

SRN38 Water Industry National Environment Programme (WINEP)

Methodology for WINEP Enhancement Business Cases

Technical Annex

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from
**Southern
Water** 

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Glossary

Acronym	Full Name
WINEP	Water Industry National Environment Programme
EA	Environment Agency
NE	Natural England
DWMP	Drainage and Wastewater Management Plan
RBMP	River Basin Management Plan
INNS	Invasive non-native species
IED	Industrial Emissions Directive
SOAF	Storm overflow assessment framework
MCERT	EA's monitoring certification scheme
A-WINEP	Advanced WINEP
R&V	Risk and Value
EPA	Environmental Performance Assessment carried out annually by the EA
EDM	Event duration monitoring
CIP	Chemicals investigations programme
SSSI	Site of special scientific interest
WFD	Water framework directive
UPM	Urban pollution monitoring
RNAG	Reason for not achieving good ecological status
ASP	Activated sludge plant
TAL	Technically achievable limit
PE	Population equivalent
BAS	Biosolids assurance scheme
SSO	Short sea outfall
LSO	Long sea outfall
SPS	sewage pumping station
DO	Dissolved oxygen
CAD	Conventional Anaerobic Digestion
SOEP	Storm overflows evidence project
WISER	Water Industry Strategic Environmental Requirements

Executive summary

Our AMP8 water industry national environment programme (WINEP) proposals have been derived through following national guidance and through extensive engagement with our regional environmental regulators at the Environment Agency (EA) and Natural England (NE). As part of our drainage and wastewater management plan (DWMP) we have also engaged with a wide range of local stakeholders about their environmental priorities for our area and how our wastewater services can be improved to enhance the natural environment in our region.

The resulting proposals make up the largest environmental improvement programme we have ever developed. It will enable us to make great progress towards our long-term aims of reducing discharges from storm overflows, significantly reducing nutrients discharged to the environment, improving the environmental health of important habitats and priority sites, and protect public health in coastal waters.

We are proud to play our part in protecting and improving the local environment and welcome the opportunity for such a significant step change. But we have concerns over the deliverability and affordability of the programme that results from following the detailed guidance the EA produced. The level of investment is close to the total 5-year AMP7 WINEP every year of AMP8. We are committed to making the improvements but need longer to do so than the five-year AMP8 period in order to smooth the impact on customer bills and to enable the supply chain to ramp up and deliver the scale of work required across the country. The programme we present in our business plan is one that phases targeted investment beyond AMP8 and into AMP9 in order to allow a more deliverable and affordable AMP8 plan. Our plans are contingent on regulatory approval of our proposed phasing.

Summary of the wastewater WINEP enhancement business cases	
Name of Enhancement Cases	WINEP monitoring wastewater flows WINEP storm overflows WINEP enhancing wastewater treatment WINEP wider environmental improvements and gaining understanding WINEP bioresources
Summary of our WINEP	<ul style="list-style-type: none"> We will reduce both phosphorus and nitrogen in our wastewater effluents at almost a third of our treatment works (96 sites) We will focus on green catchment and nature based solutions to reduce the frequency and duration of storm overflows, focusing on high priority locations and our most frequent spillers. But we recognise that grey infrastructure solutions will also be needed to meet the target dates. We plan to install additional flow monitoring to demonstrate wastewater flow permit compliance and additional event duration monitors at emergency overflows. We will carry out a wide-ranging programme of investigations to inform future environmental improvements. We will invest in storage facilities for our treated biosolids to improve resilience of recycling to agriculture.
Expected Benefits	<ul style="list-style-type: none"> The WINEP will deliver improvements across a range of environmental indicators. It will also make direct improvements to many of the wastewater common performance commitments (such as storm overflow discharge frequency and duration, river water quality) and improvements to others such as reduction in sewer flooding that may result from storm overflow solutions. Due to the high number of very tight discharge permit levels that it will result in, the WINEP will mean the discharge permit compliance may be harder to

	<p>maintain particularly due to environmental regulators expecting many of our sites to meet the lowest technically achievable limits of nutrients. Any slight effluent quality variation will mean compliance could be compromised which is less likely with more lax permits even if we continue to target our operations at 60% of permit concentrations to provide a buffer.</p> <ul style="list-style-type: none"> • In addition, the tight permit levels are driving an increase in operational carbon through higher energy and chemical use.
Associated Price Control	Wastewater network plus and Bioresources
Enhancement TOTEX	£1,218 million using alternative delivery routes for delivering some investment £1,526 million if all investment were carried out in house.
Enhancement OPEX	£68 million using alternative delivery routes for delivering some investment
Enhancement CAPEX	£1,150 million using alternative delivery routes for delivering some investment
Is this enhancement proposed for a direct procurement for customer (DPC)?	Elements of the WINEP are under consideration for DPC or other alternative funding arrangements, in particular two aspects of the storm overflow discharge reduction plan: wetlands for treatment of dilute wastewater; highways drainage solutions; and aspects of the bioresources storage investment

1. Introduction

This technical annex describes our overall approach to developing the WINEP and the evidence underpinning our related AMP8 business plan proposals. It sets out the overarching processes used across the WINEP in understanding the local environmental needs for improvements across our region and considering the options for meeting those needs following the Environment Agency’s technical guidance. It also explains our approach to costing the resulting investment needs and how customers are protected if we do not deliver the improvements we are committing to.

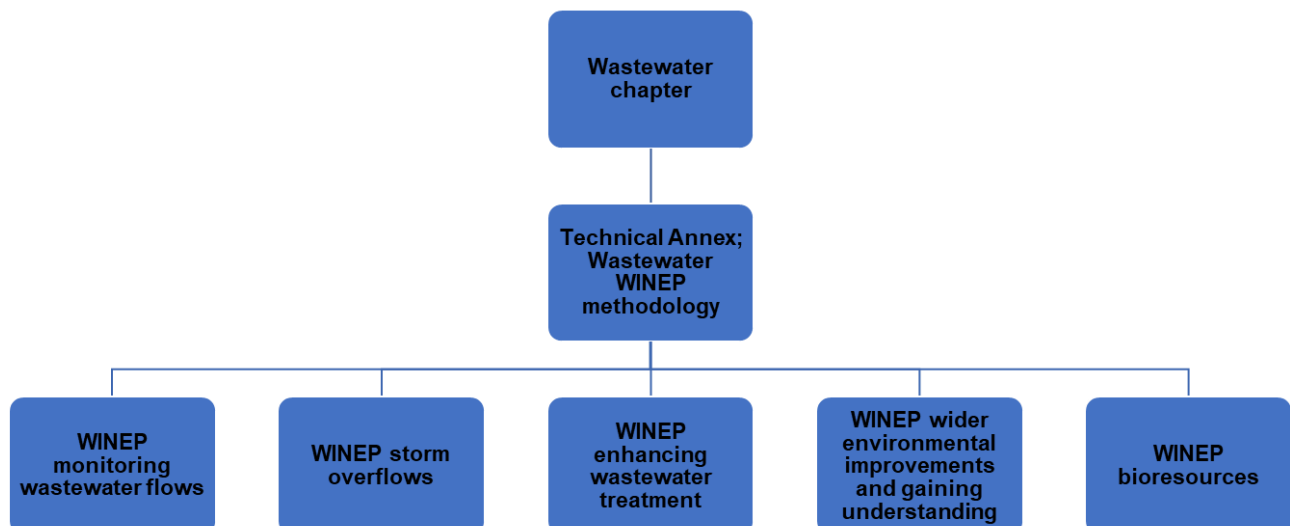
This annex includes:

- Details of our approach to developing WINEP investment needs for AMP8 and beyond
- A description of our WINEP phasing proposal which helps to produce a more deliverable and affordable AMP8 plan
- A description of our WINEP options appraisal process
- How we have ensured our WINEP costs are efficient
- How we are protecting customers for this material area of enhancement investment

This annex provides supporting information that sits above five enhancement business cases. It should therefore be read in advance or alongside each individual enhancement business case to provide a full picture of how our business plan was derived. The enhancement business cases provide the detail of the WINEP investment we propose in our AMP8 business plan, grouped into areas of common impact, as shown in . This technical annex expands on the information about WINEP provided in the wastewater chapter of our business plan.

This annex shows how we will meet our duties, the requirements in the Water Industry Strategic Environmental Requirements (WISER) and WINEP driver guidance published by the EA through the investment proposals in our business plan.

Figure 1-1: Our business plan WINEP documentation



This annex explains:

- how we have developed the needs for enhancement investment in AMP8
- our proposal for phasing targeted investment beyond AMP8
- the process for options development,
- how we have ensured our costs are efficient, and
- how customers are protected from non- or late delivery.

We then provide detail of the assessment of needs, our options appraisal outcomes, business plan costs and customer protection mechanisms in five separate wastewater enhancement business cases, as follows:

- Monitoring wastewater compliance
- Storm overflow related investment
- Enhancing wastewater treatment
- Wider environmental improvements and gaining understanding; and
- Bioresources.

These enhancement business cases cover the following areas of investment:

Monitoring wastewater compliance

We will install, upgrade and certify monitors to report at 2-minute intervals on storm overflow spill frequency and duration, and pass forward flows at as yet MCERT uncertified storm overflow locations and at emergency overflows. The investment will ensure we can demonstrate compliance with wastewater permit conditions, respond in a timely fashion to operational incidents and demonstrate progress with our ambitions to improve storm overflow performance.

Storm overflow related investment

We will deliver a comprehensive programme of investment to reduce environmental harm at priority sites and protect bathing waters from discharges from storm overflows. We are proposing to focus on managing rainwater at source through a mix of catchment and nature-based solutions delivered by working in partnership with local councils, environmental groups, landowners and communities. We will focus on green, and phase grey solutions to maximise the opportunities for wider multiple benefits for our customers and the environment, and opportunities for additional sources of funding for these wider benefits.

Enhancing wastewater treatment

Our plan includes an extensive and varied programme of improvements at our treatment works as a result of our investigations in AMP7 and water quality modelling that indicate where our treatment works are putting the environmental water quality at risk. This will enable us to meet tighter permit levels for phosphorus, nitrogen, biochemical oxygen demand (BOD), ammonia and specific chemicals of concern. We will also install UV disinfection to protect shellfish water quality from microbiological contamination.

Wider environmental improvements and gaining understanding

Where there is uncertainty over the impact of our activities on the environment, we propose studies and investigations which will inform future WINEP investments. We also explain in this section the improvement activities for specific environmental risks that are not related to storm overflows, or our treatment works effluent permits, for example meeting Eels Regulations requirements to prevent eels entering our wastewater treatment works.

Bioresources

We will enhance the resilience of recycling sludge to agriculture by installing improved treated product storage in line with our bioresources strategy. Our bioresources strategy provides context to these and other proposals in our business plan, but we outline the case for the storage solutions in this document, as they are within the scope of the WINEP.

2. Statutory Background and Long-term Planning

The Environment Agency and Natural England published the [water industry strategic environmental requirements](#) (WISER) in May 2022, setting out the issues and opportunities that water companies need to consider in meeting their environmental obligations. The WISER describes the statutory and non-statutory expectations of water companies for price review 2024 (PR24). These are organised around the 3 objectives the Environment Agency (EA) and Natural England (NE) expect water companies to achieve, namely:

- a thriving natural environment
- resilience for the environment and customers
- expected performance and compliance.

WISER requires water companies to develop the water industry national environment programme (WINEP), following guidance issued by the EA and NE. The WINEP gives information to water companies on the actions they need to take to meet their environmental legislative requirements and related government priorities (as set out in WISER).

2.1. The results of following the WISER and WINEP driver guidance

Our proposed WINEP is an almost entirely statutory programme. We developed the programme through reference to detailed AMP7 investigations, water quality modelling, new environmental regulations and through lengthy dialogue with the Environment Agency (EA) and Natural England (NE). The local environment in which we operate is under particular pressures. We have extensive coverage of areas defined as sensitive for nutrient neutrality, precious chalk stream catchments and numerous protected areas. We welcome the opportunity our WINEP presents us to play our part in improving and enhancing our local environment.

Our AMP8 WINEP requires us to make changes across our wastewater network and at many of our wastewater treatment work, as **Error! Reference source not found.** shows. It builds on previous work we have been carrying out, in the 2020-25 period and earlier. In particular, many actions we propose were shown to be needed through comprehensive AMP7 investigations which looked at the environmental risks, what we need to do to mitigate the risks and a full range of options before recommending solutions we have carried forward to our WINEP.

The AMP8 WINEP is unprecedented in scale and scope of the improvements we need to make to meet statutory requirements at the pace defined by legislation. This is due to the coincidence of new requirements defined by the Environment Act 2021, nutrient neutrality needs to accommodate high growth in the south east, as well as ambitious proposals to improve the status of water bodies driven by long-standing regulations such as the Water Framework Directive. We have worked more closely than ever before with the EA and NE to develop a robust set of proposals.

Those few elements of our proposed WINEP that are statutory plus and non-statutory drivers are:

- Improvements to SSSIs. This is a statutory plus driver, meaning that a cost benefit test can be applied. The wastewater actions under this driver contribute to meeting the Environment Act target of 80% reduction in P load by 2038 and do so at priority sites that also support wider environmental objectives. We consider that these should be priority as they are for sensitive



sites. Hence, we did not to apply the cost benefit test to filter out any SSSI_IMP actions. If we had, around £55million of investment could potentially be phased to AMP9.

- The Defra Storm Overflows Discharge Reduction Plan (SODRP) target 1 is investment to reduce environmental harm and target 2 is to protect public health in bathing waters. Our initial programme focused on target 1, which meant that many of our early investments targeted shellfish waters. We have brought forward the work to start on target 2 for bathing waters as well as target 1 in AMP8. The key date for these targets is 2035 (end of AMP9) so there is a balance of how much to invest now in AMP8 and how much to back end the programme in AMP9. Our plan is to start more in AMP8, especially for coastal sites which our customers tell us are a priority for them. This approach allows time for more sustainable and better green solutions to be delivered by 2035, and to demonstrate swift progress to our customers on tackling this important and political issue. We need to invest £1,583m in storm overflows to meet the Defra targets for 2035. Our plan is to invest £682m¹ in AMP8 and £901m in AMP9.

The AMP7 studies and investigations that have informed our AMP8 WINEP include:

- 22 SSSI, habitats or marine conservation zone investigations;
- 282 treatment works flow monitoring investigations;
- 40 bathing water studies;
- 10 shellfish water studies;
- Invasive non-native species (INNS) investigations covering 14 stretches of river and 10 recreation and maintenance pathways;
- 36 Storm overflow assessment framework (SOAF) studies;
- 16 Industrial Emissions Directive (IED) surveys

Our AMP8 wastewater WINEP forms part of our core plan in our long-term delivery strategy since it is a statutory requirement under all scenarios. However, there are few known statutory requirements that extend beyond 2030 – only the Environment Act has longer timescales which define storm overflow discharge and wastewater effluent phosphorus reduction targets to 2050 and 2038 respectively. We have chosen to phase our WINEP over a longer time period to ensure it is more affordable and deliverable, so there are a number of areas of investment resulting from our WINEP options development and appraisal process which now extend into AMP9.

¹ Includes schemes delivered through the alternative delivery mechanism and investigations

Figure 2-1 shows the totex in our business plan to deliver our phased AMP8 WINEP. These assume some of the storm overflows programme will be delivered through DPC/alternative delivery route and so include the procurement and contract set up costs rather than the costs for in-house delivery.

Figure 2-1: Summary of our wastewater WINEP investment business plan proposals (prior to removing the investment we propose to carry out through DPC or alternative delivery mechanisms)

WINEP area	AMP8 totex, £m (2022/23 prices)	WINEP drivers	Number of WINEP actions
Monitoring wastewater compliance	140	U_MON3	284
		U_MON4	251
		U_MON6	128
		EPR_MON1	1
		EnvAct_MON	5
Storm overflow related investment (excluding INV4 investigations)	657	SW_ND	29
		SW_IMP	1
		BW_ND	4
		EnvAct_IMP2	79
		EnvAct_IMP3	18
		EnvAct_IMP4	48
Enhancing wastewater treatment	611	HD_IMP	11
		HD_IMP_NN	19
		SSSI_IMP	29
		SW_ND	5 (UV treatment)
		U_IMP1	2
		U_IMP2	1
		WFD_ND	23
		WFD_IMP	32
		WFD_IMP_MOD	2
		WFD_ND_CHEM	11
		WFD_NDLS_CHEM	34
		WFD_IMP_CHEM	8
Improving understanding, enhancing catchments and working in partnership	66	25YEP	2
		BW_NDINV	7
		BW_INV	1
		HD_INV	13
		SSSI_INV	32
		SW_INV	3
		MCZ_INV	14
		NERC_INV	1
		WFD_INV	43
		WFD_INV_CHEM	25
		WFD_INV_N-Tal	4
		WFDGW_INV	6
		EnvAct_INV	210
Bioresources	51	SUIAR_IMP	2

Links to data table lines		
Wastewater WINEP costs	CWW3	Rows 10 to 163 which are all lines within blocks entitled: <ul style="list-style-type: none"> EA/NRW environmental programme wastewater (WINEP/NEP); and EA/NRW/ environmental programme bioresources (WINEP/NEP)
Phosphorus and nitrogen removal WINEP scheme costs and site information	CWW19	All rows
WINEP related cost drivers	CWW20	All rows apart from 9 (current PE served by STWs)

2.2. Link between Drainage and Wastewater Management Plan and WINEP

Our WINEP requires improvements at a large number of our assets, both within the network and at treatment works. There are new quality permit conditions that apply to over 130 of our treatment works in AMP8. The WINEP complements strategic planning frameworks such as our drainage and wastewater management plan (DWMP). The enhancement elements of our DWMP have closely informed our long-term delivery strategies.

Our DWMP sets out a long-term plan for meeting a range of planning objectives, which include:

- PO2: Storm overflow performance – compliance with the permit issued by the Environment Agency which specifies the amount, frequency and concentration allowed to be discharged into the receiving water at a storm overflow.
- PO9: Achieve Good Ecological Status or Good Ecological Potential (GES/GEP)
- PO10: Improve surface water management and reduce surface water flooding
- PO11: Secure nutrient neutrality
- PO12: Reduce groundwater pollution
- PO13: Improve bathing water quality
- PO14: Protect shellfish waters.

Through the AMP8 WINEP we expect to make significant progress towards these planning objectives. Our understanding of the status of our local rivers is informed by the 6-yearly river basin management plans which provide detailed information on progress towards good ecological status. They also inform where actions may be required, by us and by others, to mitigate risks to water quality status or to investigate pressure points in more detail.

For further detail see our DWMP.²

2.3. WINEP and long-term delivery strategies (LTDS)

We have assessed this programme against the criteria for low regret investment identified in the [LTDS guidance](#) and [Appendix 9](#) of the Final Methodology. The guidance identified that low regret investments meet the needs across a wide range of plausible scenarios, meet short-term requirements; or keep future options open, including cost minimisation.

We consider that the investment proposed in our WINEP is low regret investment for the following reasons:

- It will help us meet long-term ambitions we set out in our DWMP, in particular on reducing storm overflows and nutrient loadings, as well as improving the quality of the local environment. It is also a statutory programme
- Our assessment using regulatory guidance and the refining of our programme to devise a deliverable and affordable proposal for our business plan indicates the urgency of the improvements needed. Almost all of the investments we propose have statutory completion dates that are within AMP8.
- We have carried out a structured and comprehensive options appraisal, following WINEP guidance and considered options across a range of plausible futures, particularly in terms of growth forecasts when designing solutions.
- Being a statutory requirement, our WINEP is required across all plausible future scenarios. The selected WINEP proposals that are not statutory are modest investments and investigations that will inform future investment.

We have therefore assumed for our LTDS that we will carry out our AMP8 WINEP investments under all alternative pathways.

For investments in AMPs 9-12 we have assumed only what we know today are statutory requirements, and included the costs of what we propose to phase beyond AMP8. This means we are including:

- costs of a storm overflow improvement programme to meet 2050 and interim targets set out in the Environment Act
- costs of additional schemes beyond AMP8 required to meet the P load reduction target in 2038 set out in the Environment Act
- Non-statutory investigations of areas not yet designated as bathing waters and improvements to excellent status at bathing waters that we discussed with the EA in developing our AMP8 WINEP but could be phased into AMP9
- All other elements of the WINEP we propose to phase beyond AMP8 to allow our WINEP to be affordable and deliverable.

² [Drainage and Wastewater Management Plans \(DWMPs\) \(southernwater.co.uk\)](https://www.southernwater.co.uk)

We anticipate future WINEPs will have wider scopes than the costs we have included in our LTDS, but our principle has been to include only known regulatory requirements rather than second guess future environmental guidance, regulation or the outcome of investigations we have yet to carry out.

3. Delivery Approach for our WINEP

We will play our part in improving the local environment. However, the scale of the proposals that have emerged through following the WINEP methodology and guidance from environmental regulators is so large that we are concerned about its deliverability and affordability to our customers. This is particularly at a time when the cost of living is affecting many customers' ability to meet their household expenses. We are continuing discussions with the Environment Agency, Defra and Ofwat to resolve these concerns. We have built our PR24 Enhancement Business Case based on our phased WINEP as shared with the regulators on 19 July 2023.

Our phased WINEP delivers the best value solutions to make sure our WINEP delivers the maximum benefits it can within the scope of the improvements we need to make. We will deliver the WINEP in full, but over a slightly longer period due to the constraints on deliverability and affordability. We will need to find alternative financing approaches to smooth the impact on bills and ring-fence some programmes for deliverability purposes. We are exploring these opportunities and options now. Even with alternative financing, we still need to phase the remaining investment over a longer period than the five years of AMP8 in order for the programme to be deliverable and affordable.

3.1. Phasing our WINEP to address affordability and deliverability concerns

Our submission to the EA, Ofwat and Defra on 19 July on WINEP phasing stated that the total cost of delivering all the WINEP requirements in AMP8 is in the order of £2.6 billion in wastewater and £75 million in the water service (2022/23 prices). This level of investment is unprecedented. In general, it presents an important opportunity to make significant improvements to the environment across the South-East and support delivery of the Government's Environmental Improvement Plan 2023 and Defra's Plan for Water. However, we recognise that there is both an affordability challenge (customer feedback supports this) and deliverability challenge with the scale of this plan combined with other requirements such as our Water Resource Management Plan (WRMP).

The scale of the WINEP is close to requiring the five-year total AMP7 level of investment every year of the AMP8 period. It results in a plan that is neither affordable nor deliverable. It is the cumulative impact of the current programme on customer bills and the sheer volume of deliverable measures in AMP8 not just for Southern but across the industry, that at a programme appraisal level now presents a significant concern.

We developed our programme by following WINEP guidance, through discussions with local teams from the Environment Agency (EA) and Natural England (NE), other stakeholders and our customers. Our programme following all the EA guidance provided to us before July 2023 was extensive, totalling £2.7 billion. We were provided a steer from the Secretary of State on 5 July 2023, on the possibility of phasing some WINEP actions beyond 2030. We followed the steer provided and concluded the resulting altered AMP8 WINEP was still neither affordable nor deliverable.

³ Letter EA/2023/16

We are not seeking to evade any of our statutory commitments, nor are we questioning the environmental ambition or need for targeted investment around the government's strategic priorities, which we support. However, in direct response to the Secretary of State's legitimate concern about affordability and delivery, we consider a change in prioritisation (given the scale of competing interests) to give greater flexibility, and further rephrasing of other proposals is necessary in order to balance those concerns in a way that still enables the strategic priorities and environmental benefits to be met.

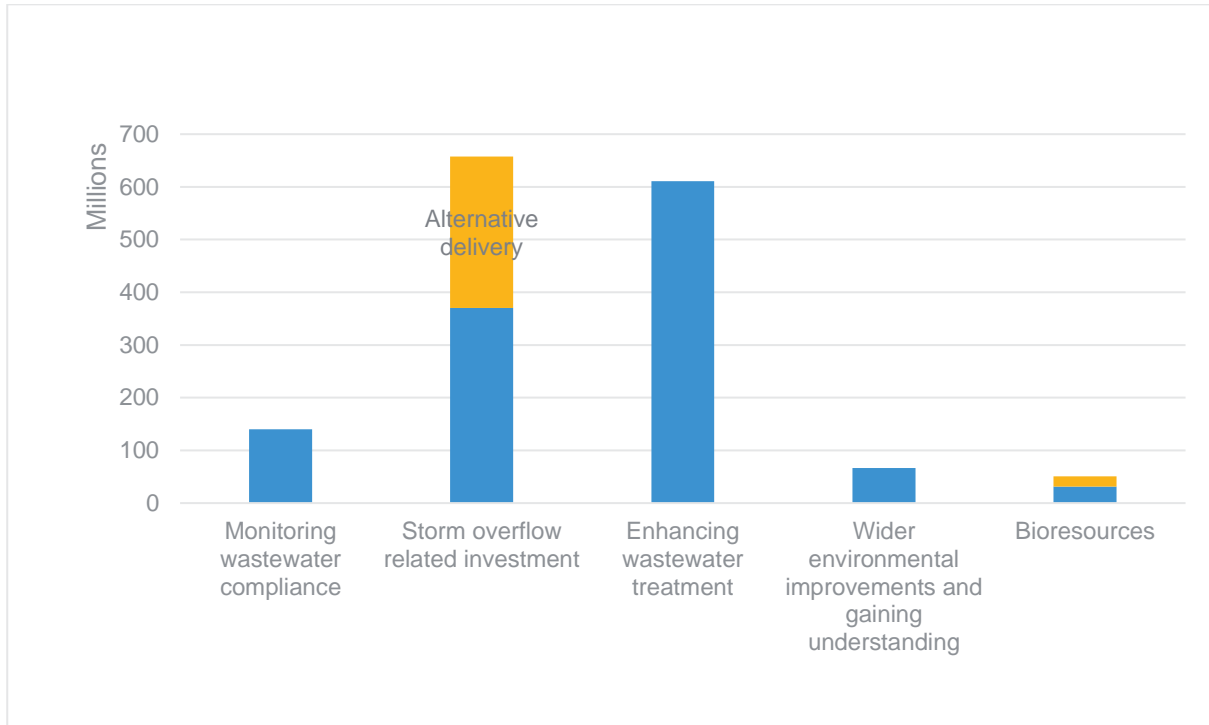
We provided supplementary proposals to those within the scope of the Secretary of State's steer. This helps us to have a deliverable and affordable AMP8 WINEP plan. This proposed phased plan still results in a material increase in investment and marked environmental improvements across our region, with the most beneficial improvements prioritised for AMP8 delivery, and the remainder for the early years of AMP9. It allows a prioritisation on sensitive catchments and better enables nature-based solutions rather than reverting to traditional grey methods to solve challenges such as storm overflows.

We have adopted the phasing proposed by Defra's Secretary of State in our PR24 business plan, and we have included the additional phasing proposals that we outlined in our response to the EA on phasing dated 19 July 2023. Due to the timing of the discussions about phasing having not concluded prior to submission of our business plan, we are not able to incorporate any feedback or decisions on our proposal into our business plan. However, we are clear that we would not be able to deliver, and our customers would be unable to afford, the WINEP phased within the constraints of the Secretary of State's steer. Our ability to comply with our statutory and licence obligations is conditional on DEFRA and the EA accepting our proposed phasing of WINEP, or the equivalent cost of alternative phased WINEP actions.

We propose to accommodate any differences between our business plan submission and the final outcome of discussions on phasing within our response to the draft determination. Our aim is to ensure the final determination reflects a full deliverable and affordable package of regulatory requirements in the WINEP which the EA and Defra conclude we are required to complete in AMP8. However, we have proposed an uncertainty mechanism for the WINEP phasing should there be no resolution prior to final determinations. We explain the mechanism in [SRN58 Uncertainty Mechanisms Technical Annex](#).

Our resulting phased WINEP for AMP8, divided into the categories we describe in the WINEP enhancement business cases is shown below.

Figure 3-1: Our AMP8 WINEP totex by subcategory – through in house and alternative delivery approaches



We discuss in the enhancement business cases the specific needs cases for these sub-categories of our WINEP.

3.2. Consideration of Direct Procurement for Customers

Our WINEP is a material programme of investment. However, it does not readily meet Ofwat’s Direct Procurement for Customers (DPC) criteria. The most material investments are on existing sites with operational assets, and there are none by themselves with a whole life cost of >£200 million totex. Nevertheless, we have carefully considered what could be grouped together for a programme of work that might be attractive to the market through DPC or other alternative financing and delivery approaches. We are continuing to explore such routes for elements of our storm overflows improvements and bioresources storage investment as part of WINEP to support the deliverability of our plan and smooth the impact on bills for our customers.

We discuss this in more detail in [SRN40 WINEP - Storm overflows Enhancement Business Case](#) and [SRN43 WINEP – Bioresources Cake Storage Enhancement Business Case](#).

4. Introducing our Wastewater WINEP

Our local water environment is under huge pressure from the growing demands of people, industry, and agriculture. There is pressure on the quality of rivers, lakes, estuaries, and wetlands from pollution, particularly in densely populated areas like ours in the south east of England. At the same time our customers' expectations of the cleanliness and accessibility of the local environment have increased. More people want to swim outdoors, spend time at a beach or near a local river. Findings from our customer engagement on views towards the environment are shown in Figure 4-1.

In response to these pressures, after listening to our customers and using evidence gathered through investigations and modelling, we have developed our enhancement submissions for our region's water industry national environment programme (WINEP). We carefully considered and applied the WINEP methodology and driver level guidance from the EA and had many detailed discussions with both the EA and NE. Our aim is to make rapid improvements, meeting the statutory requirements placed on us in a way that delivers optimal benefit for customers and the environment within an efficient investment envelope. We have worked more closely with the EA and NE than ever before to ensure we have a robust set of proposals for both investments and investigations that are well-evidenced and needed. That included discussing the timing of proposals the environmental regulators were keen for us to include but where the evidence was not comprehensively convincing of our activity's impact on the environment.

Our resulting AMP8 WINEP is the largest scale of environmental improvement investment we have seen since privatisation, and we have been pleased to make a head start through our accelerated delivery proposals during 2023-25. Despite proposing to phase some of the investment beyond 2030, delivering such a large programme of improvements in one five-year period will be extremely challenging for us and our supply chain.

The vast majority of the individual regulatory drivers within the WINEP require us to make improvements in AMP8, with little opportunity for phasing into future periods. Only some of the Environment Act proposals have delivery targets which extend beyond 2030. In these cases, our proposed AMP8 programme forms part of our long-term delivery strategy with proposals to improve high priority locations in AMP8, and lower priority locations later. Our Drainage and Wastewater Management Plan (DWMP) includes adaptive plans to meet long-term environmental objectives over the next 25 years. Similarly our Water Resources Management Plan sets out long-term measures to reduce the impact of abstraction on the local water environment. But within those long-term strategic frameworks, our AMP8 WINEP is required whatever long-term adaptive pathway we follow. The AMP8 WINEP helps us progress towards meeting long term targets we explain in our long term delivery strategy (LTDS), particularly in storm overflow performance, and nutrient removal.

Figure 4-1 :Findings from our customer engagement

What our customers are saying

The environment is important: The environment has always been important to our customers. However, during the COVID pandemic our customers told us that their appreciation of their local environment strengthened. In 2018 we heard customers talk about 'protect and improve' the environment, and now we hear them talk about 'protect, improve and restore'.

Treat the environment better: Customers expect us to protect, improve and restore our natural environment. However, our relationship with the environment can sometimes be seen as exploitative. Storm overflows are a prime example of this and where public opinion is focused. Resulting in customers demanding more proactive improvements (i.e., not just repairs).

Put nature first: While our customers have limited understanding of natural capital and nature-based solutions, our Future customers see nature as the primary option and would not support a solution that hasn't explored the natural options first, whereas larger businesses tend to favour certainty and stability.

Make best value decisions: Customers want us to focus on solutions that deliver the greatest environmental benefits. Particularly solutions that benefit habitats, wildlife, and ecosystems. Followed by benefits to the local community and wider wellbeing, such as recreation or job creation. Additionally, they want solutions to be scalable and sustainable for future generations, not just the cheapest in the short-term.

Invest in the environment: Our customers are prepared to help fund environmental infrastructure. More so, they almost feel morally obliged to do so for future generations. Southern Water must, however, play our part first and help customers build trust in us to deliver what we promise.

Demonstrate environmental leadership: Customers see us and expect us to use our expertise to evaluate the right options. Customers recognise the role they and others play but expect the water sector and government to take the lead and are willing to play their part to support our actions.

Their challenge to us and the industry

Through six waves of research, young people have build knowledge of:

How the water industry works.	Issues faced by the water industry.	Water industry priorities.
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Their focus

 Reverse existing environmental damage.	 Climate change.	 Consequences of environmental degradation.
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Their view of the industry

Government and organisations should lead on environmental protection but currently it's not taken seriously enough.

There is low trust in government and water industry.

I feel large corporations such as Southern Water should reduce more carbon than they create to repay for years of not caring about the climate

What are they not seeing

Young people who don't pay bills don't think of financial implications of prioritising the environment

Three key demands of the industry

- 1** We want change to be faster and more radical. The industry has the correct targets but is moving too slowly. We need systemic change to tackle the climate crisis.
- 2** We want consumption of water to be fairer to the planet. They want a symbiotic, rather than exploitative relationship between industry and the environment.
- 3** We want consumption of water to be fairer to each other. They want to ensure that everyone has access to water and that everyone plays an equal part in conservation.

I think it will be challenging to get major corporations/businesses to change in time... We need to be prepared for what lies ahead.

We do need to be prepared for climate change, and especially protecting people vulnerable to it. e.g. disabled, living in poverty

We propose very few WINEP investments that are discretionary, meaning “statutory plus” or “non-statutory”. For example, we are already contributing to bathing waters meeting the statutory requirements and “good” status, and we propose deferring bathing water improvements to “excellent” status to AMP9. This is due to the huge affordability and deliverability challenge the statutory programme alone will present, and to give us time to understand from experience how our wider storm overflow improvements may help to deliver bathing water quality improvements. However, in some strategic areas where there are long-term wider benefits and where our proposals will help us develop innovative solutions for future periods, we are proposing limited non-statutory elements within our WINEP proposals. The discretionary elements are:

- Our storm overflows programme where our preferred programme will deliver considerable wider benefits than the equivalent least cost programme, as well as starting to improve overflows at our coastal overflows.
- An Advanced WINEP (A-WINEP) proposal to explore with partners the remediation of nitrates within groundwater that are impacting on water quality in Chichester, Langstone and Pagham Harbours. This is included in our submission but was rejected by the EA in the final WINEP issued on 25 September. Thus, we need to remove this cost from our PR24 business plan.
- Non cost beneficial improvements to support the quality of SSSIs which also help to meet longer-term statutory targets to reduce phosphorus loads. (These are statutory-plus and could be subjected to cost benefit).

We are proposing investigations to inform future environmental improvement programmes where evidence was insufficiently robust to demonstrate the need to make an improvement in AMP8. These investigations are statutory and also justify as enhancement because they are the preliminary assessment of need and options development of future enhancement schemes.

4.1. Consideration of overlap with base and previously funded enhancement programmes

It is important to note that our investment on protecting the environment is greater than what is described in this enhancement business case. Our expenditure on operating and capital maintenance, funded elsewhere through the price review process, are equally important for protecting the environment.

WINEP, by its definition, is about a change in the level of service and improving the environment. For that reason it is categorised as enhancement rather than base expenditure. Our existing operations are designed to meet current statutory requirements and base costs would allow us to maintain services to meet those requirements. The improvements in our plan are driven by legislation meaning the changes we need to make are outside of management control. However, we have considered the overlap with base at the WINEP action level. We have assessed any additional investment needed, for example for growth or capital maintenance to plan a co-ordinated and optimised investment plan, allocating costs according to the driver of the investment needs.

We have developed our WINEP proposals with full reference not only to the existing performance of our networks and treatment works, but in the light of the on-going AMP7 environmental improvement investment. This ensures our AMP8 WINEP avoids duplicating AMP7 improvements. This has resulted in a number of improvements demonstrated as needed through water quality modelling not being proposed. We found in these cases that the required AMP8 permit level from the modelling is less stringent than that being met through AMP7 investment. Examples include Bidborough Wastewater Treatment Works (WTW) where modelling suggested a need for a 4 mg/l P permit to prevent deterioration of WFD status, but by the end of AMP7 the site will have a 2 mg/l P permit.

Our starting assumption of what to include in our programme resulted from water quality modelling or AMP7 investigations, and the direct application of new legislation. During our frequent meetings with regulators we kept a transparent log of their requests for improvements in addition to those resulting from investigations, modelling and legislation. We discussed the available evidence and allocated them as schemes or investigations depending on the nature of evidence available.

5. Our Approach to WINEP Options Appraisal

5.1 Programme options development

At the programme level, we carefully applied the WINEP methodology and followed the detailed guidance to develop a best value programme. Our first step was to identify the environmental risks and issues to be addressed through the WINEP, in collaboration with the EA, NE and local environmental stakeholders. Taking account of extensive AMP7 investigations, through modelling and understanding of regulatory requirements we reviewed the current state of the environment and the impact of our activities on it.

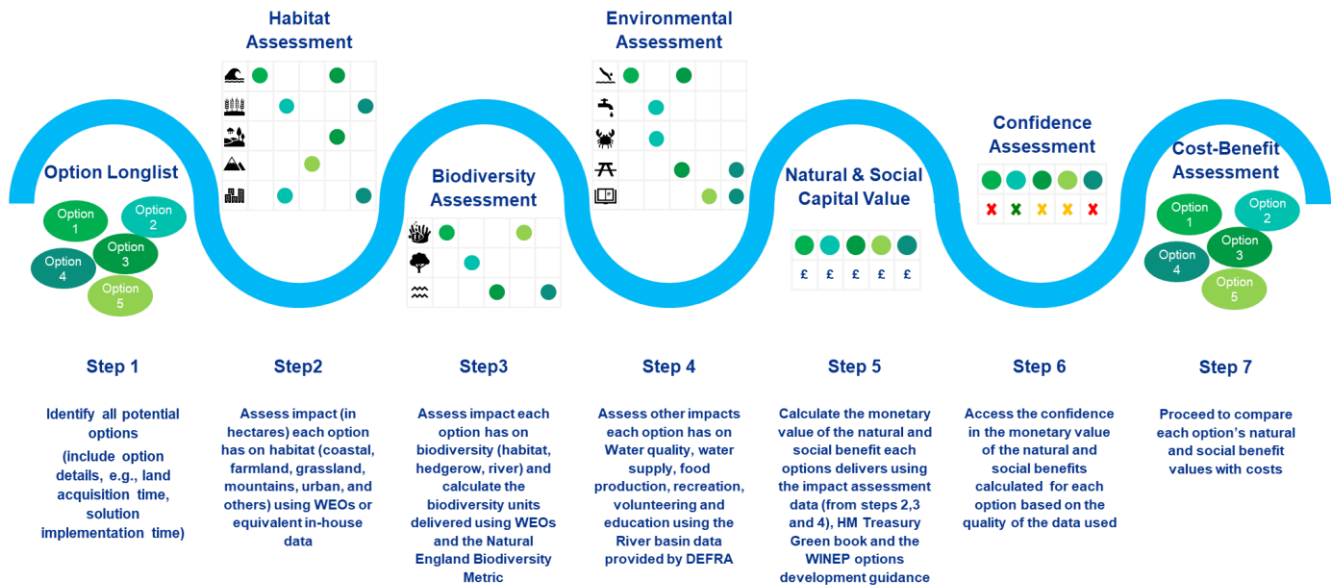
We applied the six WINEP principles to develop our best value programme options as follows:

- Environmental net gain – we set up a process to fully incorporate valuations of wider environmental benefits into our appraisal and options selection processes
- Natural capital – we fully incorporated valuations of natural capital into our appraisal and options selection processes
- Catchment and nature-based solutions. Our approach was to take forward a nature-based solution wherever it was appropriate and promote it to a full cost and benefits evaluation.
- Proportionality – we considered the extent of the environmental risk to focus our options in areas where we could maximise the benefits, focusing our options appraisal effort where the environmental risk is greater and the range of options available deliver a range of risk mitigation. We assessed only a narrow range of options where the difference in benefits delivered between the options is minor.
- Evidence – we ensured that our approach to considering environmental risks and the impact of our activities were evidence based, using extensive modelling and previous investigations to evidence the need to make improvements
- Collaboration – we worked with EA and NE to gain a shared understanding of environmental risks to be addressed through the WINEP. We held frequent meetings to explore risks and the options available to us to mitigate the risks.

Through work we commissioned from AECOM, we developed a tool to assess natural and social capital impacts of our proposals, including WINEP. For the WINEP, the tool used EA metrics across a full range of natural capital measures which we applied to our constrained options appraisal to allow us to understand which are best-value compared to least cost solutions. The tool provided monetary valuations of benefits of the different solution options across categories of natural and social capital such as provision of water supply, renewable energy and food; regulating air or water quality; regulation of natural hazards and local climate; supporting biodiversity; recreation and amenity; and volunteering opportunities. The tool also provides levels of confidence around those metrics and valuations to support decision-making use of the tool. Figure 5-1 illustrates the approach we took to benefits valuation.

We applied the approach as part of our Risk and Value (R&V) process of identifying and evaluating options. The R&V Scorecards then summarise the options and how metrics have influenced our decisions. More details are provided below.

Figure 5-1: Valuing wider environmental benefits



Note: WEOs refer to the Environmental Agency's Water Industry National Environment Programme (WINEP) metrics for wider environmental outcomes

5.2 Scheme options development

We have been through a significant exercise to optimise our WINEP investment proposals to ensure we deliver best value. At the scheme level, our business process for planning and project delivery is based upon R&V assessments, which is described in more detail in [SRN15 Cost and Option Methodology Technical Annex](#).

Our approach to assessing and evaluating natural and social capital benefits as part of assessing the wider environmental outcomes is embedded within R&V, in particular for embedded and operational carbon impacts. For the WINEP we included in our evaluations wider social and environmental benefits across a wide range of ecosystem services, including the water purification benefits of wetland solutions, climate regulation and amenity benefits of different types of solution. To do so we used the suite of research collated by the EA alongside the WINEP guidance to support the monetary valuation of benefits.⁴ We provide a description of these metrics in Appendix 1.

Our R&V approach to options development enables us to identify both least cost and best value options to meet specific WINEP needs. We have been keen to maximise the use of catchment and nature-based solutions, so we carried forward to full quantification options appraisal catchment or nature-based solutions wherever possible. However, in most instances this has not resulted in a nature-based or catchment solution being our preferred option. In outline, this is because:

⁴ EA, 7 April 2022, "WINEP Wider Environmental Outcome Metrics to use in the WINEP Options Development and Appraisal.xlsx". See Appendix 1 for description of the metrics.

- The permit requirements are prescriptive and tighter than the nature-based or catchment solutions can deliver alone;
- Land area requirements for nature-based solutions other than serving small communities make them prohibitively expensive; and
- Our EPA performance constrains our ability to use catchment permitting approaches.

Despite this, we are promoting some nature-based solutions in our WINEP. We provide the detail of these and the outcome of the options and benefits evaluation at the sub-programme level in the following sections of this business case.

The following is a summary of the optioneering process that we used to identify least cost and best value options for WINEP drivers.

- A long list of options for each driver was prepared by a subject matter expert from the team delivering similar projects in AMP7. This list was reviewed and approved by the wastewater process discipline lead. The long list of options included an appropriate range of low build, catchment, and nature-based solutions, as well as end-of-pipe engineering solutions.
- Options were assessed for each individual site using a multi-criteria assessment tool, based on the tool used to short-list options in our project delivery Risk and Value process, producing a short list of feasible options. The assessment tool scored each option on natural and social capital and carbon impact, as well as cost and deliverability. The short list of feasible options was reviewed and approved by wastewater process discipline and wastewater engineering design lead, before the options proceeded to cost and benefits estimation.
- The lowest cost option was identified as the feasible option having the lowest financial whole life cost. The best value option was identified as the feasible option having the lowest whole life cost and benefit once monetised values for embodied carbon, operational carbon, and natural and social capital were added into the whole life cost calculation.
- Selection of lowest cost and best value solutions were reviewed and verified by a peer group, which also challenged whether any feasible non-engineering solutions had been overlooked.

We have several learnings from our optioneering process, which we outline below.

Our use of catchment solutions for some WINEP drivers is currently limited by our EPA rating. The EA's guidance on innovative permitting states that its "approach seeks to exclude the worst EPA performers from innovative permitting opportunities due to the uncertainty and risk associated with these proposals. We define the worst performers as those who have a 1* or 2* rating for 3 out of the last 4 years, plus we will consider any other significant evidence such as enforcement action."⁵

We have promoted low-build and nature-based solutions wherever they were feasible and compliant with WINEP guidance. Pump-away of small treatment works requiring significant upgrade to larger neighbouring sites was also promoted wherever feasible, although distance and topography played a significant role in the cost balance between upgrading or pumping away.

⁵ Environment Agency, "PR24 WINEP supporting guidance – Permitting of innovative solutions", v0.3, p.3

We promoted nature-based solutions where possible, although this was difficult on many drivers due to the very tight permit levels required. 83% of the new P permits that we are proposing are less than 1 mg/l which is generally accepted as the limit that can be achieved by constructed wetlands on their own in the EA's Integrated Constructed Wetland Regulatory Framework, and 79% are less than 0.6 mg/l which is the limit that can be achieved by using nature-based solutions as a polishing stage after chemical dosing.

The potential for nature-based solutions and pump-away options is more difficult to assess as part of the planning process. Feasibility studies will be required to investigate site-specific land purchase, suitability of local soil conditions, and permitting implications. We will be re-examining the feasibility of these types of options during scheme delivery stages when certainty of funding availability is known and more detailed information is available on the specific site. For example, we have commissioned more detailed feasibility reports for two river restoration projects at Biddenden and Bethersden, including assessing adjacent land ownership to explore the possibility of wetland treatment solutions. Although this may change the outturn costs from those in our business plan for these two sites, we do not anticipate the changes to be material.

6. Cost Efficiency

We explain our detailed approach to costing our enhancement programmes and benchmarking in [SRN15 Cost and Option Methodology Technical Annex](#). Our approach to WINEP costing follows the methodology described there.

For most of our wastewater WINEP, direct costs for feasible options were estimated using function-level cost curves based on outturn delivery costs derived from a range of water companies, not just our own. We have followed good practice cost estimation to continuously update our cost curves with the latest cost data. Our robust Direct Cost estimating methodology uses a cost curve regression process to estimate scheme costs based on specified units of measurements of assets. This process follows our standard levels of costing approach developed by our Cost Intelligence Team, with our Level 2 estimates using an increased granularity of cost data. The cost curves also generated values for embodied and operational carbon, which were monetised and incorporated into assessment of best value options.

We have followed a robust approach to estimating indirect costs for our WINEP, using outturn AMP7 delivery data to project the required uplift to the AMP8 Direct Costs – taking into account the nature and scale of the PR24 delivery programme.

We have developed a bottom-up approach to estimating the risk profile of our WINEP, assessing the complexity and maturity of design of each individual scheme within the programme to enable a precise estimate of the required risk adjustment to our PR24 plan. Our approach is in-line with good industry practice, such as the Infrastructure and Projects Authority (IPA) Cost Estimating Guidance.

Our Finance team has modelled our PR24 Corporate Overheads by using our AMP7 data as our baseline cost for a typical capital programme and then extending this to account for the increased size of the AMP8 enhancement programme, factoring in economies of scale as we are able to spread our fixed overheads of a larger spending plan.

The large scale of the improvements we propose to meet our WINEP responsibilities reflect the sensitive nature of our local environment. This typically increases our costs above those of our AMP7 or earlier environmental improvement programmes on a simple “unit cost” basis, due to factors including:

- improvements being required on smaller treatment works with reduced economy of scale
- Needing to meet tighter standards than ever before
- New chemicals and nutrients of concern – we have a high number of nitrogen removal plants for example.

We illustrate this in more detail within the applicable sections below and provide more detail in our [SRN15 Cost and Option Methodology Technical Annex](#).

Cost uncertainty

We undertook initial level 1 costing of all of our WINEP schemes to understand the materiality of the programme and to help us select our preferred solutions. We have carried out more detailed, level 2 costing for a robust sample of the programme in order to explore and mitigate the risks of cost uncertainty. We compared level 1 costs with these level 2 costs and saw differences at the individual scheme level where site-specific factors impacted the level 2 costs. However, the overall costing at the total level and across

different types of investments were similar between the two levels of costing maturity. This has given us confidence that where we have carried out level 1 costing only, we are not expecting to see a significant change once more detailed costing is completed.

Third party funding

We have been actively engaging with third parties to explore the potential for third party funding. For example, we are exploring with the Environment Agency flood teams and Lead Local Flood Authorities the potential for joint funding on surface water and rainwater management schemes as part of our storm overflow programme. We see great potential for partnership working to reduce surface water entering the sewerage network, and fully anticipate third party funding or provision of “services in kind” by others. We have had few firm offers of funding at this stage, particularly as many of the organisations we are dealing with do not have confirmed budgets for the period beyond 2025.

An example where specific funding may be more forthcoming is for Ashford in Kent. We have been in conversation with a developer during the summer of 2023 in the Ashford area where we have an improvement scheme due for regulatory completion in 2029/30 which will reduce the nutrient loading to the river from our wastewater treatment works. The developer has not been granted permission to connect to the WTW due to nutrient neutrality constraints on the site. We are in conversations with the developer on providing funding to advance the scheme by funding us to start work in AMP7 and potentially funding the additional opex associated with early commissioning ahead of the regulatory completion date. However, this third party funding route needs to be considered in the light of the most recent changes to the drafting of the Levelling Up and Regeneration Bill⁶ which impact on the need for developers to meet nutrient neutrality requirements.

⁶ [Levelling-up and Regeneration Bill - Parliamentary Bills - UK Parliament](#)

7. Customer Protection

We will be monitored closely for delivery of our AMP8 WINEP by the EA and any late or undelivered actions will have a bearing on our annual environmental performance assessment (EPA). In addition, there are a number of performance commitment levels that we forecast will be impacted by our WINEP, meaning that undelivered WINEP actions are likely to lead to an underperformance payment. We describe the customer protection element in more detail below.

7.1 Impact on performance commitment levels and resulting benefits of WINEP

Our approach to considering the impact on common performance commitments from WINEP investment started from a conceptual understanding to assess the potential for impact. The result was a grid of primary and secondary impacts on performance commitment levels, both negative and positive (see Appendix 2).

Our second step was to estimate the impact to assess whether a secondary impact was material. Where it was not material, we have discounted the impact from our final calculations. For example, our conceptual understanding was that investment to reduce the frequency of storm overflow discharges would improve bathing water performance. However, a more detailed consideration of the impact concluded it was not material, in particular since routine monitoring of bathing water quality may be suspended during pollution incidents and “abnormal situations”, including extreme rainfall. It is during periods of such rainfall that our storm overflows discharge dilute wastewater to the environment.

Lastly, where our estimate was of material impact, we have quantified it.

For quantification purposes, we have assumed there is no impact from WINEP on the following performance commitments:

- Total and serious pollution incidents
- Sewer collapses

The wastewater common PCs materially impacted by WINEP are:

- Treatment works compliance
- River water quality
- Storm overflows

Other common PCs that are impacted to a lesser degree by our WINEP proposals are:

- Operational Greenhouse gases
- Bathing water quality
- Biodiversity
- Internal sewer flooding (secondary impact from storm overflow-related investment)
- External sewer flooding (secondary impact from storm overflow-related investment)

The detail of the customer protection and ODI benefits provided by the performance commitments is provided in [SRN18 Performance Commitment Methodologies Technical Annex](#). In that document we set out

the methodologies we have used and the impact of WINEP and other AMP8 investment proposals on our forecast performance commitment levels, calculating there the associated ODI benefits from our WINEP investment proposals.

7.2 Price Control Deliverables

As set out above, customers are protected for the scope of the WINEP which tightens treatment works effluent permit levels through the common PC for treatment works compliance. Some of the same scope is also covered by the river water quality PC which provides additional customer protection for phosphorus effluent permit tightening.

Customers are protected for the delivery of storm overflow WINEP actions through the storm overflow common PC. We are proposing to deliver some of our storm overflow programme through an alternative delivery route. We are therefore not proposing any additional customer protection for the elements of our storm overflows programme that we propose delivering through an alternative delivery route even though our assessment is that they have a higher cost than the equivalent least cost grey solutions. We will develop our procurement approach to incentivise the competitively appointed provider to deliver green solutions rather than grey.

We also propose the continuous water quality monitoring installation will be delivered through an alternative delivery mechanism and therefore do not propose to include it in the scope of a PCD.

However, there are other elements of our WINEP which do not link to any common performance commitment, in particular investigations and monitoring programmes. We see these as particularly challenging areas for deliverability due to the large programmes affecting the whole sector simultaneously and the demonstrable lack of MCERT certifiers and technical specialists able to carry out the high quality of investigations required. But these are statutory requirements, and so if we are unable to deliver them in AMP8 we would use the PCD to return funds to customers for elements not delivered due to lack of supply chain, but we will need to request the funding again at PR29 to complete the statutory requirements.

Rather than designing individual PCDs to protect customers for different sub-elements of WINEP not directly covered by common PCs, we are proposing one overarching PCD, using the risk-based approach, described in [SRN57 Risk Technical Annex](#). We propose a PCD that covers the scope and costs of the elements of the WINEP which are not changes to treatment works permit levels or we are planning to deliver through alternative delivery routes.

We are applying this PCD only to the elements of our phased programme that we plan to complete in AMP8, rather than the full WINEP derived from following driver guidance which includes elements we are phasing and will deliver beyond 31st March 2030.

We have not applied any adjustment for cost sharing.

The details of the PCD are subject to our AMP8 WINEP being finalised.

Table 7-1: PCD for WINEP delivery

Component	Output based on WINEP action completion
Output	<p>Completion of AMP8 WINEP actions as submitted in our business plan which are not phased beyond AMP8 and are within the scope of the WINEP drivers listed in Table 7-2 below.</p> <p>We will return funding to customers on a unit cost basis for non-delivery of AMP8 WINEP actions within the scope of the drivers listed in Table 7-2 below that are not completed by 31st March 2030.</p> <p>The total number of actions in scope of PCD is 1,035.</p>
Total Cost	£182 million
Unit cost	£176 thousand per 1,035 actions
Penalty rate	£176 thousand per action not completed (not taking into account cost sharing)
Output delivery date	31 March 2030
Gated dates	Assurance of the WINEP being forecast for completion by 31 March 2030 will be provided by 31 st of March 2028 to support draft reconciliation for performance during PR29.
Late penalty	Not required as being late would mean non-compliance with statutory requirements.
Measurement	Progress and performance will be reported in our annual performance report (APR) We will report progress on number of in scope WINEP actions completed by 31 March each year.
Conditions (if required)	None.
Assurance	Third party APR assurer will assure that the output and conditions have been met

Table 7-2: Drivers and number of WINEP actions and business plan costs within scope of the PCD

WINEP driver	Number of actions	Cost lines in data table CWW3	AMP8 totex, £m 2022/23 prices
EE_IMP	1	CWW3.97 CWW3.98 CWW3.99	1.836
U_MON3, U_MON4	535	CWW3.1 CWW3.2 CWW3.3 CWW3.4 CWW3.5 CWW3.6	76.737
U_MON6	128	CWW3.10 CWW3.11 CWW3.12	38.901
BW_INV SW_INV EnvAct_INV4 WFD_INV SSSI_INV HD_INV MCZ_INV WFD_INV_MP N-TAL_INV WFD_CHEM_INV WFDGW_INV WFDGW_NDINV 25YEP_INV BW_NDINV EE_INV	371	CWW3.61 CWW3.62 CWW3.63 CWW3.103 CWW3.104 CWW3.105 CWW3.106 CWW3.107 CWW3.108 CWW3.109 CWW3.110 CWW3.111	64.482

8. Conclusion

Section	Key Commentary	Section
Introduction & Background	Our AMP8 WINEP provides an opportunity to make step change improvements that will help to improve and enhance the local environment. It is an unprecedented scale of investment, particularly to reduce nutrient loads and reduce storm overflow discharge frequency. We are keen to play our part, acutely aware that our activities and the services we provide depend upon and impact upon our precious local environment.	1, 2
The scope of our WINEP	The WINEP is a statutory programme, developed to meet legislative requirements as translated by our environmental regulators into guidance that we have followed. The WINEP details improvements we need to make to our wastewater collection and treatment works effluent to meet new permit conditions. It is therefore an enhancement programme, delivering a step change in service. We are phasing the improvements that resulted from following the WINEP guidance over an extended period to make our plan more deliverable and affordable	3, 4
WINEP Options appraisal	We have carried out extensive options appraisal processes, ranging from detailed AMP7 investigations carried out by third parties, through to our internal process engineering experts assessing a long list of options to meet the new requirements.	5
Cost Efficiency	We have challenged our costs using benchmarks from: <ul style="list-style-type: none"> • Internal outturn data • Third party water industry-wide data • Applying top down efficiencies to our costs; • APR outturn data and • Ofwat's PR19 benchmark models where appropriate. In addition we have applied efficiency assumptions to future costs compared to historical costs.	6
Customer Protection	We have calculated the PC benefits associated with our WINEP proposals and for material investments not directly impacting on PC levels, we have designed a PCD to provide customer protection against non-delivery or late delivery of investments and any associated wider benefits.	7

Appendix 1: Wider environmental benefits evaluation

We reproduce below the description of the metrics provided by the EA for the monetary valuation of WINEP benefits. We do not yet have alternative local metrics that are sufficiently mature to replace the national average values in the EA's metrics and so we made use of the EA's average valuations in developing our best value WINEP.

The suite of metrics provided here is recommended for water companies to use in their WINEP options development and appraisal. These metrics should be used to help measure the potential impact on and changes to natural assets, ecosystem services/goods and the benefits they provide. Metrics have been recommended for water companies to use to support water companies to use a natural capital approach in their options development and appraisal, promote consistency and comparability, as well as supporting a proportionate approach.

Table 3 in the 'NC Logic Chain' tab presents which natural assets are more likely to provide different ecosystem services/goods. This has been included to support water companies in using a natural capital approach and the natural capital logic chain (asset-service-benefit-value) to underpin their options development and appraisal. The natural capital logic chain is also presented and described in the 'NC Logic Chain' tab alongside an example application of the natural capital logic for wetland creation.

Water companies need to understand the quantity, quality and location of natural assets in order to consider impacts on, and potential changes to them from different options. This will help to gain a comprehensive understanding of what might change, and how that might impact on ecosystem services and benefits that natural assets provide now and in the future. It is recommended that water companies use natural asset metrics to do this. In this context, it is recommended that water companies refer to existing guidance and evidence, such as that presented in Enabling a Natural Capital Approach (ENCA) (Defra, 2021), Natural capital indicators: for defining and measuring change in natural capital (Natural England, 2018) and other datasets which relate to the extent and condition of natural capital, including environmental designations (e.g. Sites of Special Scientific Interest, Special Areas of Conservation, etc.) to assess and quantify the potential changes in natural assets from different options. Please see 'References' tab for links to the sources referenced above.

The recommended metrics in each of the ecosystem services/goods tabs here, mostly relate to valuing changes in the ecosystem service/good (using monetary metrics) and, the quantitative metrics recommended alongside the monetary value metrics are those required as an input to the monetary valuation of changes in ecosystem services/goods. This is with the exception of Biodiversity. It is not currently recommended to apply a monetary valuation for biodiversity, therefore only quantitative metrics are identified for this ecosystem service.

We acknowledge that monetary values do not effectively capture the total economic value of the service/good (some will more than others) and so we recommend that water companies use natural asset metrics (both quantitative and qualitative) to understand changes to asset quantity and condition as a first step, supplementing this evidence with valuation of services/goods. See paragraphs 2 and 3 above for notes and references.

Many of the metrics recommended here represent national averages and are not location specific. This should be taken into account and considered in context when assessing options. Using such values aids consistency in application but does not account for important local variables. If water companies have locally specific data available, and it can be justified, they can choose to use that (please refer to further guidance about using additional/different metrics and evidence below and in the *Water Industry National Environment Programme (WINEP) options development guidance* (Environment Agency, 2021c)).

We acknowledge that there are other ecosystem services/goods that are not included here which are relevant to the water industry. Some of these have been considered but not included due to unavailable (not yet developed, not well enough developed, not peer reviewed etc.), unusable (too uncertain, not transferrable/scalable, out of date), inaccessible (licenced, not publicly available) evidence.

We also acknowledge that the metrics included here are not exhaustive. We recognise that there are alternative and additional metrics that could also be used. We have included metrics that are robust and relevant and are aligned in many cases with those recommended in *ENCA* (Defra, 2021) and/or used within the *Natural Capital Register and Account Tool v1 (NCRAT)* (Environment Agency, 2021). We advise water companies to use the metrics recommended here to aid consistency and comparison across optioneering. Please see 'References' tab for links to the above sources.

Water companies may want to use additional or different evidence to supplement (avoiding double-counting), or use instead of, the recommended metrics. However, water companies are expected to undertake their optioneering using the recommended metrics in the first instance. Any additional or different metrics should be used in a parallel assessment so there is consistency across water companies and appraisals, allowing comparisons to be made.

In presenting their appraisal of options, water companies must make it clear which ecosystem services/goods have been included and the sources of evidence for the metrics used. Where different metrics and evidence have informed decisions and proposed options, water companies must provide justification for using them. For example, describe the reasons for using different or additional metrics and evidence and why they are deemed more appropriate. Sources of evidence water companies present and use must be considered robust, sufficiently detailed and be openly available to allow regulators access if required. Additional or different metrics and evidence may, for example, come from water company's own primary valuation studies.

The metrics selected are accessible from open sources (with the exception of *UKCEH Land Cover Maps* (which needs to be purchased and used under licence), and source details and links are provided. A list of additional references and other useful sources of information is provided in the 'References' tab.

Appendix 2: Qualitative impact of WINEP investment on common performance commitment levels

Key:

p+	primary (positive)	n-	negative
p	secondary (positive)	n	negative if not delivered

WINEP investment category \ Common PCs	Biodiversity ⁽²⁾	Discharge permit compliance ⁽¹⁾	Serious pollution incidents	Internal sewer flooding	External sewer flooding	Total pollution incidents	Bathing water quality	River water quality (phosphorus)	Storm overflows	Operational GHG (wastewater)	Sewer collapses	None
Event Duration Monitoring at intermittent discharges												x
Flow monitoring at sewage treatment works												x
Continuous river water quality monitoring												x
MCERTs monitoring at emergency sewage pumping station overflows												x
Increase flow to full treatment	p	n					p		p	n-		
Increase storm tank capacity -grey solution	p	n					p		p+	n-		
Increase storm system attenuation / treatment on a STW - green solution	p+	n					p		p+			
Storage schemes to reduce spill frequency at CSOs etc - grey solution	p			p	p		p		p+	n-		
Storage to reduce spill frequency at CSOs etc - green solution	p+			p	p		p		p+			
Storm overflow - discharge relocation				p	p		p		p+			
Storm overflow - increase in combined sewer / trunk sewer capacity	p			p	p		p		p+			
Storm overflow - sustainable drainage / attenuation in the network	p+			p	p		p		p+			
Storm overflow - source surface water separation				p	p		p		p+			
Storm overflow - infiltration management				p	p		p		p+			
Storm overflow - sewer flow management and control				p	p		p		p+			
Storm overflow - new / upgraded screens									p			
Treatment for chemical removal	p	n								n-		

Chemicals and emerging contaminants monitoring/ investigations/ options appraisals																				x	
Treatment for total nitrogen removal (chemical)	p	n																		n-	
Treatment for total nitrogen removal (biological)	p	n																		n-	
Nitrogen Technically Achievable Limit monitoring, investigation or options appraisal																					x
Treatment for phosphorus removal (chemical)	p	n										p+								n-	
Treatment for phosphorus removal (biological)	p	n										p+								n-	
Treatment for nutrients (N or P) and / or sanitary determinands, nature-based solution	p	n										p+									
Treatment for tightening of sanitary parameters	p	n																			
Catchment management - chemicals source control												p+									
Catchment management - nutrient balancing												p+									
Catchment management - catchment permitting													p+								
Catchment management - habitat restoration												p+									
Microbiological treatment - bathing waters, coastal and inland	p											p+									
Septic Tank Replacements - Treatment Solution	p	n																			
Septic Tank Replacements - Flow diversion		n																			
Fish Outfall screens																					x
Sludge - disposal resilience and environmental impact																					x
25 Year Environment Plan																					x
Investigations, other (WINEP/NEP) - desk-based studies only																					x
Investigations, other - survey, monitoring or simple modelling																					x
Investigations, other - multiple surveys, and/or monitoring locations, and/or complex modelling																					x
Contribution to third party schemes under WINEP/NEP only (not covered elsewhere)																					x
River connectivity (e.g. for fish passage)																					x
Restoration management (marine conservation zones etc)																					x
Access and amenity for WINEP/NEP only (not covered elsewhere)																					x
Advanced WINEP (not covered elsewhere)																					x

Notes:

1. Discharge permit compliance is set to include DWF and storm overflow operation at treatment works in EPA metric from 2026 onwards.
2. "The company can, in consultation with relevant stakeholders, nominate areas of company-owned land as well as other land where habitat is improved in the process of the water company carrying out its functions."