

Drainage and Wastewater Management Plans (DWMPs)

Delivery Plan

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from
**Southern
Water** 

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1. Introduction

This paper sets out our delivery plan and detailed programme for developing the first round of the new drainage and wastewater management plans (DWMPs) across our operating region covering Kent, Sussex, Hampshire and the Isle of Wight. DWMPs are long-term plans for drainage and wastewater management to ensure the sustainability of drainage infrastructure and systems so they meet the needs of customers and the environment now and into the future.

The purpose of this paper is to: (a) support our internal planning and organisation for AMP7; (b) reassure Ofwat that we are committed to delivering these plans; and (c) to confirm that we will consult on the first DWMPs by summer 2022. It also addresses the action from Ofwat in their initial assessment of our business plan for AMP7 which stated: *“The company should provide a commitment to provide a detailed work programme by end August 2019 to assure us that the company will deliver appropriate drainage and wastewater management plans. The programme should ensure that the company can prepare and consult on its first drainage and wastewater management plan no later than the summer of 2022 to enable revised plans to be prepared in early 2023 to inform PR24 business plans”*.

2. Background, Drivers and Regulatory Context

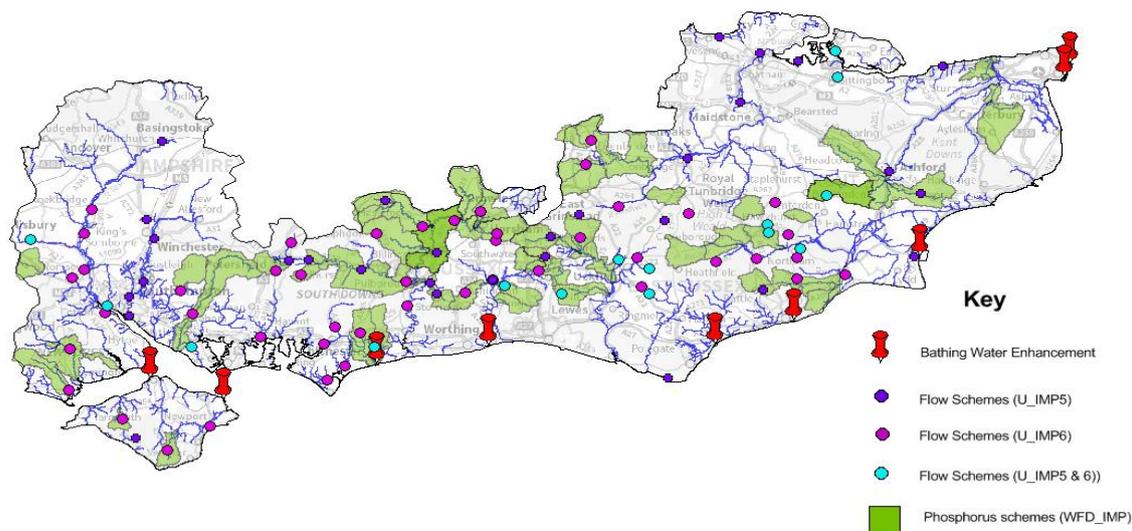
Drainage and wastewater management is essential for a strong economy, safe society and a healthy environment. Our infrastructure and the work we do to provide drainage and wastewater services provides an essential service for communities within our operating area. We serve around 4.6 million customers in Kent, Sussex, Hampshire and the Isle of Wight (IoW), and protect a wealth of natural beauty, with over 80 bathing waters, 3,400 km of river, four Areas of Outstanding Natural Beauty (AONB) and the South Downs National Park. A core focus of our wastewater service is to protect and further improve these natural assets, whilst continuing to build operational resilience in the face of high population growth and increasingly extreme weather.

The challenge is significant. There are very real external pressures that we have to prepare for now. These include:

- (i) **Population Growth** - resulting in additional homes connecting into existing sewerage systems, and new towns being developed that require new infrastructure. We experienced the highest rate of growth (5.3%) of all water companies during the period 2009 to 2013. This rate of growth has been increasing and is forecast to step up with a further 800,000 people forecast to be living in our area by 2040. In the short-term for AMP7 we are planning 20 infiltration reduction schemes, major growth schemes at 19 treatment works (100,000 new properties), partnership resilience schemes, and 73km of sewers & rising main rehabilitation.
- (ii) **Climate Change** – this is affecting our weather patterns and the frequency and intensity of rainfall. For example, 2016 was confirmed as the warmest year on record, and the third record warmest year in a row. Heavy rainfall is on the increase, and we will see more extremes of weather that will create a challenging operational environment to ensure our customers are not affected by flooding or pollution.
- (iii) **Urban Development** of roads and infrastructure – resulting in fewer green spaces and trees to absorb rainfall and reduce runoff.
- (iv) **Environmental Protection**. Tightening environmental permits is a key driver for future investment. The Water Framework Directive is the primary legislation that protects rivers and lakes, estuaries, coastal waters and groundwater, and determines what action needs to be taken to ensure all aquatic

ecosystems meet 'good status' (or 'good ecological potential' for heavily-modified water bodies) by 2027. Over 24% of our wastewater treatment works already have tight and challenging quality permits, so there is significant pressure on the need to keep rivers, lakes, reservoirs and coasts healthy and clean. As a result we are already planning one of our largest ever environmental programmes in AMP7, see figure 1.

Figure 1: One of our largest ever environmental programmes for AMP7



- (v) **Chemicals** – these enter the drainage network from homes and business (including trade effluents and run-off from farms), as well as highways. Concern has been expressed about the potential for certain chemicals and pharmaceuticals that may be present in river water to disrupt hormone systems in both humans and wildlife so we are investigating and monitoring these chemicals as part of the UK Water Industry Research's ongoing Chemical Investigations Programme.
- (vi) **Protecting Public Health.** For example, the European Union Bathing Water Directive has two bacterial indicators (E. coli and intestinal enterococci) to measure the quality of the water. Bathing waters will be classified against these standards so people can make informed decisions about where to swim and use of the water for leisure activities.
- (vii) **Plastics Pollution.** We are facing a growing number of products that could have a significant impact on people and the environment if allowed to flow unchecked through the water cycle, including micro-plastics.
- (viii) **Carbon Emissions.** Water industry operations require large amounts of energy for treating drinking water, processing wastewater, and pumping large volumes around an extensive network. Greenhouse gas emissions from the operational side of the water industry are around 0.62% of UK emissions (BEIS and Water UK, 2019), so there is significant pressure to reduce carbon emissions from our wastewater systems and make them more efficient.
- (ix) **Ageing Assets and Infrastructure.** Much of our sewer network is in excess of 50 years old. As a result, despite record investment, some public sewers are deteriorating and can collapse or block, or suffer from infiltration by either rising levels of groundwater or flooding.

We realise the scale of the challenge. We will need to think and act differently to respond to these challenges, working more closely with our customers and other water management organisations. We will be taking the opportunity to find new ways to work more collaboratively.

The main water industry response to these challenges was led by Water UK. They brought together more than 40 organisations from across the UK – governments, regulators, local authorities, environmental charities, academics and community groups – to discuss these challenges under their 21st Century Drainage Programme.

The vision of the 21st Century Drainage Programme (21CDP) is “to enable the UK water industry, working in partnership with others, to make plans for the future that will ensure the sustainability of our drainage infrastructure, and the services it provides to customers and the environment”. The programme is ensuring that the water industry moves towards a more consistent approach for long-term planning of drainage and waste water services. The 21CDP has developed a three tools to support this. These are:

- a) **Capacity Assessment Framework** – a standard way to assess how much capacity is currently available in the foul and combined sewer networks, and what might be available in the future.
- b) **Storm Overflow Assessment Framework** – a framework which includes valuing the benefits of improvements to storm overflows. This is building on the significant investment already from the water industry to reduce the impacts of storm overflows on the environment and a major programme to improve monitoring which is due for completion in 2020.
- c) **Wastewater resilience metrics** – a standard basis for assessing the resilience of wastewater services which has been confirmed as a common performance commitment in the 2024 price reviews in England and Wales.

As part of the 21CDP, Water UK has developed a planning framework for drainage and wastewater management, through which these tools are employed to assess the risks and issues, and enable companies to target investments more effectively. The resulting DWMPs will set out how water and wastewater companies intend to extend, improve and maintain a robust and resilient drainage and wastewater system, and provide customers and stakeholders with better information about their drainage and wastewater services.

We have been an active member of Water UK’s 21st Century Drainage Programme (21CDP) since 2016 and attend the Implementation Group and technical sub-groups overseeing the implementation of these tools and DWMPs.

After 150 years of developing public sewers and drains, there remains a complex landscape of ownership around sewers, highway drainage and flood protection infrastructure. Customers are often confused about who is responsible for flooding and pollution. The Floods and Water Management Act 2010 sought to clarify responsibilities and encourage greater co-operation and collaboration between “risk management authorities” (see Appendix A for a list of other organisations with responsibilities for flooding and drainage – known as risk management authorities). However it remains a highly complex system, with different and sometimes overlapping responsibilities, standards and accountabilities. Despite the Flood and Water Management Act, the sector has been criticised for still working in silos, especially in relation to surface water flooding.

Our proposals for the development of Drainage and Wastewater Management Plans provide an opportunity to work very differently. We are working with the Regional Flood and Coastal Committee (RFCC) to explore ways to plan in a collaborative, integrated manner and provide greater visibility for all our plans. A joint

workshop, with a wide mix of stakeholders, was held in June 2019 to explore best practice and share our proposals. We are committed to build on this and test how we can deliver a step change in how we work. Similarly there was real desire with members of the RFCC to find new ways to work more collaboratively. We describe our approach to stakeholder engagement and consultation in section 5.

3. Our Strategy for Water and Wastewater Services

Our vision for the future is about transforming the role of water in our daily lives. It is about being bold and innovative so we can meet our customer expectations, keep water services affordable and, at the same time, improve our precious environment, support tourism, economic growth and invest in the future of our children and grandchildren. It's about providing a resilient future for water in the South East by transforming the way we work and creating new solutions to meet the challenges ahead.

Our business plan for 2020-25 describes how we will start implementing our vision over the next investment period. The plan is the result of a structured and evidence-based process taking into account the UK Government's 25-year plan to improve the environment and the National Infrastructure Commission's report on preparing for a drier future. We consulted directly with over 42,000 customers, local and regional stakeholders and global experts to seek their views on how best to address the challenges we have. We have also gained insight from broader engagement with more than one million customers and have had a continuous dialogue with our Customer Challenge Group (CCG). The Board has provided guidance each step of the way. All of this has helped co-create an ambitious, deliverable and affordable business plan.

Our plan for 2020-25 sets out a new set of outcomes focused on delivering our customer priorities in a new and transformational way. Our first set of outcomes comes under the banner – strengthening the foundations – to ensure that we are brilliant at the basics expected from water companies. Our second set of outcomes details how we will build on these foundations, to transform the way we value water and make sure the South East can cope with the challenges ahead. These come under the banner – transformational priorities. Figure 2 summaries these outcomes.

Figure 2: The Outcomes in our Strategy “A Resilient Water Future for the South-East”



The Drainage and Wastewater Management Plans will be a key enabler in helping us achieve these goals. The benefits of these plans will be secured by working with others, adopting systems thinking, building resilience and delivering best value water and environmental engineering solutions, see figure 3.

Figure 3: Delivering the benefits of DWMPs

Resilience

- Providing a comprehensive integration with existing risk and resilience systems and from PR24 forming the basis of future business-as-usual wastewater asset and investment planning activities.
- Assessing where (largely drainage) infrastructure managed by other stakeholders may impose additional risks to drainage and wastewater services.
- Developing planning scenarios for the future states based on the challenges and drivers for change, such as growth, climate change and technology, and the long-term drainage and wastewater capacity of our systems

Systems Thinking

- Establishing a systematic understanding of our wastewater services and current system risks across our operational region and the wider South-East
- Considering and assessing long-term impacts and risks to and from drainage and wastewater systems
- Developing wider understanding of the interdependencies between infrastructure systems, impacts arising from loss of critical infrastructure and cascade failures.

Value Engineering

- Identifying options that offer best value to customers and the environment, ensuring robust, resilience and sustainable drainage and wastewater services in the long-term.
- Delivering alternative catchment based solutions that tackle the issues at source, rather than end of pipe.

Collaboration

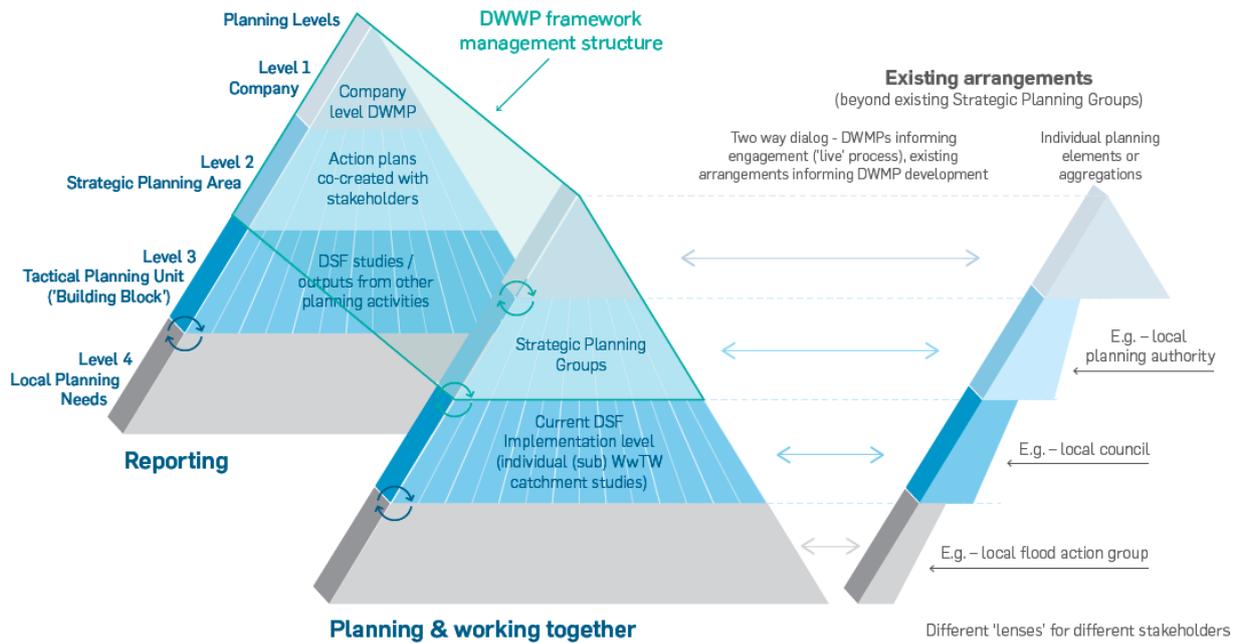
- Co-creating plans and solutions that are aligned with other organisation's planned investment in water quality, flooding and drainage, and supporting economic growth, community resilience
- Facilitating partnership-working with specific regard to plans made by other risk management authorities for sustainable drainage, flooding and pollution management
- Strengthening our structured and auditable approach to identifying and developing robust, investment plans, that meet stakeholder requirements and deliver best value for customers

4. Our Plan for Delivering DWMPs

The Water UK guidance ‘A framework for the production of Drainage and Wastewater Management Plans’ (Atkins – September 2018) provides guidance for all water companies on the development of drainage and wastewater management plans. The document sets out the steps and process for developing DWMPs, and the management structure, see figure 4. The guidance sets out three main levels of planning:

- Level 1 – Company Level. Overarching company level DWMP providing the corporate strategy for drainage and wastewater management and long term investment planning that will secure the outcomes and resilience for customers and the environment.
- Level 2 – Strategic Planning Areas. Plans aligned to individual River Basin Districts (RBD) catchments, describing strategic drivers for change and providing strategic context for detailed system assessments taking place at Level 3
- Level 3 – Wastewater catchment / system level. Detailed plans for wastewater treatment works and the sewerage network system, including Drainage Area Plans (DAPs) and Drainage Strategy Frameworks (DSFs).

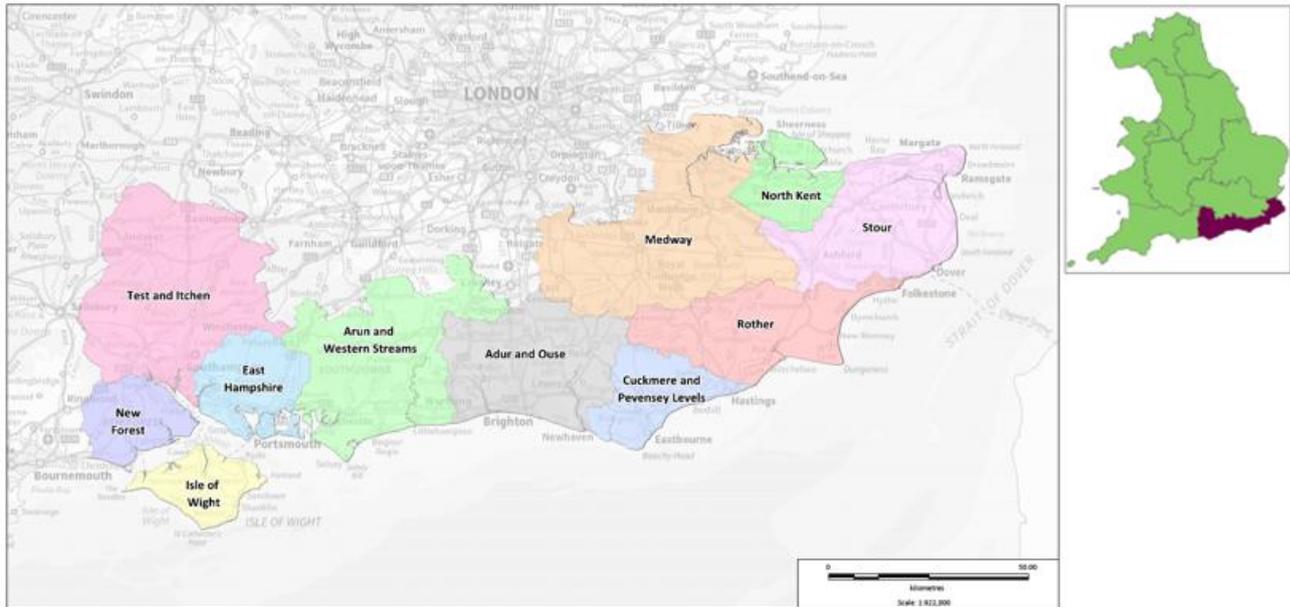
Figure 4: DWMP framework management structure



We will take a bottom up approach to the development of our first round of DWMPs by drawing upon the existing data and information we have available from existing Level 3 plans, such as our Drainage Area Plans, Drainage Strategy Frameworks, and other available datasets. This data will inform the strategic planning at Level 2.

We will produce eleven Level 2 DWMPs across our region in order to match our strategic planning areas with the Water Framework Directive and the Floods Directive River Basin District catchments, see figure 5.

Figure 5: Map showing our planned catchments for Level 2 DWMPs



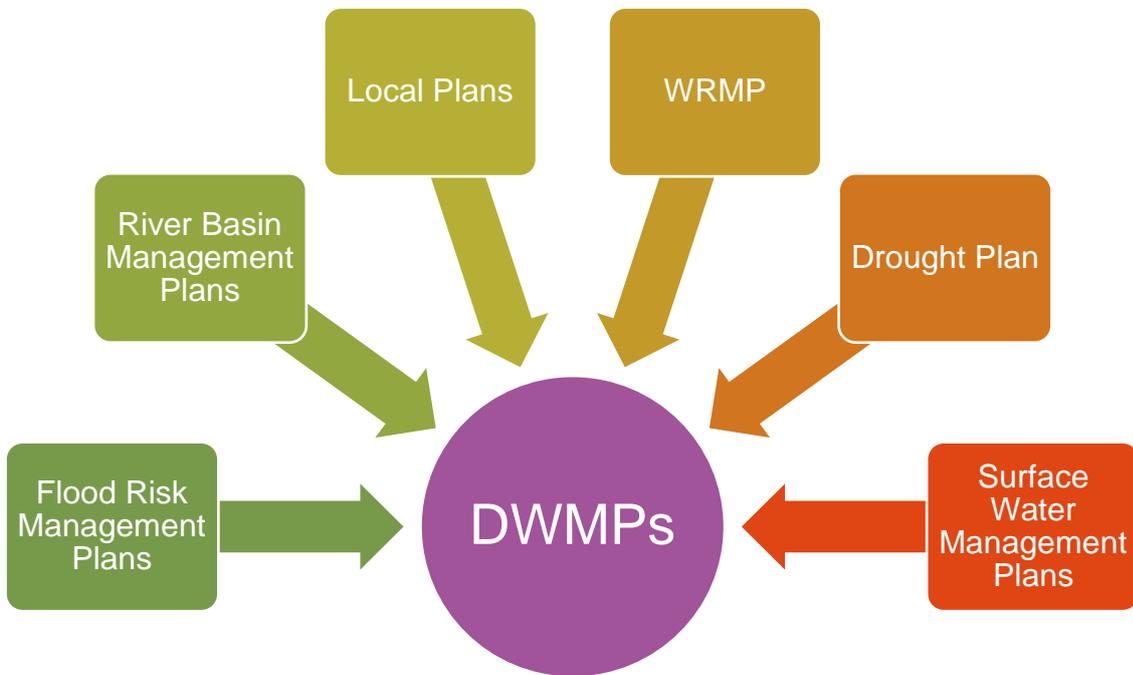
We have defined the boundaries of our Strategic Planning Areas for the Level 2 Plans to align with the River Basin Management Plans and the Flood Risk Management Plans produced by the Environment Agency as these will provide important inputs into our DWMPs. This will enable us to better engage with regulators and other risk management authorities during the development of the plans (see section 5). These planning boundaries will enable us to take on board potential impacts on the environment and the potential impacts that flood management activities by other responsible bodies may have on company and related systems. In addition we will be able to consider the objectives and actions from these statutory plans in our planning for the management of drainage and wastewater so our actions contribute towards to delivery of these wider objectives. These geographical boundaries for the strategic planning areas will also align with the existing catchment partnerships, thus allowing for better engagement with these partners on water quality and environmental issues. During the planning process we will create wider linkages between organisations across our region, and provide coverage of the whole of our operational area with Level 2 plans as illustrated in figure 5. These plans will be for local councils, planning authorities, flood risk management authorities, developers, local groups and customers so they can find out about our plans in their local area.

We will use several other plans to inform the DWMPs including Local Plans (for future development and social change), our Water Resource Management Plan (WRMP) and Drought Plan, and local council surface water management plans, see figure 6. We will create strong links to these plans so our DWMPs consider wider objectives and future needs, and our decision making and timing of delivery is co-ordinated where possible, especially where we can work in partnership to jointly fund and deliver schemes.

As we create and develop our DWMPs, we must also take account of the key legislation that is relevant to the plans, such as:

- Wildlife and Countryside Act 1981, as amended by the Countryside and Rights of Way Act 2000 and the Natural Environment and Rural Communities Act 2006
- Water Industry Act 1991
- Urban Wastewater Treatment Directive 1991
- Habitats Directive 1992
- Environment Act 1995
- Water Framework Directive 2000
- Strategic Environmental Assessment Directive 2001
- Revised Bathing Water Directive 2006
- Climate Change Act 2008
- Flood and Water Management Act 2010.

Figure 6: Strong links with other statutory and non-statutory plans



The Level 1 plan will cover the whole of our operating region by drawing upon the information from the Level 2 plans. The output at Level 1 will be a regional plan summarising the policies that we will adopt to ensure a resilient future for the South-East, as well as providing an overview of the action plans from level 2 plans, regional priorities and our proposed delivery programme. The Level 1 plan will be for regional stakeholders and our regulators.

The Water UK guidance sets out the steps and process for developing the DWMPs. The principle steps in producing a DWMP are as follows (see also figure 7):

- (i) **Strategic Context.** This defines:
 - The objective of the DWMP;
 - The key drivers behind the need for a long-term plan;
 - The planning objectives against which current and future performance is to be measured at a company and local planning level.
- (ii) **Risk Based Catchment Screening (RBCS).** This is designed to focus effort where there is evidence of system vulnerability;
- (iii) **Baseline Risk and Vulnerability Assessment (BRAVA).** This is a risk assessment process designed to:
 - Develop an understanding of impacts on planning objectives as a function of future changes to catchments based on an established base year position;
 - Develop an understanding of wider catchment resilience issues that are not directly linked to system characteristics.
- (iv) **Problem Characterisation.** This identifies the nature and complexity of the interventions required and assigns the catchments to different levels of options development and appraisal.
- (v) **Options development.** This considers the opportunities and options, and appraises them using a methodology that covers:
 - The hierarchy of options for consideration;
 - The development of, and criteria for movement between, unconstrained, constrained and feasible options lists;
 - An appraisal process to define preferred options based on 'best value' and incorporating ecosystem services assessments / natural capital approaches.
- (vi) **Programme Appraisal.** This uses a programme appraisal methodology that defines a prioritised list of interventions as a function of planning level;
- (vii) **Final DWMP Programme.** This provides an overview of the final company level 1 DWMP.

Our plan for delivering the DWMPs is to integrate the DWMP processes within our existing accredited internal Business Management System (BMS) and Asset Lifecycle Process (ALP), so they become our new ways of working for investment planning. We currently use a risk based approach to our business planning and within our resilience framework (which is aligned with the international standard for risk assessment and management, ISO31000), and a Risk and Value (R&V) process to deliver our capital investments. The DWMP process follows the risk management framework and it aligns well with the principles of Risk & Value, especially:

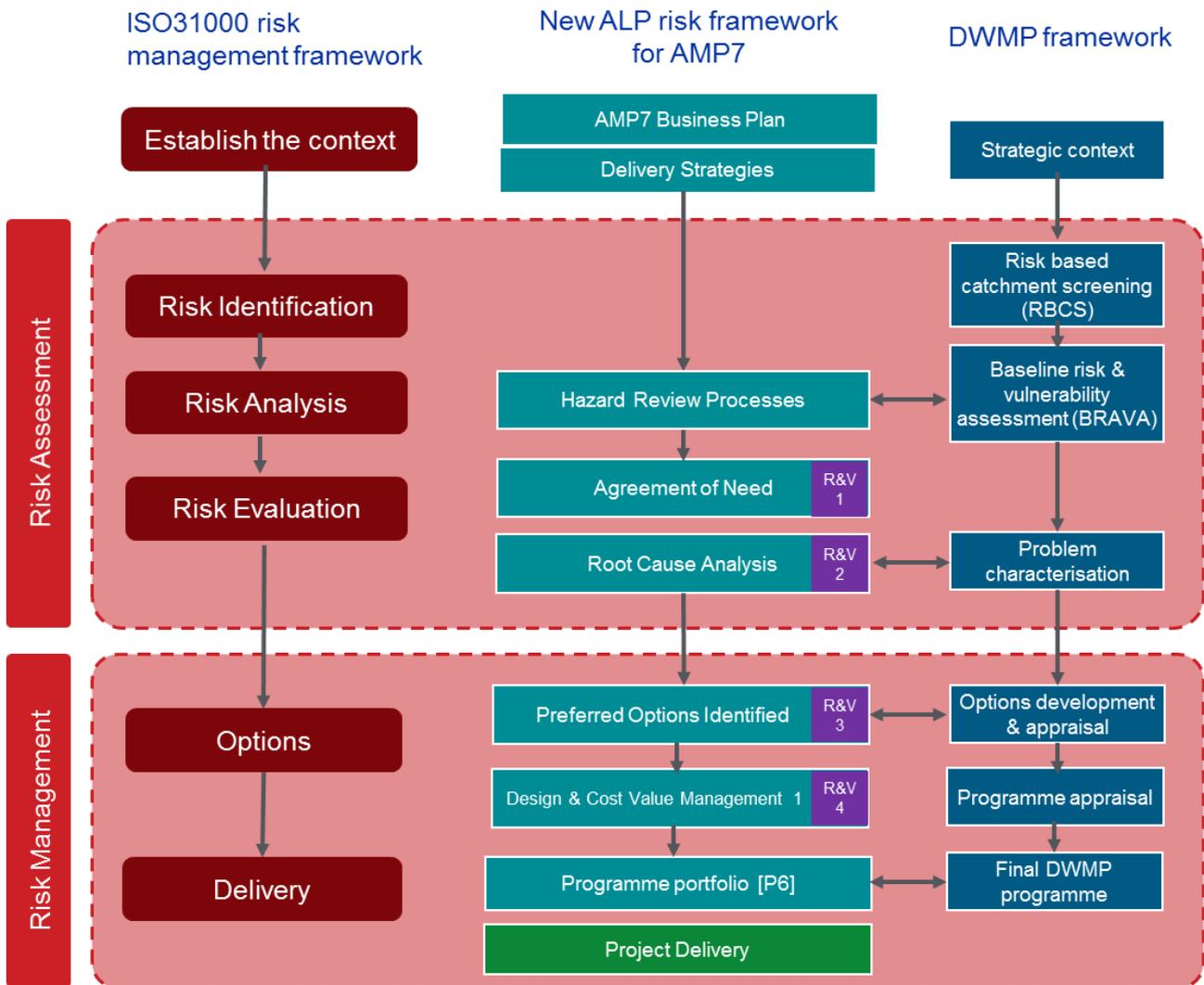
- A risk based, evidence led approach
- Involving external stakeholders to understand wider drainage risks
- Delivery in partnership through collaboration and trust
- Innovation and open mindedness to find long-term sustainable solutions.

As we develop the procedures for developing the DWMPs we will integrate them with the R&V framework to avoid duplication of effort and deliver efficiencies, see figure 7. This also supports our implementation of modern 'adaptive pathways' planning techniques for long-term planning.

The Water UK guidance on DWMPs has been developed based upon Water Resources Management Plans (WRMPs). We will use our extensive knowledge and experience of water resource planning to apply well established risk and resilience management to the DWMP. Our best practice in scenario planning and

options appraisal will be shared across both plans, and we will use common predictions for climate change and growth for the South-East. Our approach to DWMPs means we are building upon and enhancing our current investment planning process for wastewater planning and delivery, and ensures integration with other plans and our wider resilience framework.

Figure 7: Alignment of our risk management processes with DWMP framework



We will identify hazards and threats during the development of the DWMPs that, in the short-term, could impact on service provision, such as flooding of water and wastewater infrastructure, pollution and other infrastructure failures. In doing so we will assess the operational resilience of our infrastructure systems against the full range of potential hazards and threats and take proportionate steps to improve resilience. The process means that we also look at how those risks change in the future under different scenarios, so we can put in place options and actions to ensure our 'systems of systems' are resilient into the future. This work will contribute towards the annual assessment of our resilience in the round consisting of operational, corporate and financial resilience.

We are currently finalising the Risk Based Catchment Screening (RBCS) for the whole of our operating area, which we plan to share with the Water UK Implementation Group before the end of November 2019. Completing this exercise for the whole region now is more efficient than waiting until we start each Level 2 DWMP, and provide an early indication of our data coverage and quality. The RBCS assesses the current risk in each of our 365 sewerage catchments against 16 criteria, such as intermittent discharges, storm overflows, capacity, flooding and pollution (see appendix C for full list). The screening approach identifies those catchments that need to pass through into the Baseline Risk and Vulnerability Assessment (BRAVA) stage, so the risks can be considered further. Good reliable data for the whole of our operating area is required for the RBCS. Some catchments have passed through to the BRAVA stage purely as a result of the lack of data on certain criteria. These have been recorded so we can assess the need to fill these data gaps during the current round of DWMPs or later in our programme. One of the most significant shifts in moving to more strategic catchment planning is the need for wider coverage of data to allow for a risk-based approach. We will start to address this during the first round of DWMPs by identifying core datasets that we need to hold across the region for investment planning and develop actions to fill these gaps. Through discussions at the Water UK Implementation Group, we understand that our position on the number of catchments passing through to BRAVA from the RBCS is similar to the other water companies.

Once the first round of DWMPs are in place, there will be an annual review of the risk based catchment screening and BRAVA as required to evaluate and consider any risks that may have changed.

The DWMP process will enable us to improve our understanding of how surface water drainage assets function within the wider river catchment and the consequences of flooding from all sources, and identify and prioritise where additional modelling is required to support future plans and investment decisions. We will continue to work with the other flood 'risk management authorities' (such as the EA and Local Councils - as defined in the Floods and Water Management Act 2010) to share data to inform planning decisions and align actions arising from drainage plans.

The DWMP will play an important role in identifying and appraising the need for future investment in our wastewater infrastructure, people and systems. At the heart of our decisions will be the economic, social and environmental appraisal of options. Our next step is to pilot natural capital accounting in three catchments during AMP7 and we will use this approach for the options appraisal as part of the DWMP. During AMP6 we have developed our thinking and understanding of Natural Capital and payments for ecosystem services. We see that this approach will support our engagement with partners concerned with enhancing natural capital.

We have recognised the opportunity provided by DWMP to co-ordinate a range of drainage and wastewater treatment initiatives whether these address network capacity, operations and maintenance, customer engagement and behaviours, or incident response and recovery. We are implementing a "systems thinking" approach to management of wastewater by considering the planning and management of our wastewater systems as a complete 'end to end' system, and by assessing the interdependencies with other infrastructure and essential services. The approach means we can integrate our long-term wastewater planning with our resilience framework and deliver further improvements in resilience.

It is important that DWMPs become the basis for planning all activities in drainage and wastewater and address multiple future pressures such as ageing infrastructure, customer behaviours, population growth, urban creep, new development and climate change. In making an explicit link between DWMPs and our performance goals to achieve by 2040, we will retain a strategic and long term focus on the plans which will drive co-ordinated, timely and sustainable investment decisions across our business units.

5. Working with Others

We cannot deliver high-quality drainage and wastewater plans by ourselves. We will need to effectively engage with other organisations to obtain data and information to understand the wider issues and risks associated with drainage, water quality and the environment. Especially important is the necessity to work with a diverse range of partners such as: Lead Local Flood Authorities (LLFAs), the Environment Agency (EA), Highway Authorities, Internal Drainage Boards, Catchment Partnerships, National Parks, developers, community groups, parish councils, our Customer Challenge Group, and the Southern Regional Flood and Coastal Committee.

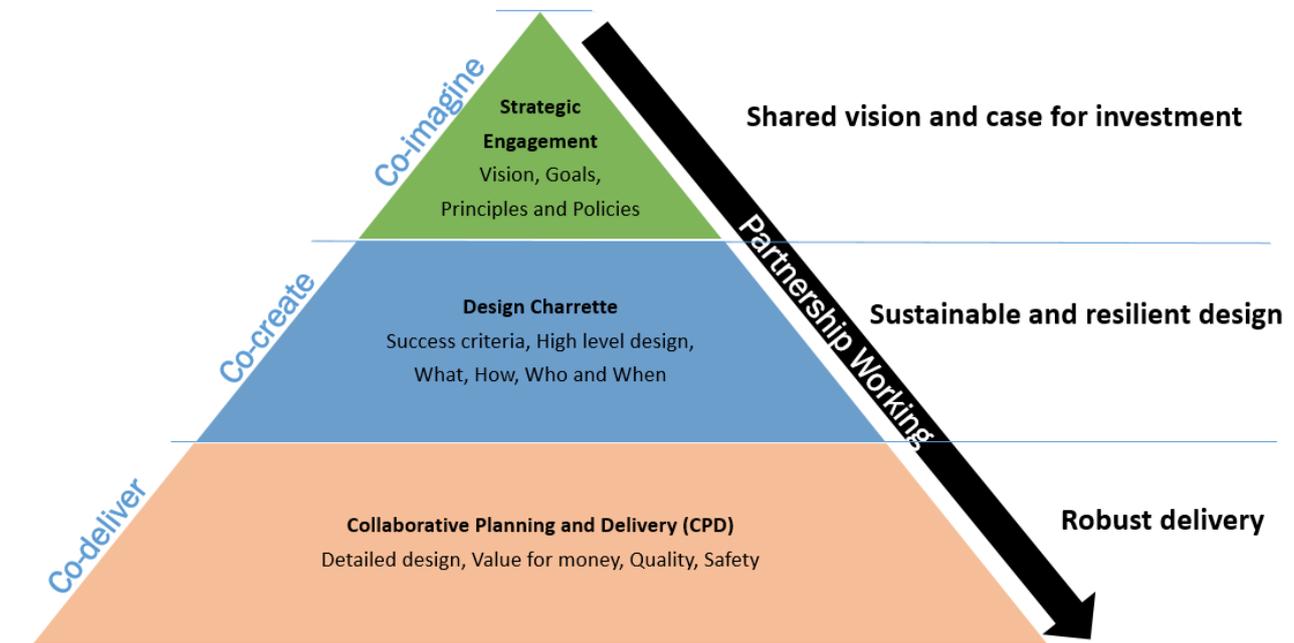
Consultation and engagement are important to us so we have a plan that is understood and supported by customers and partners. To achieve this we will be creating an environment of collaboration, information sharing and common investment need by adopting the Environment Agency's "*Working with Others*" approach. The engagement will occur with senior managers, planners and technical specialists within the various organisations, and it will continue throughout the planning process so we co-imagine, co-create and co-deliver the plans, see figure 8. Co-imagine requires strategic objectives to be shared between organisations so common goals can be found and used to support the co-creation of plans. The opportunity from this approach is to find solutions that deliver multiple benefits, such as those provided through 'blue' and 'green' infrastructure (e.g. multi-use wetlands, parks and green spaces). Working in this way will bring about better, more sustainable outcomes at a lower cost to customers.

We have already started to engage with regional stakeholders. We held a joint workshop with the Regional Flood and Coastal Committee (RFCC) and the Environment Agency in June 2019 to discuss flooding and drainage issues, including how we can best work together to plan for the future. During the workshop, participants shared ideas on how we could collaborate and examples of best practice from a wide mix of stakeholders. One of the outcomes from the workshop was a commitment from delegates for their organisation to support the development of the DWMPs, and for the RFCC to provide oversight for external stakeholders on the delivery of these plans.

The Flood and Water Management Act (2010) sets out the roles and responsibilities for organisations with flood and drainage responsibilities, including the EA, local councils and highway authorities, see appendix A. These organisations are known as "risk management authorities (RMAs)" and includes ourselves. Under the Act, we have a duty to co-operate with other RMAs, when undertaking drainage and wastewater planning. In return, other RMAs "must co-operate with other relevant authorities in the exercise of their flood and coastal erosion risk management functions". We will take the opportunity to use the DWMP to change the level of engagement we have with other risk management authorities and other organisations. We see this as a catalyst to explain our role in drainage and water, and to demonstrate how we discharge our duties by developing our DWMPs in collaboration with other RMAs.

By working with others we will develop an innovative and strategic mix of solutions to meet current and future needs, which offer best value for money over the long term and have appropriate regard to the wider costs and benefits to the economy, society and the environment. This could include promoting, adopting or maintaining sustainable drainage systems or co-investing in flood risk management, working creatively with partners and land managers "upstream" as a means of managing water at source, '*slowing the flow*' and delivering multiple benefits where possible. This approach will also further the resilience of ecosystems and contribute to the government's 25-year environment plan by encouraging the sustainable use of natural capital and by having appropriate regard to the wider costs and benefits to the economy, society and the environment.

Figure 8: Working in partnership to produce and deliver DWMPs



We will engage at the Level 1 scale across the whole region with regional stakeholders, such as our Customer Challenge Group (CCG) and the Regional Flood and Coastal Committee (RFCC). Level 2 engagement will be progressed via the existing groups where possible, such as the LLFA Strategic Flood Partnership meetings and the Catchment Partnership meetings. We will also seek to engage with established sub-regional multi-agency forums such as River Basin Planning groups. This approach will enhance these existing groups and reduce the burden of additional meetings and activity on partner organisations and third parties. It also means that we will avoid the additional cost of establishing a new separate strategic planning group (SPG) led by the water company for each Level 2 DWMP. However, we will establish one formal management Board / steering group for our DWMP delivery programme that will ensure our engagement activities deliver the desired outcomes, and change our approach if these existing groups are not effective.

Engagement at Level 3 will be with specific local organisations and interested groups (e.g. Flood Action Groups) as required and depending upon the issues and risks identified in the BRAVA and problem characterisation. However, we will consult widely on our draft plans with customers in each of the Level 2 planning areas, and again through the Level 1 plan consultation.

Our engagement will be based on the establishment of a new type of working environment for risk management authorities and other partners across the South East. We will bring together those organisations interested in water quality with those focused on flooding and drought to co-imagine, co-create and co-deliver. Our engagement will consist of meetings, workshops and discussions at key stages of planning, as well as wider communications and the establishment of an on-line portal and web applications to share programme information, data and mapping. Our proposals for partnership working are also informed by our previous use of the 'charrette' format for workshops to pro-actively engage with developers.

Wider public consultation with our customers will be planned at key stages, most notably once a draft plan has been developed for each Level 2 catchment. We are planning this approach based on our experience of public consultation on the WRMP with the aim to obtain meaningful feedback prior to finalisation of the plans. This will provide an opportunity for our customers and the wider public to have their say on all the Level 1 and Level 2 plans before they are finalised and published.

The engagement and consultation periods have been built in to our delivery programme to recognise and allow sufficient time for meaningful engagement activities. We are planning to stagger the development of regional plans evenly across our counties, with appropriate resource to ensure effective engagement with partner organisations. As we engage with partners, we will discuss the timetable for the external consultation, and may align the consultation periods for each catchment within each county, if this makes it easier for partners to respond to the consultations.

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

6. Sharing Data and Outputs

We recognise the importance of effective mapping and visualisation technologies to help communicate current drainage and wastewater risks and how these might change in the future. We have experience of data mapping and visualisation options (see figure 9) which we have applied to assess the impact of growth on our sewerage catchments (left image – Aylesford WTW catchment in Kent). The right image shows how we have applied tools such as ‘SuDS Studio’ (by Atkins) in Eastbourne to assess the potential use of sustainable drainage systems (SuDS). These techniques of displaying data using geographical information systems will help us engage with professional partners and also effectively communicate with customers.

Figure 9: Example visualisations showing a sub-catchment sewer capacity assessment (left), and sources of rainfall run-off and sinks to identify potential opportunities for SuDS (right)



The visualisation technologies will need to bring together our own asset data, information on drainage capacity, water quality information, results from model simulations, operational data and data from partners. We will look to create something different, specifically how we can use new catchment modelling to determine the probability and consequences of risks on the environment, such that we can explore the potential effectiveness of catchment management solutions.

A step change for us will be how we share our data more widely than before. We recognise that to build trust with our partners and customers that we will need to share more information (at no cost) about our assets and their performance. This will mean that our partners and customers can understand more about our challenges, the resulting investment decisions, and the benefits that they will bring.

Mapping current and future risks will help us understand the root causes of problems and point towards solutions which can be delivered through time using an adaptive pathways approach and in partnership with others.

The DWMP guidance from Water UK follows the approach for Water Resources Management Plans (WRMP). The outputs from our DWMP programme are therefore likely to consist of similar documentation as our WRMP, although our aspiration is to develop more interactive information for customers on our website that is regularly updated rather than our plans being in a fixed printed format every 5 years.

We will design the structure of our DWMPs to be accessible for our customers, stakeholders and regulators. We expect to produce:

- a) One Level 1 DWMP non-technical document to summarise our policies and approach to investment, and present a summary of our investment programme in the short, medium and long-term epochs. This document will be aimed at our strategic partners, the Southern RFCC, our Customer Challenge Group, and regulators.
- b) Eleven Level 2 DWMP documents (one for each strategic planning area). These will be a strategic plan for each river basin catchment, setting out the current issues and risks, how they will change over time (future risks), options we've considered and our future investment programme. There will be a technical document written for external partners and internal stakeholders to inform other plans and investment cycles, including our own Price Review submissions. It will be a reference to guide all our planned wastewater investments. A non-technical summary will be produced for each of the 11 DWMPs for customers, businesses, and local partners and stakeholders.
- c) One Strategic Environmental Assessment (SEA) report on our suite of DWMPs. Habitat Regulations Assessment (HRA) and Water Framework Directive (WFD) assessments will also be completed and published where required.
- d) DWMP Annexes and supporting documents – we are developing the procedures to produce the DWMP as part of our pilot on the Isle of Wight, and other technical documents may be required (such as our approach to Natural Capital approaches to economic, social and environmental appraisal). We will consider making this work available to others through a series of technical annexes.

7. Our Pilot DWMP for the Isle of Wight

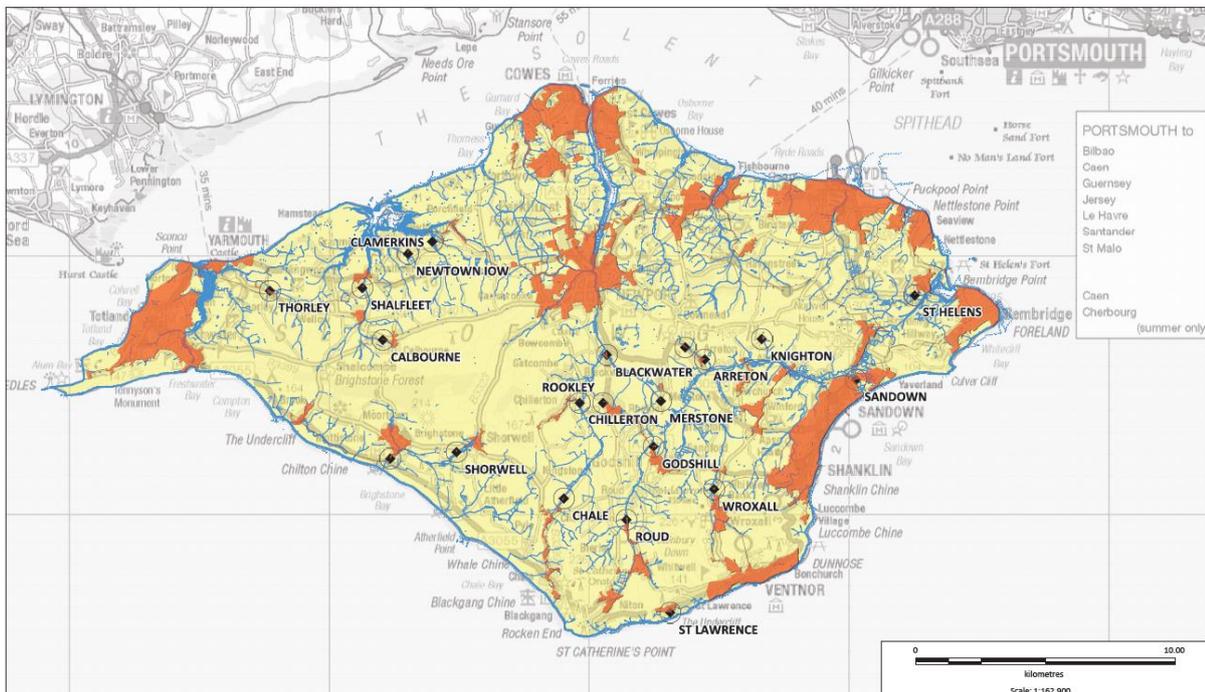
We are currently testing and developing our approach to the DWMPs in a pilot study covering the Isle of Wight (IoW) which is due to complete in November 2019. This area was chosen because it is a discrete geographical area with one unitary authority and provides a good size and level of complexity for rapid learning in 2019 (see figure 10). The Isle of Wight is characterised by a mix of urban, rural and coastal drainage issues which are representative of much of the South East. This further demonstrates the scalability of insights gathered during the pilot.

Our team developing the pilot level 2 DWMP for the IoW is gaining a detailed working knowledge of the Water UK guidance, and they are in regular liaison with other water companies and their suppliers to share knowledge and experience.

We have developed three planning objectives as part of the strategic context for the IoW DWMP. These are based on our long term goals (by 2040) for wastewater as set out in our business plan for AMP7, and focus on flooding, pollution and environmental compliance. We have used these to identify issues and risks to consider and evaluate within the BRAVA.

The risk based catchment screening for the IoW meant that all 20 of the wastewater catchments passed through to the BRAVA. This would not be expected when taking a risk based approach, so it might be that the criteria for pass or fail is not set at the right level. We are discussing our lessons learned with the Water UK Implementation Group.

Figure 10: Isle of Wight River Basin District

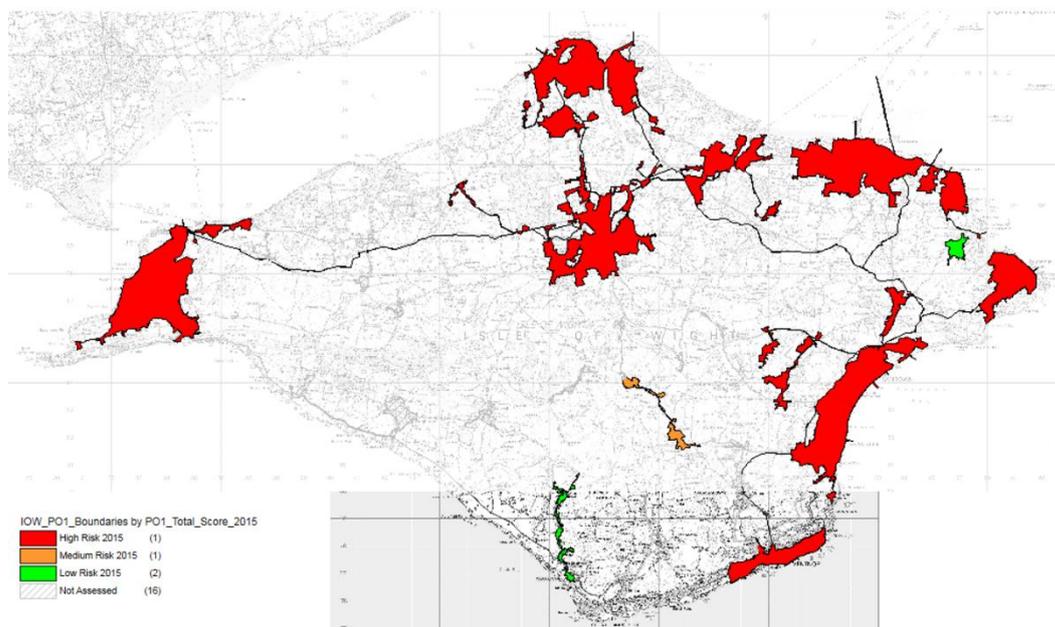


We have worked through the BRAVA stage for the IoW pilot. This required the development of risk categories for each of the planning objectives. Each of these category has been defined by five severity bands and given a weighting in order to provide a methodology for scoring the risks for the current period and the follow two planning horizons (epochs). As a result of this pilot, we consider that it may be necessary to identify additional planning objectives to gain greater insight of the current and future risks in a river basin catchment, for example risks to coastal and bathing waters or shellfish waters. However, we need to evaluate and improve the end to end process and scoring, and test the sensitivities of the weightings that we have applied to the risk categories across other catchments first. The additional planning objectives should enable greater clarity of communication with stakeholders in understanding risks at the different reporting levels of DWMPs, and ensure that their objectives are included in the BRAVA assessment.

The catchment risk score from the BRAVA enabled us to identify the catchments to go through to the problem characterisation, see figure 11. The hydraulic modelling outputs from the DAP for the Sandown catchment developed in AMP6 have been beneficial to the process by providing the data to understand current and future risks in those catchments, although we have completed the BRAVA for un-modelled catchments too.

In the problem characterisation stage, we assessed the strategic needs using the supply and demand questions within the guidance. This element introduces subjectivity so we have developed a scoring method to establish a common basis for our decisions during this stage. This led to us populating the tables to generate a strategic needs score and a complexity factors score for each of the planning objectives. We are now looking at how we use this data to develop a programme of work.

Figure 11: IoW preliminary DRAFT results of BRAVA: High, Medium and Low Risk catchments



Our engagement with stakeholders during the pilot DWMP for the IoW has been limited as we are using the pilot to test the Water UK guidance and develop the procedures for completing the DWMPs. We attended the IoW Council's Flood Partnership meeting before we commenced the pilot to set out our approach, and we plan to meet in September 2019 to update the group on progress. We have programmed a longer period within our delivery programme to re-fresh and complete the full IoW Level 2 DWMP, with engagement with the partner organisations, followed by external public consultation.

Data sharing with external stakeholders is an important element of the DWMP to ensure we can identify and assess all the drainage and wastewater risks in the wider river basin catchment. We have secured data from the Environment Agency (EA) and the IoW Council for the pilot, although we have learned that data requests should be made well in advance. Hence, as we commence the programme for DWMPs, an early activity will be to progress any necessary data sharing agreements/licences with the EA and local councils across our region in advance of needing the data for the DWMPs. Setting these up on a regional level will improve management and governance of these agreements and provide clarity to our stakeholders both internally and externally.

The right information technology will also facilitate delivery of the DWMP and sharing mapping and data. As our business implements the IT transformation strategy this will improve our ability to share data with external stakeholders whilst maintaining security and governance of data we hold. This will provide greater visibility and accessibility to external bodies and we aim to enhance the ease in which stakeholders can feedback through improved software and systems to minimise the effort required to engage.

The pilot for the IoW has given us a much clearer understanding of the resources and effort required to produce DWMPs. We have used this information to help us plan and resource the delivery of the complete suite of DWMPs by early 2023, and achieve the interim milestones required by Ofwat. We will ensure DWMPs receive the required support internally and actively promote and encourage external stakeholder engagement.

After we have completed the IoW pilot in November 2019, we plan to engage Atkins, the authors of Water UK's DWMP framework document, to provide assurance on the Isle of Wight pilot plan. This will ensure that the framework is applied as intended and will also result in useful lessons learned and advice being fed back to the Water UK implementation group as part of the framework's continuous improvement.

We will run a lessons learned workshop at the end of 2019 in order identify lessons from the IoW pilot that we need to learn and factor into the thinking and procedures for future DWMPs. These will be invaluable in refining our detailed programme and budget for delivery of the remainder of the DWMP programme, starting in autumn 2019. It will also be a testing ground for partnership working, the presentation of BRAVA results and refining the level of detail necessary to develop drainage and wastewater strategies.

8. Our Programme for Delivering DWMPs

Ofwat's timetable for delivering the first round of DWMPs is challenging but essential to allow our DWMPs to support the development of our PR24 business plan. The timetable is also driven by the need to inform the National Infrastructure Commission's second National Infrastructure Assessment (NIA) into the state of the water industry's infrastructure, which is due to be published in 2023.

The key dates that will be achieved through our delivery programme are:

- Complete the Risk Based Catchment Screening (RBCS) for the whole region by end November 2019.
- Complete the Baseline Risk and Vulnerability Assessment (BRAVA) for all catchments (level 2 plans) by the end of December 2020.
- Publish for consultation our Level 1 DWMP by summer 2022
- Finalise all our first round of DWMPs by early 2023.

We have considered the tasks, activities, sequence and resource requirements in detail in order to develop a programme gantt chart that we consider is realistic and achievable (see attached gantt chart programme), and meets these key dates. The programme includes the key steps for developing DWMPs as well as other programme activities and milestones including: (a) internal gateway dates for project governance, (b) the development of our internal Design Plan for the programme, (c) our Project Steering Group to oversee the deliver programme, (d) our continued involvement in the Water UK Implementation Group through the delivery of the DWMPs, (e) engagement with stakeholders, (f) development of procedures for development of the DWMPs to ensure quality and consistency of outputs across our region. The programme also illustrates how we will achieve the regulatory dates required by Ofwat.

The timetable for the delivery of the first round of DWMPs is a significant challenge. We understand what is involved and our detailed programme has considered how we will deliver the DWMPs, the sequencing and timetable, and the resources required. We will work hard to ensure that the first round provide a good first set of DWMPs for our region and a valuable outcome to support our work with partner organisations, customers and our business plan for PR24.

We have produced a resource plan for DWMPs by reviewing the current roles and responsibilities within the Planning and Resilience teams to identify existing activities and new tasks required to produce DWMPs. This aim of this is to understand what is new, and how we need to change what we currently do in order to embed DWMPs as our new ways of working in the business as usual environment. We have engaged our existing teams in the process for DWMPs so we build upon established business processes and knowledge.

Our initial estimate of the number of days' work required for each activity for each Level 2 DWMP is shown in appendix B. We have recognised the challenge for the first round of DWMPs and we are increasing the current project team in order to complete tasks within the timetable so we can be in the best place to inform our PR24 business plan and meet the dates set by Ofwat.

The engagement of partner organisations will run throughout the development of the plans. The level of engagement is a step change from our current level of service so we plan to address this within our resource plan.

We have scheduled within our programme a period of three months for the final public consultation, and three months to respond to the consultation and finalise the plan. This will provide our partners and customers to have a final say on our first DWMPs before they are published, and develop an ongoing

mechanism to enable them to continue to have their say on our planning and investment decisions during implementation.

We will complete the first round of drainage and wastewater planning for our operating region by the end of December 2022. These final plans will be available in early 2023 to inform PR24 business plans.

We have started external discussions and engagement with partner organisations on our programme for delivering the DWMPs. We have shared the programme at a workshop we held with the Southern Regional Flood and Coastal Committee, and also at four regional stakeholder events with senior officials and partners from a variety of organisations that we work with.

The assumptions incorporated into our programme are:

- Our first round of DWMPs will mainly utilise existing data and the hydraulic models which cover approximately 90% of our customers, and our simple models for our remaining catchments. We have not based the programme on developing full hydraulic models for all catchments – these are not necessarily justified in terms of expenditure where the risks are low. Hence, we will only commission additional hydraulic modelling during this first round by exception and as the timescale allows.
- Wider drainage and flooding issues within the level 2 strategic planning areas will be considered where data and information can be provided by other organisations / risk management authorities. We have already obtained data from the Environment Agency where it is readily accessible through their national data team.
- External consultation with the public, local businesses and other organisations will be undertaken at the level 2 stage to provide a focus on local data and information. We will discuss with partner organisations whether to align the consultation period in each county to make the consultation response easier.
- Resources will be secured internally and through our consultancy framework partners to enable delivery of the DWMPs to the timeframe identified.
- We will implement the technology and collaboration tools required to share data and information with partner organisations to ease the process for all organisations.

The feedback on our provisional programme has been positive. Lead Local Flood Authorities have responded positively and are keen to work with us. A risk to effective engagement is the availability of resources within the partner organisations to engage with us to develop these plans and provide data. We will therefore engage early and discuss options with them as to how to make the planning process as easy as possible within any resource constraints. For example, we may be able to stagger the development of each plan in each county, combine the consultation periods of each Level 2 plan so partner organisations only need to respond once, and even resource up internally so we are in a position to ensure effective engagement with other organisations.

Engagement with partner organisations will run throughout the development of the plans, with a 12 week public consultation on each Level 2 DWMP before we finalise the plans. With the final Level 2 plans out for consultation, we will complete the one Level 1 plan for the region, which will provide an overall summary and programme of actions, for a public consultation in summer 2022.

We will put in place the funding and resources to deliver to this programme timeline. Early funding has already been allocated within year 5 of AMP6 for the Isle of Wight pilot, and also to start the work and external engagement on two further Level 2 DWMPs: (i) Medway catchment; and (ii) Arun and Western Streams Catchment. This approach enables the commencement of our engagement with the partners across all three of the counties in our region (Hampshire & IoW; Sussex and Kent) in 2019. It will also allow for a rapid start to the full programme in April 2020.

Water UK's timetable for delivering the first round of DWMPs is challenging. We currently have one team of 6 staff working on the Isle of Wight DWMP to deliver it within the timetable available for the pilot. We will create two further teams so we have three teams (one for each County: Kent, Sussex and Hampshire & IoW) dedicated to the development and delivery of the DWMPs. These teams will be larger than the existing team – the resource levels have been calculated based on a detailed estimate of the number of man-days required for each activity in the programme, based on key metrics on the number of wastewater catchments, customers and existing information available. In addition, we will supplement the team with data specialists, communications support, GIS experts, process engineers and wastewater modellers. The resources will be secured from within our existing Planning and Resilience teams, our in-house Engineering and Technical Services, and draw upon expertise from our external framework consultants as required. This approach builds our capacity and capability within our core Planning and Resilience team to continue to regularly review the risks, progress actions and update our plans, and lead the development of new plans every five years.

As we develop our first DWMPs, we will embed the procedures into 'business as usual' processes for strategic and investment planning, such that future DWMPs and business plan submissions to Ofwat are fully supported by our DWMPs.

9. Summary & Conclusions

The DWMP is an exciting opportunity to work with other water/flood risk management authorities and catchment partnerships to consider wastewater and drainage issues in river basin catchments over the longer term. This is the first time that both water quantity and water quality are considered together in our long-term strategic plan. This is a big step forward for the water industry and Southern Water.

Our approach to implementing the Drainage and Wastewater Management Plans (DWMPs) will improve our understanding of risk and our resilience levels for our wastewater systems, and drive the delivery of resilient solutions. The benefits we will gain from the DWMPs include:

- Risk identification and assessment consistently applied across all 11 catchments, with a first coverage completed by summer 2022.
- Understanding of our systems and how they interact with other infrastructure systems through collaboration with stakeholders and customers.
- A systematic and collaborative approach to solution development for identified risks. Resilience principles are included in the decision making process.
- An iterative process enabling coverage of the whole of our operating region and will be refined over time.
- Providing visibility to stakeholders of the decisions for investment into the future.

As a result of the DWMPs, our customers and local businesses will see greater collaboration between drainage risk management authorities and environmental groups, more aligned investment programmes that will deliver better outcomes for people and the environment, and improved management of water across the whole river basin. These plans will also enable us to reduce costs through better planning, managing future risks and resilience, and by doing the right thing.

Appendix A: Organisations with responsibilities for drainage

The Environment Agency/Natural Resources Wales/Scottish Environment Protection Agency/ Northern Ireland Environment Agency

The Environment Agency, Natural Resources Wales, Scottish Environment Protection Agency and Northern Ireland Environment Agency are the UK governments' environmental regulators, responsible for protecting the environment from harm. They manage the risk of flooding from main rivers, reservoirs, estuaries and the sea, owning and maintaining key flood defences, including flood barriers and river pumping stations. They also monitor the water quality, for example, at designated bathing waters.

Lead Local Flood Authorities

County councils and unitary authorities are the Lead Local Flood Authorities that manage flood risks from surface water, groundwater and ordinary watercourses.

Highway Authorities

Highway Authorities are responsible for the public drains that deal with the surface water run-off from local roads, to help prevent flooding and protect the integrity of the highway itself. The systems these councils maintain and improve include gullies, culverts and open ditches.

District, Metropolitan and Borough Councils

District, Metropolitan and Borough Councils are key partners in flood risk management, carrying out work on minor watercourses, working with Lead Local Flood Authorities and others, and taking decisions on developments in their area to ensure that flood risks are effectively managed.

Internal Drainage Boards

Internal Drainage Boards are independent public bodies responsible for water level management in low lying areas. There are 114 Boards in England and Wales, which actively manage and reduce the risk of flooding. The Boards operate and maintain more than 500 pumping stations and 22,000km of watercourses.

Private Owners/Industry/Supermarkets often have large areas of drainage systems which are linked to foul sewers.

Highways England/Transport Scotland/Welsh Assembly are responsible for drainage from major roads.

Extract from the 21st Century Drainage Programme (Copyright: Water UK).

Appendix B: Initial Estimate of the Days to Deliver each of our Level 2 DWMPs

Resource	Effort in ManDays									
Level Factor	Level 2 RBMD	%age TPUs by pop	SC	RBCS	BRAVA	PC	ODA	Programme	TOTALS	
3	Adur and Ouse	15%	25	25	175	44	283	57	608	
2	Arun and Western Streams	9%	25	25	105	26	170	34	385	
2	Cuckmere and Pevensy Levels	7%	25	25	82	20	132	26	310	
2	East Hampshire	8%	25	25	93	23	151	30	348	
1	Isle of Wight	3%	25	25	35	9	57	11	162	
3	Medway	20%	25	25	233	58	377	75	794	
1	New Forest	3%	25	25	35	9	57	11	162	
1	North Kent	3%	25	25	35	9	57	11	162	
1	Rother	2%	25	25	23	6	38	8	124	
2	Stour	12%	25	25	140	35	226	45	496	
3	Test and Itchen	17%	25	25	198	50	321	64	682	
		Total Days	275	275	1153	288	1868	374	4233	
Overall effort estimate										
		1165	BRAVA hrs - assume 5 days to do model catchment							
			BRAVA hrs - assume 1.5 days to do catchment without model							
		1886.5	ODA hrs - assume 11 days for modelled catchment							
			ODA hrs - assume 3 days for catchment without model							
			ODA hrs - assume only 70% of cathcments in total need optioneering							

Acronyms:

TPUs – Tactical Planning Units

SC – Strategic Context

RBCS – Risk Based Catchment Screening

BRAVA – Baseline Risk and Vulnerability Assessment

PC – Problem Characterisation

ODA – Options Development and Analysis

PA – Programme Appraisal

Appendix C: Risk-based catchment screening indicators

Indicator	Measure	Description
Catchment characterisation (stage 2 of the wastewater resilience metric methodology). (Tier 2 indicator)	Catchment characterisation score from the PR19 common performance commitment.	Provides a mechanism to understand the vulnerability of the catchment/sub-catchments to sewer flooding as a result of an extreme wet weather event.
Intermittent discharge impacts upon bathing or shellfish waters.	None specified	Mechanism to understand the significance of any impact of water company operations on environmental receptors (bathing or shellfish waters).
Continuous or intermittent discharge impacts upon other sensitive receiving waters (part A).	None specified	Mechanism to understand the significance of any impact of water company operations on environmental receptors.
Continuous or intermittent discharge impacts upon other sensitive receiving waters (part B). (Tier 2 indicator)	None specified	Mechanism to understand the significance of any impact of water company operations on environmental receptors.
Storm Overflow Assessment Framework (SOAF).	None specified	SOAF procedures: Current activity instigated Potential for future activity
Capacity assessment framework (CAF).	The focus is on the outputs from either the Initial or Enhanced approaches for the 'present day' case. There are accepted issues around the confidence in outputs from the Initial model which does not include for surface water inputs; in this case some engineering judgement may be required to supplement the outputs.	Provides an indication of capacity constraints in the network as a leading indicator to service failure.
Internal sewer flooding	PR19 common performance commitment (internal sewer flooding)	Historical measure that records the number of internal flooding incidents per year (sewerage companies only) indicative of capacity constraints. Note that this is a variation from the PR19 common performance commitment so the numbers considered in this assessment, as they exclude extreme events, will differ from figures reported for the performance commitment.
External sewer flooding	PR19 asset health performance commitment (external sewer flooding)	Historical measure that records the number of external flooding incidents per year (sewerage companies only) indicative of capacity constraints.
Pollution incidents (Category 1, 2 and 3)	As per the 2017 definition of the Environmental Performance Assessment (EPA).	Historical measure that identifies incidents of unexpected release of contaminants that have resulted in environmental damage.
WwTW quality compliance.	As per the 2017 definition of the Environmental Performance Assessment (EPA).	Historical measure relating to the performance of the treatment works (discharge permit compliance (numeric)).
WwTW dry weather flow compliance.	Based on measured flow volumes where available and calculated flows where measured flows are not available.	Historical measure of compliance with flow permits.

Storm overflows.	The focus is on using available data to examine permit risks that have not been captured by other indicators. Where monitoring is not in place consideration will need to be given to reported concerns.	Examines issues associated with all storm overflows not captured by other indicators (e.g. issues to be considered include non-compliance with pass forward flow conditions, storm storage conditions (where relevant) and screening requirements).
Risks from interdependencies between RMA systems.	A mechanism to understand risk posed by other RMA assets in the catchment.	Risk to be based on developing an understanding of whether there have been historical issues in the catchment through engagement with relevant stakeholders. Fluvial, coastal and surface water flooding potentially impacting on sewer networks (e.g. locking of outfalls) may be assessed through use of Environment Agency flood risk maps overlaid on the catchment area.
Planned residential new development.	None specified	Uses predicted residential population growth forecasts to target catchments requiring investigations for potential future capacity constraints.
WINEP.	WINEP sets out the actions that companies will need to complete to meet their environmental obligations.	Details the specific drivers for mitigating measures.
Sewer collapses.	PR19 common / asset health performance commitment (sewer collapses)	Historical measure that identifies risks to the integrity of the sewer system.
Sewer blockages.	PR19 asset health performance commitment (sewer blockages)	Historical measure that records obstructions in a sewer (that require clearing) which causes a reportable problem (not caused by hydraulic overload), such as flooding or discharge to a watercourse, unusable sanitation, surcharged sewers or odour.

Extract from: “A framework for the production of Drainage and Wastewater Management Plans”, Appendix B: Risk-based catchment screening. Copyright: Water UK, September 2018.