DWMP SEVERN TRENT
Drainage and Wastewater Management Plan

DWMP HAFREN DYFRDWY
Drainage and Wastewater Management Plan

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Strategic Context

Stakeholder Consultation

October 2019

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1 Introduction

The Drainage and Wastewater Management Plan (DWMP) framework was developed to address concerns raised by UK Government [1] regarding lack of transparency and assurance on how the sewerage undertakers were planning for the future. This led to the development of the '21st Century Drainage Programme', where over 40 representatives across the UK and the Republic of Ireland from government, regulators, non-governmental interest groups and water industry representatives came together to identify solutions to tomorrow's drainage challenges. One of the outputs of this work was the DWMP Framework.

This document is intended to provide an overview of the framework, and specifically set out the 'Strategic Context' for Severn Trent Water and Hafren Dyfrdwy, which is the first step of the DWMP journey. The purpose of this Strategic Context document is to raise stakeholder awareness of the objective of the DWMP, identify key drivers behind the need for a long term plan and, importantly, agree the planning objectives against which current and future performance is to be measured, both at a company and local planning level.

It is envisaged that this document will be revised and updated through the implementation of the DWMP to take account of developing best practice during its implementation ahead of DWMP publication in summer 2022.

So that we can agree the direction of DWMP delivery we welcome your feedback to a set of questions set out throughout this document.

2 What are Drainage and Wastewater Management Plans?

The Drainage and Wastewater Management Plan framework [2] was published by Water UK in September 2018. The need arose following concerns raised by Department for Agriculture and Rural Affairs (Defra), the Environment Agency (EA) and Office of Water Services (Ofwat) that there was no common framework for drainage planning. This led to the development of the 21st Century Drainage Programme, made up of over 40 representatives across the UK and the Republic of Ireland from government, regulators, non-governmental interest groups and water industry representatives. They were tasked with working together to identify solutions to tomorrow's drainage challenges.

One of the main objectives of the 21st Century Drainage Programme was to deliver a new UK wide framework that built on existing good practice and provided consistency of approach for drainage and wastewater planning throughout the UK. The new framework was commissioned by Water UK in collaboration with Defra, Welsh Government (WG), Ofwat, Environment Agency, Natural Resources Wales (NRW), Consumer Council for Water (CCW), The Association of Directors of Environment, Economy, Planning and Transport (ADEPT) and Blueprint for Water with representation from all UK sewerage companies. A non-technical overview document explaining how we can work together to deliver DWMPs is available on the Water UK website [3].

The new common framework was delivered for use in September 2018, which aims to:

- Embed a consistent, standardised and more robust approach towards long term planning that facilitates consideration of the wider drainage networks which interact with our drainage and wastewater systems.
- Provide transparency and line of sight with regards our plans to customers and other stakeholders who need to engage with the sewerage company on strategic decisions and investments in drainage and wastewater
- Facilitate the alignment of management plans across all organisations who have responsibility for different aspects of drainage and flooding, supporting achievement of common goals and outcomes.

[1] UK Government (Public consultation on draft Strategic Policy Statement – September 2017)

[2] https://www.water.org.uk/policy-topics/managing-sewage-and-drainage/drainage-and-wastewater-management-plans/

[3] https://www.water.org.uk/wp-content/uploads/2019/09/Working-together-to-improve-drainage-and-environmental-water-quality-an-overview-of-Drainage-and-Wastewater-Management-Plans.pdf

- Produce a plan that complies with relevant statutory obligations, governments'/regulators' policy expectations and customers' priorities for drainage and wastewater services.

The scope of a DWMP includes wastewater networks (foul, combined and surface sewers), interconnecting drainage systems (such as highway drainage and culverted water courses), wastewater treatment works and the interrelated flood risk and environmental impact on receiving waters; including rivers, streams and other watercourses, estuarial and coastal waters.

Whilst the responsibility for development and publication of DWMPs sits with the sewerage company there is clearly a need to work closely with other stakeholders.

3 What are we already doing?

Drainage planning has been around since public sewerage systems were first constructed to address public health concerns in the 19th century. To formalise and provide structure to catchment planning Severn Trent initiated their 'Drainage Area Planning' (DAP) programme in 1984. The intention was to assess all catchments over a ten year cycle to understand each catchment's hydraulic, operational, structural and environmental needs. An integral part of this programme being to build the first generation of hydraulic computer models whereby predicted performance was verified using actual rainfall. These models helped understand performance constraints both in dry and wet weather and could be used to evaluate long term scenarios, as well as being used to design improvement upgrades. These studies also included extensive work to understand the structural condition and serviceability performance of our sewers by embarking on a programme of closed circuit television (CCTV) surveys. Using the principles set out in the Sewer Rehabilitation Manual this improved understanding of sewer criticality which we used to prioritise investment.

Our initial ten year DAP programme was completed in 1994. During this time advances in hydraulic modelling software and ever increasing computer hardware capabilities enabled continual improvements in the understanding of our catchment performance with catchments being reviewed on a 10 year cycle. In 2010 we moved to 'Sewerage Management Planning' (SMP). This was driven by the fact that the 10 year DAP review cycle meant that our hydraulic models and catchment assessments were not always as up to date as they could be. We decided to move away from a cyclic approach to one where models were updated to a 'live' status and then maintained. This ensured that we always had the most up to date model available which accounted for new development as well as changes to the network on the back of our investment programme. This significant move has taken 10 years to complete but in their 'live and ready' status we are able to assess the future demands on our network with the confidence of knowing that our models are up-to-date. Our SMP programme also sets out specific time horizons for catchment performance analysis (current, 5 year future and 25 year future) with coverage of 100% of our connected population. A lot of this foresight now underpins the requirements set out in the DWMP framework.

Our investment in drainage planning over the last 35 years will stand us in good stead for evolving our approach into the production of DWMPs. The key change for us will be translating the reports, models and plans that we have created into an output that can be used and understood by both internal and external stakeholders During this period we have seen significant reduction in the number of customer's properties affected by sewer flooding, a reduction in pollutions and improvements in asset health such as blockages and sewer collapses. However, as always, we want to strive for even better performance to improve the service to our customers and the environment.

This is where Drainage and Wastewater Management Plans will help support our aspiration, as whilst we have all the information and expertise to work with our drainage partners, the DWMP framework provides a national structure to ensure consistency across the industry. It also provides a methodology to publish information that can assist external stakeholders to understand risks, projects and strategies for our area, and enables collaboration to deliver holistic improvements to the drainage and wastewater system.

4 Delivery Programme

DWMPs are required to inform our 2025-2030 business planning process (known as 'PR24') with submission of Business Plans expected around September 2023. To ensure sufficient time for stakeholders to consult on DWMPs and for investment needs to be incorporated into the PR24 Business Plan there is an expectation that draft DWMPs will be published by 30th June 2022 ahead of a six month consultation period. Final DWMPs would then be published by 31st March 2023 to inform the PR24 submission milestones (which are yet to be confirmed).

The various stages of our delivery programme (aligned to the DWMP framework) are set out below:

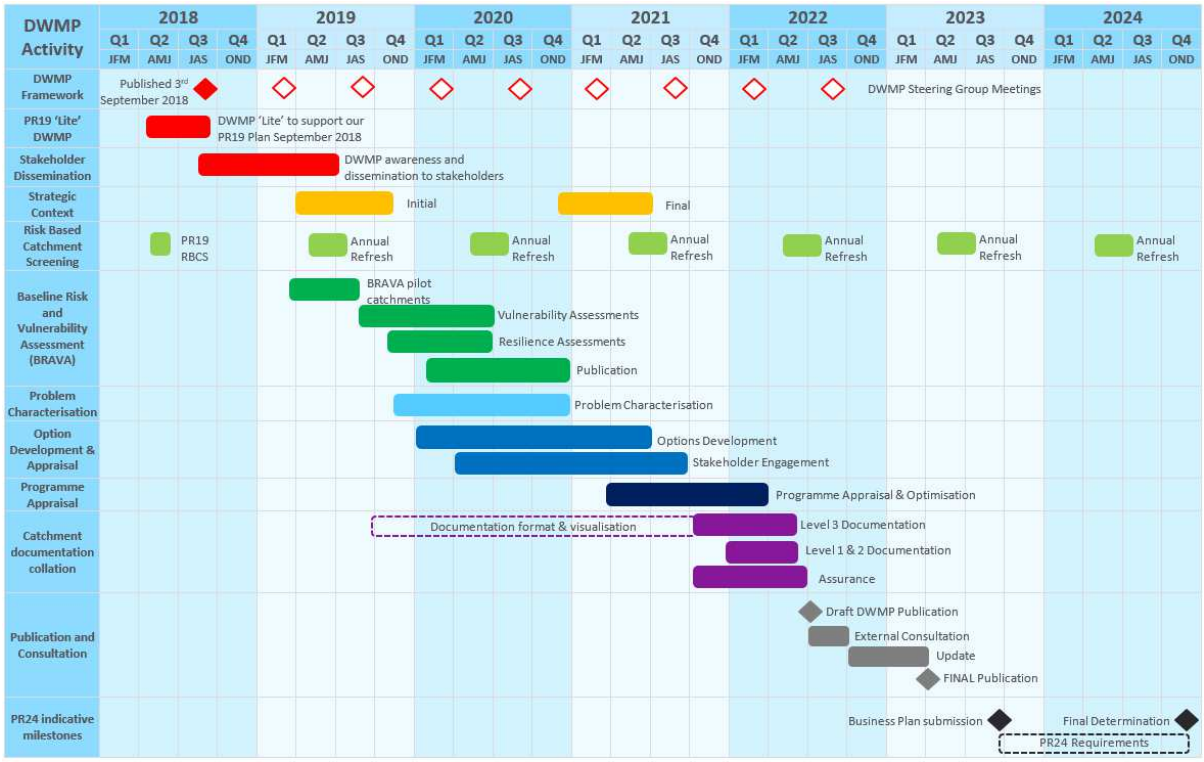


Figure 1: DWMP Delivery Programme

5 Governance Structure

Our proposed approach to overview the delivery and eventual ratification of our DWMPs is to use Regional Flood and Coastal Committee's (RFCC). This is principally driven by the River Basin Management District, which underpin our Strategic Planning Area building blocks, being focused on the Trent RFCC and Severn & Wye RFCC. At these meetings both the Environment Agency, LLFAs and elected members are represented.

Figure 2: DWMP Governance Structures

We are conscious that we don't want DWMP engagement to become over burdensome and add additional demands on existing over stretched resources. Our proposals therefore is to split our stakeholder groups into two groups:

'Delivery Partners' comprising Severn Trent / Hafren Dyfrdwy, Environment Agency (England) / Natural Resources Wales (Wales) and Lead Local Flood Authorities/Internal Drainage Boards – Led by the sewerage company, this group will be responsible for developing 25 year catchment strategies at each WwTW level whilst also collating the needs at a Strategic Planning Unit.

'Supporting Partners' comprising Local planning authorities (80), Natural England/Natural Resources Wales, Wildlife trusts, Rivers Trusts, Canal & Rivers Trust plus others. The input of these stakeholders will be essential to ensure the wider needs of a catchment have been identified and that the resultant DWMP strategies are fit for purpose. The intention is that these groups will be principally consulted/informed with engagement through Catchment Based Approach (CaBA) structure.

In line with DWMP ethos, transparency would be maintained to ensure visibility of how drainage strategies have been developed but in a manner that takes a pragmatic and proportionate approach to minimise bureaucracy and optimise stakeholder involvement.

Question 1:
Do you think this governance structure will meet your needs? What means of communication do you think would work best for your organisation?

6 The role of Stakeholders (What can DWMPs do for you…and what you can do for DWMPs)

Due to the complexities and interactions of drainage systems, DWMPs cannot be developed in isolation. It needs to be recognised that DWMPs will be running concurrently with the Flood And Coastal Erosion Risk Management (FCERM) programme (next plan cycle running from April 2021 to March 2027), River Basin Managements Plan (RMBP Cycle 3: Jan 2020 to Dec 2027), Flood Risk Management Plans (FRMP Cycle 2: Jan 2022 to Dec 2027) and initial development of the 2025-30 Water Industry National Environmental Programme (WINEP). The intention of DWMPs is that they will not duplicate these work streams but will complement each other to avoid duplication of activities to optimise resources.

Whilst sewerage undertakers are responsible for maintaining and upgrading the public sewerage network to meet future demands, this relies on working with other stakeholders to ensure customers benefit from drainage systems fit for the 21st century. For many years we have been closely working with other flood risk management authorities to alleviate flood risk both from multiple sources, as clearly working in silos is not conducive to effective flood risk management or DWMPs objectives.

Although DWMPs will be led and published by the sewerage company, they will not be developed in isolation and will need input from our partners to ensure current risks and issues are fully understood so that strategic intervention plans can be developed and delivered by 2050, and beyond. Successful delivery of DWMPs will rely of effective sharing of performance data, intelligence and expertise. The role expectations and benefits of stakeholder involvement are outlined below:

Local Planning and Developers

One of the key pressures of the sewerage network is from new development to meet Government house building targets to accommodate projected increases in population. Under current legislation (in England only) house builders have an automatic right to connect surface water discharges from new development to the public sewerage system, with Lead Local Flood Authorities providing advice on sustainable drainage requirements. Where sewerage capacity upgrades are required these are funded by the sewerage company. To ensure effective planning of capacity we are wholly reliant on working with local planning authorities to ensure upgrades can be delivered in a timely and efficient manner to ensure development is not delayed. We also need to be cognisant of the risks of abortive investment if planned development does not come to fruition and so it is essential that we work closely with local planners to manage uncertainty.

Across the Severn Trent / Hafren Dyfrdwy region we have nearly 80 planning authorities, albeit some are on the periphery and only partly within our wastewater boundary. Successful delivery of effective DWMPs will need good liaison with local authorities to ensure we have the best available thinking on their long term development proposals. We often find that strategic local plan periods only cover the next 10-15 years and so we need to ensure assumptions made to project to the 25 year DWMP time horizon are realistic, whilst also recognising the uncertainty of local planning.

Our commitment to ensure robust DWMP strategies is that we will consult with all our planning authorities to ensure we are aware of what is currently in the adopted Local Plan and what proposals are being considered for future development. As part of these discussions we will also be providing information on where catchments are currently under stress to help inform planning policy, especially with regard to improving the management of surface water disposal.

Lead Local Flood Authorities

Lead local flood authorities (LLFAs) are responsible for managing the risk of flooding from surface water, groundwater and ordinary watercourses and lead on community recovery.

Across the Severn Trent / Hafren Dyfrdwy region we have 28 Lead Local Flood Authorities (LLFA) as well as some Internal Drainage Boards (IBD). Effective surface water management is essential to both the LLFA/IDB and the sewerage company as surface water run-off can cause flooding before it enters the underground drainage network as well and being a key contributor to sewerage performance. Partnership working to alleviate flood risk is going to be vital and so sharing data is going to be essential to ensure successful DWMP outcomes.

Environment Agency

Within England, the Environment Agency are responsible for many activities but from a DWMP perspective are responsible for improving the resilience of people, property and businesses to the risks of flooding and coastal erosion, protect and improving water, land and biodiversity, and the protection and improvement of water, land and biodiversity. They are also responsible for managing the risk of flooding from main rivers, reservoirs, estuaries and the sea.

Across the Severn Trent region we have three Environment Agency regions and on a daily basis we are working with them to improve the environment and reduce flood risk through partnership working initiatives. Through the DWMP programme we will build on and enhance the current way we work to ensure we play our part in delivering common objectives.

Natural Resources Wales

Across our Welsh catchment, Natural Resources Wales has taken over the functions of the Countryside Council for Wales, Forestry Commission Wales and the Environment Agency in Wales, as well as certain Welsh Government functions. Whilst their remit is varied we see DWMPs underpinning collaborative delivery of long term catchment strategies to protect people and the environment.

Environmental Partners

Whilst the Environment Agency and Natural Resources Wales are our environmental regulators for England and Wales respectively, we are fully aware of the vital roles other bodies play in protecting the environment. Across our region we interact with Natural England, Natural Resources Wales, Wildlife Trusts, Woodland Trust, Canals & Rivers Trust, National Trust, National Farmers Union, Severn Rivers Trust, Trent Rivers Trust, Shropshire Hills AONB Partnership plus many customer groups. Through our DWMP consultation process we need to understand where we can improve and enhance areas affected by our activities.

Our DWMP commitment is that we will consult with our environmental partners and keep them informed as to how our DWMPs will help them deliver their long term aspirations.

Highway Authorities

A large percentage of the flow entering the public sewerage network drains from the public highway, roads and footpaths. By dealing with inflow at the source, there is potential to release capacity within the sewerage network by working with local highways authorities to divert or slow down highway water runoff. Obviously the water needs to go somewhere and so if we can work with highway engineers to undertake separation projects or build sustainable drainage systems this is likely to provide a considerable benefits. This will clearly involve challenges when it comes to operational maintenance but installing retrofit sustainable drainage (SuDS) solutions (such as green street rain gardens and swales) would not only reduce flood risk but also improve the community in terms of amenity and biodiversity benefits. SuDS could also be incorporated into traffic calming solutions and public realm initiatives.

As this will provide benefit to the sewerage system we would look to how best to deliver these benefits whilst also recognising the role highways engineers have to play to maintain road safety.

Customers

Raising awareness with customers regarding the role they have to play in the effective performance of a catchment is essential. For many years there have been customer education initiatives to raise awareness and influence behavioural change surrounding water efficiency and the impact of flushable items and fats oil grease (FOG) on sewer blockages but awareness of how paving over gardens can collectively increase surface water runoff and increase flood risk is a challenge. We need to embed customers into the heart of DWMPs and raise awareness so that they can help deliver its objective. The benefits will help reduce flood risk, reduce maintenance needs and ultimately reduce customers' bills.

As part of our DWMP process will are developing a visualisation tool so that customers can get an awareness of the challenges faced by the catchment in which they live. We will also be using this platform to share DWMP catchment strategies and, supported by customer education, will disseminate how they can contribute to their success. The ultimate aim being that customers become a part of how their community fits into drainage solutions and also that our solutions can enhance the needs of a community, for example through our AMP7 Green Communities initiatives. By delivering enhanced SuDS features that deliver social, amenity and biodiversity benefits in addition to managing flood risk, investment will deliver wider green community benefits.

Question 2:
Do you understand the role your organisation can play in the development of DWMPs? Are there any other areas where DWMPs will help contribute to your long term aspirations?

7 Drivers to be considered by DWMPs

Demands on drainage and wastewater networks are constantly changing and the challenge to water companies and other stakeholders is to work together to meet customers' needs whilst also managing uncertainties that are inherent with long term catchment management.

The key challenges that DWMPs need to consider are:

Environmental	Customer expectations	Resilient systems
• Climate change • New development (including population growth) • Compliance with environmental quality standards	• Customer behaviours • Service level expectations • Changes in water consumption • Paving over impermeable areas	• How to manage trends, uncertainty and variability • Ensuring plans are in place to mitigate, manage and recover from extreme events.

The objective of the DWMP is to work with our stakeholders and customers to raise awareness of each catchments needs over the next 25 years and beyond. By working closely with our partners to understand the internal and external pressures on the drainage and wastewater networks, we can work together to deliver the most cost effective sustainable solutions to our customers.

External challenges

We know ***population growth*** will continue to put pressures on the wastewater network with new development being connected to the sewerage system. In addition, we continue to see increased paved area from existing housing estates, as permeable green areas and gardens are replaced with hard surfaces. This is commonly referred to as ***urban creep*** but can also be experienced in rural areas. This not only increases surface water run-off into the surface water network and receiving watercourses but we are also seeing increases in surface water flows into the foul / combined sewers. This is increasing pressure on sewerage systems that they not designed for.

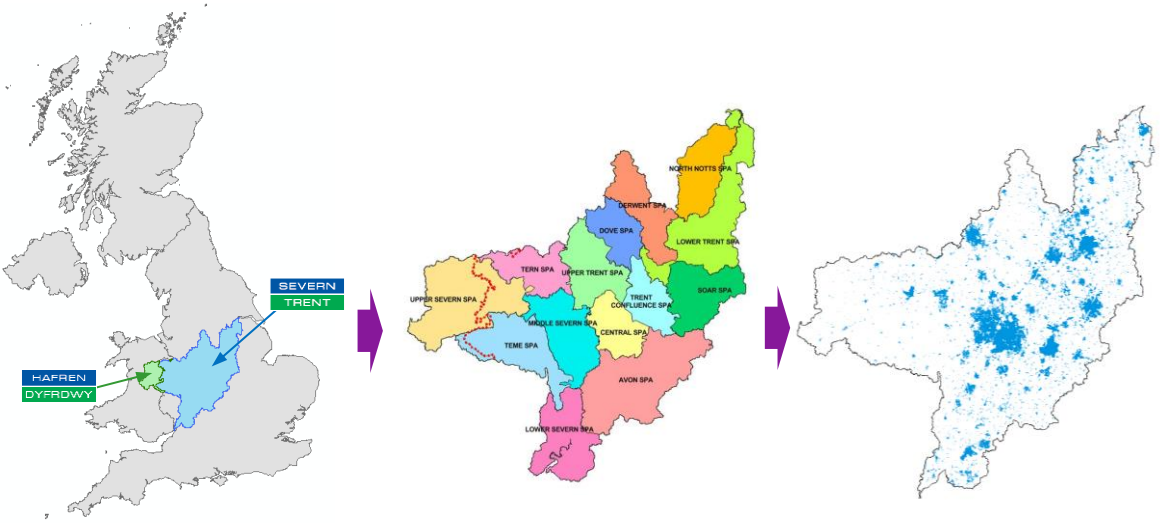
Climate change is an acknowledged challenge and although there is uncertainty regarding the scale and rate of its impact, the industry is fully aware that rainfall patterns are changing. We feel the biggest risk is how to manage this uncertainty and recognise that the focus of our DWMP needs to focus on sustainable surface water management as part of adaptive pathway strategies. By reducing the amount of surface water connecting into the wastewater networks and working with parties to ensure outflows are not hindered, this will enhance resilience. We also recognise that the sewerage network is only one link in a much longer surface water chain needed to convey rainfall from headwaters down to the sea. We are aware of the part our actions as a water company can place on our partners and so it is essential that we share intelligence and resources to deliver our collective goals to reduce flood risk. To achieve this, we intend to give greater focus on working with our partners and customers to build sustainable drainage systems (SuDS) which deliver multiple benefits in line with the CIRIA SuDS Manual [4]. We believe surface water management should not just be about attenuating rainwater as great SuDS design can enhance the local environment by making communities a better place to live by planting trees and building biodiversity habitats. Our Green Communities initiative is aimed at building 'better SuDS', where good design can be incorporated into traffic calming schemes or introducing wetlands to inner city areas which benefit wildlife and the general good feeling of our customers. Clearly there will be challenges to delivering this future.

Question 3:
Do you think there are any other drivers that need to be considered in the development of 25 year DWMP catchment plans?

[4] https://www.ciria.org/Resources/Free_publications/SuDS_manual_C753.aspx

8 Defining our planning boundaries

In line with the DWMP Framework we will be developing our DWMP at three different planning levels, as shown in the figure below:



Level 1: Company Level
Severn Trent &
Hafren Dyfrdwy

Level 2: Strategic Planning Areas
Based on River Basin Management Districts (x14)

Level 3: Tactical Planning Units
Wastewater Treatment Works catchments (x 1011)

Figure 3: DWMP Planning Levels

- **Level 1 - Company**: This section brings together planning at level 2 and 3 to provide a high level overview to summarise the overarching DWMP to provide a strategic, long-term plan for drainage and wastewater resilience and associated investment over the plan period. We will be publishing separate DWMP reports for Severn Trent and Hafren Dyfrdwy, although they will be closely aligned due to the overlap with the River Severn / Afon Hafren river basin management districts.

- **Level 2 - Strategic Planning Areas (SPA)**: These areas provide an aggregation of Level 3 units into larger level 2 strategic planning areas (SPAs). The Level 2 SPAs are proposed to describe the local drivers for change as well as facilitating a more strategic and collaborative level of planning above the detailed catchment assessments.

  Our SPAs have been primarily based on the River Basin Management District (RBMD) boundaries as this offers the good alignment with other drivers (such as water quality and flood risk) and enables us to make use of the existing catchment based partnerships that are running in these areas. In some cases we have had to slightly fine-tune the boundaries to ensure that the entirety of a sewage treatment catchment boundary falls within a single Strategic Planning Area. By doing this we maintain line of sight from Tactical Planning Unit through into Strategic Planning Area.

  In total we have 14 Strategic Planning Areas that wholly or partially cover Severn Trent Water and 3 areas that intersect with Hafren Dyfrdwy.

Figure 4: Strategic Planning Areas

- **Level 3 – Local Tactical Planning Unit (TPU)**: These local planning areas are based on wastewater treatment works (WwTW) catchments. For small catchments these may be aggregated together, but for our larger wastewater treatment works (WwTW) catchments discrete sub-catchments have been identified.

  As part of the DWMP stage to undertake Risk Based Catchment Screening we will be undertaking this using Tactical Planning Units based on wastewater treatment works catchment boundary. We have 1,011 WwTW catchments, of which 50 are located in Hafren Dyfrdwy. For reporting purposes, we may consolidate and group some of our smaller rural catchments together based on local river reaches.

In summary our DWMPs will consist of the following three levels:

Level 1 Company Level	**Level 2 Strategic Planning Units** (aligned to River Basin Management Districts)	**Level 3 Tactical Planning Units** (Nr of WwTW's)
HAFREN DYFRDWY SEVERN TRENT	Upper Severn - aligned to 'Severn Uplands' RBMD	80
	Tern - aligned to 'Severn Middle Shropshire' RBMD	91
	Teme - aligned to 'Teme' RBMD	71
SEVERN TRENT	Upper Trent - aligned to 'Trent Valley Staffordshire' RBMD	59
	Dove - aligned to 'Dove' RBMD	39
	Derwent - aligned to 'Derwent Derbyshire' RBMD	69
	North Notts - aligned to 'Idle and Torne' RBMD	52
	Lower Trent - aligned to 'Lower Trent and Erewash' RBMD	107
	Soar - aligned to 'Soar' RBMD	58
	Trent Confluence - aligned to Anker and Mease elements of the 'Tame Anker and Mease' RBMD	41
	Central - aligned to Tame element of the 'Tame Anker and Mease' RBMD	26
	Avon - aligned to 'Avon Warwickshire' RBMD	154
	Middle Severn - aligned to 'Severn Middle Worcestershire' RBMD	65
	Lower Severn - aligned to 'Severn Vale' RBMD	99
2 Areas	**14 SPAs**	**1011 WwTWs**

Question 4:
Based on the proposed planning areas, what do you think is the most appropriate way of engaging with your organisation? If you have regional areas are you able to provide contact details.

9 How we will report our DWMPs

We will be publishing DWMPs for each Level 1 Company area. In line with the DWMP Framework they will include the following documents:

- A non-technical summary which outlines the plan. This is to be written in an easily accessible and readable format.
- A technical summary which follows a similar structure to the non-technical summary, but goes into more detail around the approaches taken in developing and producing the plan.
- The plan which provides the detail of the approach, outputs and interpretation of the assessment, derivation of the draft preferred plan and, subsequent to consultation, the final plan. The plan will provide a step by step description of the development of the DWMP.
- Technical appendices to provide supporting detail on the assessments and outputs undertaken at a more granular level i.e. at Level 3 and Level 2.
- A customer facing summary document. This will be supported by an interactive web-based portal to make it easier for customers to interact with the DWMP content.

In line with the delivery programme we will be publishing our DWMP by 30th June 2022. This will allow feedback to be incorporated into the final document ahead of the PR24 business plan submission in the autumn of 2023.

Question 5:
What do you think would be the best format/platform to share DWMP findings? Would a paper based reporting process be useful or would you find a web based interactive portal easier to us?

10 What are the Planning Objectives for successful a DWMP?

The DWMP Framework requires the Strategic Context document to set out the Planning Objectives against which current and future performance is to be measured. These objectives will also be used to inform and evaluate development of strategic options to inform catchment strategies which contribute to all planning objectives.

As DWMPs are wider than just wastewater it is essential that Planning Objectives covers all stakeholders' objectives. With this in mind, we have drafted an initial list of seven principle planning objectives to be delivered by DWMPs. We would however like to receive your comments on whether these cover the objectives of your organisation and if not provide suggestions as to how they could be enhanced. The initial list we have identified are:

1. Reduction in risk from **sewer flooding**
    a. Reduce number of properties impacted by Internal flooding
    b. Reduce number of properties impacted by External (curtilage) flooding
    c. Reduce number of flooding incidents to public areas (highways flooding and open spaces)
    d. Reduction in the number of sewer blockages and collapses through improved asset health
2. Reduction in risk from **surface water, groundwater and river flooding**
    a. Reduction in non-sewer flooding risk, such as:
        i. Supporting delivery / completion of an activity or action agreed in the Lead local Flood Authorities local flood risk management strategy (LFRMS) or published Surface Water Management Plan (SWMP)]
        ii. Supporting delivery of / completion of an activity or action that directly contributes to the delivery of the National Flood and Coastal Erosion Risk Management Authority.
3. Improvement in **WwTW permit compliance.** 100% compliance for:
    a. Treatment capacity: Dry weather flow (DWF) & Flow to Full Treatment (FFT)
    b. Water quality: Final effluent
4. Reduce **Unsatisfactory Intermittent Discharges**
    a. No remaining water quality UIDs;
    b. Address any aesthetic needs associated with WQ needs.
5. Sustainable accommodation of **future growth**
    a. Ensure new development can be sustainably accommodated without unavoidable delay
    b. Support local planning authorities with development of local plans
6. Effective **resilience**
    a. A baseline assessment completed for all critical assets and a risk score assigned
    b. Overall proportion of customers at risk reduced
    c. Overall proportion of environment at risk reduced
    d. Overall population at risk of sewer flooding in a 1 in 50 year storm reduced
7. Supporting **Water Resource Management Plan** strategies
    a. Optimising surface water management initiatives to support water resources, for example supporting aquafer recharge whilst also ensuring Water Resource Zones are protected.
    b. Supporting water efficiency measures by promoting rainwater harvesting and water reuse in water stressed areas

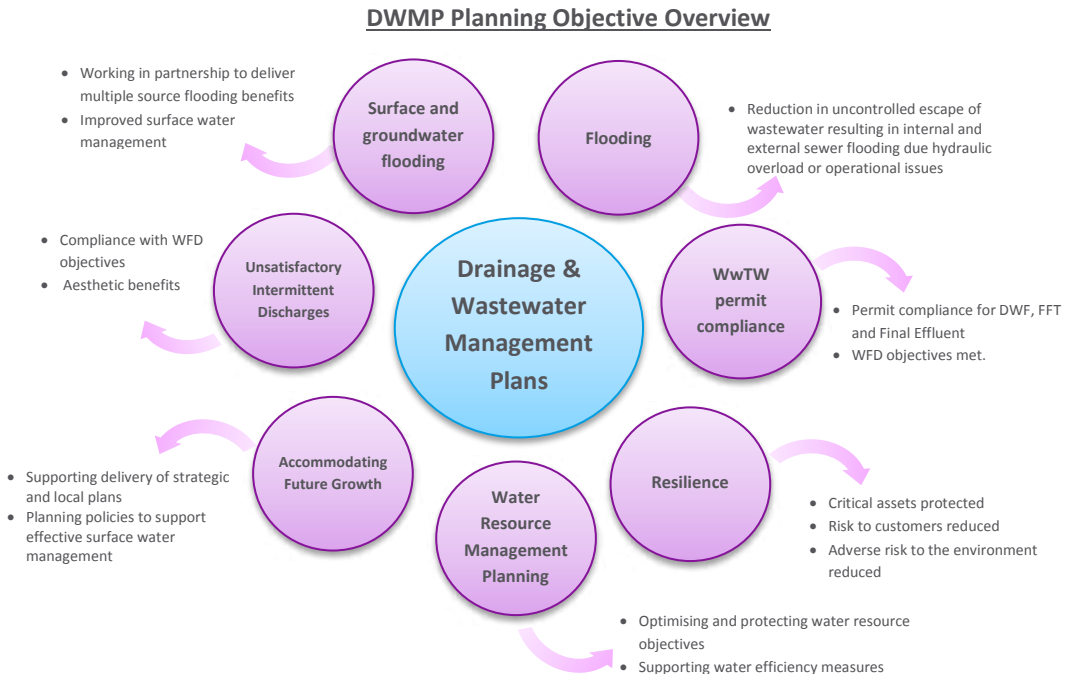


Figure 5: Planning Objectives

A key activity underpinning all these objectives will be developing sustainable strategies with an increased focus on managing inflow and optimising current capacity before building new assets. We will also want to increase awareness with our customers and stakeholders so that they are aware of the challenges and stresses on drainage and wastewater catchments so that they can play their part in contributing to the success of a DWMP and Severn Trent / Hafren Dyfrdwy can plan in delivering the objectives of others.

Question 6:
Do you think the seven Planning Objectives outlined above are the appropriate? Do you think there should there should be additional objectives?

11 What future trends & challenges do DWMPs need to consider?

There are many challenges that a water company needs to consider as part of long term catchment planning between now and 2050. As part of considering catchment strategies there will be a need to consider future uncertainties to ensure the risk of abortive investment is managed to a minimum to safeguard customers' bills.

The challenges we envisage that need to be taken into account when developing effective and robust DWMP catchment strategies include:

Customer expectations – Customer satisfaction is paramount and at the heart of everything we do and so the levels of service customers expect of their wastewater service will become increasingly challenging. Tolerance and the acceptability of flooding, regardless of cause or responsibility, has changed over recent years and with recent experiences from extreme weather this is not expected to change. We also need to consider the wider waste management process to ensure disposal of non-sewer waste (fats oil grease, un-flushable items, sanitary products and nappies) is disposed of in an appropriate manner.

Protecting critical infrastructure – ageing wastewater infrastructure, as well as physical and cyber security risks could limit our ability to maintain a reliable service in the future.

Demographic change – We are envisaging a continued increase on population growth, accompanied by associated employment and commercial demands. Through the planning process we see DWMPs will have a vital role to play to raise awareness to inform planning policy and be informed by local plan discussions'. Through our Water Resource Management Plan we are also forecasting a trend towards lower occupancy rates per dwelling and together with reduced water consumption driven by improved water efficiency, we are expecting an overall decrease in per capita water consumption. We envisage past practices of existing customers paving over impermeable areas (e.g. driveways replacing front gardens, conservatories and extensions) will continue to increase the volume of surface water entering drainage systems. This will be compounded by climate change.

Policy and regulatory change – The water industry, being a monopoly, is highly regulated with a substantial amount of policy and regulations. Clearly from a political perspective this could change, especially after the UK's departure from the European Union or the nationalisation debate. We also recognise the challenge from competition which has been introduced for through commercial development and we all need to be aware of the possibility of this being extended to residential customers or through regulation of catchments at a local level.

Climate change – We have all been seeing more frequent and extreme weather events, including intense localised rainfall events that by far exceed the capacity of the underground drainage systems and road drainage gully capacity. These event therefore have the potential to adversely impact on the rivers and catchments. Dealing with flooding is not just about increasing capacity to get flows into the piped drainage network as quickly as possible, as this often just moves the problem elsewhere. Hence mitigation of climate change will not just be a sewerage company or local authority remit. It is more than likely going to need buy-in from our customers to play their part, for example through increased acceptance of sustainable drainage solutions. The additional benefit being that in addition to helping control surface water runoff, sustainable drainage can enhance amenity and biodiversity and make the community a nicer place to live.

Environmental change – Whilst Severn Trent and Hafren Dyfrdwy don't have a coastline we are heavily reliant on the network of rivers to convey flows to the sea. At 220 miles (354km) the River Severn / Afon Hafren is the longest river in the UK, with the River Trent being the third longest at 185 miles (297km). This provides additional challenges to ensure we play our part in meeting water quality standards that are also

likely to come under greater scrutiny as climate change reduces base flow in hotter drier summers, whilst alleviating river flooding in wet weather.

Carbon neutrality – We recognise the UK Government commitment for the UK to become carbon neutral by 2050. The drainage industry has its part to play and so Severn Trent / Hafren Dyfrdwy have introduced the triple pledge by 2030 to have:

1) Net zero carbon emissions
2) 100% electric vehicles
3) 100% of energy from renewables

As part of our pledge we will be looking to reduce operating costs associated with pumping and treating wastewater, optimising product recovery and reducing our day to day activities to deliver net zero carbon neutrality.

Question 7:
Do you agree with the challenges? Are there any other aspects that a DWMP should consider?

12 Planning Horizons and uncertainties

Our DWMP assessments cover a minimum 25 year planning horizon and so to align with our PR24 business planning period this will cover the period from 2025 to 2050. Clearly trying to project catchment needs so far into the future is going to be demanding when considering uncertainties surrounding climate change, population increases and other challenges. Whilst most, if not all, are outside the control of a water company to manage, we do have the tools and experience to undertake scenario planning and sensitivity testing to ensure our strategies are adaptable. To provide 'check-in' points we will be breaking our overall strategic plans into 5 year and 10 year horizons that will both aligned to the 25 year planning objectives.

Question 8:
Given that DWMPs are looking at a 25 year planning horizon, what challenges can you foresee within your organisation that could development of catchment strategies and what options are available to overcome future uncertainties.

13 What Planning Tools will be used to inform DWMPs?

We have a range of comprehensive planning tools that we use to help us develop a detailed understanding of system risk. We are using the very latest software and modelling techniques to test multiple future scenarios and identify optimal and timely interventions.

It is the level of detail and the coverage of our planning tools that sets us apart from the rest of the sector. For example all companies will have hydraulic models of their sewer network, but few have 100% coverage with all models maintained in a 'live' state. Similarly, all companies will have some form of asset deterioration model to predict failures and inform operational investment. Few however will have factored in input characteristics such as local population demographics and proximity to food outlets - and even less will considered true consequence by mapping the path and depth of flood water.

Our suite of planning tools gives us a much clearer view of risk and therefore allows us to prioritise really effectively where we intervene, which in turn makes us more efficient. An example is the difference that we have made on sewer flooding by introducing a new risk register approach. We have calculated that we will have delivered a 42% increase in risk reduction for a like for like investment in the last 5 years, all through prioritising the highest risk schemes.

We can also use the models to identify where there are synergies between programmes of work that can be exploited to make sure that when we do invest at a site, we resolve all potential drivers at the same time or build in a modular way that allows for future expansion. An example of this is how we have used the water quality models (SAGIS), our non-infrastructure deterioration model and our flow and load model to align the timing of our WFD improvements with capital maintenance needs or with capacity increases needed to accommodate additional flows. Aligning drivers of investment at a site or catchment level delivers significant efficiency over a non-aligned investment programme.

We have summarised our key planning tools and the function that they serve:

Tool	Planning function
Sewerage Management Plan Models (using Integrated Catchment Modelling (ICM))	• Our Sewerage Management Plan (SMP) models deliver all of our understanding on how our system operates hydraulically. • The models are developed using the most appropriate version of the Integrated Catchment Management (ICM) software from Innovyse. • By 2020 we will have full coverage of our system and all models will be maintained in a 'live' state (regularly updated for any catchment changes and re-verified)
Sewer Consequence Model (using Infonet)	• We have developed bespoke Sewer Consequence Models using the software Infonet. These models simulate a failure of every one of our pipes and assess the likely consequence using a range of datasets such as LiDAR, GIS mapping and 2D Flood Modelling. • Knowing the likely consequence (flooding or pollution) of a failure and being able to predict its severity (i.e. would it have affected a property internally or polluted a sensitive watercourse) enables better prioritisation.
2D Flood Routing (using Flood Risk Mapper and PondSIM)	• As an input to our SMP and Sewer Consequence Models we use 2D flood routing / mapping software to consider the risk from hydraulic overload, blockage or collapse of the sewer. • The outputs from this modelling work is already being used to inform predicted flood risk at a project solution level. It is also a useful tool to use to inform the 1 in 50 year sewer flooding resilience metric.
Hydraulic Flooding Risk Register	• In preparation for AMP6 we introduced our own hydraulic flooding risk register to replace the DG5 methodology. Our risk register calculates true risk by calculating a likelihood, based on an annual probability of flooding, and a consequence, based on area impacted by flooding and the depth. • This risk calculation has allowed us to convert all potential flooding schemes into a common denominator (known as the Equivalent Flooding Index) and therefore rank schemes based on the true risk.
Water Quality Models (inc. SIMPOL, SIMCAT and SAGIS)	• Our water quality models assess the impact of our discharges (both continuous and intermittent) on river and estuarine water quality. • We use these models to calculate the standards our treatment works or CSO discharges need to achieve to meet the objectives of the Water Framework Directive. We can also use these models to take a catchment based approach to improving water quality or consider options for alternatives to treatment enhancement (e.g. diffuse pollution management).
Flow and Load Tool	• We have a 'ready reckoner' tool for considering the impact of additional flows or loads on our Wastewater Treatment Works (WwTW) performance. • The Flow and Load Tool uses current performance versus design flow and load to calculate available headroom in WwTW capacity. When a risk threshold is breached this will trigger on site investigation and potential investment.
Sewer Infrastructure Model	• The Sewer Infrastructure Model (SiM) is our asset deterioration and operational whole life costs and benefits optimiser. It uses sewer condition assessments, asset data and performance data to calculate a rate of deterioration and the levels of investment needed to offset this deterioration or meet a defined set of targets.

	• The model is built in the Enterprise Decision Analytics software supplied by SEAMS Ltd and represents over 10 years of ongoing model development.
Non-Infrastructure Model	• The Non-Infrastructure model works in a similar way to SiM but considers the deterioration of above ground assets including both civil structures and mechanical and electrical equipment.
Portfolio Optimiser	• The Portfolio Optimiser is another tool from the Enterprise Decision Analytics package. We enter all the costs and benefits (using both willingness to pay and private costs of failure) of our schemes into the Portfolio Optimiser and it supports us in choosing the optimum overall balance of investment.

Question 9:
We are interested to understand what data and planning tools your organisation may have which could help with the delivery of DWMPs? If you could let us know what information is available that would be welcomed. We appreciate that some of this information might be sensitive and so we would like to understand what restrictions would be placed on its access and any limitations on its use.

14 What's next?

As per the framework, the Strategic Context is the first step of the DWMP journey.

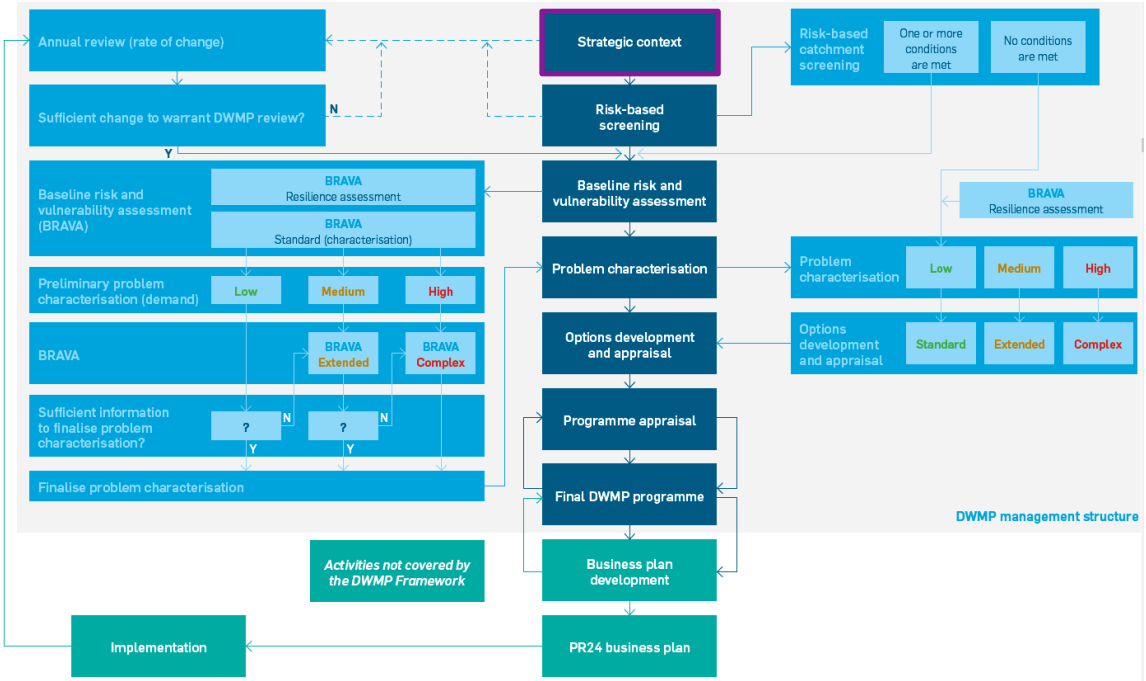


Figure 6: Schematic of the DWMP process steps (extracted from the DWMP framework)

The Strategic Context will provide the direction of the DWMP but as we learn from its implementation it is envisaged that it will evolve and ultimately form part of the final published DWMP. Along with the Risk Based Catchment Screening (RBCS), it will help inform development of strategic options in subsequent phases. Our RBCS for all our WwTW catchment is to be refreshed annually to ensure any changes catchment understanding is considered as part of the development of catchment strategies and publication of DWMPs ahead of PR24.

Question 10:
Do you have any further comments or observations which you think will help to agree the Strategic Context or delivery of DWMPs by June 2022?

15 How to feedback

Accompanying this document is a separate feedback template to capture your comments. We would appreciate your comments by 5pm on Friday 15th November with templates emailed to either dwmp@severntrent.co.uk for Severn Trent and dwmp@hdcymru.co.uk for Hafren Dyfrdwy.

In the meantime, if you have any more detailed queries or clarifications you would like to raise then please get in touch via email and we will get back to you.

Annex A - Summary of consultation questions

Question 1:
Do you think this governance structure will meet your needs? What means of communication do you think would work best for your organisation?

Question 2:
Do you understand the role your organisation can play in the development of DWMPs? Are there any other areas where DWMPs will help contribute to your long term aspirations?

Question 3:
Do you think there are any other drivers that need to be considered in the development of 25 year DWMP catchment plans?

Question 4:
Based on the proposed planning areas, what do you think is the most appropriate way of engaging with your organisation? If you have regional areas are you able to provide contact details.

Question 5:
What do you think would be the best format/platform to share DWMP findings? Would a paper based reporting process be useful or would you find a web based interactive portal easier to us?

Question 6:
Do you think the seven Planning Objectives outlined above are the appropriate? Do you think there should there should be additional objectives?

Question 7:
Do you agree with the challenges? Are there any other aspects that a DWMP should consider?

Question 8:
Given that DWMPs are looking at a 25 year planning horizon, what challenges can you foresee within your organisation that could development of catchment strategies and what options are available to overcome future uncertainties.

Question 9:
We are interested to understand what data and planning tools your organisation may have which could help with the delivery of DWMPs? If you could let us know what information is available that would be welcomed. We appreciate that some of this information might be sensitive and so we would like to understand what restrictions would be placed on its access and any limitations on its use.

Question 10:
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