Catchment Strategic Plan

Part of our Drainage and Wastewater Management Plan (DWMP)

Co-creating resilient wastewater catchments

A long-term Strategic Plan for the **Beddington and Hogsmill** Systems

Thames Water

Contents

Foreword

Thames Water has been making considerable progress to bring to fruition their drainage and wastewater management plan (DWMP). The DWMP vision is to co-create a 25-year plan for drainage and wastewater that benefits communities and the natural environment in London and the Thames Valley. We can all agree that planning to adapt to the growing critical pressures facing the water industry, such as climate change, a growing population and urbanisation, is of paramount importance and it has been very good to see that these challenges have been faced head on in the development of this plan.

Thames Water's commitment to achieve the DWMP vision through a collaborative process is one of the most important and admirable themes of this plan. Working alongside stakeholders and customers, including the Thames Regional Flood and Coastal Committee, ensures that the plan is reflective of our combined views and optimises overall efficacy and acceptability.

I have thoroughly enjoyed being part of this process and have been impressed by the extent of engagement that Thames Water has managed to undertake despite the challenging conditions of the coronavirus pandemic. As a result, I believe that the DWMP offers a significant step forward in planning for drainage and wastewater in our region.

Of course, the real changes will only happen once the plan is implemented on the ground, but the joined-up work and co-creation of the DWMP plan so far promises significant improvements for customers, communities and the natural environment across London and the Thames Valley. Continued focus on maintaining a tight relationship with all stakeholders is essential in moving forward to ensure Thames Water reaches their ambitious goals.

Professor Robert Van de Noort
Chair, Thames Regional Flood and Coastal Committee

Preface

Our DWMP progress and enhancements since our draft plan

We're proud of our first DWMP, and encouraged by the level of positive feedback we've received. By engaging and working collaboratively with around 2,000 of our customers and stakeholders, we've been able to deepen our shared understanding as well as develop new ways to approach drainage and wastewater management across our region.

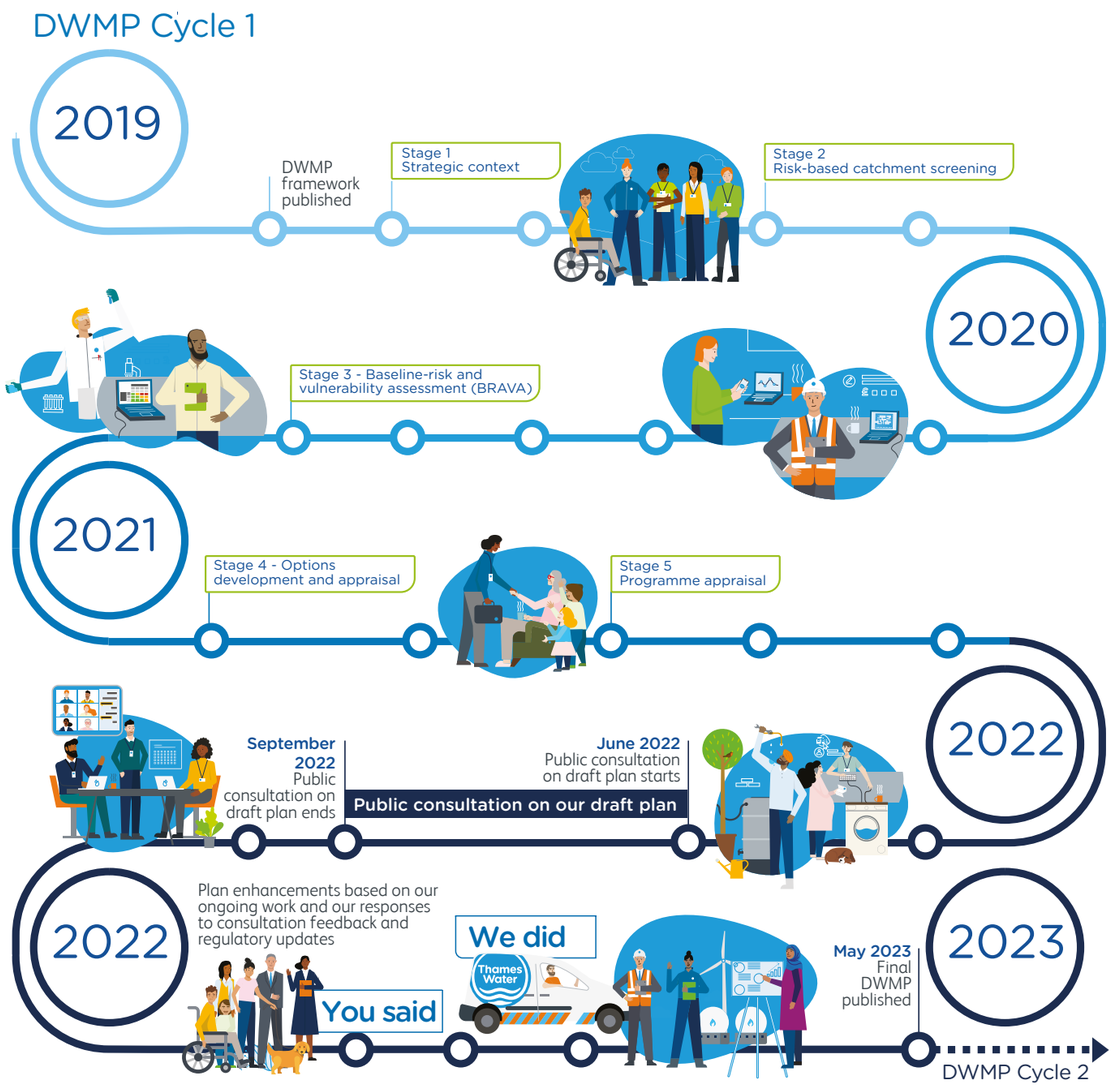
We'd like to say a big thank you to everyone who got involved and collaborated with us in the development of our shared plan. We're really happy it's having a positive impact already, and encouraged by the shared benefits we can deliver in the future as we continue to move forward together.

Our plan aligns with wider industry strategic plans and delivery programmes, such as the Water Industry National Environment Programme (WINEP) and the Long-Term Delivery Strategy (LTDS), and we'll make sure it continues to do so as we tackle current pressures and future challenges.

Over the past four years, we've developed, tested and enhanced our DWMP by engaging with customers and stakeholders and working with their valuable input and feedback to create a final plan we can all support. It's been almost a year since we first published our draft DWMP, and we've made some great progress since then. As customer and stakeholder requirements have evolved over time, our plan has evolved too.

We've enhanced our adaptive planning to increase the resilience of our final DWMP. We've also been testing its sensitivity against a range of alternative plans, risks and uncertainties to make sure our final plan is flexible to different potential futures. This approach will help us to make more proactive, adaptable and informed choices over time. It will also make sure that our interventions are set up for the future and can add the best value while providing ongoing opportunities for us to develop innovative solutions and ways of working.

The rest of this document summarises our final plan for this specific Catchment Strategic Plan (CSP) area, including the progress we've made from draft to final. We look forward to building on this progress and our collaborative approach as we implement our shared plan and evolve into DWMP Cycle 2.



Preface

What you told us about the draft DWMP for our region

We published our draft DWMP for public consultation in June 2022, and asked our customers and stakeholders for their feedback on it. We received around 1,400 responses from a wide range of local, regional and national stakeholder groups, including responses from every CSP area across our region.

We received lots of positive comments on the quality and ambition of our draft plan as well as useful ideas for making our final DWMP even stronger.

The consultation feedback had six main themes, as outlined below. We've listened carefully and responded wherever possible within our final plan*.

This valuable feedback has further enhanced our DWMP and will help our customers, communities and the natural environment in our region to thrive now and in the future.

You said

You supported

- Our preferred plan with the majority of our customers and stakeholders agreeing with this choice
- Our proposed solution types from nature-based solutions to using the latest technologies to increase capacity in our sewer system
- Our partnership-working approach with our 200+ local authorities, organisations, action groups, catchment partnerships and national stakeholders

You challenged

- Our targets – you wanted amendments or some new ones to be added
- Our programme – you wanted quicker delivery in certain areas and were concerned about such an ambitious SuDS plan
- The cost – you were worried about the impact on customer bills

You offered ideas for

- New or amended solutions that we could consider including in our preferred plan
- Maximising the benefits of our preferred plan's positive outcomes
- Enhancements to our stakeholder engagement approach and ongoing activities

You wanted more details on

- The resilience of our assets to flooding and power outage
- How our plan will be funded - by business-as-usual activities (base funding) or enhancement funds
- Adaptive planning scenarios to evidence how our plan could adapt to future influencing factors such as climate change

Feedback themes

Protecting the environment
Level of ambition and pace of delivery

Evidencing best value
Affordability and bill impact

Delivering the plan
Solutions and deliverability of the plan

Enhancing the plan
Technical clarifications and ease of navigation

Working together
Collaboration to achieve multiple benefits

Valuing your input
Stakeholder engagement

We did

We've used as much of your feedback as we could, together with the progress from our ongoing DWMP work and our responses to regulatory updates, to enhance our final plan including in the following ways:

- **More** ambitious storm overflow target delivery to help protect the environment
- **Increased** evidencing around best value and justification for our preferred plan
- **Increased** alignment of DWMP to other strategies and delivery plans
- **Increased** number of proposed solutions
- **Rewritten** and restructured parts of the documents to be clearer and more accessible
- **More** detailed content throughout, especially on strengthening partnership working and stakeholder engagement
- **Additional** future scenario testing
- **Increased** balancing of risk, ambition and deliverability
- **Earlier** planned implementations
- **New** dedicated technical appendices

* Some consultation feedback didn't require further action or wasn't relevant to the DWMP process. Other feedback was relevant to future DWMP planning cycles and will be used to inform this work.

This document focuses on the progress and updates we've made in our final DWMP for this specific CSP area.

Find out more about how we've addressed the wider consultation feedback in our You said, We did Technical appendix.

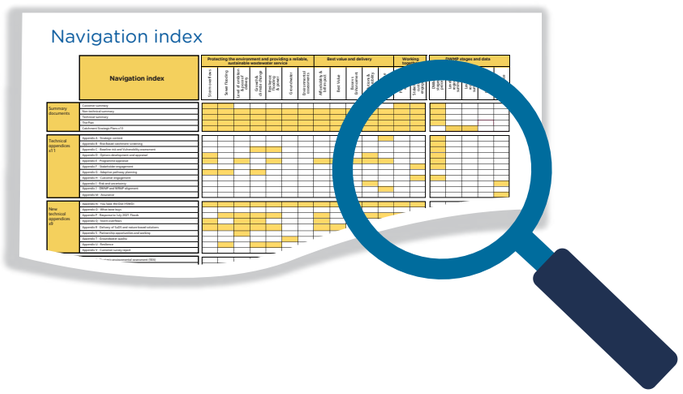
Preface

Navigating the final DWMP for our region

We've enhanced our final DWMP since we published it as a draft for public consultation in June 2022, and we want to make it easy for you to see what's changed.

You can spot all the places we've updated our draft plan with our 'progress signposts', which we've used across all our final DWMP documents. Here's where they'll be:

- Preface summaries - We've put a summary table in each document's preface, excluding Summary documents and the Catchment Strategic Plans (CSPs)
- Relevant chapters - We've placed the appropriate signposts next to each relevant chapter, including Summary documents and the CSPs

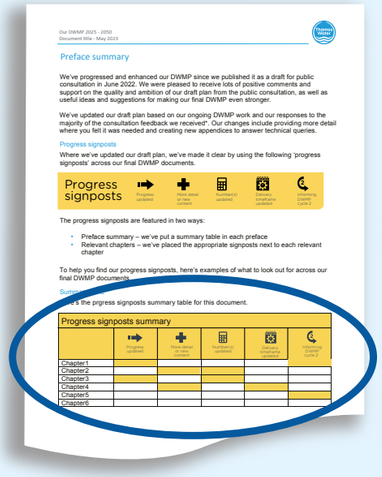


Progress signposts

- Progress updated
- More detail or new content
- Number(s) updated
- Delivery timeframe updated
- Informing DWMP cycle 2

To help you find our progress signposts, across our final DWMP documents, here are examples of what to look out for:

Preface summaries



Relevant chapters

If you need help navigating our final DWMP and locating key content, you can find a Navigation index at the back of this document.

Catchment strategic plan glossary

Term	Definition
1 in 30-year storm	A storm that has a 1 in 30 chance (3.33% probability) of being equalled or exceeded in any given year. This does not mean that a 30-year flood will happen regularly every 30 years, or only once in 30 years.
1 in 50-year storm	A storm that has a 1 in 50 chance (2% probability) of being equalled or exceeded in any given year. This does not mean that a 50-year flood will happen regularly every 50 years, or only once in 50 years.
Baseline Risk And Vulnerability Assessment (BRAVA)	Following Risk Based Catchment Screening (RBCS) detailed risk assessments on those catchments where we believed there was an adverse risk to performance over time, we modelled their performance for future epochs (2020, 2035 and 2050).
Combined Sewer	A combined sewer is a sewer designed to carry both wastewater and surface water from domestic and/or industrial sources to a treatment works in a single pipe.
Dry Weather Flow (DWF)	Dry Weather Flow (DWF) is the average daily flow to a Sewage Treatment Works (STW) during a period without rain.
EA Pollution Categories 1 to 3	Category 1 incidents have a serious, extensive or persistent impact on the environment, people or property. Category 2 incidents have a lesser, yet significant, impact. Category 3 incidents have a minor or minimal impact on the environment, people or property with only a limited or localised effect on water quality. Further guidance available here.
Event Duration Monitoring (EDM)	Event Duration Monitoring measures the frequency and duration of storm discharges to the environment from storm overflows.
Foul Sewer	A foul sewer is designed to carry domestic or commercial wastewater to a sewage works for treatment. Typically, it takes from sources including toilets, baths, showers, kitchen sinks, washing machines and dishwashers from residential and commercial premises.
Hydraulic Overload	When a sewer or system is unable to cope with a high flow.
L2 Area (Strategic Planning Area)	An aggregation of level 3 catchments (tactical planning units) into larger level 2 strategic planning areas. The level 2 strategic planning areas allow us to describe strategic drivers for change (relevant at the level 2 strategic planning area scale) as well as facilitating a more strategic level of planning above the detailed catchment assessments.

Term	Definition
L3 Catchment (Tactical Planning Unit)	Geographical area in which a wastewater network drains to a single sewage treatment works. Stakeholders may be specifically associated with this area. Includes for surface water sewerage that may exist which serves the wastewater geographical area but drains to a watercourse.
Lead Local Flood Authorities (LLFAs)	LLFAs are Risk Management Authorities as defined by the Flood and Water Management Act. They have statutory duties with respect to flood risk management, investigating flooding and the compilation of surface water management plans.
Risk Based Catchment Screening (RBCS)	A first pass screening exercise of catchment vulnerability against 17 different risk indicators to understand which catchments are low risk catchments and those that are likely to be at risk in the future if not supported by our long-term plan.
Sewage Treatment Works (STW)	A Sewage Treatment Works is a site where wastewater is received and treated to a standard legally agreed with the Environment Agency before it is released back into the environment.
Storm Overflow Discharges	Storm overflows are used to manage excess flows, which typically occur as a result of heavy rainfall. Excess flow that may otherwise have caused flooding is released through a designated outfall to a waterbody, land area or alternative drainage system.
Surface Water Sewer	A surface water sewer collects rainwater from domestic and commercial roofs, driveways, patios, etc to a local watercourse or suitable surface water drainage system.
Sustainable Drainage Systems (SuDS)	Drainage solutions for surface runoff that mimic natural drainage regimes and provide an alternative to a network of pipes and sewers.
Thames Regional Flood and Coastal Committee (TRFCC) Area	Thames Regional Flood and Coastal Committee (TRFCC) area was established by the Environment Agency under the Flood and Water Management Act 2010 that brings together members representing the Constituent Authority. Featured TRFCCs are listed here on our DWMP portal.

Introduction

Since 2019, we've been working with you, our stakeholders, to develop our first long-term strategy for wastewater and drainage issues within the Beddington and Hogsmill systems. The Beddington catchment consists of the London boroughs of Sutton and Croydon, as well as parts of Reigate & Banstead District Council (DC), and Tandridge DC. The Hogsmill catchment is mainly within Surrey and part of the Royal Borough of Kingston upon Thames (RBK). We're developing a strategy for the next 25 years to meet future challenges such as climate change, population growth and urban creep which could impact the sewerage and drainage systems in our region.

We want to make sure we increase the resilience of our sewerage and drainage assets and network so that we can protect our customers, communities, and the environment from the impacts of these challenges. This long-term strategic plan outlines our shared vision for the future and details how, through working together, we can improve and enhance our wastewater and surface water services in this TRFCC area to achieve the following ambitious goals:

In this document we'll explain:

- How we've worked in partnership to develop our strategic plan
- Our predictions of the future challenges we face in this region
- How this plan is expected to address these challenges and who else needs to be involved
- Our shared strategy for maintaining the safe and reliable delivery of wastewater and surface water services in the long-term

In this document we summarise our long-term plan for this catchment and also provide links to allow readers to investigate further into various risk zones. If you want to contact us or want to find out more about our DWMP and the set of documents it comprises, please use the following links:

DWMP@thameswater.co.uk

Drainage and wastewater management plan

Our Goals

95% of properties not at risk of flooding in a 1 in 50-year storm by 2050

Eliminate harm from storm overflows - no more than an average of 10 discharges per annum by 2045 at overflow locations

Enhancing resilience at our sewage treatment works to ensure 100% permit compliance and protect river water quality

Our DWMP components

DWMP Framework

Our DWMP

The Plan

DWMP portal

Strategic Context

Technical Summary

Technical Appendices

Non-Technical Summary

Theme		How we will measure performance			
	Environment	**Sewage treatment works quality compliance** The ability of Sewage Treatment Works (STW) to treat and release treated sewage in line with the consented discharge permit quality conditions.	**Sewage treatment works DWF compliance** The ability of STWs to treat and discharge treated sewage in compliance with the flow discharge permit Dry Weather Flow (DWF) conditions.	**Risk of pollution incidents** The risk of polluting the environment through uncontrolled escape of sewage (classed as Category 1 to 3 by the Environment Agency) arising from either network or treatment sites.	**Storm overflow performance** The number of storm overflow discharges to the environment, both in the network and at the STWs.
	Property hydraulic sewer flooding	**Internal hydraulic sewer flooding risk in a 1 in 30-year storm** The risk of properties flooding internally as a result of hydraulic sewer overload.	**External hydraulic sewer flooding risk in a 1 in 30-year storm** The risk of sewer flooding to gardens and other land within the property curtilage as a result of hydraulic sewer overload.	**Risk of hydraulic sewer flooding in a 1 in 50-year storm (resilience sewer flooding)** The risk of residential properties experiencing sewer flooding as a result of hydraulic sewer overload based on a modelled assessment of the performance of our sewers in a storm that statistically occurs once every 50 years on average.	
	Asset health	**Sewer collapses** The risk of sewers collapsing or rising mains bursting that leads to a loss of/interruption to continued service.			

The Beddington and Hogsmill systems

Beddington

Beddington is located in South London within the perimeter of the M25 motorway. The catchment that drains to Beddington STW consists of the London boroughs of Sutton and Croydon, as well as parts of Reigate & Banstead, and Tandridge and includes towns of Croydon, Purley, Coulsdon, Caterham, Sutton, Kenley, Carshalton, Thornton Heath, Warlingham, Tadworth and Kingswood. The total catchment population is over 400,000.

The system serves a predominantly residential area with higher density housing in the north of the catchment and less dense areas in the south. These residential areas are interspersed with some smaller industrial and light industrial land uses. A large industrial area exists directly to the east and south of Beddington STW on Purley Way.

This catchment is principally serviced by a separated sewer network, but the foul system is storm responsive, and comprises of over 3,000km of sewer network draining the catchment generally from south to north.

All foul flows drain to the Beddington STW located in Sutton 2 km to the north west of the centre of Croydon in the north of the catchment. The treated effluent from the STW, discharges into the River Wandle. The existing works was commissioned in the 1870s, therefore many of the local sewers in the area are now well over 100 years old.

Hogsmill

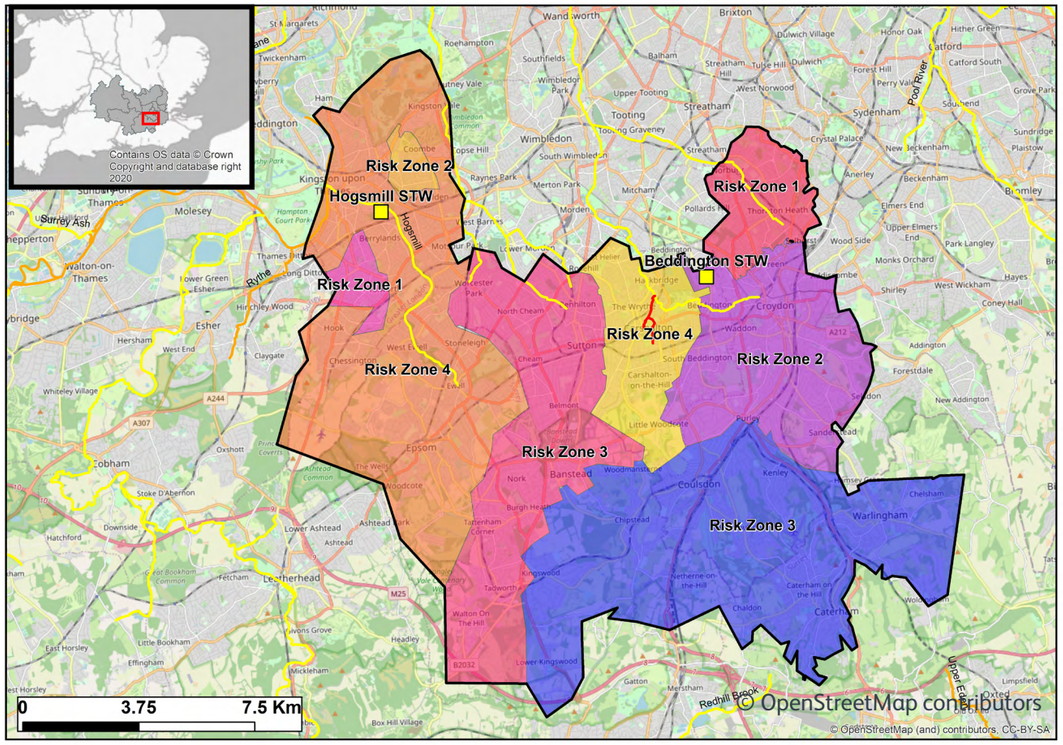
The Hogsmill catchment covers approximately 10,600 ha mainly within Surrey and part of the south west of London. It is located within the M25 boundary and is served by one sewage treatment works, Hogsmill STW in the Royal Borough of Kingston upon Thames, to the north of the catchment. The total population in this catchment is around 387,000. There are some commercial and industrial areas, hospitals, and a number of sports and recreational areas, but the catchment is predominantly residential.

The Hogsmill catchment is mainly served by a foul system and small elements of a combined system.

Surface water sewers are present throughout the catchment but generally in more recently developed or redeveloped areas. Surface water is predominantly drained via soakaways, highway drainage and land drainage. The catchment has around 3,000 km of sewer network. Most of the system is drained via gravity sewers with only a small proportion of the system being pumped to reach the treatment works.

Hogsmill STW discharges most of its flow to the Hogsmill River but pumps some into the Beverley Brook due to closure of Surbiton STW in the 1990s. The region overview map below highlights the watercourses in this area that are typically heavily modified with water status ranging from moderate to bad.

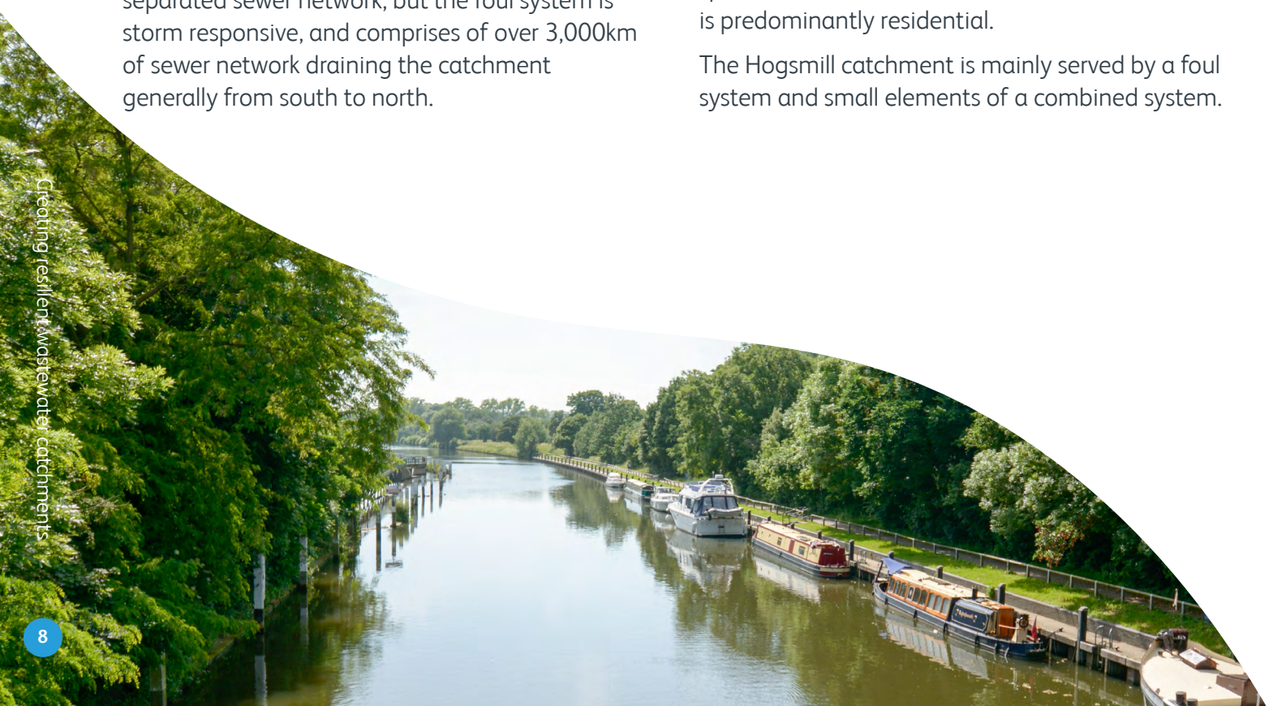
The map also shows the sub-division of the Beddington and Hogsmill systems into 4 risk zones per STW. The risk zones allow the DWMP process to be applied and tailored to smaller discrete areas.



L2 TRFCC Strategic Planning Area

Environment Agency WFD River Water Quality Status 2019

High Good Moderate Poor Bad



Our co-creators

Who our stakeholders are

It's not possible for all the benefits identified in the DWMPs to be developed by water companies alone. They are led by water companies but created collaboratively with other organisations and groups that, with Thames Water have a shared responsibility and/or interest in drainage, flooding and environmental protection. Active engagement with these stakeholders is vital for the consultation, planning and refinement of our DWMP.

Since 2019, we've been working with a wide variety of stakeholders from across this region to understand the local issues and opportunities so that we could create a long-term plan that provides the best outcome for everyone.

In this region we've engaged and worked with stakeholders from the following organisations and groups:

Environment Agency, Natural England, Greater London Authority, Transport for London, National Highways, Department for Environment, Food and Rural Affairs (Defra), Consumer Council for Water, Thames Water Customer Challenge Group (CCG), South East Rivers Trust, Royal Borough of Kingston upon Thames, Merton Council, Thames21, Sutton Council, Croydon Borough Council, Ravensbourne Catchment Partnership, Beverley Brook Catchment Partnership, Wandle Catchment Partnership and Hogsmill Catchment Partnership.

Ravensbourne Catchment Partnership

Wandle Catchment Partnership

Beverley Brook Catchment Partnership

Hogsmill Catchment Partnership

Thames Water Customer Challenge Group

The stakeholder feedback we've received

To ensure our stakeholders' views have been considered and are a fundamental part of our final DWMP, we've carried out a variety of stakeholder engagement activities.

From 2020 to 2022 much of the interaction was online due to coronavirus restrictions, but over the years they've included workshops, drop-in sessions, 1-2-1 calls, recorded webinar updates, newsletters, surveys, feedback forms as well as online discussions. From our engagement throughout each of the DWMP framework stages we know that our stakeholders want our strategic plan to deliver the following things in this region (see quotes on the right).

We've spoken to our stakeholders to identify their strategic management plans and policies that could interact with our DWMP. The strategic themes are displayed below and the following table records all of the plans and policies and how they align with the DWMP.

> "The plans look encouraging, but I would be keen to understand how TWUL plan to integrate any updates into the plan, to make it a living document. For example, we are updating our LFRMS currently, and therefore once this is published and live, would it render aspects of their CSPs invalid / outdated?"

> "It is positive that Thames Water is exploring a wide range of interventions, with the potential to deliver multiple benefits, to improve the resilience of the network. The plans are a good first step, but success all depends on further collaborative work to tailor the plans and clearly demonstrate how they would actually be delivered. This process would need to be properly resourced with adequate time for stakeholders to be consulted."

Partners' policies

Management Plan (Hyperlink)	Key aspects that align with the DWMP
Local Flood Risk Management Strategies	
Local Flood Risk Management Strategy: 2015-2020, London Borough of Croydon	• This strategy sets out the long-term vision and flood risk management priorities to shape a strategy that delivers the greatest benefit to the people, property and environment of Croydon.
Surrey Local Flood Risk Management Strategy	• Make the catchment more resilient to flooding on a long-term basis through a coordinated approach with residents and partners • Reducing the risk of flooding and its impact • Supporting flood alleviation work where appropriate • Investing in natural and engineered flood alleviation schemes, influencing policy and supporting residents • Partnership working
London Borough of Sutton, Local Flood Risk Management Strategy	• Improve the knowledge and understanding of the different risks of flooding in Sutton • Proactively encourage sustainable solutions for the management of local flood risk which take account of climate change • Use planning powers to appropriately mitigate flood risk to or caused by developments across Sutton • Educate, encourage, and empower local residents, businesses and landowners to take action on reducing flood risk • Nurture collaborative partnerships with key organisations and Risk Management Authorities, including for funding and resources
Royal Borough of Kingston upon Thames, Local Flood Risk Management Strategy	• Educate, encourage and empower local stakeholders to take action on reducing flood risk • Apply an intelligence-led risk-based approach to the management of flood risk in the Royal Borough of Kingston upon Thames • Establish and maintain collaborative partnerships with key organisations, including Thames Water, neighbouring boroughs and the Environment Agency • Use planning powers to encourage sustainable solutions for the management of local flood risk which take account of the likely effects of climate change
London Borough of Richmond upon Thames, Local Flood Risk Management Strategy (Draft for consultation)	• The purpose of this strategy is to set out the approach to managing flood risk from local sources in both the short and long term.

Management Plan (Hyperlink)	Key aspects that align with the DWMP
Surface Water Management Plans	
Surface Water Management Plans for: London Borough of Sutton London Borough of Croydon London Borough of Richmond on Thames Royal Borough of Kingston Upon Thames Epsom and Ewell	• These plans outline preferred surface water management strategies and include consideration of flooding from sewers, drains, groundwater and runoff from land, small watercourses and ditches that occur as a result of heavy rainfall. • These plans enable the LLFA to carry out their responsibilities by proposing potential mitigation measures and an Action Plan to reduce flood risk in the area, as well as suggesting methods for working collaboratively with partners and stakeholders.
River Catchment Partnership Plans	
A Catchment Plan for the River Wandle	• "A naturally functioning and self-sustaining chalk river rich in biodiversity and a haven for Londoners" • Habitat and wildlife: the river supports a mosaic of habitats with high biodiversity • Water: plentiful and clean, and varied in its flow speeds, widths and depths • Good access: sympathetically managed pathways along the whole river • Engagement: everyone in the catchment aware of the river and knowing how their actions can affect it • Councils, businesses, government agencies and the public working together for the river

Management Plan (Hyperlink)	Key aspects that align with the DWMP
Ravensbourne Catchment Plan	• New development enhances the river and allows nature to thrive • Community and volunteer groups are well supported in their work along the river • Enhancement and education programmes benefit local people • A locally supported Catchment Plan creates a path towards a healthy future for the rivers within the catchment
Hogsmill Catchment Partnership	• Deliver projects to enhance and restore habitats, biodiversity and natural processes along the Hogsmill • Misconnections along the river are identified and resolved, future misconnections are prevented • Combined sewer overflows in the catchment do not have a detrimental effect on the river's ecology and recreational value • Implement improvements to the Hogsmill Sewage Treatment Works to reduce the impact of the effluent on water quality • Urban diffuse pollution is addressed, or mitigated for, across the catchment • Community engagement and education • Data and evidence • Planning and development
Maidenhead to Teddington Catchment Plan	• The vision statement is 'A healthy river Thames for all. Our vision is to protect, improve and enhance all rivers within the Lower Thames Catchment by 2027, making them cleaner, more accessible and more attractive, to benefit local communities and wildlife, both now and for the benefit of future generations'.
SuDS Design and Evaluation Guide	
Surrey County Council, Sustainable Drainage System Design Guidance	• This advice sets out the requirements that the LLFA has for drainage strategies and surface water management provisions associated with applications for development.
Sustainability and Planning	
Green Infrastructure Strategy, Reigate & Banstead Borough Council	• This strategy explains how the council will use its own resources, and work closely with partners, to make the most of the green infrastructure network that runs through the borough and beyond. It will inform the council's plan-making work, its determination of planning applications, and the activities of its Greenspaces Team.
Chalk Stream Restoration Strategy	• Enhanced status for all chalk streams
The London Plan	• This plan is an integrated economic, environmental, transport and social framework for the development of London over the next 20-25 years.

Issues today

The initial risk-based catchment screening (RBCS) in this region, published in 2019, assessed system performance against a range of 17 indicators, using information from company reporting systems or from relevant stakeholders, to identify systems that are vulnerable to the risks of growth and climate change. We identified that the Beddington system warranted long-term planning with 6 of the 17 indicators being breached and the Hogsmill system warranted long-term planning with 7 of the 17 indicators being breached.

As part of optioneering we have then assessed the catchment against a series of planning metrics as shown in the table below.

This identified the highest risk for each metric that then progressed through optioneering and into the appraisal phases. The tables below identify the risk areas and metrics that have passed through for solution development.

The DWMP process is iterative and will be repeated every 5 years, with the next version due in 2028. This will capture any changes in demands for this catchment, incorporate the outputs from the review of the 2021 floods and will look for opportunities to utilise future technologies and engineering solutions.

Beddington Risk							
Risk Zone	**Storm Overflow Performance**	**Internal Sewer Flooding**	**External Sewer Flooding**	**Resilience (1 in 50 - year storm)**	**Surcharging**	**STW Quality Compliance**	**STW DWF Compliance**
STW	N/A	N/A	N/A	N/A	N/A	Yes	No
1	No	Yes	Yes	Yes	Yes	N/A	N/A
2	No	Yes	Yes	Yes	No	N/A	N/A
3	No	Yes	No	Yes	Yes	N/A	N/A
4	Yes	No	No	Yes	Yes	N/A	N/A

Hogsmill Risk							
Risk Zone	**Storm Overflow Performance**	**Internal Sewer Flooding**	**External Sewer Flooding**	**Resilience (1 in 50 - year storm)**	**Surcharging**	**STW Quality Compliance**	**STW DWF Compliance**
STW	N/A	N/A	N/A	N/A	N/A	Yes	No
1	No	Yes	Yes	Yes	Yes	N/A	N/A
2	No	Yes	Yes	Yes	Yes	N/A	N/A
3	Yes	Yes	Yes	Yes	Yes	N/A	N/A
4	Yes	Yes	Yes	Yes	Yes	N/A	N/A

'N/A' indicates that a particular risk is not applicable/cannot be quantified either to/for the STW or risk zones

Our predictions for the future - Beddington

We've modelled the entire Beddington system against future challenges, assessed targets and carried out discussions with local stakeholders and forecast that, if we do nothing and do not implement the DWMP, over the next 25 years there will be an increased risk of flooding and pollution from our sewer systems.

We modelled the impact of climate change, population growth and urban creep on flood risk, pipe capacity, treatment works compliance and storm overflow compliance from a 2020 baseline, which includes the Thames Tideway Tunnel, to 2050.

This has helped determine how risk will change over time due to these factors.

Our forecast network performance metrics are summarised opposite. By 2050 we forecast that, across the region, over 6% of properties will be at risk of flooding in a 1 in 50-year storm.

Based on our findings from the modelling and carrying out discussions with local stakeholders we forecast that, if we do nothing, over the next 25 years there will be an increased risk of hydraulic sewer flooding and pollution from our sewer systems in this region.

Beddington STW water quality and DWF compliance

	2020	2025	2030	2035	2040	2045	2050
Water Quality (SS* & BOD*)	79%	92%	94%	95%	96%	97%	99%
Water Quality (AmmN*)	79%	92%	94%	95%	96%	97%	99%
DWF	47%	48%	49%	50%	50%	51%	52%

* Suspended Solids (SS)
* Biochemical Oxygen Demand (BOD)

* Ammonical Nitrogen (AmmN)

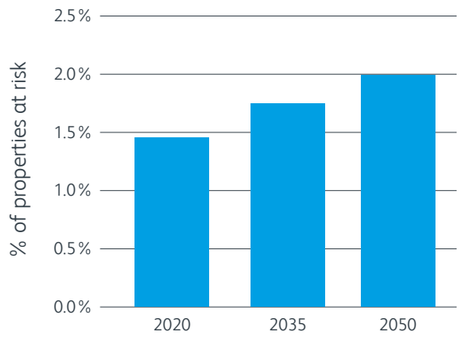
The ability of STW to treat and dispose of sewage in line with current water quality and dry weather flow (DWF) discharge permit conditions was assessed. The results presented above indicate that there is headroom for DWF permit compliance and that water quality performance will breach the current Thames Water target of being less than 80% of the permitted level and will breach the permit by 2025.

Therefore, there is an evident need for long-term planning and the implementation of the DWMP, to protect this region and support its future growth. If you are a DWMP practitioner, further details can be found on our Practitioner portal.

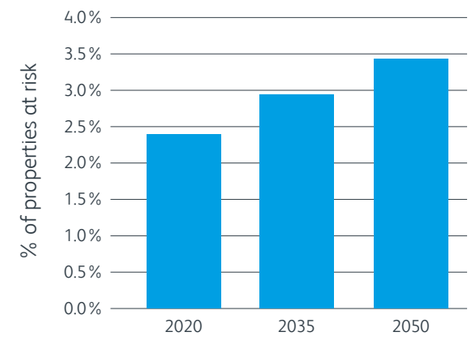
DWMP Practitioner portal

Change in risk if we do nothing and do not implement the DWMP

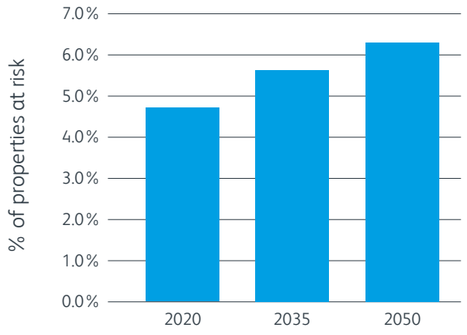
Internal hydraulic sewer flooding (1 in 30-yr storm) - i.e >3.3% chance of happening each year



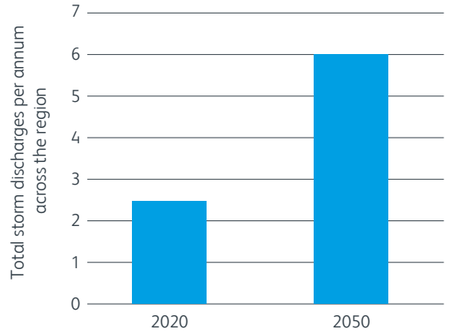
External hydraulic sewer flooding (1 in 30-yr storm) - i.e >3.3% chance of happening each year



Hydraulic sewer flooding (1 in 50-yr storm) - i.e. >2% chance of happening each year



Annual storm overflow performance



2020 and 2050 modelled overflow data in DWMP catchments due to hydraulic incapacity

Our predictions for the future - Hogsmill

We've modelled the entire Hogsmill system against future challenges, assessed targets and carried out discussions with local stakeholders and forecast that, if we do nothing and do not implement the DWMP, over the next 25 years there will be an increased risk of hydraulic sewer flooding and pollution from our sewer systems.

We modelled the impact of climate change, population growth and urban creep on flood risk, pipe capacity, treatment works compliance and storm overflow compliance from a 2020 baseline, which includes the Thames Tideway Tunnel, to 2050.

Our forecast network performance metrics are summarised opposite. By 2050 we forecast that, across the region, over 31 % of properties will be at risk of hydraulic sewer flooding in a 1 in 50-year storm.

Based on our findings from modelling and from discussions with local stakeholders, we forecast that if we do nothing, over the next 25 years there will be an increased risk of hydraulic sewer flooding and pollution from our sewerage systems in this region.

Hogsmill STW water quality and DWF compliance

	2020	2025	2030	2035	2040	2045	2050
Water Quality (SS* & BOD*)	78 %	91 %	94 %	97 %	100 %	103 %	106 %
Water Quality (AmmN*)	78 %	91 %	94 %	97 %	100 %	103 %	106 %
DWF	78 %	77 %	78 %	78 %	80 %	83 %	85 %

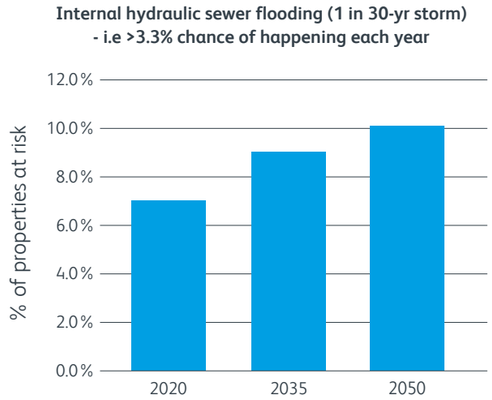
* Suspended Solids (SS)
* Biochemical Oxygen Demand (BOD)
* Ammonical Nitrogen (AmmN)

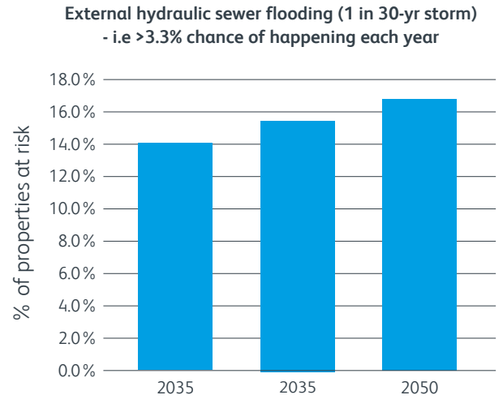
The ability of STW to treat and dispose of sewage in line with current water quality and dry weather flow (DWF) discharge permit conditions was assessed. The results presented above indicate that water quality performance will breach the current Thames Water target of being less than 80 % of the permitted level and will breach the permit by 2025.

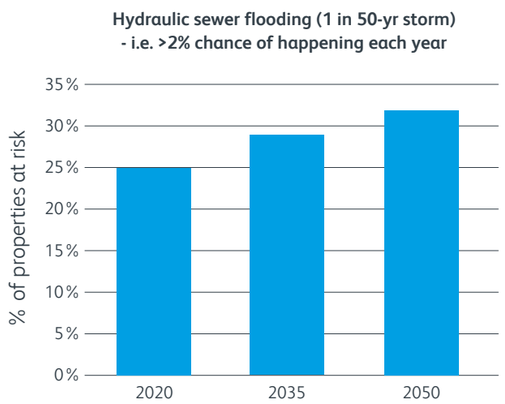
Therefore, there is an evident need for long-term planning and the implementation of the DWMP, to protect this region and support its future growth. If you are a DWMP practitioner, further details can be found on our Practitioner portal.

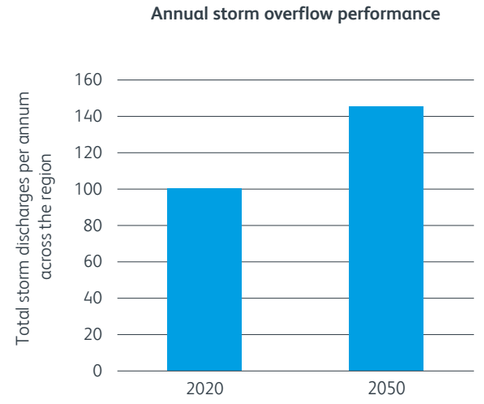
DWMP Practitioner portal

Change in risk if we do nothing and do not implement the DWMP









2020 and 2050 modelled overflow data in DWMP catchments due to hydraulic incapacity

Sustainable solutions

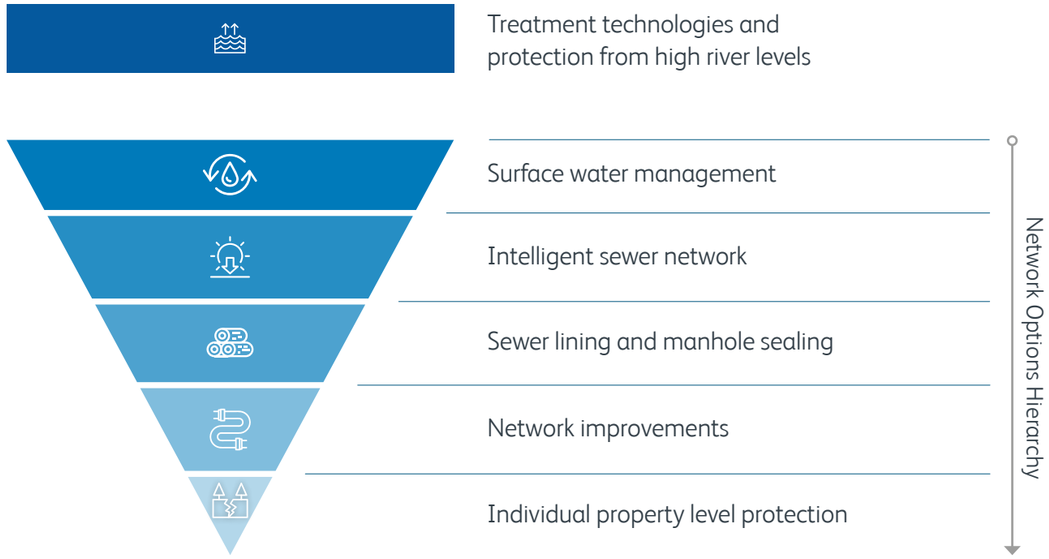
We've combined our knowledge of the catchments with the stakeholder feedback we've received to help us identify the solutions required to meet the future needs of this region. We've used a structured approach that started with over 40 generic solutions, to ensure broad thinking, and identified and assessed the feasibility of a wide range of potential interventions and the extent to which they resolve the area's future needs.

Our approach has followed the same method that has been developed and implemented successfully over many years for our Water Resources Management Plans (WRMP).

Our stakeholders, like us, want this DWMP to work in balance with the natural environment and make the best use of available land.

Our hierarchy of options follows this principle - it focuses first on maximising the efficient use of existing assets, then prioritising natural surface water management solutions over network improvements.

The common sustainable solution options we've considered for this area are outlined below. Further information on Options Development and Appraisal stage is available on our DWMP portal.



Solution options considered in optioneering

Surface water management

Surface water separation and the installation of features to collect, store and/or infiltrate surface water from buildings and impermeable areas, such as driveways and car parks as part of enhancing our surface water sewerage system. This option also looks to reinforce the fundamental basis of our sewerage systems being separate by addressing property misconnections of surface water into the foul sewer system or foul to surface water.

Intelligent sewer network

Active system management at key points in the network to optimise available network capacity by balancing network flows. e.g. automation of weir chambers on trunk sewers or the active system management of pumping stations, using sewer monitors for live/predictive modelling.

Sewer lining and manhole sealing

Undertaking a programme of sewer and manhole lining, we will target as a priority the areas of high infiltration and with a high potential to reduce unwanted flows into our sewer system that currently take up much of its capacity.

Network improvements

Managing the impact of surface water on the sewerage system through the identification of network improvements to address deficiencies in the sewerage network capacity, specifically in areas with deliverability constraints and a high risk of sewer flooding now or in the future. This includes the construction of large attenuation sewers, new surface water and foul water sewers.

Individual property level protection

Providing vulnerable homes with active and passive flood protection measures such as flood proof doors, self-sealing bath/shower systems (non-return valves) and installation of household pumping stations.

Treatment technologies and protection from high river levels

Implementation of a range of different technologies identified to enhance the performance of the STW, through either retrofitting or new-build options. This will include the use of more intensive wastewater treatment processes which have the capacity to meet future demands and the construction of flood bunds to protect our assets from high river levels.

Partnership working – case studies

Working in partnership with our stakeholders is a fundamental component of our plan. It can provide significant potential to support delivery of mutually beneficial outcomes, address multiple drivers and deliver multiple benefits. In this section we present a few examples of partnership working opportunities in this region.

Purley Oaks Station

This area was identified in the BRAVA workshops as a priority area in South West London that has high community interest and local concerns. Croydon Borough Council are investigating the surface water flooding that has occurred around Purley Oaks Station. A range of opportunities exist to develop collaborative surface water management options, such as SuDS features within the local recreation ground, combined with network improvements to reduce flooding.

Croydon Conservatives Twitter, August 2020

Beddington Catchment Flooding Alleviation Scheme

Surface water flooding occurs through the underpass at Demesne Road in South Beddington. This opportunity involves taking a catchment-wide approach with the Sutton Council to install a pump system which would help direct surface water towards an attenuation tank at the nearby allotments and help protect customers from internal flooding to their properties.

Implementing SuDS features such as raingardens and tree pits at Wallington Station and Beddington Gardens could reduce flood risk for lower order events. Partnership funding from the Department of Education exists to deliver SuDS within Sherwood Park School, Bandon Hill, Woodfield and Ockfield primary schools as part of the project.

Latchmere Park and King George's Field

There is an opportunity to take a catchment-wide approach (Hogsmill) to address flooding in partnership with Royal Borough (RB) of Kingston. A number of users of the Latchmere Recreation Ground and those affected by flooding along Latchmere Lane, Latchmere Road and Aldersbrook Drive would benefit from SuDS features. Properties along Hook Rise South that experience garden flooding from surface water run off via the underpass under the A3 would benefit from a new swale along the north boundary of the King George's Field connecting to a culverted watercourse.

Opportunity	Partner
Beddington Catchment Flood Alleviation Scheme (FAS)	Sutton Council
Purley Oaks Station	Croydon Borough Council
Latchmere Park	RB of Kingston
King George's Field	RB of Kingston
Rosehill Park	Sutton Council

These opportunities have been identified following a detailed screening and prioritisation exercise with our partners. This approach is explained in the Appendix S Partnership Opportunities and Working report.

Our shared plan

Our shared long-term plan for the Beddington and Hogsmill systems has been formulated based on a balance of how deliverable and sustainable the proposed interventions are, and also how cost-efficiently they can deliver multiple benefits.

The challenges this region has presented to us in delivering that balance have included:

- Population growth uncertainties
- Incomplete mapping of surface water systems e.g. sewer, highway or land drainage and the extent of our hydraulic surface water sewerage network model coverage
- Location of property level misconnections
- Pipe materials e.g. pitch fibre sewers impacting asset health
- Ownership and maintenance of SuDS

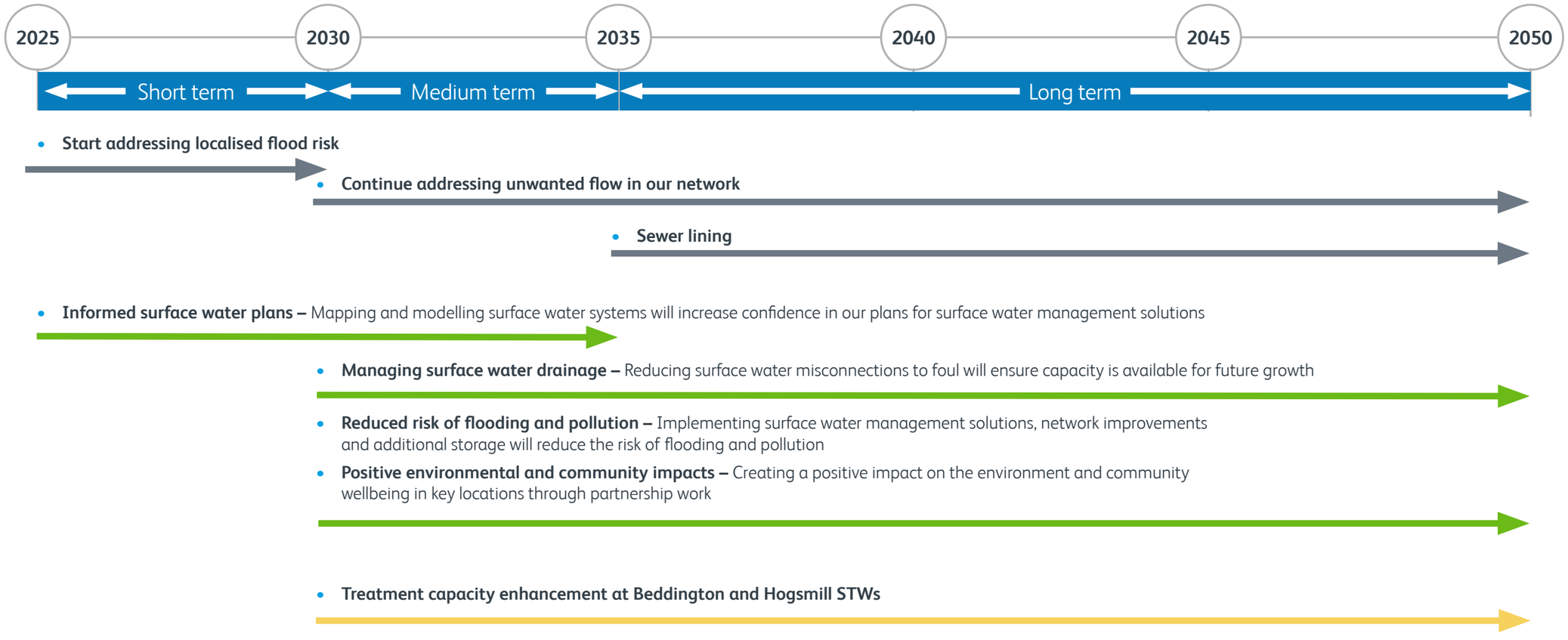
We will achieve this through an adaptive approach whereby we will aggressively target unwanted flows to restore capacity in our network incrementally at system level over the next 25 years.

This will include disconnecting surface water misconnections from foul and combined sewers and redirecting it to surface water drainage.

Our approach is to address systems holistically, to provide wide-ranging benefit to the catchments we service in the most resilient and sustainable way for foul, combined and surface water systems. We will work in partnership, where possible, to evolve surface water systems, championing green infrastructure.

We will focus on our hotspots in the short to medium term to deliver the maximum benefit of reducing sewage escapes to the environment in the shortest possible time for our customers. Those assets linked to the most sensitive water courses will be prioritised.

The diagram below outlines the sequencing of our proposed interventions for this area:



Developing our preferred plan for Beddington and Hogsmill

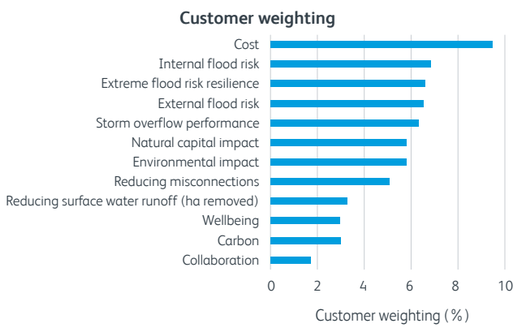
Progress +

Defining a best value framework

A best value framework is one that considers broader criteria than just economic cost. So our DWMP maximises outcomes for the communities it serves. Our criteria are based on the 12 planning objectives of the DWMP with additional criteria to capture broader environmental impact.

Defining what our customers and stakeholders value

We have used quantitative customer research to determine the relative priorities of the different criteria.



Agreeing scenarios with stakeholders

For our London catchments our approach has focused on a programme of storm discharge and flooding reduction that meets targets in each of the thirty-five risk zones. We identified and agreed scenarios to cover the range of our ambitions through discussion with our regional stakeholders.

Alternative plans and outcomes

Maintain flooding resilience - delivers the statutory storm discharge reduction requirements and maintains property flooding at 2025 levels

Maximum community benefit - meets our DWMP sewer flooding objectives and delivers our storm discharge reduction plan for high priority sites by 2035 and all sites by 2045 whilst also creating the most benefit to communities and the environment

Resilient - constrained - meets our sewer flooding planning objectives and delivers our storm discharge reduction plan for high priority sites by 2035 and all sites by 2045. Delivers a feasible level of surface water management within the first 10 years of the plan

Accelerated / deliver sooner - accelerates investment to deliver our performance outcome targets sooner, including our storm discharge reduction at all sites by 2035, reflecting views expressed by stakeholders in the public consultation

To avoid customer bill volatility, we also explored alternative investment profiles that define how quickly options are implemented. We also considered a better information plan that includes factors such as improvements in overflow and river monitoring data and improved accuracy in our hydraulic modelling to predict flood risk.

Scoring our options against our planning objectives

Scores have been generated for every option for each of our planning objectives and weighted based on our customer priorities. For example, DWMP with additional criteria to capture broader environmental impact.

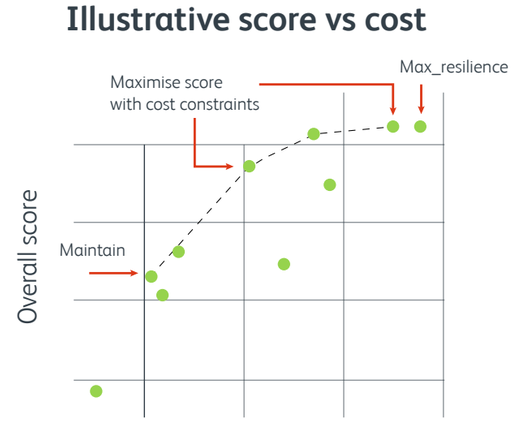
Natural capital (NC) impact
We used data from Natural England on the existing NC in the catchment and assessed whether the option would improve or reduce this baseline based on additional green space generated. Surface water management schemes scored highly whilst new sewers and tanks scored lower.

Wellbeing impact
We used data on environmental factors in the catchment that influence population and human health, including improved access to recreation and the environment, and assessed whether the option would improve or reduce this baseline.

Reducing misconnections
We assessed the area to be disconnected from our foul and connected into our surface water systems as part of our options.

Assessing different scenarios

We used a decision support tool to optimise our plan based on our 'value criteria'. We tested multiple alternative plans to allow us to assess different scenarios and compare their outcomes.



Determining our preferred plan

Our preferred plan has been developed by considering a range of factors including:

- affordability
- deliverability
- performance outcomes
- strategic environmental appraisal
- stakeholder feedback

This has allowed us to develop an adaptive plan that recognises areas of risk and uncertainty, where improved understanding will be used to prioritise interventions at key decision points over those that can be deferred.
Our preferred plan balances our ambitions, our stakeholder and customer desires, our planning objectives and affordability.

Our preferred plan for Beddington

From the first iteration of our preferred plan for the Beddington system we estimate that to tackle growth and climate change we need to invest an additional £0.6bn over the period 2025 to 2050, on top of our day-to-day maintenance activities. We aim to reduce this cost requirement in subsequent iterations of our DWMP through partnership benefits, innovation and better targeting with enhanced surface water system knowledge.

Our asset strategy for our systems in London is to deliver a storm discharge and flooding reduction programme that will meet our targets in each of the 35 risk zones by 2050 allowing for climate change and growth.

Our preferred plan comprises options that have been developed to meet medium term (2035) and long term (2050) performance targets.

Our hierarchy of solution types commences with, and seeks to maximise the implementation and benefit from sustainable urban drainage solutions.

- £171m on managing the impact of surface water on the sewerage system including construction of new sewers, sewer upsizing and attenuation storage to provide additional capacity
- £370m on improvements to surface water management, with a particular focus on removing surface water from impacting on the networks
- £25m upgrading the Beddington STW
- £45m on sewer lining

Storm overflow performance
Reduce the number of average annual storm discharges by 2. By 2050, none of the 2 storm discharge locations in this catchment will overflow more than ten times per annum on average

Property flooding
Protect 1,995 properties from internal sewer flooding up to a 1 in 30-year storm event
Protect 3,077 properties from external sewer flooding up to a 1 in 30-year storm event
Protect 5,481 properties from sewer flooding up to a 1 in 50-year storm event
If we don't invest, over 5.4 % of properties would be at risk in a storm up to 1 in 50-year storm in 2050. As a result of implementing our plan, this would decrease to 2.9 %

Treatment capacity enhancements and/or protection from high river levels at the STW
Upgrade the Beddington STW by 2050

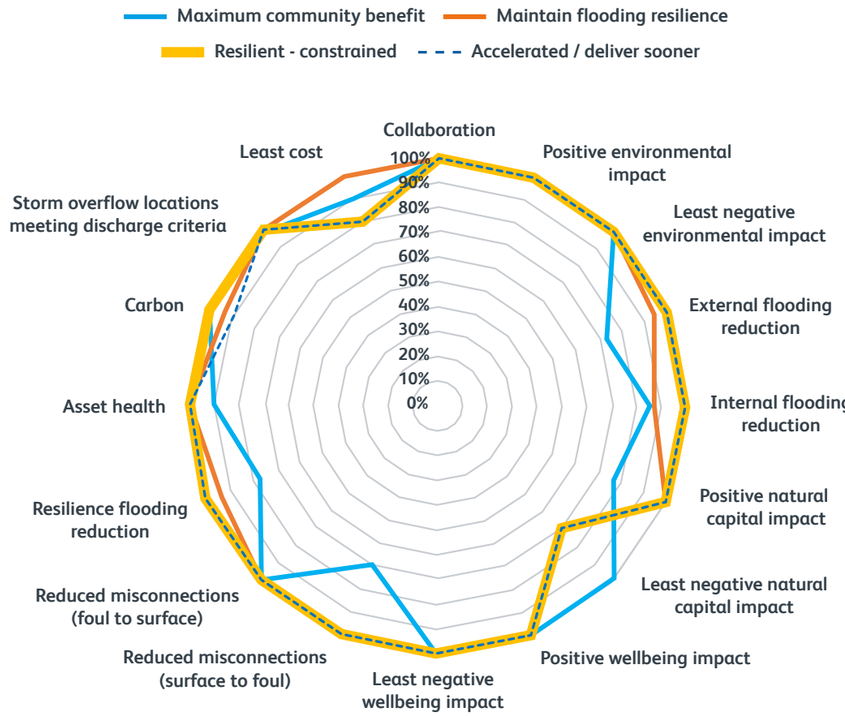
Asset improvements
Reline 32 km of sewers

Reduce misconnections / Reduce surface water runoff
157 ha (equivalent to 10,400 properties) to be disconnected from our sewers and reconnected to a surface water sewer with attenuation or to a soakway

Carbon
57,222 tonnes of carbon embodied in delivering the plan, with 266 tonnes of carbon sequestered in delivering the plan

Our preferred plan (resilient - constrained) has been optimised to offer the best value solution to reduce sewer flooding, protect the environment, and enhance natural capital as shown in the relative performance of our preferred plan figure.

Relative performance of our preferred plan



Our preferred plan for Hogsmill

From the first iteration of our preferred plan for the Hogsmill system we estimate that to tackle growth and climate change we need to invest an additional £4.8bn over the period 2025 to 2050, on top of our day-to-day maintenance activities. This high scope and cost are a reflection of the large amount of surface water sewer modelled in Hogsmill. We aim to reduce this cost requirement in subsequent iterations of our DWMP through partnership benefits, innovation and better targeting with enhanced surface water system knowledge.

Our asset strategy for our systems in London is to deliver a storm dicharge and flooding reduction programme that will meet our targets in each of the 35 risk zones by 2050 allowing for climate change and growth.

Our preferred plan comprises options that have been developed to meet medium term (2035) and long term (2050) performance targets.

Our hierarchy of solution types commences with, and seeks to maximise the implementation and benefit from sustainable urban drainage solutions.

- £3.9bn on managing the impact of surface water on the sewerage system including construction of new sewers, sewer upsizing and attenuation storage to provide additional capacity
- £821m on improvements to surface water management, with a particular focus on removing surface water from impacting on the networks
- £40m upgrading the Hogsmill STW

Storm overflow performance
Reduce the number of average annual storm discharges by 202. By 2050, none of the 15 storm discharge locations in this catchment will overflow more than ten times per annum on average

Property flooding
Protect 14,438 properties from internal sewer flooding up to a 1 in 30-year storm event
Protect 24,618 properties from external sewer flooding up to a 1 in 30-year storm event
Protect 44,241 properties from sewer flooding up to a 1 in 50-year storm event
If we don't invest, over 27 % of properties would be at risk in a storm up to 1 in 50-year storm in 2050. As a result of implementing our plan, this would decrease to 5.1 %

Still supporting an overall goal of 95 % of properties not at risk across London

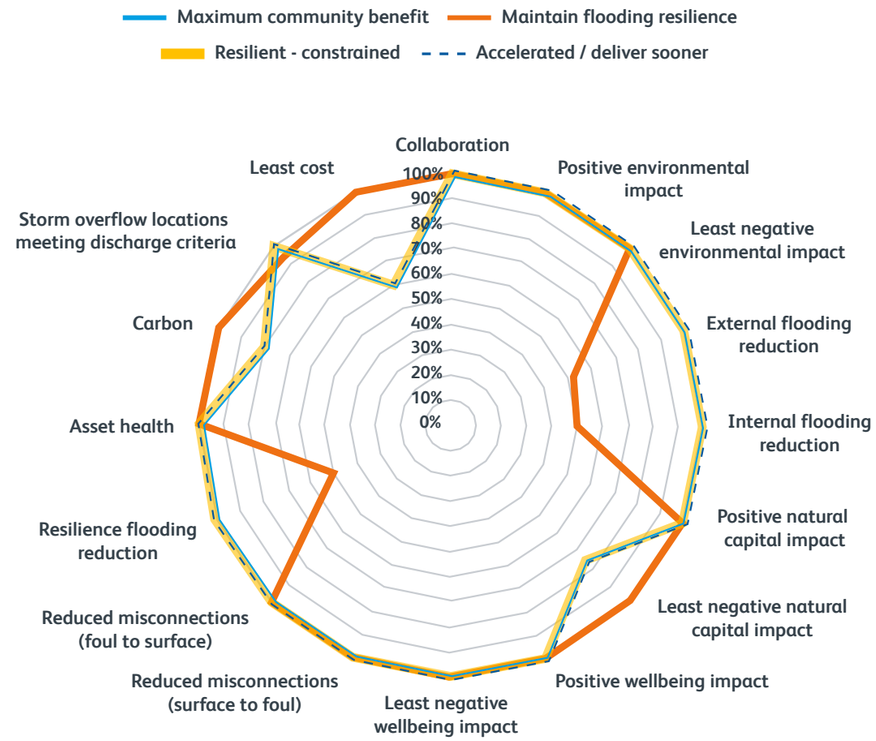
Treatment capacity enhancements and/or protection from high river levels at the STW
Upgrade the Hogsmill STW by 2050

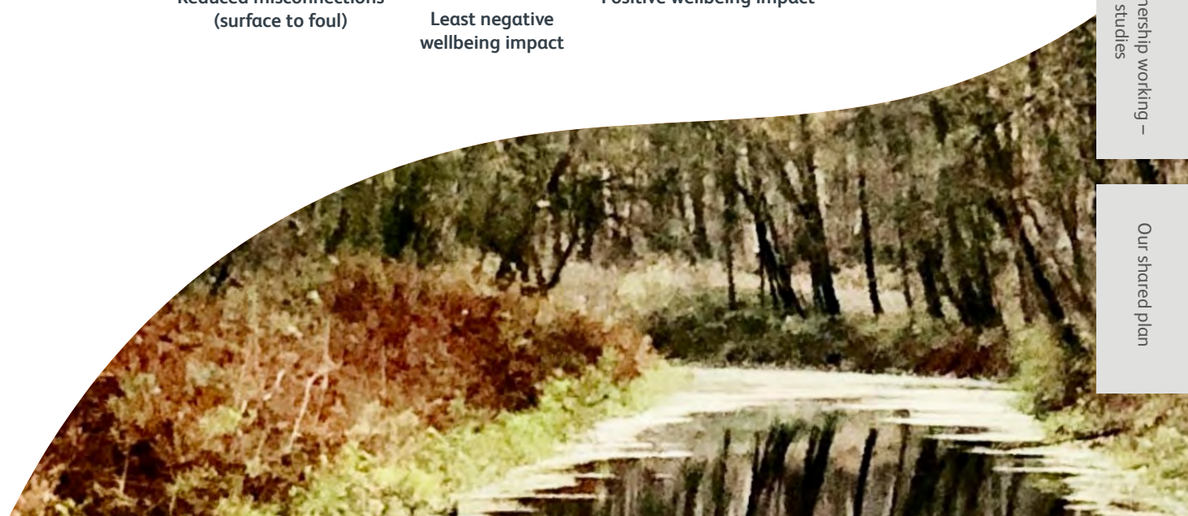
Reduce misconnections / Reduce surface water runoff
357 ha (equivalent to 23,800 properties) to be disconnected from from our sewers and reconnected to a surface water sewer with attenuation or to a soakway

Carbon
480,149 tonnes of carbon embodied in delivering the plan, with 513 tonnes of carbon sequestered in delivering the plan

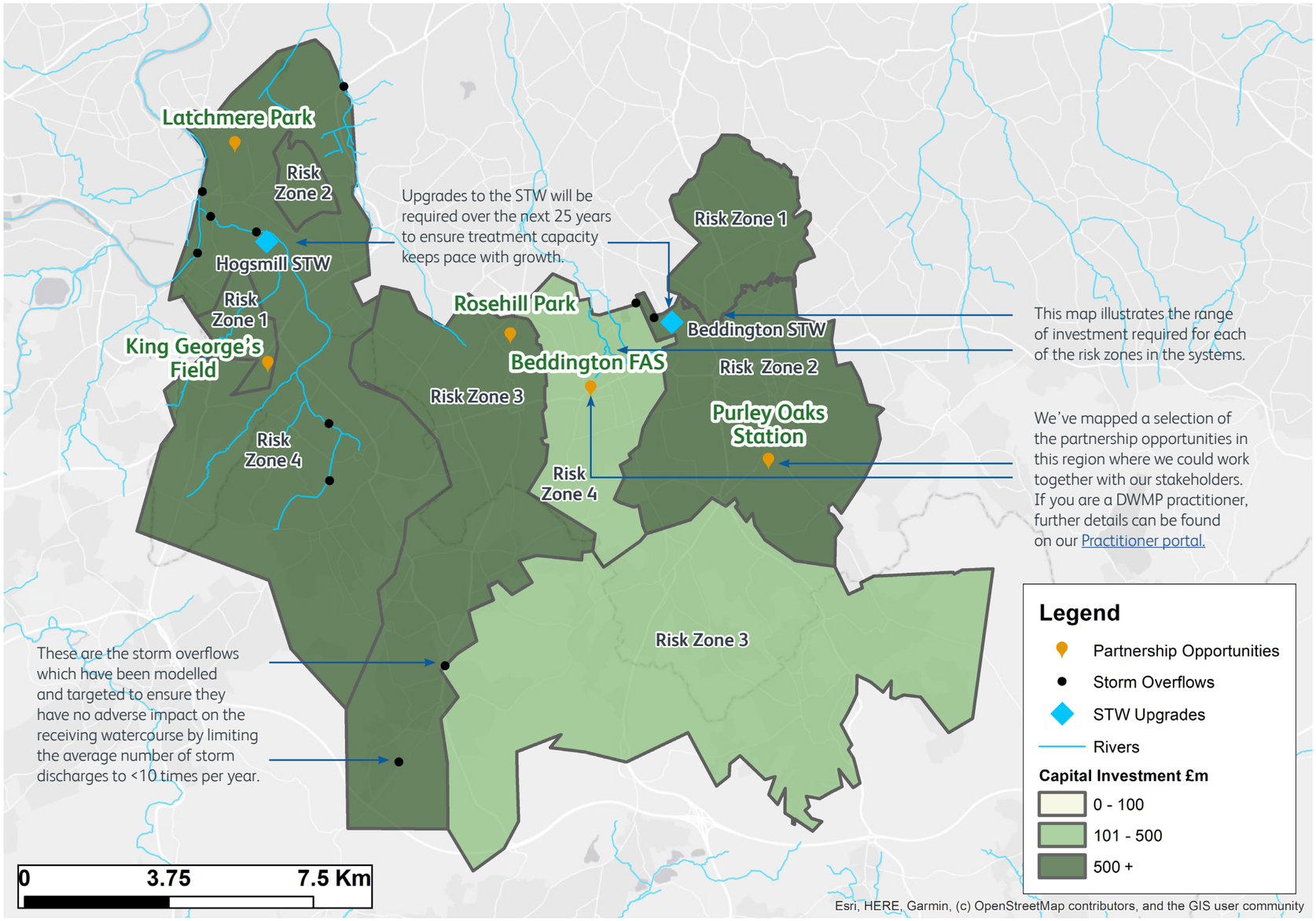
Our preferred plan (resilient - constrained) has been optimised to offer the best value solution to reduce sewer flooding, protect the environment, and enhance natural capital as shown in the relative performance of our preferred plan figure.

Relative performance of our preferred plan





Our preferred 25 year plan for Beddington and Hogsmill



Next steps

Final version of the plan

We've progressed and enhanced our DWMP since we published it for public consultation in June 2022. We've updated our draft plan based on our ongoing DWMP work and our responses to regulatory updates and the majority of the feedback received during the 12-week consultation period.

Our preferred plan balances our ambitions, our stakeholder and customer desires, our planning objectives and affordability.

Further stakeholder input

This is our first DWMP and it will be the launch pad for future DWMP cycles that will occur every five years where growth, risks and system performance will be re-assessed and reviewed and the DWMP process repeated. We hope that we will receive a similar level of engagement and co-creation from our stakeholders in the next iteration as it has been a valuable contribution to this first iteration.

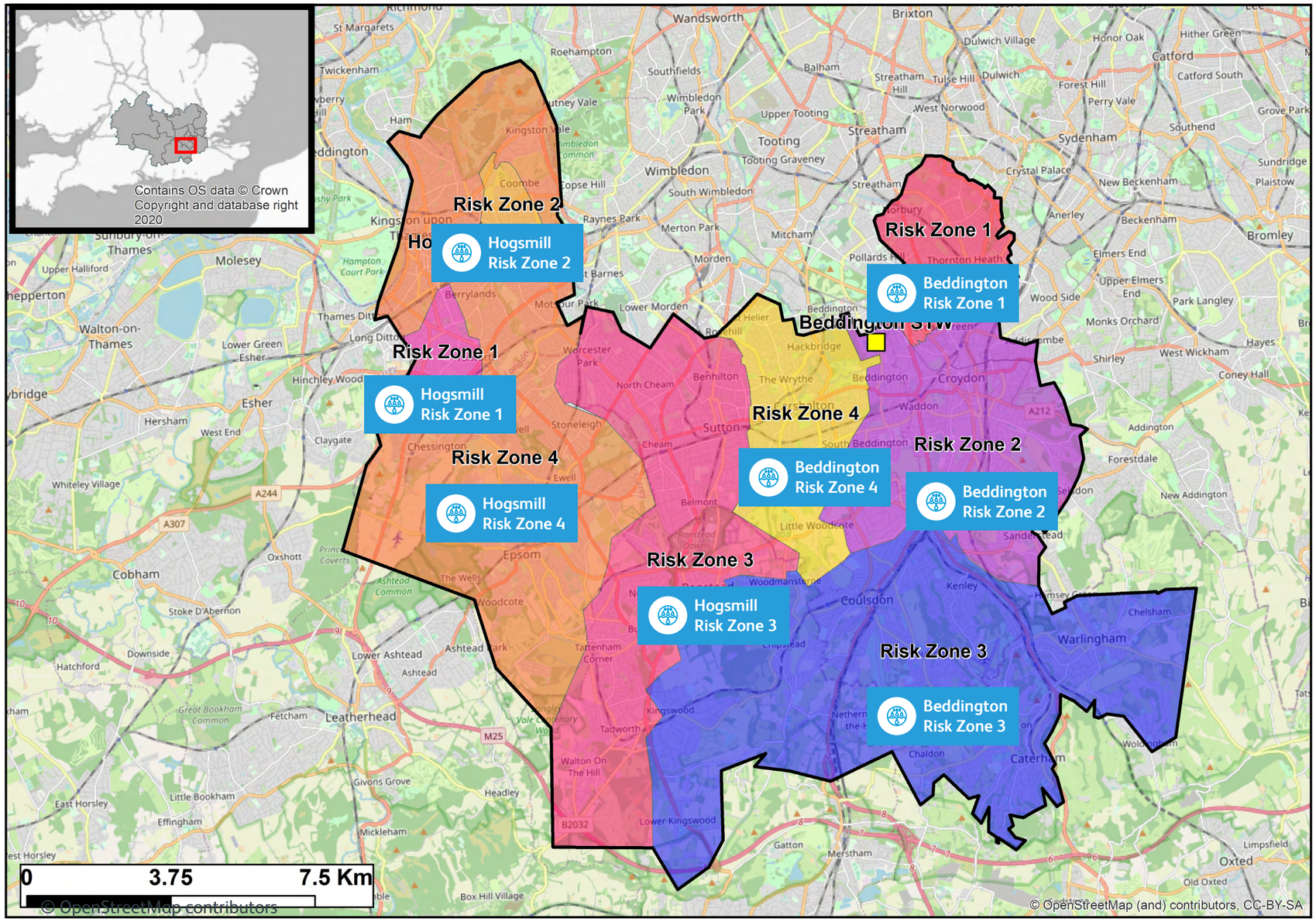
Funding and delivery

This DWMP is a 25-year rolling strategic plan. The first 5-years of the plan will be assessed through the price review process to confirm the funding to deliver the initial phase between 2025 and 2030.

Future iterations on the plan will address elements that can't be progressed due to funding restrictions, as well as changes in customer priority or technical issues.

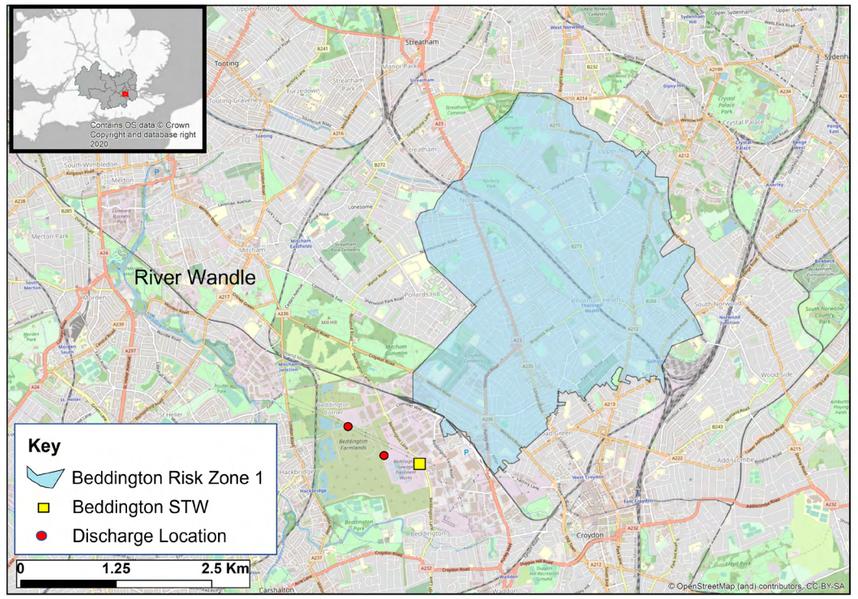
Our shared plan at catchment level

Use this interactive map by clicking on the blue boxes to find out more about our plans for the Beddington STW and Hogsmill STW risk zones.



Beddington Risk Zone 1 - North East

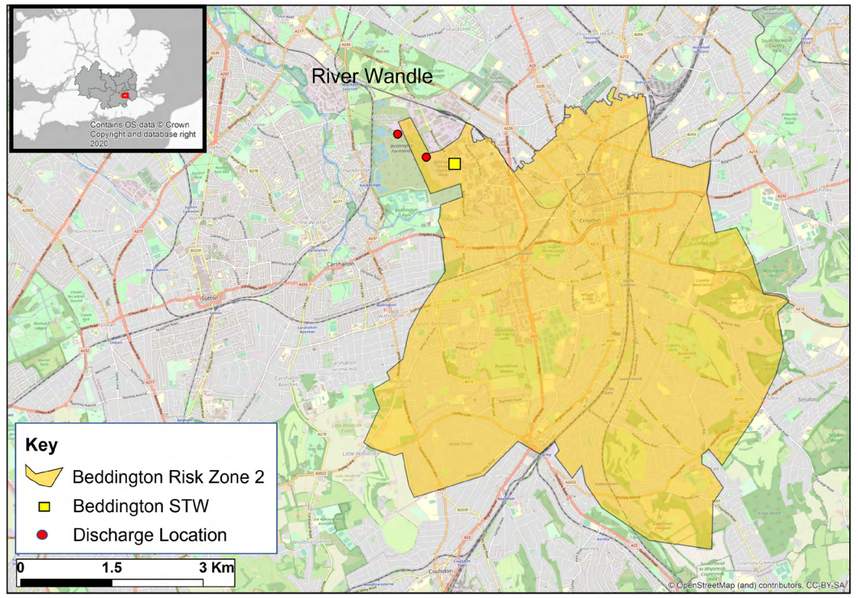
What are the challenges?	• Increased internal hydraulic sewer flooding - from 1.1 % to 1.6 % of properties: Calculated as increased modelled risk of internal hydraulic sewer flooding from 1.1 % of properties (530) at risk up to a 1 in 30-year storm in 2025 to 1.6 % of properties (743) at risk by 2050 • Increased external hydraulic sewer flooding - from 3.1 % to 4.5 % of properties: Calculated as increased modelled risk of external hydraulic sewer flooding from 3.1 % of properties (1434) at risk up to a 1 in 30-year storm in 2025 to 4.5 % of properties (2096) at risk by 2050 • Increased hydraulic sewer flooding - from 5.2 % to 7.2 % of properties: Calculated as increased modelled risk of internal hydraulic sewer flooding from 5.2 % of properties (2439) at risk up to a 1 in 50-year storm in 2025 to 7.2 % of properties (3358) at risk by 2050
Which of our solutions are best suited?	• Surface water management • Network improvements • Construct deep tanks and tunnels



Timescale	2025 – Short term	2030 – Medium Term	2035 – Long Term	2050
What targets are we seeking?	To: • Reduce property hydraulic sewer flooding to 1.5 % (internal) and 3 % (external) for rainfall up to a 1 in 30-year storm event in any given year • Reduce storm discharges (where overflows are present) to <10 in an average year by 2050			
How will we achieve the targets?	We will: • Increase the confidence in our plans for long-term investment to reduce the risk of internal and external hydraulic sewer flooding and enable catchment-level planning of surface water management solutions • Provide sewer network improvements by installing larger sewers to increase network capacity	We will: • Further develop our catchment-level planning and implement surface water management solutions to reduce the risk of hydraulic sewer flooding by removing rainfall runoff that is entering our foul sewer system and enhance our surface water sewerage systems • Continue to provide sewer network improvements by installing larger sewers to increase network capacity • Construct deep tanks and tunnels to store combined sewage	We will: • Continue to reduce the risk of hydraulic sewer flooding by removing surface water from our foul sewer systems through the implementation of surface water management solutions • Continue to construct deep tanks and tunnels to store combined sewage	

Beddington Risk Zone 2 - Central

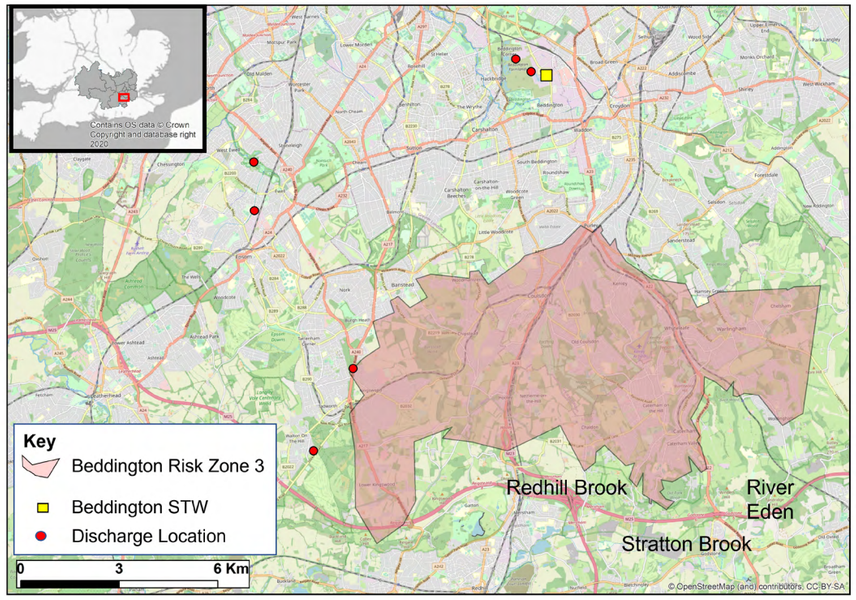
What are the challenges?	• Increased internal hydraulic sewer flooding - from 1.6 % to 2.1 % of properties: Calculated as increased modelled risk of internal hydraulic sewer flooding from 1.6 % of properties (1270) at risk up to a 1 in 30-year storm in 2025 to 2.1 % of properties (1677) at risk by 2050 • Increased external hydraulic sewer flooding - from 2.1 % to 2.7 % of properties: Calculated as increased modelled risk of external hydraulic sewer flooding from 2.1 % of properties (1696) at risk up to a 1 in 30-year storm in 2025 to 2.7 % of properties (2206) at risk by 2050 • Increased hydraulic sewer flooding - from 4.3 % to 5.7 % of properties Calculated as increased modelled risk of internal hydraulic sewer flooding from 4.3 % of properties (3522) at risk up to a 1 in 50-year storm in 2025 to 5.7 % of properties (4649) at risk by 2050
Which of our solutions are best suited?	• Surface water management • Network improvements • Invest in our sewage treatment works to achieve 100 % compliance



Timescale	2025 Short term	2030 Medium Term	2035 Long Term	2050
What targets are we seeking?	To: • Reduce property hydraulic sewer flooding to 1.5 % (internal) and 3 % (external) for rainfall up to a 1 in 30-year storm event in any given year • Reduce storm discharges (where overflows are present) to <10 in an average year by 2050 • Achieve 100 % STW permit compliance			
How will we achieve the targets?	We will: • Increase the confidence in our plans for long-term investment to reduce the risk of internal and external hydraulic sewer flooding and enable catchment-level planning of surface water management solutions	We will: • Further develop our catchment-level planning to reduce the risk of hydraulic sewer flooding by removing rainfall runoff that is entering our foul sewer system and enhance our surface water sewerage systems • Invest in our sewage treatment works to ensure compliance	We will: • Reduce the risk of hydraulic sewer flooding by removing surface water from our foul sewer systems through the implementation of surface water management solutions • Provide sewer network improvements by installing larger sewers to increase network capacity	

Beddington Risk Zone 3 - South

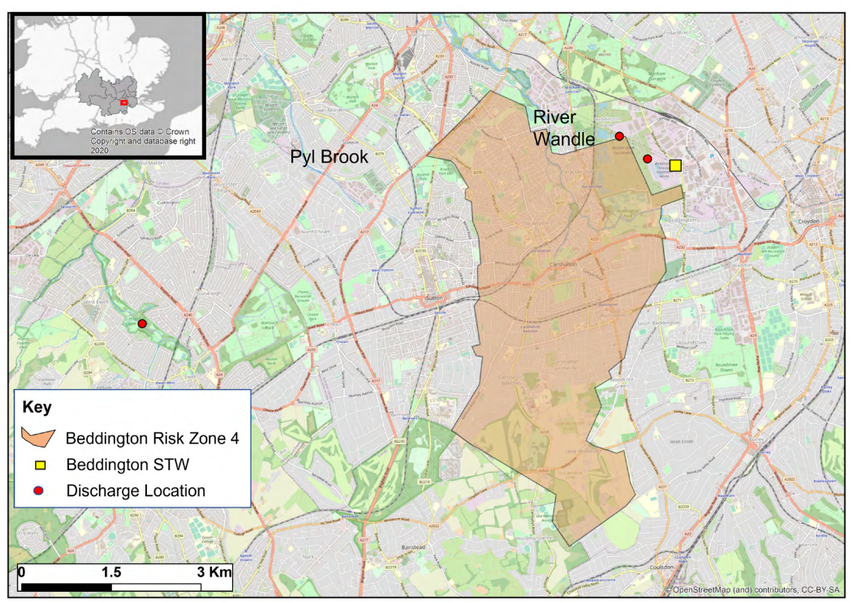
What are the challenges?	• Increased internal hydraulic sewer flooding - from 1.3 % to 1.8 % of properties: Calculated as increased modelled risk of internal hydraulic sewer flooding from 1.3 % of properties (628) at risk up to a 1 in 30-year storm in 2025 to 1.8 % of properties (886) at risk by 2050 • Increased external hydraulic sewer flooding - from 1.8 % to 2.8 % of properties: Calculated as increased modelled risk of external hydraulic sewer flooding from 1.8 % of properties (888) at risk up to a 1 in 30-year storm in 2025 to 2.8 % of properties (1377) at risk by 2050 • Increased hydraulic sewer flooding - from 3.8 % to 5.1 % of properties: Calculated as increased modelled risk of internal hydraulic sewer flooding from 3.8 % of properties (1902) at risk up to a 1 in 50-year storm in 2025 to 5.1 % of properties (2562) at risk by 2050
Which of our solutions are best suited?	• Surface water management • Sewer lining to target infiltration hotspots • Network improvements



Timescale	2025 Short term	2030 Medium Term	2035 Long Term 2050
What targets are we seeking?	To: • Reduce property hydraulic sewer flooding to 1.5 % (internal) and 3 % (external) for rainfall up to a 1 in 30-year storm event in any given year • Reduce storm discharges (where overflows are present) to <10 in an average year by 2050		
How will we achieve the targets?	We will: • Increase the confidence in our plans for long-term investment to reduce the risk of internal and external hydraulic sewer flooding and enable catchment-level planning of surface water management solutions	We will: • Further develop our catchment-level planning and implement surface water management solutions to reduce the risk of hydraulic sewer flooding by removing rainfall runoff that is entering our foul sewer system and enhance our surface water sewerage systems	We will: • Continue to reduce the risk of hydraulic sewer flooding by removing surface water from our foul sewer systems through the implementation of surface water management solutions • Improve the resilience of our sewers at greatest risk of groundwater inflows by undertaking sewer lining works • Provide sewer network improvements by installing larger sewers to increase network capacity

Beddington Risk Zone 4 - North West

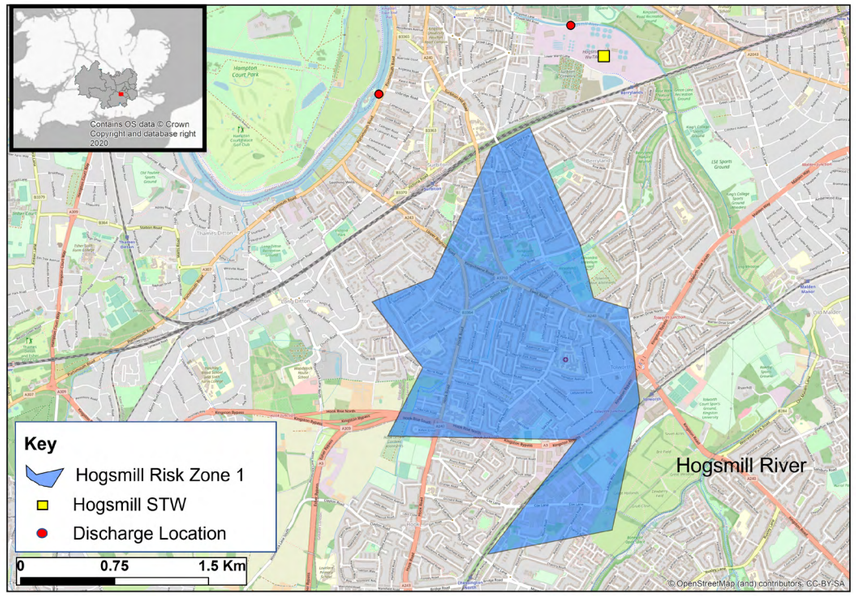
What are the challenges?	• Increased internal hydraulic sewer flooding - from 0.5 % to 0.6 % of properties: Calculated as increased modelled risk of internal hydraulic sewer flooding from 0.5 % of properties (173) at risk up to a 1 in 30-year storm in 2025 to 0.6 % of properties (226) at risk by 2050 • Increased external hydraulic sewer flooding - from 0.9 % to 1.7 % of properties: Calculated as increased modelled risk of external hydraulic sewer flooding from 0.9 % of properties (350) at risk up to a 1 in 30-year storm in 2025 to 1.7 % of properties (642) at risk by 2050 • Increased hydraulic sewer flooding - from 2.0 % to 2.9 % of properties: Calculated as increased modelled risk of internal hydraulic sewer flooding from 2.0 % of properties (751) at risk up to a 1 in 50-year storm in 2025 to 2.9 % of properties (1067) at risk by 2050 • The only overflow in this area discharged 3 times in 2021
Which of our solutions are best suited?	• Surface water management • Network improvements



Timescale	2025 – Short term	2030 – Medium Term	2035 – Long Term	2050
What targets are we seeking?	To: • Reduce property hydraulic sewer flooding to 1.5 % (internal) and 3 % (external) for rainfall up to a 1 in 30-year storm event in any given year • Reduce storm discharges (where overflows are present) to <10 in an average year by 2050			
How will we achieve the targets?	We will: • Increase the confidence in our plans for long-term investment to reduce the risk of internal and external hydraulic sewer flooding and enable catchment-level planning of surface water management solutions • Provide sewer network improvements by installing larger sewers to increase network capacity	We will: • Further develop our catchment-level planning and implement surface water management solutions to reduce the risk of hydraulic sewer flooding by removing rainfall runoff that is entering our foul sewer system and enhance our surface water sewerage systems	We will: • Continue to reduce the risk of hydraulic sewer flooding by removing surface water from our foul sewer systems through the implementation of surface water management solutions	

Hogsmill Risk Zone 1 - Surbiton

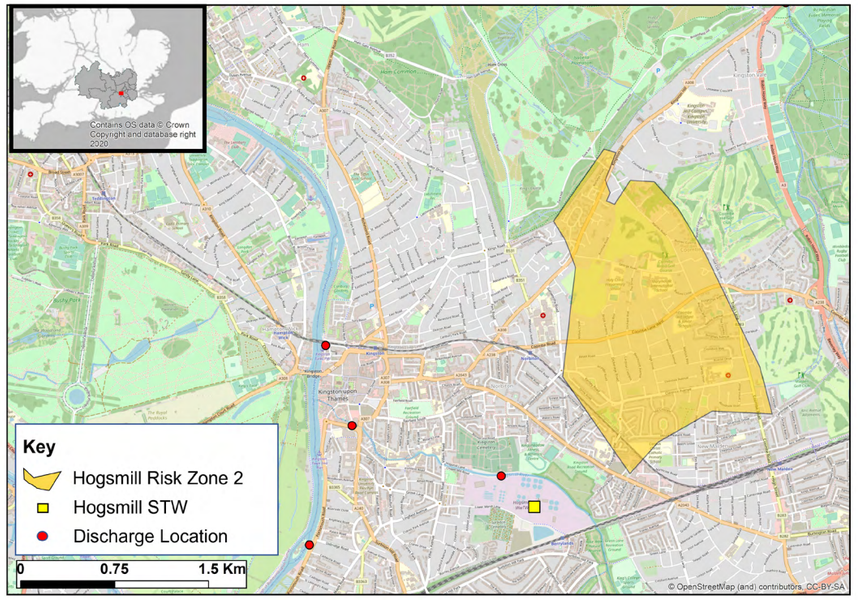
What are the challenges?	• Increased internal hydraulic sewer flooding - from 6.1% to 8.3% of properties: Calculated as increased modelled risk of internal hydraulic sewer flooding from 6.1% of properties (799) at risk up to a 1 in 30-year storm in 2025 to 8.3% of properties (1090) at risk by 2050 • Increased external hydraulic sewer flooding - from 13.7% to 15.1% of properties: Calculated as increased modelled risk of external hydraulic sewer flooding from 13.7% of properties (1794) at risk up to a 1 in 30-year storm in 2025 to 15.1% of properties (1967) at risk by 2050 • Increased hydraulic sewer flooding - from 23.1% to 30.0% of properties: Calculated as increased modelled risk of internal hydraulic sewer flooding from 23.1% of properties (3017) at risk up to a 1 in 50-year storm in 2025 to 30.0% of properties (3922) at risk by 2050
Which of our solutions are best suited?	• Surface water management • Network improvements • Construct deep tanks and tunnels



Timescale	2025 – Short term	2030 – Medium Term	2035 – Long Term	2050
What targets are we seeking?	To: • Reduce property hydraulic sewer flooding to 1.5% (internal) and 3% (external) for rainfall up to a 1 in 30-year storm event in any given year • Reduce storm discharges (where overflows are present) to <10 in an average year by 2050			
How will we achieve the targets?	We will: • Increase the confidence in our plans for long-term investment to reduce the risk of internal and external hydraulic sewer flooding and enable catchment-level planning of surface water management solutions	We will: • Further develop our catchment-level planning to reduce the risk of hydraulic sewer flooding by removing rainfall runoff that is entering our foul sewer system and enhance our surface water sewerage systems • Construct deep tanks and tunnels to store combined sewage	We will: • Reduce the risk of hydraulic sewer flooding by removing surface water from our foul sewer systems through the implementation of surface water management solutions • Provide sewer network improvements by installing larger sewers to increase network capacity • Continue to construct deep tanks and tunnels to store combined sewage	

Hosgmill Risk Zone 2 - Coombe

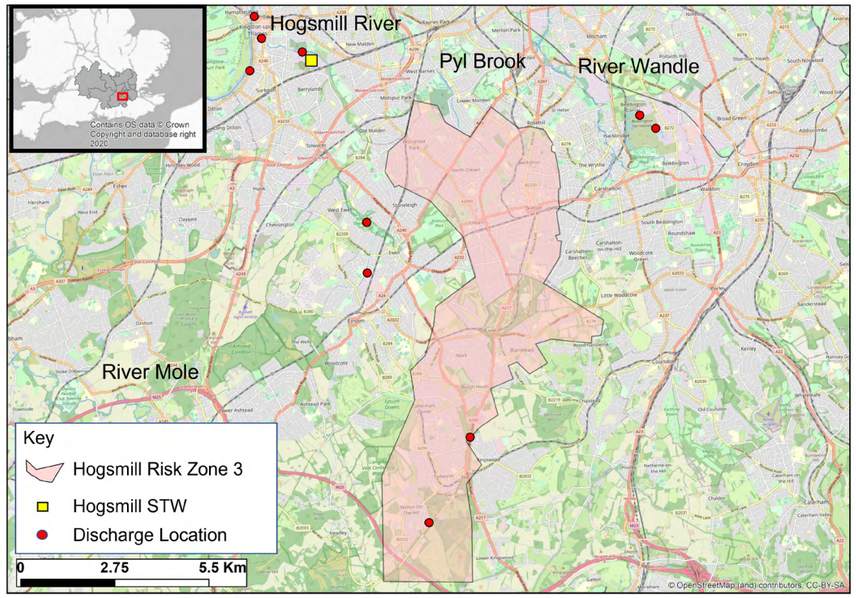
What are the challenges?	• Increased internal hydraulic sewer flooding - from 10.9 % to 14.2 % of properties: Calculated as increased modelled risk of internal hydraulic sewer flooding from 10.9 % of properties (434) at risk up to a 1 in 30-year storm in 2025 to 14.2 % of properties (564) at risk by 2050 • Increased external hydraulic sewer flooding - from 14.9 % to 18.3 % of properties: Calculated as increased modelled risk of external hydraulic sewer flooding from 14.9 % of properties (589) at risk up to a 1 in 30-year storm in 2025 to 18.3 % of properties (725) at risk by 2050 • Increased hydraulic sewer flooding - from 29.7 % to 38.2 % of properties: Calculated as increased modelled risk of internal hydraulic sewer flooding from 29.7 % of properties (1176) at risk up to a 1 in 50-year storm in 2025 to 38.2 % of properties (1514) at risk by 2050
Which of our solutions are best suited?	• Surface water management • Network improvements



Timescale	2025 – Short term	2030 – Medium Term	2035 – Long Term	2050
What targets are we seeking?	To: • Reduce property hydraulic sewer flooding to 1.5 % (internal) and 3 % (external) for rainfall up to a 1 in 30-year storm event in any given year • Reduce storm discharges (where overflows are present) to <10 in an average year by 2050			
How will we achieve the targets?	We will: • Increase the confidence in our plans for long-term investment to reduce the risk of internal and external hydraulic sewer flooding and enable catchment-level planning of surface water management solutions	We will: • Further develop our catchment-level planning to reduce the risk of hydraulic sewer flooding by removing rainfall runoff that is entering our foul sewer system and enhance our surface water sewerage systems	We will: • Reduce the risk of hydraulic sewer flooding by removing surface water from our foul sewer systems through the implementation of surface water management solutions • Provide sewer network improvements by installing larger sewers to increase network capacity	

Hogsmill Risk Zone 3 - East Catchment (Worcester Park)

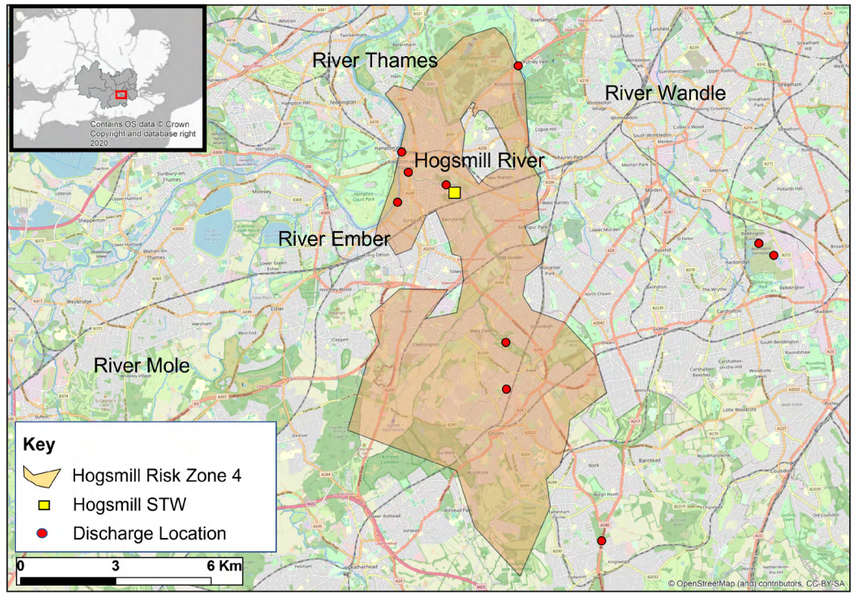
What are the challenges?	• Increased internal hydraulic sewer flooding - from 5.7% to 7.8% of properties: Calculated as increased modelled risk of internal hydraulic sewer flooding from 5.7% of properties (3978) at risk up to a 1 in 30-year storm in 2025 to 7.8% of properties (5393) at risk by 2050 • Increased external hydraulic sewer flooding - from 9.6% to 11.4% of properties: Calculated as increased modelled risk of external hydraulic sewer flooding from 9.6% of properties (6699) at risk up to a 1 in 30-year storm in 2025 to 11.4% of properties (7946) at risk by 2050 • Increased hydraulic sewer flooding - from 18.1% to 22.9% of properties: Calculated as increased modelled risk of internal hydraulic sewer flooding from 18.1% of properties (12556) at risk up to a 1 in 50-year storm in 2025 to 22.9% of properties (15882) at risk by 2050 • The two overflows in this area discharged 7 times in 2021
Which of our solutions are best suited?	• Surface water management and large-scale surface water management • Network improvements • Construct deep tanks and tunnels



Timescale	2025 – Short term	2030 – Medium Term	2035 – Long Term
What targets are we seeking?	To: • Reduce property hydraulic sewer flooding to 1.5% (internal) and 3% (external) for rainfall up to a 1 in 30-year storm event in any given year • Reduce storm discharges (where overflows are present) to <10 in an average year by 2050		
How will we achieve the targets?	We will: • Increase the confidence in our plans for long-term investment to reduce the risk of internal and external hydraulic sewer flooding and enable catchment-level planning of surface water management solutions • Provide sewer network improvements by installing larger sewers to increase network capacity	We will: • Further develop our catchment-level planning to reduce the risk of hydraulic sewer flooding by removing rainfall runoff that is entering our foul sewer system and enhance our surface water sewerage systems • Continue to provide sewer network improvements by installing larger sewers to increase network capacity • Construct deep tanks and tunnels to store combined sewage	We will: • Reduce the risk of hydraulic sewer flooding by removing surface water from our foul sewer systems through the implementation of surface water management solutions and large-scale surface water management strategies • Continue to provide sewer network improvements by installing larger sewers to increase network capacity • Continue to construct deep tanks and tunnels to store combined sewage

Hogsmill Risk Zone 4
- West Catchment (including Epsom and Ewell)

What are the challenges?	• Increased internal hydraulic sewer flooding - from 5.7 % to 8.1 % of properties: Calculated as increased modelled risk of internal hydraulic sewer flooding from 5.7 % of properties (6552) at risk up to a 1 in 30-year storm in 2025 to 8.1 % of properties (9365) at risk by 2050 • Increased external hydraulic sewer flooding - from 13.4 % to 16.1 % of properties: Calculated as increased modelled risk of external hydraulic sewer flooding from 13.4 % of properties (15532) at risk up to a 1 in 30-year storm in 2025 to 16.1 % of properties (18612) at risk by 2050 • Increased hydraulic sewer flooding - from 23.3 % to 28.8 % of properties: Calculated as increased modelled risk of internal hydraulic sewer flooding from 23.3 % of properties (26912) at risk up to a 1 in 50-year storm in 2025 to 28.8 % of properties (33277) at risk by 2050 • The six overflows in this area discharged 60 times in 2021
Which of our solutions are best suited?	• Surface water management • Network improvements • Construct deep tanks and tunnels • Invest in our sewage treatment works to achieve 100 % compliance



Timescale	2025 – Short term	2030 – Medium Term	2035 – Long Term	2050
What targets are we seeking?	To: • Reduce property hydraulic sewer flooding to 1.5 % (internal) and 3 % (external) for rainfall up to a 1 in 30-year storm event in any given year • Reduce storm discharges (where overflows are present) to <10 in an average year by 2050 • Achieve 100 % STW permit compliance			
How will we achieve the targets?	We will: • Increase the confidence in our plans for long-term investment to reduce the risk of internal and external hydraulic sewer flooding and enable catchment-level planning of surface water management solutions • Provide sewer network improvements by installing larger sewers to increase network capacity	We will: • Further develop our catchment-level planning to reduce the risk of hydraulic sewer flooding by removing rainfall runoff that is entering our foul sewer system and enhance our surface water sewerage systems • Continue to provide sewer network improvements by installing larger sewers • Construct deep tanks and tunnels to store combined sewage • Invest in our sewage treatment works to ensure compliance	We will: • Reduce the risk of hydraulic sewer flooding by removing surface water from our foul sewer systems through the implementation of surface water management solutions • Continue to provide sewer network improvements by installing larger sewers • Continue to construct deep tanks and tunnels to store combined sewage • Continue to invest in our sewage treatment works to ensure compliance	

Risk zone summary table

	2025 modelled baseline (no.& % of properties)					2050 Performance without DWMP (no.& % of properties)					2050 Performance with DWMP (no.& % of properties)				Preferred solutions			
Risk Zones	Internal flooding (2025)	External flooding (2025)	Resilience flooding (2025)	Number of monitored storm overflows (2021)	Recorded (EDM) storm overflow discharges in 2021	Internal flooding (2050)	External flooding (2050)	Resilience flooding (2050)	Number of monitored storm overflows (2050)	Modelled average annual storm discharges (2050)	Internal flooding (2050) DWMP	External flooding (2050) DWMP	Resilience flooding (2050) DWMP	Modelled average annual storm discharges (2050) DWMP	2025-2030	2030-2035	2035-2050	Investment Band (£)
Beddington STW	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	CP	CP	STW	Low
Beddington RZ1	530 (1.1%)	1434 (3.1%)	2439 (5.2%)	N/A	N/A	743 (1.6%)	2096 (4.5%)	3358 (7.2%)	N/A	N/A	185 (0.4%)	640 (1.4%)	1159 (2.5%)	N/A	CP, NI	CP, DT, NI, SWM	DT, SWM	High
Beddington RZ2	1270 (1.6%)	1696 (2.1%)	3522 (4.3%)	N/A	N/A	1677 (2.1%)	2206 (2.7%)	4649 (5.7%)	N/A	N/A	563 (0.7%)	1169 (1.4%)	2344 (2.9%)	N/A	CP	CP, STW	NI, SWM	High
Beddington RZ3	628 (1.3%)	888 (1.8%)	1902 (3.8%)	N/A	N/A	886 (1.8%)	1377 (2.8%)	2562 (5.1%)	N/A	N/A	588 (1.2%)	1064 (2.1%)	1952 (3.9%)	N/A	CP	CP, SWM	NI, SL, SWM	Medium
Beddington RZ4	173 (0.5%)	350 (0.9%)	751 (2%)	1	3	226 (0.6%)	642 (1.7%)	1067 (2.9%)	2	22	201 (0.5%)	371 (1%)	700 (1.9%)	<=10	CP, NI	CP, SWM	SWM	Medium
Hogsmill STW	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	CP	CP	STW	Low
Hogsmill RZ1	799 (6.1%)	1794 (13.7%)	3017 (23.1%)	No data	No data	1090 (8.3%)	1967 (15.1%)	3922 (30%)	2	22	73 (0.6%)	187 (1.4%)	417 (3.2%)	<=10	CP	CP, DT	DT, NI, SWM	High
Hogsmill RZ2	434 (10.9%)	589 (14.9%)	1176 (29.7%)	N/A	N/A	564 (14.2%)	725 (18.3%)	1514 (38.2%)	N/A	N/A	37 (0.9%)	38 (1%)	151 (3.8%)	N/A	CP	CP	NI, SWM	High
Hogsmill RZ3	3978 (5.7%)	6699 (9.6%)	12556 (18.1%)	2	7	5393 (7.8%)	7946 (11.4%)	15882 (22.9%)	2	15	717 (1%)	1740 (2.5%)	3859 (5.6%)	<=10	CP, NI	CP, DT, NI	DT, LSSWM, NI, SWM	High
Hogsmill RZ4	6552 (5.7%)	15532 (13.4%)	26912 (23.3%)	6	60	9365 (8.1%)	18612 (16.1%)	33277 (28.8%)	11	309	1147 (1%)	2667 (2.3%)	5927 (5.1%)	<=10	CP, NI	CP, DT, NI, STW	DT, NI, STW, SWM	High

Note: We will achieve our London-wide flood reduction targets. However, there are a number of risk zones where this is not possible that are offset by other zones where the risks are reduced below the target.

CP = Catchment-level planning including mapping and modelling

SWM = Surface water management

LSSWM = Large-scale surface water management

NI = Network improvements

DT = Deep tanks and tunnels

SL = Sewer lining

STW = Treatment process technologies and protection from high river levels

Navigation index

We've developed a comprehensive document suite to share our final DWMP. This includes five summary documents, that contain increasing levels of detail, as well as Catchment Strategic Plans. To help you to navigate around our document suite and to find key DWMP content, we provide a navigation index below.

Navigation index		Protecting the environment and providing a reliable, sustainable wastewater service							Best value and delivery					Working together		DWMP stages and data				
		Storm overflows	Sewer flooding	Level of ambition & pace of delivery	Growth & climate change	Resilience: flooding & power	Groundwater	Environmental assessments	Affordability & bill impact	Best Value	Base vs Enhancement	Solutions & deliverability	Programme alignment	Partnership working	Stakeholder & customer engagement	DWMP stages & process	Level 2 regional summaries	Level 3 regional summaries	Data tables	Risk & Assurance
Summary documents	Customer summary	■	■											■	■	■				
	Non-technical summary	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■				
	Technical summary	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■				
	The Plan	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■				
	Catchment Strategic Plans x13	■	■	■	■	■	■	■	■	■	■	■	■	■	■		■	■		
Technical appendices x11	Appendix A - Strategic context											■				■				
	Appendix B - Risk-Based catchment screening															■				
	Appendix C - Baseline risk and Vulnerability assessment				■	■										■				
	Appendix D - Options development and appraisal	■										■				■				
	Appendix E - Programme appraisal	■		■		■			■	■	■	■	■			■				
	Appendix F - Stakeholder engagement														■	■				
	Appendix G - Adaptive pathway planning	■	■		■															
	Appendix H – Customer engagement Part A – Draft DWMP														■	■				
	Appendix I - Risk and uncertainty											■								■
	Appendix J - DWMP and WRMP alignment												■							
	Appendix M - Assurance																			■
New technical appendices x9	Appendix N - You Said, We Did (YSWD)	■	■	■	■	■	■	■	■	■	■	■	■	■	■					
	Appendix O - What base buys										■									
	Appendix P - Response to July 2021 Floods		■	■	■	■			■			■	■	■	■					
	Appendix Q - Storm overflows	■		■	■				■				■							
	Appendix R - Delivery of SuDS and nature-based solutions	■	■	■	■	■			■	■		■	■	■	■					
	Appendix S - Partnership opportunities and working			■								■		■	■					
	Appendix T - Groundwater quality						■													
	Appendix U - Resilience		■		■	■							■	■	■					
	Appendix V – Customer engagement Part B – Consultation Survey Report														■					
Environmental assessments	Appendix K - Strategic environmental assessment (SEA)							■												
	Appendix L - Habitats regulations assessment (HRA)							■												
Portals and data	Customer portal	■	■							■		■		■	■	■	■	■		
	Practitioner portal	■	■											■	■		■	■		
	Data tables			■							■								■	
	Data tables commentary																		■	

Find all the documents in our DWMP suite on our website.

Work with us

We want to continue to draw on your expertise and local knowledge and invite you to work further with us to meet the future needs of drainage and wastewater services in our region.

Please get in touch with us or provide feedback on this document by emailing our DWMP team at DWMP@thameswater.co.uk

For more information on our DWMP work or to share your views, please visit the DWMP portal on our website here.