

# **TA 11.WR03 Catchment Management Solutions Business Case**

September 2018  
Version 1.0

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# 1. Executive Summary

Name of Technical Annex	WR03 Catchment Management Solutions
Context	<p>Good catchment management safeguards current and future water quality, improves source resilience and water quality and delivers wider social and environmental benefits for our customers. We regard this as an essential component of building a resilient water future for our region.</p> <p>Working in partnership with stakeholders is critical to addressing risk and reversing adverse trends in the upstream catchments. This approach means we can resolve diffuse pollution, water resources and biodiversity issues more effectively than through traditional engineering solutions.</p> <p>We currently supply water to customers from 82 groundwater works and 9 surface water works. All surface and groundwater water catchments are vulnerable to contamination from the use of surrounding land. We need to understand each catchment so that we can work to anticipate and address risks before they arise.</p> <p>Using natural processes and working with catchment partners to deliver a better raw water environment is a more strategic, proactive and sustainable approach than traditional engineering solutions. It results in a lower treatment burden, lowering our costs and therefore our customers' bills, while enhancing our natural environment.</p>
Customer and stakeholder views	<p>Customers consistently regard catchment management as a high priority. Our key regulators, the DWI and the Environment Agency, also expect us to have a strong catchment focus, with the AMP7 catchment programme due to take place under regulatory instruction (DWI Undertakings and Water Industry National Environment Programme (WINEP) Schemes). With other water companies adopting catchment approaches several AMPs ago, customers, stakeholders and regulators expect clear progress from us.</p>
Our aim	<p>We aim to address water quality risks and issues at source, working with catchment stakeholders on measures to protect and improve raw water quality and quantity. While treatment prior to supply will always be needed to safeguard customers, a catchment management approach is more sustainable and averts increasing the level of treatment processes as the quality of raw waters deteriorates.</p> <p>We will do this by undertaking schemes to address nitrate and pesticide risks, as well as through other collaborative studies and projects.</p>
Scope of this business case	<p>Enhancement investment to implement catchment schemes in priority water supply catchments throughout AMP7.</p>

	This covers groundwater and surface water catchments for nitrate and pesticide schemes, a programme of water resource investigations, catchment risks investigation for all of our catchments and management in priority catchments and finally a catchment partnership and enabling programme.		
	Botex	Enhancement	Total
Totex (£'m)	£0m	£31.2m	£31.2m
Opex (£'m)	£0m	£31.2m	£31.2m
Capex (£'m)	£0m	£0m	£0m
Residual, post-AMP7 capex (£'m)	£0m	£0m	£0m
20 year Whole life totex (£m)	-	-	£110m
20 year cost benefit (£m)			
Materiality (% 5 year Totex for relevant price control)	-	-	24%
Relevant business plan table lines	-	WS2 line 52, 56, 57, 58	
<b>Enhancement – Catchment Management Solutions</b>			
Need for enhancement / investment	<p>All schemes and investigations are driven by regulatory notices or agreements.</p> <p>7 Surface Water Schemes – to address pesticides in surface water systems through catchment management (all on DWI Undertakings and one is also on WINEP)</p> <p>42 Groundwater Schemes – to address nitrates (all on DWI Undertakings and all also on WINEP)</p> <p>20 Groundwater Investigations – on WINEP</p> <p>3 Surface Water Investigations – on WINEP</p> <p>87 Water Resources Investigations – on WINEP</p> <p>6 Water Resources Schemes – on WINEP</p> <p>Catchment risk identification and management activity</p>		
Overview of AMP7 proposals	Our investment includes £13.0m of catchment schemes, £15.2m of investigations, and £3.0m of catchment risk assessments driven by DWI regulations.		
Why the proposals are the best programme-level option for customers	<p>This annex discusses three options, summarised as follows:</p> <p>Option 1: is an increased catchment programme across the entire Southern Water area, covering a wider range of potential risks and approaches.</p> <p>This option introduces advice and mitigation measures within all of our catchments, increasing the number of water quality monitoring locations and establishing partnership in five catchments. Option 1 is unlikely either to be affordable for customers, nor achievable during AMP7 timescales.</p>		

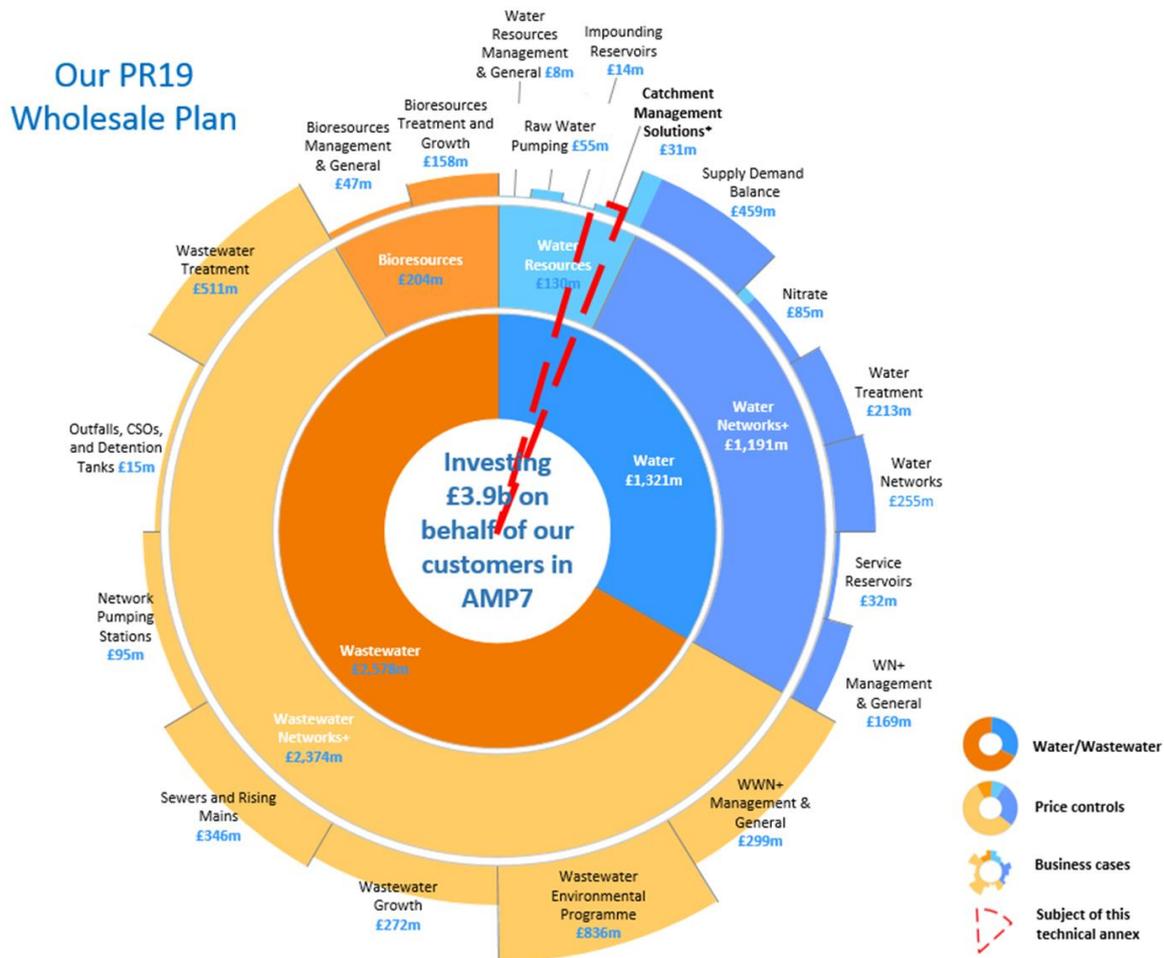
	<p>Option 2: implements the regulatory schemes and investigations assigned to Southern Water by the Environment Agency and Drinking Water Inspectorate during AMP7. This option will provide the appropriate level of advice within the relevant catchments, deliver the WINEP/DWI programmes as per the agreed scopes, and monitor water quality at an optimal number of locations.</p> <p>Option 3: is a reduced scope option, saving customers' money but falling short of regulatory compliance. Option 3 could also result in increased reliance on engineering solutions, or development of new sources, in the future. This option restricts high-level advice and mitigation to the WINEP/DWI catchments only, and reducing the number of water quality monitoring locations.</p> <p>Option 1: Increased scope: £46.7m  Option 2: Preferred Option: £31.2m  Option 3: Reduced scope: £23.8m</p>
Customer and stakeholder support	In addition to support from the CCG, customers strongly back our proposed use of catchment approaches to address water quality issues in more sustainable ways. The EA, DWI and Natural England use the detailed information from the investigations and track benefits from scheme mitigations.
Need for a CAC (if relevant)	Not applicable
Extent of management control (if relevant)	We are under regulatory instruction for this catchment work, and as such the additional expenditure proposed is part of management control of long term risk
Robustness and efficiency	<p>A series of AMP6 schemes and pilots have helped us design more robust and effective ways of working.</p> <p>We are delivering an increased amount of this work through our new in-house team to reduce costs on sub-contractors, reducing risks while ensuring consistency and robustness of approach.</p> <p>We are pulling scheme delivery into discrete clusters to allow economies of scale to be maximised through delivery.</p>
Customer protection (if relevant)	Work is driven by regulatory notice by 31/03/2022 and 31/3/2025.
Affordability considerations	<p>We have taken steps to reduce the cost by exploring different approaches (and resulting costs) for implementation of catchment approaches. This included: a) fully outsourcing; b) blend of outsourcing and in-house delivery and c) fully in-house delivery.</p> <p>The preferred option assumes a blend of outsourcing specific components such as technical studies and investigations, alongside in-house delivery. This ensures costs are incurred for specialist services where required, whilst delivery is undertaken</p>

<p>in a more cost effective and inclusive way by in-house staff and catchment partnerships where possible.</p> <p>We have also undertaken market testing of services, such as for sampling and laboratory analysis to ensure affordability.</p>		
Board assurance (if relevant)	None	
Performance Commitments supported by this business case		
PC	How relevant is this business case?	Comment
CRI	High	Raw water quality impacts treated water quality
Schemes and scheme-level options		
Schemes over £10m/£20m	Options	
	Description	Cost Selected option and rationale
None		

## 2. Scope of Technical Annex

Our wholesale plan has been valued at £3.9 billion. This technical annex covers £31m of planned investment in Catchment Management Solutions. Our investment in this area is primarily funded through the Water Resources price control.

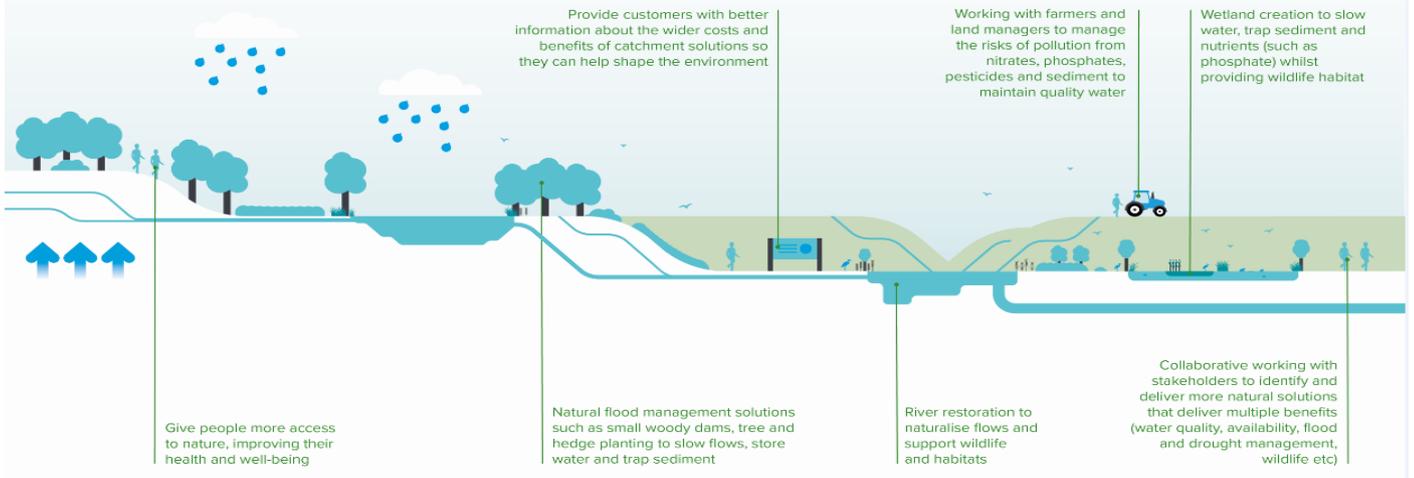
The wholesale plan is depicted below.



This technical annex covers Catchment Management Solutions and specifically key elements of the integrated **Catchment First** programme. It includes the combined catchment investment across our plan, incorporating Catchment Management Solutions, Natural and Social Capital, Water Supply and Demand but not Wastewater catchment management schemes which are discussed in **TA.12.WW06 Wastewater Environmental Programme**.

## Catchment First

Bringing our catchments into the heart of our decision making and delivery processes to achieve a more resilient service and environment



**Catchment First** includes the agreed regulatory deliverables alongside our business-as-usual catchment compliance approach and our plans for catchment resilience. The deliverables include catchment investigations and options appraisals, catchment scheme feasibility assessments and implementation of catchment risk mitigation measures for both drinking water and wastewater. This document covers the drinking water elements of **Catchment First** and the following table shows the scale of the drinking water catchment management solutions to be delivered.

**Table 1: Schemes included in Catchment Management Solutions**

Scheme	Price control	QBEG	Cost location	Ofwat table	AMP7 Totex (£m)
Nitrate catchment solution	Water Resource	Quality	TA.11.WR03 Catch't Mgt solns	WS2 line 56	5.555
Pesticide catchment management	Water Resource	Quality	TA.11.WR03 Catch't Mgt solns	WS2 line 52	4.963
WINEP - Drinking Water Protected Areas	Water Resource	Quality	TA.11.WR03 Catch't Mgt solns	WS2 line 58	2.795
Catchment Compliance	Water Resource	Quality	TA.11.WR03 Catch't Mgt solns	WS2 line 52	3.000
WINEP- Water Resource (inv & schemes) Biodiversity (inv)	Water Resource	Quality	TA.11.WR03 Catch't Mgt solns (inv)	WS2 line 58	12.415
	Water Resource	Quality	TA.11.WR03 Catch't Mgt solns (schemes)	WS2 line 57	2.500
Catchment Partnership/Enabling <sup>1</sup>	Split between all price controls	Base	Management and General	WWS1 line 13, WS1 line 13.	4.375

<sup>1</sup> Catchment Partnership/Enabling costs are captured within Management and General

In-stream Catchment Resilience Schemes (ICRS) <sup>2</sup>	Water Resource	Quality	TA.11.WN01 Supply and Demand Balance	WS2 line 8	4.272
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Other schemes included in **Catchment First** are resilience schemes, and wastewater catchment schemes. Wastewater catchment schemes are detailed in technical annex **TA.12.WW06 Wastewater Environmental Programme**.

**Catchment First** can be split into four key areas: Regulatory, Resilience, Compliance and Partnership Working. The investigations and schemes to be delivered under each of these for drinking water is described in Appendix 1.

## 3. AMP6 Strategy

### 3.1. Investment Strategy

Our catchment management investment strategy has evolved over the past two AMPs. In AMP5, catchment activity was driven by the National Environment Programme (NEP) and focussed on heavily modified water body investigations and option appraisals, with little emphasis on water quality. In AMP6, the NEP included some water quality investigations for drinking water protected areas and some water resource sustainability reduction investigations for specific abstractions. Meeting the Drinking Water Inspectorate (DWI) legal limits on concentrations of nitrates in certain groundwaters and pesticides (metaldehyde) in certain surface waters also shaped our AMP6 approach.

In year 3 of AMP6, our emphasis evolved further, as we adopted a more proactive and expansive approach, termed the Catchment Compliance Programme. We were responding to the DWI's concerns that our catchment approach was narrowly focussed and based solely on DWI Undertakings and NEP drivers. The DWI recommended action should be taken requiring us to adopt a catchment strategy that considered all chemical and microbiological risks to water quality. The Catchment Compliance Programme, involving proactive risk assessments (desk and field based) and mitigation measures, will continue throughout future AMPs as part of business as usual.

Alongside an increased water quality focus, we are also taking a catchment approach to solving water resource challenges. Through the River Itchen and Test Inquiry we have agreed to expedite some planned future work to protect and enhance the Rivers Test, Itchen and Candover, increasing resilience of riverine habitats to low flows. A total of £2.8m investment in AMP6 will include mitigation, compensation and monitoring across the three river systems.

In AMP6, we also launched our Integrated Water Cycle Management Programme, with an emphasis on integrated catchment-scale water management across the business. The project is initially focussed on two pilot catchments – the Arun & Western Streams and the River Medway – bringing together evidence around current and future risks with planned investment to identify opportunities to deliver more integrated solutions that deliver multiple benefits.

During the remainder of AMP6 we are trialling an Integrated Catchment Health programme on the Isle of Wight drinking water protected areas mapping the challenges of phosphorous permit compliance, natural flood management, and bathing water compliance. From that, we will establish a baseline water quality monitoring programme to provide the evidence for targeted action and to demonstrate the success of the integrated approach.

<sup>2</sup> ICRS costs are captured within TA.11.WN01 Supply Demand Balance

We are also developing a ‘Capitals Approach’ to apply to our decision making, reporting and governance. We are developing a framework, including relevant metrics and processes, for identifying, measuring and valuing impacts (costs and benefits) on natural and social capital.

**Table 2: Actual AMP6 drinking water investment figures from the catchment first budget**

(£'m)	AMP6 Actual					AMP6 Total
	2015/16	2016/17	2017/18	2018/19	2019/20	
TOTEX	0.408	1.518	3.573	4.939	12.313	22.752
CAPEX	0	0	0	0	0	0
OPEX	0.408	1.518	3.573	4.939	12.313	22.752

Table 2 includes costs for [the] DWI nitrate catchment solution, DWI pesticide catchment management, WINEP drinking water protected areas investigations, catchment compliance risk assessments, WINEP water resource investigations and implementation and the Integrated Water Cycle Management pilots. The AMP6 expenditure for ICRS is £2.781m, forming part of the WRMP budget which is detailed in the technical annex [TA.11.WN01 Supply Demand balance](#). The AMP6 expenditure for Catchment Partnership/Enabling is £3.351m, forming part of the Management and General budget. ICRS and Catchment Partnership/Enabling do not form part of the £22.8m.

## 3.2. Customer Benefits and Resilience

Successful delivery of the NEP programme directly affects our environmental performance assessment metric (EPA). Failure to deliver can have a negative impact with the potential result of the EA down-rating our overall annual EPA company rating. Our EA EPA company rating is important in the EA’s overall assessment of water companies and feeds into a public facing annual assessment of water industry performance.

Our EPA company rating is a reference point for Defra. If we fail to help the UK achieve EU Directive compliance the EA or other regulators may enforce against us, including via the imposition of sanctions. Likewise, our EPA company rating is a reference point by Ofwat in understanding our comparative environmental performance.

Our NEP programme has been successfully delivered throughout AMP4, AMP5 and AMP6.

# Water Quality Compliance

## Rank of Southern Water Quality Compliance

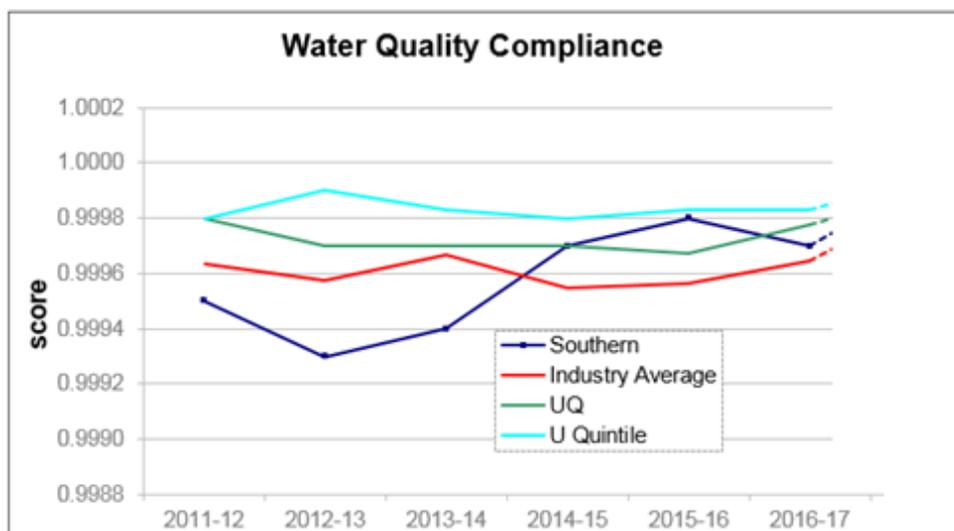
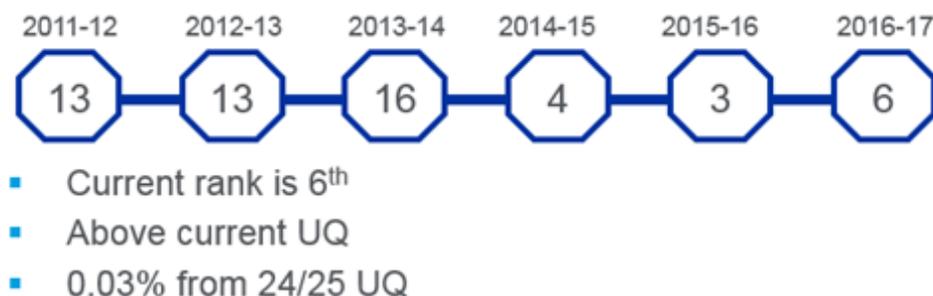


Figure 2: Graph to show Southern Water's improvement in Water Quality compliance

The measure currently used for water quality compliance is Mean Zonal Compliance (MZC). This will be replaced in AMP7 by a new measure, the Compliance Risk Index, (CRI – see section 5.4).

Since 2011 our relative water quality performance improved significantly (see Figure 2). Nevertheless, challenges dealing with quality of the raw water including cryptosporidium, turbidity, nitrate and pesticides have put pressure on existing assets to deliver compliant drinking water. The catchment portfolio of work is designed to manage the raw water quality and quantity pressures in the natural environment and reduce the risk at our point of abstraction.

## 4. Drivers for change

### 4.1. Customer and stakeholder views

We have developed a deep and granular understanding of the views and priorities of our customers and stakeholders (see technical annex [TA 4.4 Customer and Stakeholder Engagement deliverables](#)).

The DWI and the Environment Agency, also expect us to develop a stronger catchment focus, and as a result the AMP7 catchment programme is almost exclusively being undertaken under regulatory instruction (DWI Undertakings and Water Industry National Environment Programme (WINEP) Schemes). Finally, we recognise we are behind other water companies, many of which have pursued catchment solutions over several AMPs. In short, customers, stakeholders and regulators all expect us to significantly progress catchment management from AMP7 onwards.

In summary, customers and stakeholders consistently rate catchment management, and the direct and wider outcomes it delivers, as important.

### **Safe and high quality water**

Customers view safe and high quality water as a top priority. They want access to water that is as natural as possible and object to too many chemicals being added to their water supply. However, customers also acknowledge chemicals are sometimes necessary to ensure water safety. In particular, customers are concerned about the levels of nitrate in their drinking water as they understand nitrates can have a big impact on human health, especially on young babies (see technical annex [TA.11.WN02 Nitrate](#)).

On the other hand, stakeholders regard the supply of safe and clean water to be a given, consequently ascribing it a lower priority. Customers of the future also take water quality for granted and tend to focus more on protecting and enhancing the environment. They therefore consider it is a medium priority.

### **Customers believe water resilience is a medium priority**

Our customers view water as a precious, natural resource to be looked after and used wisely. They are concerned about their water supply being at risk due to a growing regional population. They are also concerned about the impact of climate change on their water and wastewater services.

They expect us to ensure future generations have access to the same level of water services as today, and are willing to pay for investment now to prevent future deterioration in services. Customers prefer approaches with lower carbon and environmental impact.

### **Stakeholders believe water resilience is a high priority**

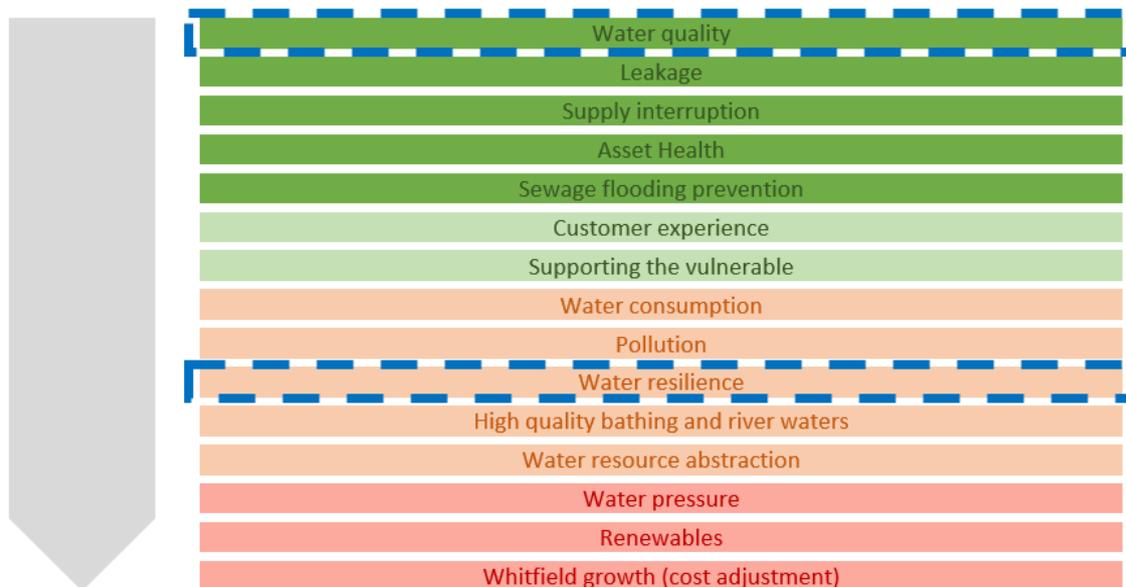
Government and stakeholders want to see more resilient long-term water resource strategies. Stakeholders see us as playing a vital role in delivering necessary improvements, both by persuading government of the need for change and by pioneering new projects. However, some stakeholders believe a great deal of the measures required to improve resilience are beyond our remit, resting instead with government and the wider water industry.

More information on how we are going to deliver water resilience can be found in Technical Annex [TA.11.WN01 Supply and Demand Balance](#).

### **Customers and stakeholders want greater adoption of catchment management**

Both customers and stakeholders agreed catchment management is one of the preferred methods for guaranteeing a high quality and sustainable water supply for the future. However, there is no consensus about who should take the lead. There is consensus we should not fund catchment work of no direct benefit to customers.

A lack of consensus exists about our role in controlling the use of pollutants in agriculture that run off into the water streams. While stakeholders generally see us partnering with farmers, there is no agreement about whether and how to compensate farmers for preventing run off of contaminants. Some customers believe compensation funding should be not met through their water bills, while others say that withholding compensation will lead to higher food prices.



**Figure 3: Relative priority of services according to our customers**

Figure 3 visualises customers' prioritisation of Ofwat's performance commitment categories. We developed this by triangulating the evidence from our customer engagement and our historic performance data for each performance commitment. The performance commitments were then grouped into categories based on similarity. The full results and approach can be found in [TA.4.3 Triangulation of customer priorities](#).

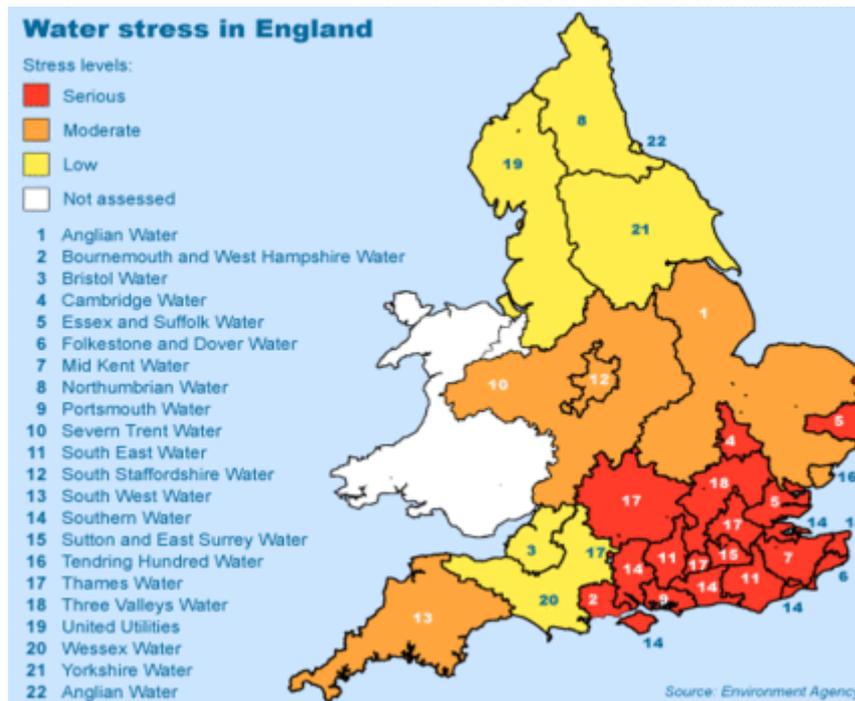
We used this to develop a set of performance commitments and investment proposals, and validated and refined these over the course of our programme of customer engagement. Our success at delivering on these priorities will be measured by the performance commitments outlined in this business case.

## 4.2. Future Trends and Pressures

Our water supply is made up of 70% from groundwater, two-thirds of which have increasing nitrate concentrations. The remaining 30% of our abstractions are from surface water sources. Of the 9 surface water supply works, 6 have regular concentrations of metaldehyde that exceed the drinking water quality limit (see Appendix 2). If these issues are not managed at source via a catchment scheme, they will require a treatment solution, or new sources to be developed in the future.

The natural environment already faces pressures from climate change, urbanisation, water demand and changes in land use. There are also increasing pressures on the natural functionality of our waterbodies from historic, existing and proposed physical features such as weirs, sluices, modified banks and disturbance activities that limit naturalisation.

In the already water-stressed South East (see Figure 4) the water resources WINEP will allow us to understand the WFD impact on water bodies from our abstractions. This may lead to a reduction in our abstraction licences to a sustainable level, which in turn will affect supply options for the WRMP.



**Figure 4: Water stress in England (Source EA 2013)**

The Government has stated it wants to be ‘*the first generation to leave the natural environment of England in a better state than it found it*’<sup>3</sup> with environmental resilience as an integral part of its vision for a resilient water sector. In the government’s Strategic Policy Statement<sup>4</sup> there is an expectation that water companies “*further the resilience of ecosystems that underpin water and wastewater systems and services, where this achieves best value for money over the long-term. This includes considering where water and wastewater systems could be used to provide wider benefits to the economy, society and the environment without having adverse impacts on costs or services, for example by using reservoirs to help alleviate flood risks where appropriate*”.

## 5. AMP7 Strategy

### 5.1. Investment Strategy

By working in partnership with catchment stakeholders to address risk and reverse adverse trends in the upstream catchments, we can resolve some of our main challenges around diffuse pollution, water resources and biodiversity more effectively than through traditional engineering solutions.

We have 82 groundwater works and 9 surface water works from which we currently supply water to customers. All water catchments, whether surface or groundwater, are vulnerable to contamination from the surrounding land use, so we must understand each catchment and the potential risks to be able to anticipate and address issues before they arise; prevention is better than cure.

**Catchment First**, is a more strategic, proactive and sustainable approach, using natural processes and working with catchment partners to deliver a better water environment. Ultimately, this contributes towards a reduced treatment burden, more affordable bills and a better environment for our customers.

<sup>3</sup> A Green Future: Our 25 Year Plan to Improve the Environment [assessed on 10<sup>th</sup> March 2018 [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/673203/25-year-environment-plan.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/673203/25-year-environment-plan.pdf)]

<sup>4</sup> The Government’s Strategic Priorities and Objectives for Ofwat [assessed on 10<sup>th</sup> March 2018 [https://consult.defra.gov.uk/water/consultation-on-a-new-sps/supporting\\_documents/Draft%20SPS%20for%20consultation%20%20FINAL.pdf](https://consult.defra.gov.uk/water/consultation-on-a-new-sps/supporting_documents/Draft%20SPS%20for%20consultation%20%20FINAL.pdf)]

Our aim is to address water quality risks and issues at source, by working with stakeholders to protect and improve raw water quality and quantity. Although water treatment will always be necessary to safeguard customers, catchment management alongside traditional treatment better protects raw water quality in the longer term rather than simply responding to the vicious cycle of ever declining raw water quality with yet more treatment processes.

Catchment First will:

- Operate at a regional level - incorporating catchment partnerships, collectively investigating issues and delivering schemes to alleviate the key pressures.
- Incorporate natural & social capital assessments - natural and social capital accounting will form a crucial part of cost/benefit analyses of schemes.
- Align the interests of partners – we will meet our regulatory requirements, but in many instance this will be by working collaboratively on schemes and investments to contribute to Catchment First outcomes. This will be most effective where the incentives of all partners are aligned.
- Be evidence-led - to inform ongoing stakeholder engagement.

The Catchment First AMP7 cost breakdowns are shown in Table 1.

Table 3 sets out the need and outcomes from the [Catchment First](#) programme of work.

**Table 3: The need, outcome and value for money for Catchment First**

Scheme	The need	The driver	Justification for investment
<p><b>Nitrate catchment solution</b> – implement catchment management to manage the rise in raw water nitrate concentrations in our groundwater sources</p>	<p>We have an increasing nitrate issue in our groundwater – this scheme will implement catchment management at 42 of our sources following recommendations from AMP6 investigations. This will include sources where we are developing a nitrate treatment solution in AMP7 – details of which can be found in technical annex <a href="#">TA.11.WN02 Nitrates</a>.</p>	<p>WINEP/DWI notice – regulatory compliance</p>	<p>Comply with our regulatory legal requirement. Managing the nitrate problem at source is substantially cheaper than nitrate removal treatment and is a more sustainable solution. The 60 year NPV for nitrate treatment in the Thanet WRZ is £125.4m. The 60 year NPV for nitrate treatment combined with catchment management in the Thanet WRZ is £103.7m.</p>
<p><b>Pesticide catchment management</b> – implement catchment management to manage/reduce the volume of metaldehyde (and specific pesticides) used within our surface water catchments</p>	<p>Of our 9 surface water abstraction WSWs, 7 currently have an issue with metaldehyde concentrations breaching the drinking water quality limit. Metaldehyde is not effectively removed via traditional treatment techniques, other water companies have trialled treatment solutions which were both exceptionally high in Capex and Opex. Managing metaldehyde in the catchment is the cheaper and more sustainable solution.</p>	<p>WINEP/DWI undertaking – regulatory compliance</p>	<p>Comply with our regulatory legal requirement. Managing the metaldehyde problem at source is substantially cheaper than advanced additional treatment and is a more sustainable solution. The 60 year NPV for metaldehyde treatment at Burham WSW is £25.2m. The 60 year NPV for catchment management only for metaldehyde within the Medway catchment is £6.8m.</p>
<p><b>WINEP - Drinking Water Protected Areas</b> – Schemes following AMP6 investigations and investigations to inform AMP8 schemes</p>	<p>A number of investigations will be undertaken in early AMP7 to determine the source, pathway, receptor of specified substances deemed to be a risk to our drinking water quality. Catchment solutions will</p>	<p>WINEP – regulatory compliance</p>	<p>These investigations will inform what action is required in AMP8.</p>

	also be implemented following on from AMP6 investigations.		
<b>Catchment Compliance</b> – catchment water quality sampling, risk assessments to inform Drinking water Safety Plan (DWSP), mitigation measures to control/reduce risks	To understand the risk posed from the catchment and by catchment activities to our drinking water quality and catchment health.	Regulation 27 of the DWSP- regulatory obligation (DWI)	Work required to be compliant with the DWSP regulatory obligation. Work required to remove need for DWI enforcement order. Work to assess the risk to the natural environment and drinking water quality from pollutants.
<b>WINEP – Water</b> Water Resources (investigations) – investigations to inform AMP8	Investigations to assess the Water Framework Directive impact on the environment from our abstractions.	WINEP – regulatory compliance	These investigations could ultimately lead to a reduction in abstraction licence quantity which will impact on our supply demand balance. This could trigger selection of more expensive reuse or desalination schemes in the WRMP options appraisal. Undertaking all of these investigations in AMP7 means that we can future proof schemes which is the most cost effective and sustainable solution.
<b>WINEP - Water</b> cont. Water Resources (scheme implementation) – implementation of schemes following AMP6 investigations	As part of the AMP6 investigations, options appraisal and cost benefit analysis determined the appropriate action required from Southern Water to mitigate the risks from our abstractions on the natural environment.	WINEP – regulatory compliance	Implementation following AMP6 investigations and options appraisal work. This work will also minimise the risk of reductions to abstraction licence quantity, which would trigger selection of more expensive reuse or desalination schemes in the WRMP options appraisal.
<b>WINEP – Water</b> cont. Biodiversity (investigations) – investigations to inform AMP8	To support nature’s recovery and restore losses we will also be delivering a number of biodiversity investigations (SSSI condition, invasive non-native species etc.)	WINEP – regulatory compliance	Investigations in AMP7 will propose mitigation measures to be implemented in AMP8 to improve catchment health.

<p><b>Catchment Partnership/Enabling</b> – integration of projects both internal and external stakeholders to maximise outcomes, future proofing and achieving/quantifying wider benefits.</p> <p><b>For information only. ICRS costs are included in TA.11.WN01 Supply Demand Balance</b></p>	<p>Ensuring that programmes of work are aligned to deliver multiple benefits. Valuing natural and social capital benefits across AMP7 and embedding these valuations in our decision making processes.</p>	<p>WRMP – regulatory compliance Enhance the WRMP options appraisal. In-line with Defra’s 25 year Environment Plan, which will translate into regulatory guidance</p>	<p>Natural capital accounting will form part of the new WRMP methodology and will be required to inform the 2023 draft WRMP. A better understanding of natural and capital values to inform decision-making; inform conversations with customers around willingness to pay; provide evidence to target partnership working (beneficiaries of ecosystem services) etc.</p>
<p><b>In-stream Catchment Resilience Schemes (ICRS)</b> – investigations to inform AMP8 WRMP options</p> <p><b>For information only. ICRS costs are included in TA.11.WN01 Supply Demand Balance</b></p>	<p>Investigations to assess the potential to adjust the in-stream catchment to be more resilient to future drought conditions. If we can make our rivers more resilient to drought/low flow conditions we may be able to delay or reduce any reduction to our abstraction licence and the duration that water use restrictions are in place for our customers.</p>	<p>Section 20 legal requirement following the AMP6 Inquiry WRMP – regulatory compliance</p>	<p>Following the Inquiry it has been agreed that monitoring will commence in AMP6 with mitigation measures in by 2023 to meet the WFD sustainability deadline of 2027. These investigations will inform AMP8 implementation, designed to minimise the risk of reductions to abstraction licence quantity, which would trigger selection of more expensive reuse or desalination schemes in the WRMP options appraisal.</p>

The variance of AMP6 actuals and AMP7 forecast are shown in Table 4.

**Table 4: Breakdown of Catchment Management Solution AMP7 expenditure in comparison to AMP6 actuals by programme.**

Scheme	AMP6 (£m)	AMP7 (£m)	Variance AMP6 to AMP7 (£m)
WINEP - Water	12.376	14.915	2.539
NEP - Drinking Water protected Areas catchment mgmt.	0.659	2.795	2.135
Nitrates Catchment Solution	0.906	5.555	4.649
Catchment Compliance	5.800	3.000	-2.800
Pesticides Catchment Mgmt.	3.010	4.963	1.953

Table 5 shows future expenditure proposed for catchment management. These costs exclude wastewater catchment schemes the ICRS and Catchment Partnership/Enabling costs.

**Table 5: Medium and long-term investment proposals**

(£'m)	AMP6	AMP7	AMP8	AMP9
TOTEX	22.752	31.229	39.301	39.301
CAPEX	0	0	0	0
OPEX	22.752	31.229	39.301	39.301

The In-stream Catchment Resilience Schemes (ICRS) investment in AMP6 was £2.781m, In AMP7 it will rise to £7.280m, and then to £18.958m in AMP8, with a forecast of £23.356m in AMP9. Costs are captured within **TA.11.WN01 Supply Demand Balance**. Catchment Partnership/Enabling in AMP6 was £3.351m in AMP7, it will rise to £3.5m for AMP8 and AMP9. Costs are captured within Management and General. See Appendix 2 and 3 of this document for further information.

Our AMP7 catchment focus will be transformational compared to that in previous AMPs (see section 3.1). We will not only deliver NEP/regulatory compliance, but move beyond, into proactive management of catchments where future water resource constraints are predicted.

## 5.2. Plan Options

We considered three main options:

**Option 1:** an increased catchment programme across our entire area, covering a wider range of potential risks and approaches. We will adopt advice and mitigation measures within **all** of our catchments, and **increase** the number of water quality monitoring locations. This option leads to higher bills than our customers are prepared to pay and cannot be completed during AMP7.

**Option 2:** implements the regulatory schemes and investigations assigned to Southern Water by the Environment Agency and Drinking Water Inspectorate during AMP7. This option provides an appropriate level of advice within the **relevant** catchments, delivers the WINEP/DWI programmes as per the **agreed** scopes, and monitors water quality at an **optimal** number of locations.

**Option 3:** is a reduced scope option with the lowest costs but which does not meet our regulatory obligations. We would also rely more on engineering solutions or new sources in the future. This option will **restrict** high-level advice and mitigation to the WINEP/DWI catchments only, and **reduce** the number of water quality monitoring locations.

**Option 1:** Increased scope: £46.7m<sup>5</sup>

**Option 2:** Preferred Option £31.2m<sup>5</sup>

**Option 3:** Reduced scope: £23.8m<sup>5</sup>

<sup>5</sup> Costs exclude ICRS and Catchment Partnership/Enabling

We have taken steps to reduce costs by exploring different approaches (and resulting costs) for implementation of catchment approaches. This included: a) fully outsourcing; b) blend of outsourcing and in-house delivery and c) fully in-house delivery.

The preferred option assumes a blend of outsourcing specific components, such as technical studies and investigations, and in-house delivery. This ensures lowest possible cost to customers. We have market tested services, such as for sampling and laboratory analysis, to ensure long term affordability.

We have also looked at synergies with other projects from wastewater catchment management and asset maintenance to incorporate our water quality and quantity models into a single, holistic evidence base. All catchment management schemes have been assessed via the WRMP options appraisal and cost benefit analysis process.

The activities agreed with our regulators are appropriate and the most cost beneficial in order to fulfil our WINEP responsibility.

### 5.3. Innovation

Our **Catchment First** programme brings together water quality and quantity drivers to achieve integrated outcomes with a lighter treatment burden and less reliance on engineering.

We are also innovating through our AMP6 programme:

#### **Integrated outcomes: water quality and water resource benefits**

Given the pressure on drinking water supplies in our region, we are examining a number of schemes in the Test, Rother and Arun and Medway catchments where future water quality and resource pressures oblige us to plan for a range of engineering solutions at great cost but limited wider natural and social benefits. Integrated catchment risk management – looking at both quality and quantity - will allow us to delay and/or reduce the need for costly engineering solutions.

#### **Natural and Social Capital**

We are adopting natural and social capital accounting for environmental evaluation of the feasible options in the WRMP. This will support our catchment resilience investment and provide metrics to help us describe the 'desired' state' of natural capital in each catchment.

#### **Modelling and Mapping**

During AMP5 and 6 we built comprehensive groundwater models covering Brighton and Worthing, the Isle of Wight, and the rivers Test and Itchen. During AMP7 we will improve our understanding of the hydrogeological nature of our sources covering the majority of our raw water catchments. We will investigate options to incorporate water quality into our water resource models to provide a more comprehensive understanding of our sources.

The geology in the chalk areas across the South of England is fractured, allowing fast pathways for pollutants to aquifers. We carried out a Kast feature mapping exercise in AMP6 covering the Brighton and Worthing supply areas. In AMP7 we will apply this wherever relevant to understand the locations of sinkholes providing fast pathways directly to our abstractions. We will then tracer test the level of risk to our abstraction and the level of catchment management required.

We will also work with regional universities on **Catchment First**, developing internal and external research opportunities.

#### **Monitoring**

In AMP6 we worked with the University of Portsmouth on water quality analyses (including pesticides and pharmaceuticals) at all of our catchment sample locations. In AMP7 we will re-conduct this, defining the catchment sampling programme needed each year. This will enhance our understanding of the catchment risks.

We have monitored a number of our catchments to understand soil health, assessing a number of parameters including worm counts.

During the remainder of AMP6 we plan to monitor the water quality outputs from our wastewater treatment works (WwTW) for metaldehyde providing additional risk identification to our assessments. We will operate in a collaborative manner, joining up the clean water and waste water side of the business to determine our business impacts on the raw water quality risk. In AMP7 we will undertake further water quality monitoring, broadening the determinants assessed at our WwTWs, including WTW catchment capture zones and where appropriate adopt catchment management measures. We will co-develop a catchment sampling programme to address the requirements of all relevant stakeholders within the business to define a cost beneficial centralised programme.

### Technology and data capture

We use aerial imagery and data analysis to look at sediment movement in the catchments, changes in depth and temperature of rivers. We will use emerging technologies in each field to map our catchment’s habitat at a more detailed scale than ever before. We are also implementing innovative data capture techniques using hand held devices.

### Engagement Approaches

We are adopting innovating engagement techniques with catchment stakeholders, testing the effectiveness of different emphasis in targeted engagements. Following our success in AMP6, we are looking to further fund the facilitation of more farmer led cluster groups, where we co-develop measures and outcomes and farmers are able to suggest options and solutions to address multiple issues. We will work with these farmer cluster groups, funding schemes or providing expert advice. We are also looking at options of getting farmers to bid for funding to reduce pollutants within high risk catchments.

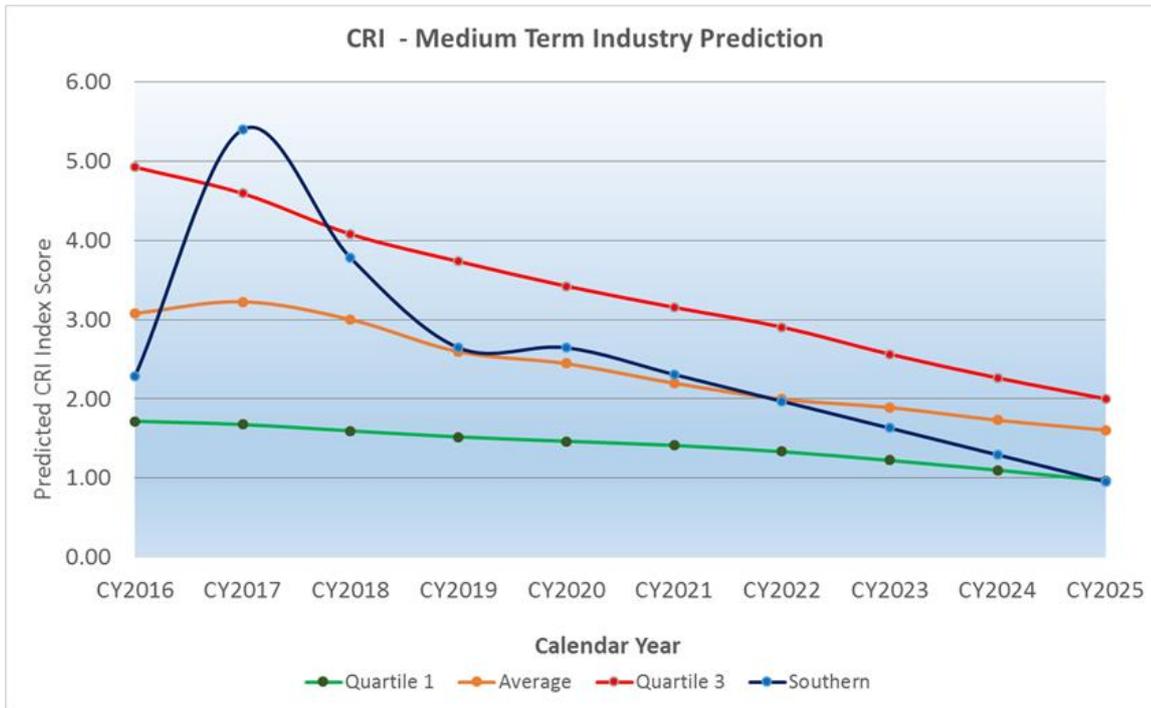
## 5.4. Customer Benefits and Resilience

The £35.6m investment detailed in this document along with the £7.3m for the ICRS making up the **Catchment First** portfolio will lead to reduced future capital expenditure across each catchment.

The Drinking water Inspectorate (DWI) has developed a new measure called the Compliance Risk Index, (CRI). This measures risk calculating a value which takes into account the consequence of failures using the prescribed values in the Regulations, any potential health risks, the population affected and the assessed actions of the company in response. The measure may be calculated for national, company and supply systems permitting performance comparison and measurement in mitigating risk to consumers. Compliance with the Nitrate PCV is a key component of CRI performance. Southern Water’s CRI is presented in Table 6 and Figure 4 below.

**Table 6: Southern Water’s AMP6 and AMP7 CRI performance**

Performance commitment	Measure	End AMP6 Performance	End AMP7 Performance
Water quality compliance	CRI basket measure	2.65	0.95



**Figure 5: AMP6 and AMP7 CRI performance<sup>6</sup>**

Our current performance on CRI puts us in quartile 2. Catchment management alongside treatment measures will further improve this score.

## 5.5. Value for Customers

Customers are not prepared to accept reductions in service in exchange for lower bills, and in general are willing to pay for improvements in service levels for our proposed water measures.

The total amount our customers would be willing to pay for a reduction of 1 in the number of cases of “Non-ideal taste and smell of tap water for a few days” was £48,929 per year (Table 8).

Our additional ODI research into willingness to pay for service level improvements indicated that our customers are willing to invest £1.37 on average to ensure their drinking water quality meets the required compliance.

Full detail on our customer engagement findings can be found in [Chapter 4 – Customer and Stakeholder engagement](#).

**Table 7: Willingness to pay for Water measures**

Service Attribute	Unit	WTP [£/Unit/Year]		
		Central	Low	High
Non-ideal TASTE AND SMELL of tap water for A FEW DAYS	Case/prop	£48,929	£37,588	£60,270

Customers have repeatedly told us they expect water to be safe to drink and they do not want supplies to be interrupted. The catchment management work will allow us to better understand the risk posed from the catchment to our raw water quality, and the sustainable quantity of water that is available.

Instead of assessing catchment management on an individual pressure basis across our region we will take a fully integrated regional approach. This will include the monitoring strategy, risk assessment and verification, stakeholder engagement and advice, suite of mitigation measures implemented, reporting etc. This approach will prevent unnecessary duplication of work and

<sup>6</sup> Source: PR19 Data Table App1 and TA.11.01

investment, ensure all risks are assessed and managed appropriately and allow us to work across all functions within the business to deliver lower cost catchment management solutions.

**Catchment First** will deliver multiple benefits to our customers and stakeholders including:

- Addressing the issue at source, delaying/avoiding expensive engineering solutions.
- Proactively managing our catchments so that any future operational decisions are well informed to address the risks.
- Making data collection open access.
- Supporting our partners/stakeholders in community projects.
- Increasing the land available to the public to access water within the pilot catchments. Currently less than 2% of the River Test catchment is accessible to the public (see Appendix 2 for more details).
- Improving the natural form and function of rivers within the catchment, increasing aesthetic value, encouraging tourism and making the water environment sustainable for the long-term.

## 6. Costing Strategy

Delivery will be via a mix of internal experts and external consultants. We have recruited a Catchment Risk Management team to technically manage and deliver the AMP7 programme. We have also agreed a delivery programme with the EA spanning the whole of AMP7 for the water resource NEP.

A substantial proportion of the expenditure for AMP7 is based on the scopes of work agreed between us and our regulators. Our AMP6 investigations provided useful insight into the scale of the implementation phase required.

Catchment scheme solution costs have been costed by reviewing existing literature available, coupled with professional judgement. The table in Appendix 3 shows the options considered to define the preferred scope and investment for catchment schemes.

The ICRS investment will form part of the WRMP portfolio which includes catchment initiatives that deliver deployable output benefits. The development of the catchment schemes will demonstrate whether or not the approach is cost beneficial in the long term when compared to alternative built solutions.

Consultancy input will be procured through a framework/tendering process. The monitoring and analysis is undertaken using in-house samplers and the our contracted laboratory. The mitigation delivery has been estimated based on current incentive schemes and land use volumes to estimate the budget required to implement catchment management mitigation measures.

We are identifying opportunities to align our investments with current and planned external stakeholders plans and aspirations in order to achieve a more robust collaborative delivery – for both SWS and our partners. An example of this is the continuation of the Catchment Health programme on the Isle of Wight, incorporating project requirements from across the business and extending out to stakeholders.

Our approach to natural and social capital accounting has been endorsed by key external stakeholders and our CCG. We will explore how our wider ‘capitals approach’ can inform our strategic investment planning framework to support decision and delivery processes and to enable us to better articulate the wider benefits that our business delivers.

We are applying a natural and social capital accounting approach to a number of schemes within our plan (including the WRMP) to demonstrate how this approach has influenced our investment decisions. We are planning how we start to build environmental and social valuations into longer term conversations with our customers through our customer insight work. We are aligning our approach to natural & social capital accounting with partner initiatives (most notably with Sussex Local Nature Partnership and a Defra Local Action Project on the Medway).

## 7. Key Risks and Opportunities

Key risks and opportunities relevant to the Catchment Management Solution programme are highlighted below.

### 7.1. Risks

- **Nitrate** – raw water nitrate concentrations increase at a higher than predicted rate, leading to an increase in implementation, or capacity of, a treatment solution.
- **Metalddehyde** – if not banned, treatment solution would be required to ensure compliance by 2025.
- **Brexit** – leads to changes in farming practices i.e. an increase in high risk arable practices (increase in Oil Seed Rape/Wheat) or an increase in livestock farming – increasing the risk of nitrate and cryptosporidium issues.
- **Water/climate** – situation in the South East could influence crop patterns and pesticide use.
- **Cost** – the investigations and schemes have been costed using previous delivery methods, expert knowledge and based on actual cost rates for consultants and water quality analysis.

### 7.2. Opportunities

- **Metalddehyde** – is banned in all high risk drinking water protected area catchments.
- **Stakeholders** – opportunity to enhance relationships with stakeholders including regulatory bodies, to work collaboratively with key catchment stakeholders.

## Appendix 1: Projects & Schemes in AMP7

Scheme	Regulatory driver	Deliverable	Delivery date	Scheme TOTEX
<b>Nitrate Catchment solution</b> (42 groundwater sources, inc. 35 under DWI Notice and 40 under WINEP)	DWI Notice/EA - WINEP	Implementation of Catchment Management	31/03/2025	£5.6m
<b>Pesticide Catchment Management</b> (7 surface water sources)	DWI Undertaking	Implementation of Catchment Management	31/03/2025	£5.0m
<b>NEP – Drinking Water Protected Area</b> (20 groundwater and 3 surface water source investigations) (43 source catchment management schemes – costs of which have been absorbed within the Nitrate Catchment Solution line for efficiency)	EA - WINEP	Catchment investigation	31/03/2022	£2.8m
<b>Catchment Compliance</b>	DWI Regulations	Risk assessment and scoring	31/03/2025	£3.0m
<b>WINEP – Water</b> (Water Resources and Biodiversity)	EA - WINEP	See breakdown below		£14.9m
		Water Resource 61 high priority source investigations	31/03/2022	£9.1m
		Water Resource 26 lower priority source investigations	31/03/2025	£2.3m
		Biodiversity investigations (15 investigations)	31/03/2022	£1.0m
		Water Resource scheme implementation	31/03/2025	£2.5m
<b>TOTAL</b>				<b>£31.2m</b>

Catchment regulatory works:

DWI driver:

- Nitrate Catchment Solution – 35 groundwater source catchments will be included in DWI nitrate notices for assessment and mitigation measures.
- Pesticide Catchment Management – 8 surface water source catchments will be included in the DWI metaldehyde undertakings for continuation of mitigation measures.

WINEP regulatory driver:

- WINEP Drinking Water Protected Areas – 20 groundwater sources will be investigated as Drinking Water Protected Areas (DrWPA) and 3 surface water sources will be investigated as DrWPA.
- WINEP Drinking Water Protected Areas – 40 groundwater sources will require catchment mitigation measures and 3 surface water sources will require catchment mitigation measures – these have been scoped and costed in line with other mitigation measures for efficiency delivery of schemes.
- WINEP – Water – Water Resource investigations - 83 groundwater sources and 4 surface water sources will be investigated to assess the risk of Water Framework Directive (WFD) deterioration from our abstractions.
- WINEP – Water – Water Resource implementation – Implementation of measures following AMP6 WINEP investigations for WFD deterioration.

For the WINEP It is important water quantity and quality are considered together to fully understand risk and resilience and to assess any synergies that can be made.

- WINEP – Water – Biodiversity – 9 investigations under the Sites of Special Scientific Interest (SSSI) WINEP driver, 3 investigations under the Natural Environment & Rural Communities (NERC) WINEP driver, 2 investigations under the Habitats Directive (HD) WINEP driver, 1 investigation under the Invasive Non-Native Species (INNS) WINEP driver.

Catchment resilience:

Supply Demand schemes - In-stream Catchment Resilience Schemes (ICRS)<sup>7</sup>

Water is our most precious resource and the water environment is facing enormous pressure from climate change and increasing episodes of severe flooding and drought. Our strategy for the future is about securing a resilient and sustainable water resource in the South East by transforming the way we work and innovating to meet the challenges ahead.

The ICRS Schemes take on the aims of the Supply Demand Balance technical annex to deliver sustainable water use, resilient to climate change and economic pressures. These initial investigations and resulting schemes will aid the business as environmental legislation is already requiring us to make changes to some of our existing sources of water, restricting the water available in dry and very dry years, through in-channel habitat resilience and improvements to form and function of water ecosystems. Water use limitations and other licences are predicted to continue to be restricted into the future, to protect and improve rivers, aquifers, reservoirs and coasts for the future.

AMP7 investment will include gathering the baseline information in which to take in-channel interventions forward. These interventions are reliant on gathering data on river form and function through catchment scale analysis of land-use, geomorphology and hydrological regime and to work with stakeholders including partnership groups to develop specific priority interventions to ensure time and cost savings. We also plan to work closely on the co-design and co-delivery of

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<sup>7</sup> ICRS costs are captured within TA.11.WN01 Supply Demand Balance

partnership projects with stakeholders in each of the pilot catchments (Test, Arun & Western Rother and Medway catchments).

These catchment resilience schemes aim to enhance the natural resilience of catchments to better support water ecosystems. This is in line with Defra's 'Creating a great place for living' publication<sup>8</sup>.

#### Catchment Compliance:

We are taking a more proactive approach to catchment management, while also addressing reactive water quality issues. The catchment compliance work will continue in AMP7 for 10 surface water catchments (Itchen, Test, Medina, Yar, Western Rother, Arun, Weir Wood, Medway, Brede and Eastern Rother) and 95 groundwater catchments (covering operational and non-operational sources). The risk will be reassessed annually and as a tactical response to water quality issues. Mitigation measures will be discussed and agreed with relevant stakeholders with schemes being implemented in AMP7 and future AMPs to manage risk. We will also work across the business to ensure that we manage the risk coming from our assets.

#### Partnership Working

##### Catchment Partnership/Enabling<sup>9</sup>

We face big challenges in conserving and improving our natural world and a natural capital approach will help us meet them. As a supplier of water and wastewater treatment, we have a significant dependence on the natural capital within and surrounding our operational boundaries, including for the provision of a reliable supply of good quality water, climate regulation and flood risk management.

A better understanding of our impacts and dependencies in terms of natural and social capital facilitates the balanced management of these competing demands. The inclusion of environmental and social values into decision making provides opportunities for:

Optimising investment expenditure so that it provides the best value across financial, social, and environmental measures.

Achieving more for less through targeting solutions which are likely to provide multiple benefits.

Encouraging closer collaboration with stakeholders in terms of being able to better capture stakeholder values in decision making and communicate the outcomes of those decisions.

Demonstrating the wider impacts of our operations to regulators using a framework which allows quantification of environmental and social impacts.

As part of our approach to natural & social capital we are developing catchment accounts for 3 catchments (the Test, Arun & Western Streams and Medway) supported by a range of metrics. We are doing this in partnership with key stakeholders in order to consistently measure and monitor the extent and condition of our natural capital assets.

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<sup>8</sup> Creating a great place for living: Defra's strategy to 2020 (January 2016)

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/501709/defra-strategy-160219.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/501709/defra-strategy-160219.pdf)

<sup>9</sup> Catchment Partnership/Enabling costs are captured within Management and General

## Appendix 2: Details of Drinking Water Catchment First Schemes

### Nitrate regulatory compliance

High nitrate fertiliser application during the 1980s is a major source of the increasing nitrate levels we are currently seeing at the majority of our groundwater sources. Figure 5 is an example of nitrate modelling we have undertaken in AMP6.

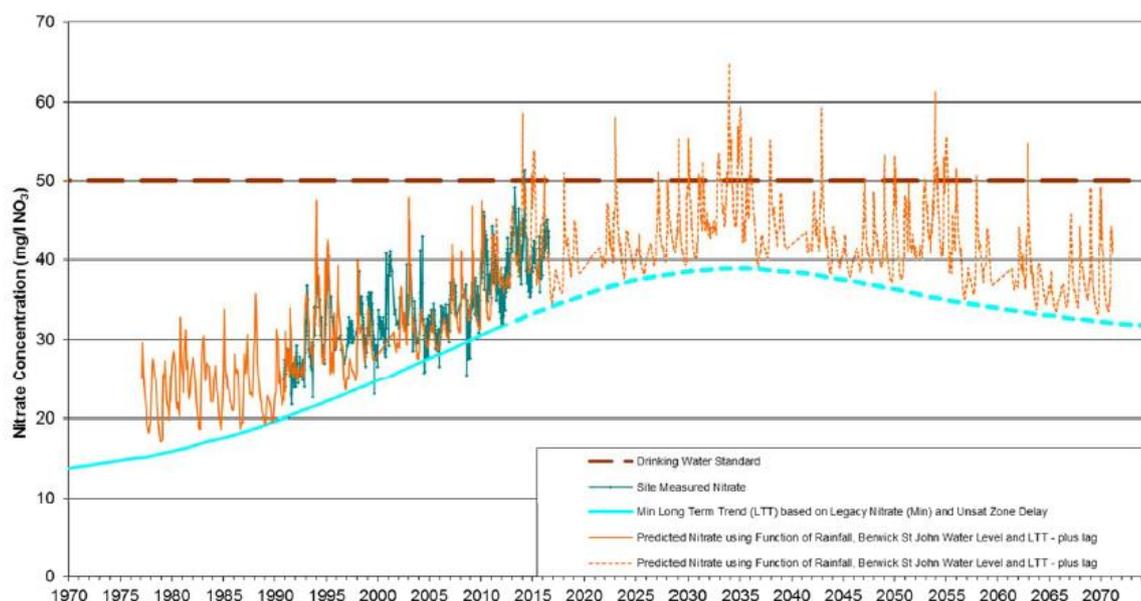


Figure 6: Nitrate modelling output

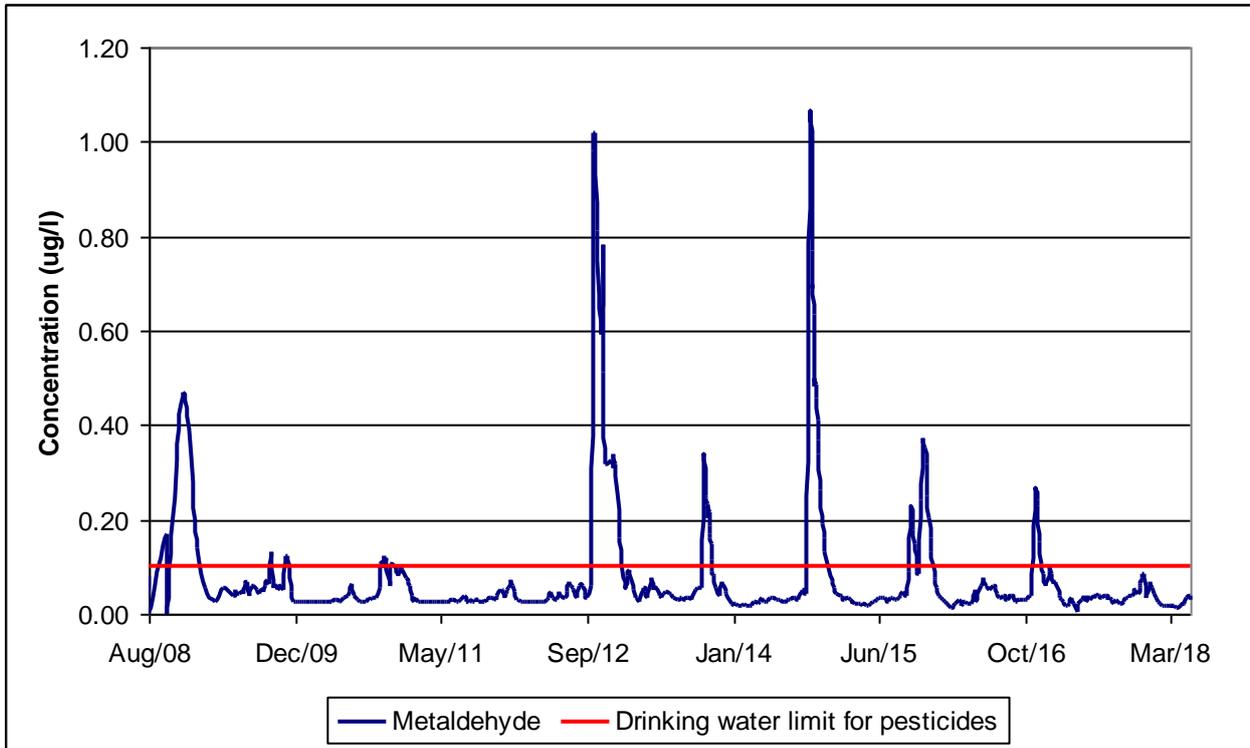
Catchment Management to address nitrate levels in groundwater is a long-term commitment with direct water quality benefits not being evident for several AMP. As outlined in technical annex [TA.11.WN02 Nitrate](#), raw water Nitrate levels are currently rising. We need to reduce the long term rate of rise and hasten the point at which raw water nitrate levels decline. This can be achieved through active management of catchments. We will therefore be implementing catchment management throughout our supply area to reduce and control sources of nitrate. In future AMPs, this will reduce both the amount of time nitrate removal plants are operating for and reduce the required capacity of future plants. AMP7 will see us actively engage in catchment management specifically to start to alleviate this issue in 46 groundwater catchments.

Nitrate in water reduces to nitrite which inhibits oxygen transport in blood leading to Methemoglobinemia or 'Blue Baby Disease'. This is particularly harmful to babies due to the relatively large proportion of their diet which can come from water.

The 5 nitrate removal treatment plants planned for installation in AMP7 have an asset life of approximately 20 years then will need further capital expenditure to renew the asset, along ongoing with operational costs, details of which can be found in technical annex [TA.11.WN02 Nitrate](#). This coupled with additional sources requiring treatment in AMP8 and beyond to address nitrate is a substantial investment. Successful catchment management will manage the point source nitrate concentrations affecting our abstractions, which will lead to a reduction in operation of the nitrate removal treatment plants and potentially negate the need to renew the asset at the end of its asset life. It will also reduce the number of sources that will require an engineered treatment solution to treat nitrate in future AMPs.

### Metaldehyde regulatory compliance

Annual spikes in metaldehyde concentration recorded at our surface water abstractions often exceed the drinking water limit, which is demonstrated in the graph below (Figure 6).



**Figure 7: Metaldehyde water quality analysis**

Metaldehyde is an industry wide problem as it is difficult to remove via conventional treatment methods. In AMP6 a research and development trial was undertaken by the Innovation team working with Arvia to pilot a small scale treatment plant at Burham WSW. By early 2019 we will have results of the effectiveness of this treatment trial with regards to metaldehyde removal.

By working closely with the users of this pesticide we can reduce the concentration in the environment to negate the need for a potentially very expensive, energy intensive treatment solution. This would also apply to other harder to treat pesticides used within our catchments.

The AMP6 metaldehyde undertaking has been extended until the end of AMP7 to continue measures to reduce the volume of metaldehyde used in our high risk catchments.

#### Instream Catchment Resilience Schemes<sup>10</sup>

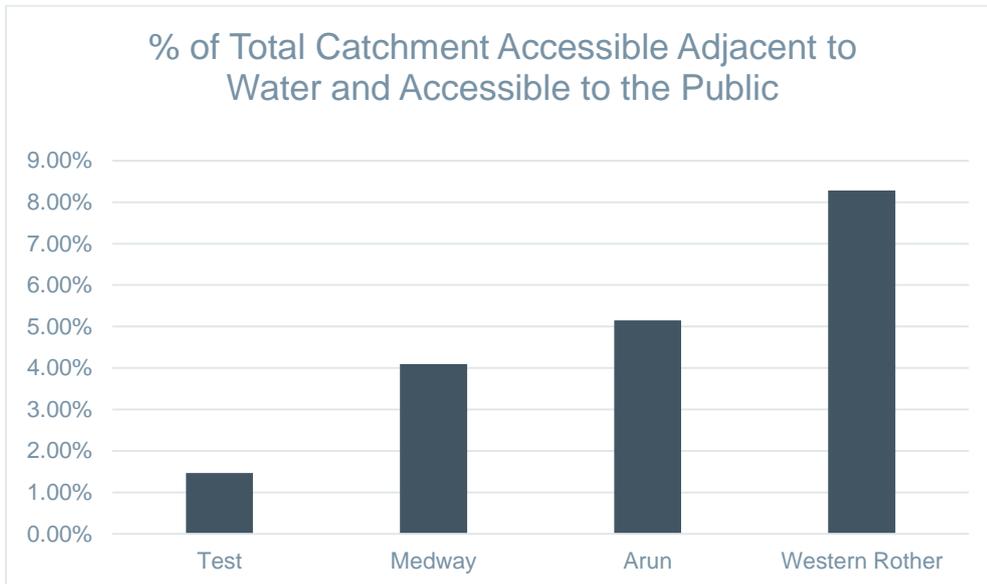
The ICRS give us the opportunity to address in-channel pressures such as water quality, sediment and modified form and function of water bodies, enabling the business and the environment to be sustainable and resilient in the future. Investment for ICRS will be from those planned AMP7 schemes within the WRMP. ICRS will provide much of the environmental investigation work that will support planned WRMP solutions.

Achieving improvements in physico-chemical parameters such as pH, dissolved oxygen and nutrients will be required to support a functioning ecosystem. For example, fish cannot survive and reproduce unless there are sufficient oxygen levels and suitable habitat. Without intervention, on a catchment scale, water quality reductions will ultimately lead to further deterioration of habitats impacting customers, recreational users, and wider stakeholders. There are multiple pressures within each of the catchments leading to reasons for not achieving good WFD status, these include direct and indirect impacts from the water industry however they also include pressures caused by land management, development, industry and domestic impacts such as septic tanks and dirty water run-off, which a catchment based approach could help manage.

Access to the countryside is becoming more and more important for our customers, not only to provide recreational fulfilment but also for health and wellbeing. There are increasing pressures in all of our operational catchments for public access, especially for access to water. We feel access

<sup>10</sup> ICRS costs are captured within TA.11.WN01 Supply Demand Balance

to water should be easy and readily available for our customers, to encourage understanding of water use and for the enjoyment of naturally functioning environments. The current state of access is shown in Figure 7. There is particularly a lack of access within the Test and Medway catchments, in part due to the large private estates that own the riparian rights within the catchments. By using customers' money to improve rivers and access, customers will equally share the benefit of better access to riparian catchments.



**Figure 7: Customer access to water**

## Appendix 3: Details of Options Considered

Work package	Increased scope option	Reduced scope option	Preferred option
Catchment Management (includes nitrate catchment solution, pesticide catchment management and drinking water protected areas)	As this is a WINEP requirement we cannot reduce the number of sources but we can increase to cover all of our sources and deliver advice and mitigation measures £23.4m	As this is a WINEP requirement we cannot reduce the number of sources but we can reduce the level of catchment management to advice only £10.4m – this will however slow resolution of the risk.	£13.3m This has been costed based on an initial screening for catchments where catchment management could make a difference.
Catchment Compliance	Increase the number of water quality sample locations within the catchment allowing refined clarity on the source of the contaminant/issue, including risk assessments and funding for mitigation measures £5.0m	De-scope to undertake water quality analysis at key locations within the catchment, without assessment and mitigation £1.5m - this will just monitor the risk and not provide any mitigation to protect drinking water quality.	£3.0m this has been costed based on the completion of the AMP6 phase and incorporating catchment monitoring, risk assessment updates and funding of mitigation measures
WINEP - Water (Water Resources investigations)  Included in the WINEP Water (investigations & implementation) line	As this is a WINEP requirement we cannot reduce the number of sources but we can increase the level of investigation to increase all sources to the high priority category and increase the scope of work delivered £11.9m	As this is a WINEP requirement we cannot reduce the number of sources but we can reduce the scope of work to be delivered (this would require authorisation and sign off from the EA) £7.9m – this programme is strategically important, reducing the scope could impact understanding and evidence which could increase the level of investment required in the WRMP.	£9.9m this has been costed based on an initial prioritisation screening, with sources either being high priority (requiring enhanced scope) or low priority (lesser scope requirement).
WINEP – Water (Water Resources implementation)  Included in the WINEP Water (investigations & implementation) line	As this is a WINEP requirement we cannot reduce the number of sources but we can increase the scale of implementation and the scope of work delivered £5.0m	As this is a WINEP requirement we cannot reduce the number of sources but we could reduce the scope of work to be delivered (this would require authorisation and sign off from the EA) £3.0m, reduced mitigation could retain risk to drinking water quality.	£4.0m this has been costed based on AMP6 investigations and options appraisal work, which has determined the most optimal scheme to be delivered.

WINEP Water (Biodiversity investigations)	As this is a WINEP requirement we cannot reduce the number of investigations but we can increase the level of investigation and increase the scope of work delivered £1.5m	As this is a WINEP requirement we cannot reduce the number of sources but we can reduce the scope of work to be delivered (this would require authorisation and sign off from the EA) £1.0m.	£1.0m this has been costed based on an initial review of the WINEP requirements for each of the investigations that make up this programme of work.
Catchment Partnership/Enabling Costs are included here for information only. Catchment Partnership/Enabling costs are included TA.11.WN01 Supply Demand Balance	Costed on data gathering, design, delivery and partnership funding of five pilot catchment in AMP7 £7.0m	Costed on data gathering, design, delivery and partnership funding of one pilot catchment in AMP7 £1.5m. No two catchments are the same we run the risk of not fully understanding the risks and benefits to the company by delivering this approach.	Costed on data gathering, design, delivery and partnership funding of three pilot catchment in AMP7 £4.4m
In-stream Catchment Resilience Scheme Costs are included here for information only. ICRS costs are included in TA.11.WN01 Supply Demand Balance	To deliver full package of resilience work for all of the three pilot catchments in AMP7: £35.7m, includes data gathering, feasibility/options appraisal, design, access, partnership funding and implementation.	Costed on full data gathering, design, delivery, access and partnership funding of one pilot catchment in AMP7 c.£2.5m. No two catchments are the same we run the risk of not fully understanding the risks and benefits to the company by delivering this approach.	£5.4m costed on data collection, options/feasibility and co-design and co-delivery partnership projects in all three pilot catchments. (AMP7 £4.3m, AMP8 £1.1m)