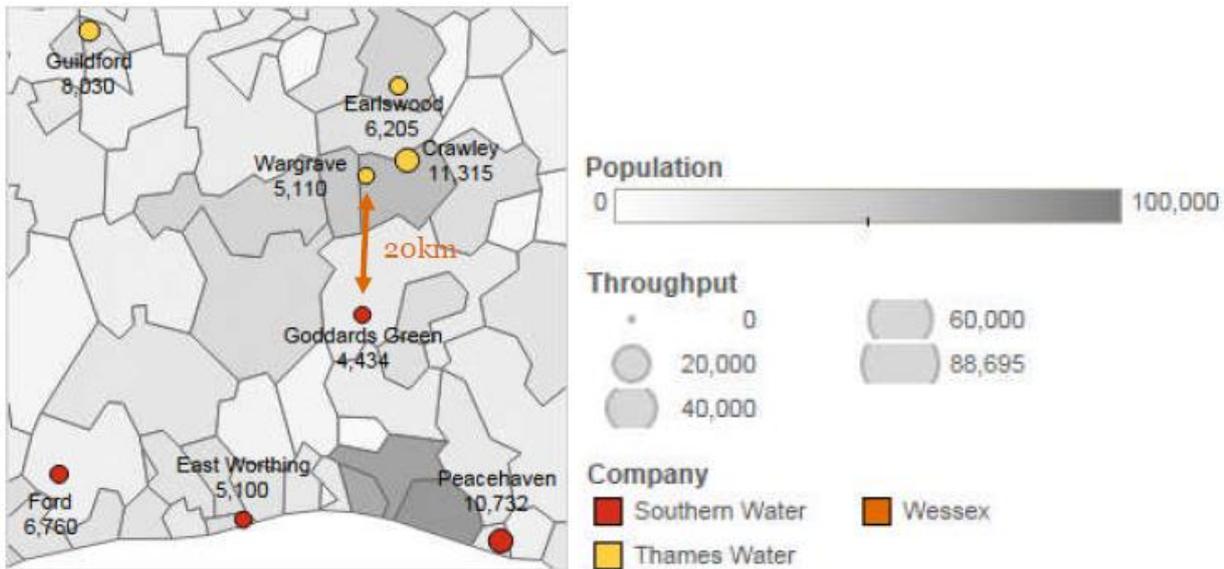
September submission and was referred to by Southern therein. At the time Wessex Water were reviewing options for their Poole STC site and uncertainty was preventing negotiations progressing beyond high level agreement in principle that Millbrook capacity would be available to them if required.

In a meeting in February 2019 it was confirmed by a non-executive director of GENeco that the understanding described above remains current. GENeco and Wessex Water have yet to commit to a definitive course of action regarding Poole STC but the capacity offered by Millbrook will be an integral part of their strategy. As such, commercial negotiations remain on hold until a clear strategy has been developed by Wessex Water and GENeco. Individuals have been identified within each organisation to resume negotiations at an appropriate time.

In addition to the above, Southern Water have often been able to make use of limited available capacity for liquid imports at Wessex Water's Bournemouth STC to address acute capacity shortfalls related to planned maintenance activities or plant failure. This long-standing collaborative arrangement has been restated and re-confirmed in conversations taking place during the IAP response window in 2019.

Goddards Green – Crawley (Southern/Thames)

CMI.B1a.Figure 3 – Goddards Green - Crawley sludge transfer options



Our September submission included an application for £3.8m (£3m capex, £0.8m opex) enhancement spend to address sludge growth requirements. Our preferred solution, assessed on a whole-life cost basis, is to extend the sludge cake reception capability at our ██████████ STC in Portsmouth in order to unlock constrained treatment capacity. Additional evidence for this enhancement expenditure is provided in the separate response to IAP_ TA 6a_Securing Cost Efficiency.

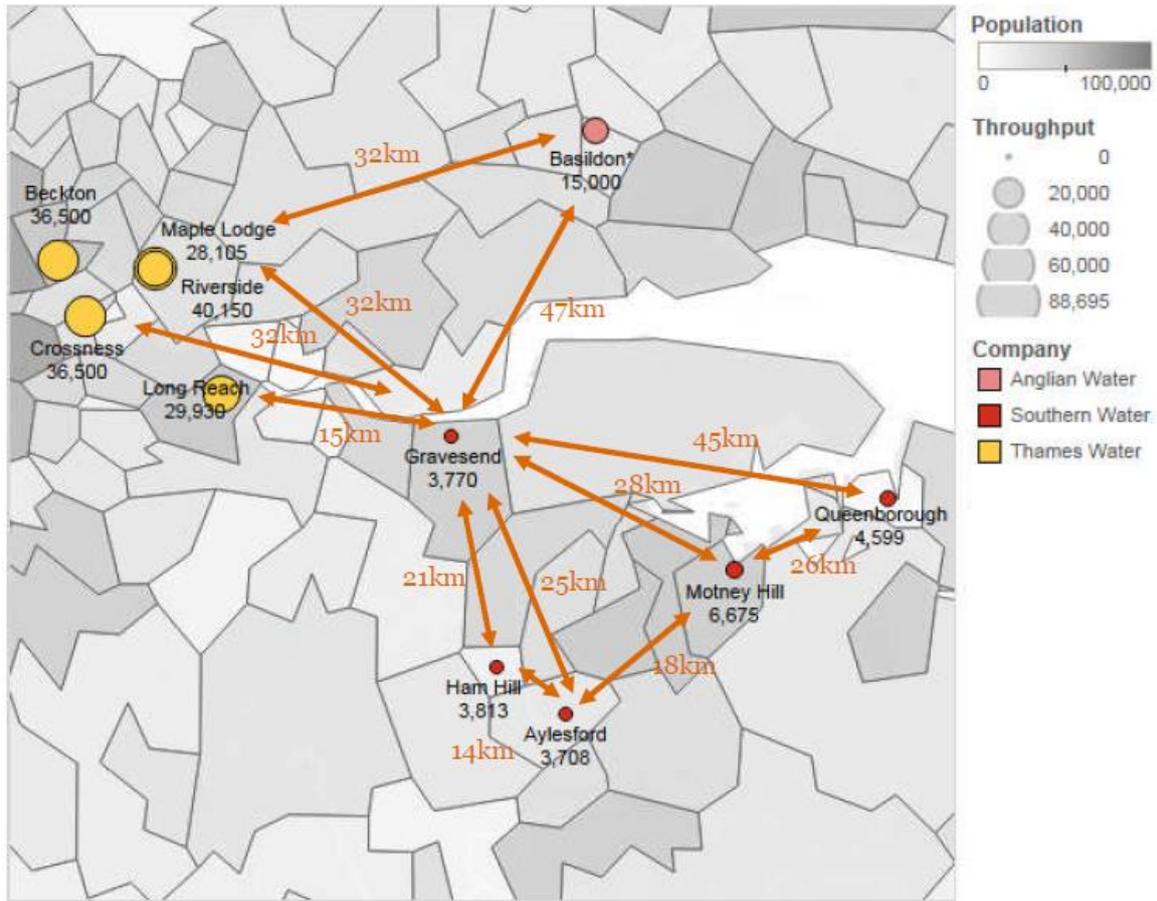
Before committing to capital investment to accommodate sludge growth in our region, it is our approach to look to our neighbouring WaSCs to assess whether they can provide the required treatment capacity, avoiding unnecessary capital works. Accordingly, in 2016 we approached Thames Water to understand whether they had available capacity on their southern border to accommodate the forecast growth requirement. Thames Water confirmed at the time they had limited capacity for additional sludge cake at their Crawley STC (approx. 0.5tds/day) which could be utilised in an emergency scenario but also stated their preference to retain this as redundancy for their own sludge operation. They also disclosed a small amount of capacity for additional liquid imports at their Basingstoke STC. A cost benefit undertaken by Southern Water deemed this to be uneconomical, as whilst there appears to be an approx. £1/m³ benefit in transporting sludge from identified rural WTWs in North Hampshire, the low volumes in question mean that any operational benefit is likely to be absorbed by the commercial effort required to establish sufficient trading agreements.

Ultimately the available treatment capacity disclosed by Thames Water was deemed to be insufficient to meet the demands of the growth challenge and thus informed our conclusion that enhancement investment at ██████████ STC was necessary and provided the best value solution to the growth challenge.

The above understanding was reconfirmed in a meeting with Thames Water management in February 2019. Southern Water and Thames Water have identified appropriate responsible people to reinstate sludge trading negotiations and both have committed to continue looking to identify and exploit opportunities to enter into trading arrangements to the mutual benefit of both parties and our customers.

Gravesend – London (Southern/Thames/Anglian)

CMI.B1a. Figure 4 – Gravesend - London sludge transfer options



Gravesend is in close proximity to four Thames Water sludge treatment sites, and one run by Anglian Water, in addition to being within 50km of four other sites operated by Southern Water. This presents a clear opportunity for us to work in partnership with Thames and Anglian to co-create an STC consolidation strategy to better serve customers in the South East, however the main driver for this is not sludge trading, and the development of possible solutions will be carried out during AMP7. We are forecasting a capacity shortfall in North Kent but not until AMP8, which aligns closely to the projected development of Ebbsfleet Garden city. Any STC consolidation in North Kent will be assessed as part of the continued development of our long-term sludge strategy and will include options for consolidating existing assets to deliver an optimal cost to treat.

Summary of findings – Stakeholders and third parties

Our market reviews revealed limited opportunities for non-water industry waste management providers and third parties to trade in sewage sludges. Instead our strategy has been to liaise directly with stakeholders and third parties to identify opportunities to co-locate waste management facilities, consolidating regional waste management activities and opening the door to the diversification of our waste management services in the future.

Brighton and Hove Energy Services Co-operative (BHESCO)

In 2016 Southern Water began liaising with the Brighton and Hove Energy Services Co-Operative (BHESCO) to review opportunities to maximise energy and revenue generation through food waste AD. We concluded that co-digestion of food waste with sludge within our existing AD asset base is not viable due to the regulations around the disposal of mixed wastes and as such judged that a dedicated food waste AD facility would be required in order to exploit the opportunity. It was deemed uneconomical for Southern Water to invest in a designated food waste AD capacity but we offered BHESCO the opportunity to co-locate their own food waste AD facility on one of our operational sites.

At a meeting in January 2019 BHESCO reconfirmed their interest and reported that they are in discussions with developers and investors. A roadmap of follow-on meetings has been planned between BHESCO and Southern Water executives and both parties have committed resources to actively pursue the identified opportunities.

Local authorities

In September 2018 we met with several local authorities to discuss our Resource Hub vision, with special regard to consolidating regional waste management facilities, reducing heavy vehicle movements and maximising the generation of renewable energy. The local authority representatives present explained that their opportunities to collaborate were limited by:

- The demand (or lack of) for food collection services within discrete local authority areas;
- The differences of responsibilities and activities between unitary councils and district/borough councils and a lack of standardisation between the waste management contracts managed by incumbent local authorities;
- The operational impact of the separation of dry and wet wastes on the infrastructure needs of district/borough councils.

The local authority representatives referred to the National Waste and Resources Strategy (November 2018) and have since expressed disappointment that it did not recommend sufficient financial disincentives around a national recycling strategy, which otherwise may have provided a clear driver for future investment requirements with regard to consolidating existing waste management facilities and services.

We identified the incumbent councils that currently offer separate food collection services in our region and have identified opportunities to co-locate enhanced treatment services and facilities utilising capacity at our [REDACTED] and Chickenhall Eastleigh treatment works.

One option for co-locating services centres around Hampshire County Council's (HCC) plans for a new Materials Recycling Facility (MRF) located on land adjacent to our Chickenhall Eastleigh indigenous sludge dewatering site. Although current regulations prohibit the spreading of co-digested sludge from sewage and other organic wastes on agricultural land as fertiliser, treatment and energy output efficiencies could be realised by using biogas generated by both waste streams to fuel a single, sufficiently sized CHP installation, owned and operated by Southern Water. In order to make a centralised MRF a viable option HCC requires a significant proportion of the district councils and unitary authorities under its control to offer separate waste collection services which is not foreseeable under the current operating regime, although HCC are seeking to influence this in the future.

Despite the blockers, we remain in contact with representatives from the county and local authorities and will develop these relationships as part of our Resource Hub strategy. Stakeholder groups including representatives from local authorities regularly meet as part of Southern Water's engagement programme. The identified co-location opportunities could provide a blueprint for future collaboration activities and allow

us to take meaningful steps into sludge and waste trading within current regulatory guidelines concerning the final application of co-digested waste. This in turn will deliver more flexible waste treatment capacity in the South-East, value to the local economy, and more resilient waste management capabilities to the benefit of customers.

Environment Agency (EA) Water Quality and Waste Planning Group

The regulations regarding the application to land of digestate produced by co-digesting sewage sludge with other organic wastes continue to be a persistent sticking point when developing sludge trading opportunities with commercial AD operators and service providers outside the water industry. We continue to be an active participant in the co-digestion debate and in January 2019 we accepted an invitation to join the Environment Agency's Sludge Strategy Water Company Shaping Group. The draft terms of reference for this group summarises the existing regulatory landscape as below:

The regulatory framework for sludge treatment and use is complex. This is because it is derived from a number of separate and dated pieces of legislation which are not necessarily consistent with each other. This has led to different regulatory standards for the waste and water industries. The increasing commercialisation of the bio-resources sector has blurred the previously distinct boundary between the water and waste management sectors. As waste companies engage in the sludge market and water companies move into commercial anaerobic digestion, the differences in how the sectors are regulated is becoming increasingly problematic. The Sludge Use in Agriculture Regulations are now 30 years old and do not take into account the chemical complexity of modern sludges or their usages. It also hampers innovation and the opportunity to exploit new business opportunities. As a result the Environment Agency are developing a strategy to modernise the current regulatory framework, provide consistency across the bio resource sector and to better understand and mitigate potential future risks from sewage sludge.

Through membership of this and other industry forums and working groups we aim to influence regulatory reform in a way that encourages market activity and creates value for customers and businesses in the South East.

Conclusion

We have worked extensively to identify opportunities to trade in sewage sludge both within the regulated business between other WaSCs, and in the commercial AD sector with third party waste management service providers and regional stakeholders. However, we recognise that this was not clearly communicated in our Business Plan in *BP_12_Wholesale Wastewater_TA.12.BR01, Section 6*.

We will continue to influence the regulatory framework to maximise opportunities that the opening market present for our longer term bioresource strategy. However, recognising the fast changing nature of the bioresource and renewables market, our view remains that the most promising opportunities are the ones presented in the September submission. These are shorter term border trading with Wessex Water and Thames Water based on treatment capacity constraints, and exploring co-location of food waste AD assets with stakeholders and third parties. We will actively pursue these opportunities and have designated resources and established working groups through which we will develop future commercial relationships.

11. SRN.CMI.B1b

Ofwat action	How we have responded
The company should consider how it can collaborate with other companies to maximise the opportunities for research to address common challenges (e.g. leakage detection, water efficiency and wastewater treatment processes) rather than companies progressing research independently.	Further information provided

Our detailed response

Summary of response

We understand that there is a considerable benefit to be gained through collaboration, generating benefits for our customers both on shared cost and in expansion of knowledge potential through shared learning. Collaboration is an important part of the work we do within Southern Water, in particular within Research and Development (R&D). We are establishing new approaches towards collaboration that go beyond the traditional methods, as well as continuing to collaborate on ‘one voice’ challenge areas through UK Water Industry Research (UKWIR), UKWIR have framed 11 ‘Big Questions’ facing the entire industry, such as “How do we halve our abstractions by 2050?” and “How do we become carbon neutral by 2050?”, these questions work towards far reaching research areas with shared challenges. We are assessing other avenues to unlocking customer value through collaboration which will be addressed in this document.

We are on a journey to enhance the way we innovate across our business, this includes our focus on delivering customer value through innovation and collaboration. 2018 saw the set-up of our new innovation initiative, Bluewave, an innovation function including R&D designed to support the business in enabling business process and people efficiencies with design thinking ways of working. This includes collaborating with others from outside our business, working on challenge areas of shared value where different approaches and ways of thinking can help establish positive solutions.

This document is set out to:

- Frame **how we currently collaborate** as an organisation, particularly within research activities;
- Give an overview of our new **Bluewave innovation strategy** and how it helps us collaborate;
- Highlight **where we are improving**;
- Summarise our **future vision for collaboration**.

1. How we currently collaborate

We currently collaborate on many levels for research across the industry, from technical working groups typically occurring biannually such as Sensors for Water Interest Group (SWIG), Wastewater Networks (WWN), Water Networks (WN) and Isle Utilities’ Technology Approval Group (TAG), to R&D managers meetings and collaborations on specific research project activities. The aims of these collaborative groups are to share knowledge and experiences on the specific technical area. For example, the WWN is a network established by Cranfield University and is the forum where wastewater technical experts meet to discuss the latest technologies and research findings on phosphorus removal. Where possible and reasonable, we look for opportunities to work on club projects to answer business challenges. For example, following a multi-party funded bio-monitor technology scan, we hosted a trial of one of the chosen technologies which is then shared across the parties involved.



Other topic specific examples include:

Phosphorus removal – In order to meet future WINEP standards most of the industry are looking for cost-effective solutions for removing phosphorus through wastewater treatment processes. We have established forums through which we can share findings on technology (beyond the industry wide, UKWIR led Chemicals Investigations Programme trials) and efficacy of approaches with many of the other water companies including Severn Trent and Thames. We are involved in cross company research projects through both Cranfield University and University of Portsmouth in this area and have established a shared research facility at our Petersfield wastewater treatment works in Hampshire with the University of Portsmouth.

Resource recovery – Our transformational programme Resource Hubs has driven our involvement in the Interreg¹ funded project New Energy and Resources from Urban Sanitation (NEREUS). We've partnered with 7 other organisations² across four countries, looking at water, energy and nutrient recovery techniques and decision-making parameters for use. This collaborative project aims to share learning across various approaches and technologies to develop a decision-making tool for use by key industry decision makers when assessing the viability and acceptability of resource recovery and reuse approaches. A key focus of the project is to share insight, learning and project outputs across the industry.

R&D informal shared learnings – As part of our research and development programme we link in with other water companies to share learnings on similar technology trials, or development of future potential research areas. An example of this, from July 2018 we have been sharing insights with Thames Water on our respective approaches to water re-use, Thames hosted a site visit in July 2018 to their Old Ford treatment works where they are trialling water reuse techniques. This is helping inform our research into different viable approaches for water re-use, which in turn will be shared with Thames through the course of our research, starting May 2019. The research includes a focus on how regulations can be informed to enable water reuse within the UK, given the pressures presented through future water scarcity, changes in regulation to enable water reuse look to address future resilience of water supply for our customers. A water re-use group in the South of England has recently been set up consisting of thought leaders from University of Brighton, Cranfield University plus the water companies in the south, which we will be using as a collaboration mechanism on this topic.

Catchment programme – Focusing on our Catchment First transformational programme, we are a partner in an Interreg funded project Channel Payments for Ecosystem Services (CPES)³, where we are working with 13 partners such as: French water companies (trial partners), Portsmouth Water, South Downs National Park Authority, Environment Agency and West Country Rivers Trust. The project is using six Payments for Ecosystem Services (PES) pilots across Southern England and Northern France to test and develop a toolbox to inform delivery of sustainable payments for ecosystem services to improve water quality; this will have potential to be adopted at a wider scale in the future.

¹ Interreg is a series of programmes to stimulate collaboration between European Union regions, funded by the European Regional Development Fund (ERDF) <https://www.nereus-project.eu/>

² Three knowledge partners: University of Portsmouth, HZ University of applied sciences Rotterdam, Vlakwa (The Flanders Knowledge Center Water). Five trial partners: Waterlink (Belgium water company, Antwerp), DuCoop (Belgium water company, Gent), Evides (water company operating a pilot in Rotterdam), Capso (French municipal water company of Saint Omer), Southern Water.

³ CPES Interreg project <https://www.cpes-interreg.eu/en/cpes-project/the-project>

Farmer network – Led by Exeter University, we are involved in a farmer network established to gather insight from Farmers on a range of topics including trust in organisations impacting their business, risks and opportunities for their business. For example, the potential for future design of incentive mechanisms and use of Artificial Intelligence. This is in partnership with other water companies, farmers' supply chain such as the Co-op, who are purchasers of local farmers produce and banks who are interested in providing farmers with funding from a sustainable business perspective. This initiative supports our Catchment First transformational programme.

New development collaborations – As part of the Ebbsfleet Garden City initiative we've been collaborating with Ebbsfleet Development Corporation. Our joint aim is to use this opportunity to create a 21st century answer to the environmental issues and challenges posed by water supply, collection and treatment from urban conurbations through the construction of a Water Management Facility in a more appropriate location. We involved Thames Water in this joint discussion to share their knowledge about water efficiency. This initiative epitomises how our transformational programmes drive a cross-cutting approach resulting in progressive collaborative solutions.

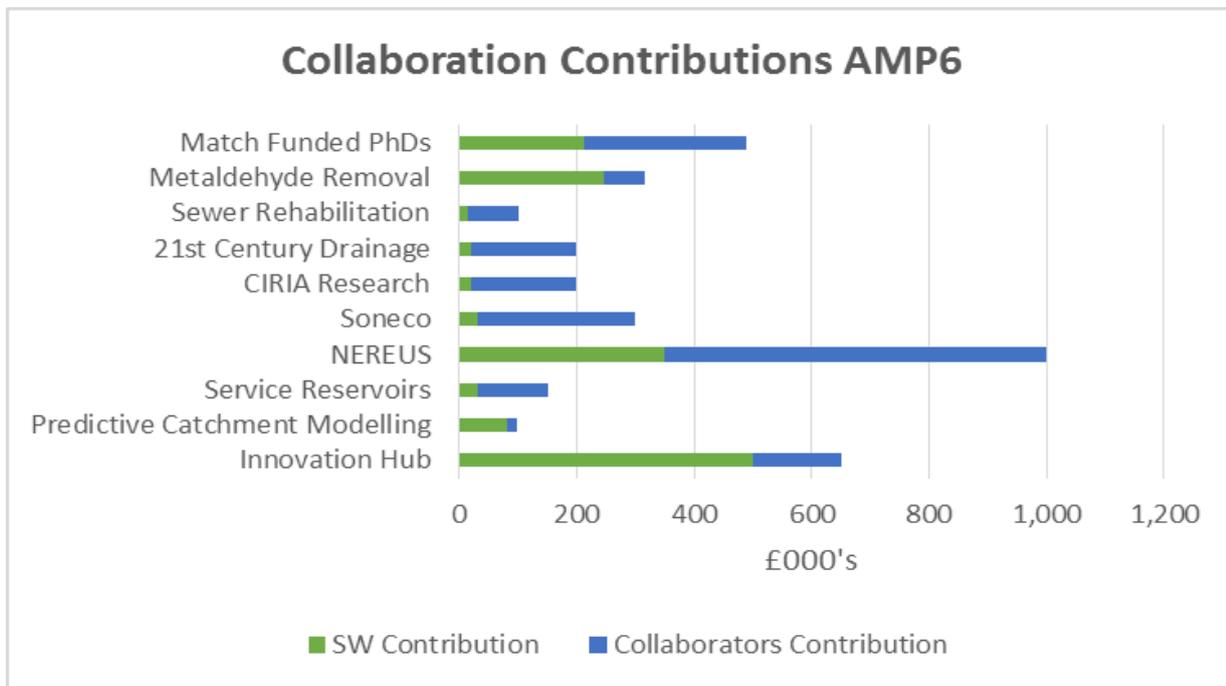
Challenge (Target 100) – As part of our target 100 programme, we've been collaborating with Eastleigh Borough Council on the Challenge. Areas in Hampshire with abstraction restrictions and high consumption have been given incentives of funding community projects, upon reducing their water consumption; maximum £50,000 upon 25% reduction. The pilot 12-month scheme resulted in 8% reduction in consumption and funded swimming lessons for local children. The scheme is being applied to 52,000 resident area in collaboration with Eastleigh Borough Council with plans to extend regionally.

Vulnerable customers – Focusing on the needs of our customers and the benefits we can bring them, our customer team have led the formation of a group of water companies operating in the south region (Affinity, Essex & Suffolk Water, Northumbrian Water, Portsmouth Water, South East Water, South West Water, Sutton & East Surrey Water and Thames Water) and a number of third sector partners (Christians Against Poverty, Money Advice Liaison Group, Money Advice Trust, StepChange and Turn2Us) with the aim of securing an agreement from the water companies to align their eligibility criteria for social tariffs. The Consumer Council for Water and other consumer representative groups had been making the point that the social tariff landscape was confusing for both customers and customer advisory bodies and suggested that water companies should be trying to simplify things. After a number of detailed discussions and pieces of analysis, we are one of five of the water companies who have agreed to align their eligibility criteria around an income threshold from April 2019, with others looking to do the same the following financial year. This approach has been endorsed by the third sector organisations involved in this group and also the Consumer Council for Water.

These headline examples highlight how we see collaboration as a critical factor in how we work, demonstrating the value that can be gained through working with those both in our local communities and further afield in other sectors and countries. Although we're collaborating across a number of areas, we understand that we have still got room for improvement, which we're planning through our new Bluewave initiative.

The collaborative research and innovation has an efficiency value associated with it. In AMP6 the estimated value of the collaborative research we've been part of is £3.5m, of which collaborators are funding 57%, as shown in *CMI.B1b.Figure 1 – Collaboration contributions* (shown previously in *BP_TA.12.MG04 Business Case – MG Research and Development*).

CMI.B1b.Figure 5 – Collaboration contributions



This excludes UKWIR funding and collaborative value which is evident across the industry. The Collaborators Contribution represents the value of the research we have through access to through the collaborative approach.

Collaborative research represents 11% of our current innovation budget spend of £15.4m. Through AMP7 we expect the proportion of collaborative research to increase by focusing on both targeted collaborations with other water companies on specific areas (such as water reuse) and wider collaborations (such as club projects) where the problem space is a multi-party challenge. Throughout the business we continue to work closely with local universities and local enterprises, to bring value to both customers and stakeholders. How we develop in this space will form part of our Bluewave strategy.

2. Bluewave innovation strategy

One of the ways we are encouraging collaboration in research to address shared issues is through our Bluewave initiative. Our Bluewave journey began in June 2018, when the initiative was first established. Bluewave is a diverse, cross-functional team consisting of both a Lab function and R&D. Bluewave’s collective purpose is to support innovation across Southern Water, helping departments, teams and individuals work at pace on tightly defined problems facing the business and the industry.

Bluewave strategy aims to deliver value for our customers through working with the business to embrace innovative ways of working to address problem areas and find more efficient and effective solutions. The Bluewave team are trained to use design thinking methodologies and agile approaches, aiming to help the business embrace these ways of working to increase the level of innovative thinking across the organisation.

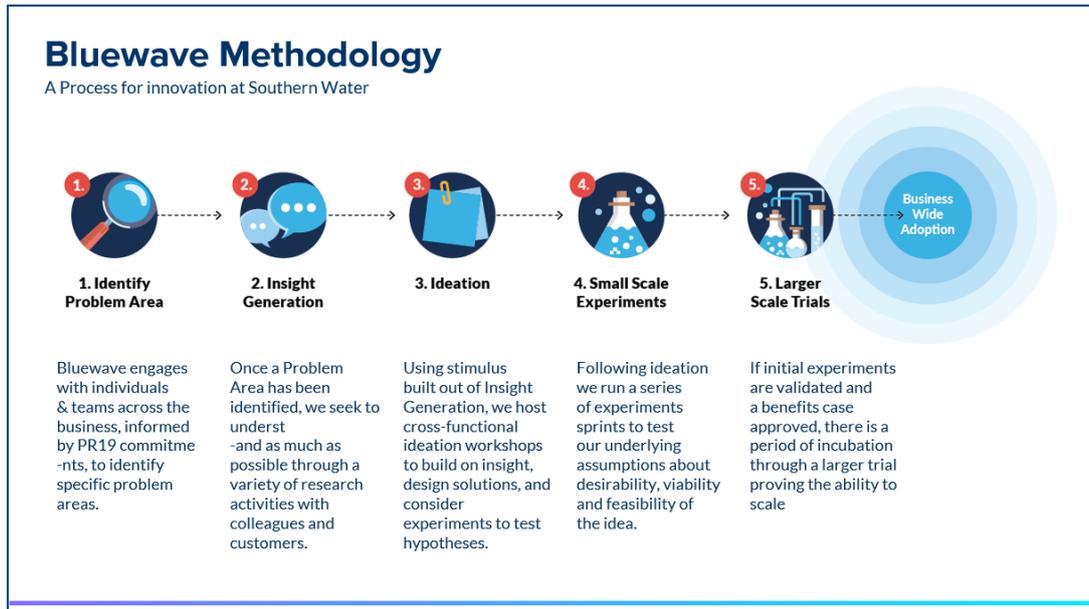
The Bluewave approach brings together colleagues, peer companies, customers and other stakeholders to develop ideas before testing potential solutions. We focus on pace and progress over perfection, driven to



help people make change that sticks. This change can never happen within the confines of the Lab alone, making collaboration a corner-stone of Bluewave.

The idea generation ('ideation') stage within the Bluewave process typically involves a 48-hour 'rapid start' workshop, through these events we collaborate across the organisation, with local stakeholders, with other water companies and with other technical experts relevant to the problem area. We are constantly improving our processes for how we enable innovation within the business. *CMI.B1b.Figure 2 – Bluewave methodology* shows our Bluewave Methodology, we are starting to integrate this process.

CMI.B1b.Figure 6 – Bluewave methodology



The Bluewave process includes how we can develop and maintain an effective level of collaboration throughout the different stages, from gaining insight with and from others through research, to cross industry collaborations on ideation and solution exploration. The process includes the mechanisms for how we make collaborations fit for purpose and effective to ensure they are targeted and best for delivering value to our customers.

Through the idea generation ('ideation') stage the type of potential solution will be assessed through metrics, this will include taking a view on whether the research area is required within the business, an industry sub-group, the wider industry or has cross-industry collaboration potential. The aim of this process is to act as a challenge-led approach to innovation and research opportunities. Our intention is to support internal collaboration digitally with an online ideas space, we are currently using Workplace (a business social media platform) to push out video updates and 'call to action' highlighting problem space focus and welcoming involvement, this way of working is promoting collaborative approaches both internally and externally.

CMI.B1b.Figure 3– Bluewave summary stats - January 2019 shows the summary statistics for the Bluewave Lab's new ways of working. During the rapid start events we had employees, other water company leads, local councils, business owners and other relevant business professionals collaborating to co-create potential solutions.

Over the next year we aim to develop Bluewave by expanding the team to enable a wider focus across the organisation, looking at a greater number of problem spaces. We will be developing how we approach



partnerships and collaboration opportunities and new ways of digitally gathering and assessing potential innovation problem spaces, both for internal and external stakeholders. The overall aim being to harness value for the business and our customers.

3. Where are we improving

CMI.B1b.Figure 7 – Bluewave summary stats- January 2019

Summary Stats

Bluewave Lab achievements so far



We’re on an innovation journey to develop Bluewave and bring together processes and methodology for innovation across the business. The key factor is how we empower our people to embrace innovation, through Bluewave we are able the work across the business with new design thinking approaches to provide learning and evidence the benefits of increased dynamic pace in innovative problem solving. Our innovation methodology relies on co-creating through collaboration internally and externally, there are five key areas highlighted below, each of which evolve around how we can empower our people to embrace a culture of innovation.

Associations – Collaborations create a greater chance of associations being made between problems and many different (part) ideas to enable greater innovative and research solutions. There are many informal collaboration spaces across the water industry, there is a need for a space to be developed to share challenges and work together towards potential solutions. This is answered in part by universities and industry led conferences. Through our Bluewave processes, we’ll be giving the opportunity to encourage greater associations through sprints on challenge areas.

Speed – To improve the pace of working on challenges within the industry, collaboration can play a key role. We are focusing on agile methodologies, working in lean, cross-functional teams from within the business and outside, to focus on specific problem spaces. We’re aiming to connect with other companies through Bluewave to become more effective at finding solutions to industry problems. The Bluewave team are trained to work with agile practices, such as sprint-based working, assumption-based testing and iterative project and service development, with a remit to encourage the business to practice continuous innovation. We aim to be able to collaborate in an effective way with efficient pace.

Connections – There are many formal and informal channels for connection at varying levels across the water companies within the industry. Naturally some approaches are better established than others, some achieve greater results than others. We will build on our experiences to develop our strategy further, using



best practice to ensure we maximise the potential benefits through collaboration. For example, a network of R&D/Innovation managers from the majority of the water companies meet three times a year, in this group we are looking at optimal areas for collaborating and what tools and mechanisms we need in place to be able to collaborate, for example we will be using an innovation platform from one of the companies to set an industry innovation challenge for the all to collaborate around. We're making initial plans for this to happen within the next year. There is a current project LITSON, looking at areas of similar interest across the industry, this provides a great source of collaboration potential, highlighting where different organisations are focusing on similar challenges. Alongside these two examples, we continue to build connections to collaborate through universities, UKWIR and directly with other water companies.

Early Evidence – To enable innovation we see the importance of working with customers and partners at an early stage of the innovation process in order to leverage expertise early, identify collective assumptions and then test a potential solution's desirability, feasibility and viability. This ensures we're focusing effort to fail and learn fast, only progressing with innovations which have evidence-based results, this relies on insight gained through collaborative working at the front end of the process. For example the Bluewave team gain customer insight (internal and external) to establish a clear view of the problem space, spending time with the people encountering the problem, from idea generating sessions the smallest low fidelity solutions can then be developed and tested to evidence the solutions efficacy in answering the problem. Through this process we have been able to stop unnecessary time spent on unlikely solutions fast, we reach a conclusion and either stop and learn, or develop and continue to a potential solution.

Implementation – Progressing an innovation through to implementation relies on certainty of performance, presented through evidence. As an industry we have the opportunity to collaborate further to build a trust in the evidence collected by others. To trust trial evidence enables a greater potential for innovation implementation through a 'fast-follower' approach, rather than duplicating similar trials. A fast follower approach enables the uptake of new or improved technologies and processes more quickly and at a lower cost to the customer. We are working across a number of projects whereby we share learnings and outcomes with other water companies who have similar technology trials, to combine thinking and learn from each other's outcomes as to the applicability of the trialled technologies.

4. Future vision

The benefits of innovation and R&D are can be seen as financial and non-financial, represented through incremental innovation, transformational innovation and radical innovation. We aim to enable financial benefits of £50m within AMP7 through the Bluewave process, predominantly through incremental innovation within the critical problem areas around the business.

Our Bluewave methodology and ways of working aims to embrace the most effective means of engaging people both internally and externally, helping to define problem spaces, gain insight and develop and test potential solutions, we are aiming to maximise the value we can get through collaboration.

We aim to deliver value through innovation by establishing an innovation culture which will lead to a mind-set of continuous innovation throughout the business, pairing this with longer term research and development on future challenge areas we aim to deliver value for our customers through exploring the most effective, efficient and cost beneficial solutions to answer our business problems.

We are collaborating in many different ways with other water companies, regulators, local businesses and interest groups. To pursue our vision, we will embrace the most effective ways of working collaboratively on each problem space and future challenge. Innovation activities are internal to the company for business specific innovation, targeted collaborations for problem spaces shared by other specific companies, formal collaborations through jointly funded research programmes.



Our Bluewave strategy is to drive innovative ways of working through the business, focusing on how we can improve productivity and efficacy to deliver greater value in what we do for our customers. We are aiming to develop digital tools to embrace innovation activities and collaborations internally and externally. Prioritising effort on high value current and future challenge areas, we will be developing a greater focus on partnerships and collaborations within research, innovation and across the business.

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