River Basin Catchment Summary

Wye

1.0 Introduction

This Drainage and Wastewater Management Plan (DWMP) sets out how Dŵr Cymru Welsh Water (DCWW) will manage and improve its assets to maintain a resilient and robust wastewater drainage system. The plan aims to manage flooding and pollution from our wastewater assets in the future, for our customers and our environment.

1.1 Catchment Information

Wye (see Figure 1 below) consists of 163 wastewater catchments with a total population of 250599.475572686. There is a total sewer length of 2500km, where 1149km is associated to the foul system, 483km is associated to the surface water system and 830km is associated to the combined system. There are 163 Wastewater Treatment Works (WwTW), 275 Sewerage Pumping Stations (SPSs), and 207 Combined Storm Overflows (CSOs) across this river basin catchment level.

The main river in the Wye is the River Wye, which stretches from Hereford to Chepstow, covering the Gloucestershire, Herefordshire and Monmouthshire counties.

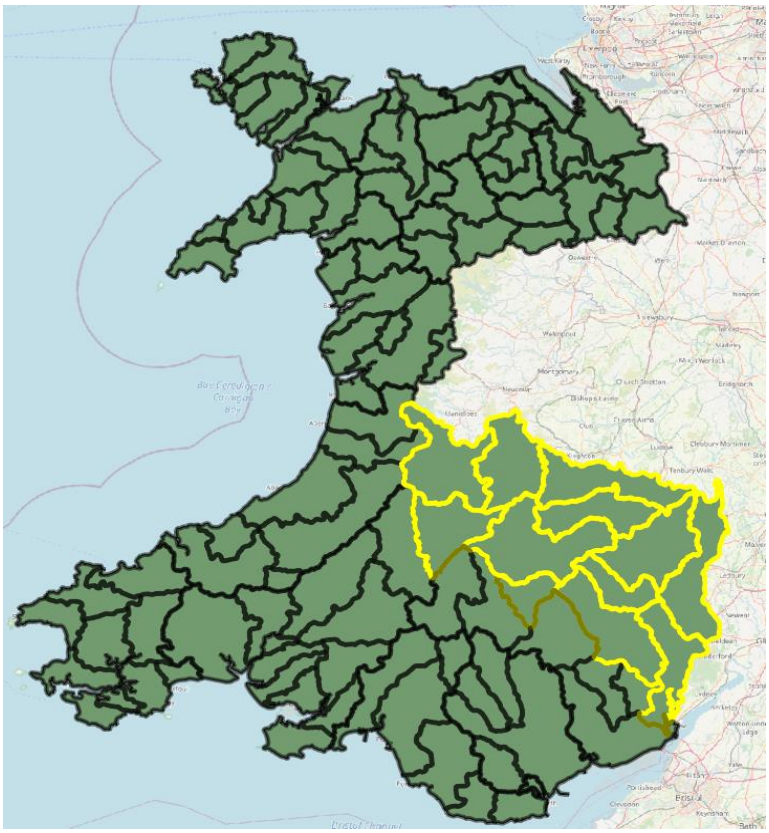


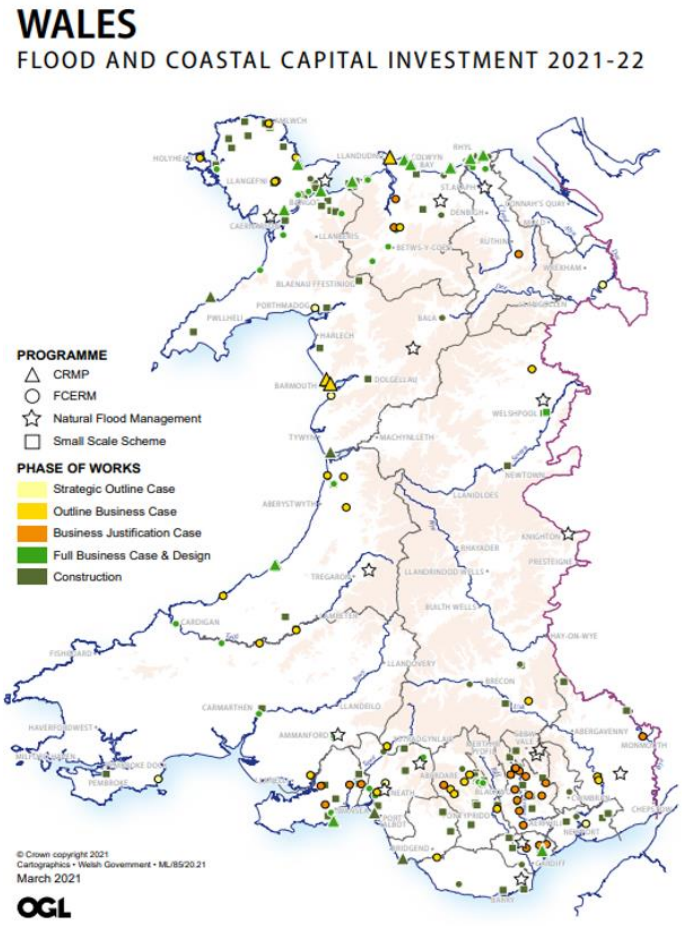
Figure 1 - River basin location detailing the associated tactial planning catchments

2.0 Stakeholder Engagement

The DWMP aims to enable DCWW to work collaboratively with stakeholders, regulators and local authorities to tackle current and future challenges. DCWW has identified stakeholder objectives that align with the aims of the DWMP and goals of other management plans. Table 1 details the main opportunities we have identified but this is not intended to be exhaustive. Note that these stakeholders have their own planning processes and plans which do not necessarily align with those of DCWW.

Table 1 - Stakeholder opportunity partnerships

Plans	Stakeholder Engagement	Responsible Bodies/Primary Stakeholder
Local Management Plans	Natural Resources Wales (NRW) Usk Management Catchment Strategy: (https://naturalresources.wales/media/3214/usk-management-catchment.pdf)	Natural Resources Wales Environment Agency Local partnerships
Flood Risk Management Plans (FRMP)	FRMPs are managed by Natural Resources Wales (NRW), the Western Wales river basin district, and the Environment Agency (EA) and NRW, for the Dee and Severn river basin districts. The local flood risk management strategy consists of the following general objectives: 1. Providing an effective and sustained response to flood and coastal erosion events. 2. Establishing effective routine maintenance regime. The FRMP for Monmouthshire County Council: https://www.monmouthshire.gov.uk/app/uploads/2016/04/Flood-Risk-Management-Plan.pdf	Welsh Government Water companies Coastal Groups (local authority led) Natural Resources Wales Environment Agency Lead local flood authorities
Shoreline Management Plans (SMP)	Shoreline Management Plans (SMP) SMP 19 covers the following councils under the Severn Estuary group: Carmarthenshire (Vale of Glamorgan, Bridgend County, Neath and Port Talbot, Swansea, Pembroke). The overall objective is to prioritise flood risk management measures so that advice is made available and provided to utility companies in order to protect critical infrastructure, development control advices and enable flood warning investment. Further information can be found here :https://severnestuarycoastalgroup.org.uk/wp-content/uploads/sites/4/2016/03/SE-SMP2-planning-leaflet_Monmouthshire-draft_v1.pdf in relation to Severn Estuary and Monmouthshire and here : https://www.newport.gov.uk/documents/Planning-Documents/LDP-2011-2026/River-Usk-Strategy---Low-Res.pdf in relation to the 2011 to 206 River Usk Strategy.	Coastal Groups (local authority led) County councils Lead local flood authorities
River Basin Management Plan (RBMP)	River Basin Management Plans (RBMP) set out how a combination of organisations and parties work together and set out to improve the catchments water quality and environment. The RBMPs can be found here: https://www.gov.uk/government/collections/river-basin-management-plans-2015	Water companies Coastal Groups (local authority led) Natural Resources Wales Welsh Government Environment Agency Defra
Flood and Coastal Erosion Risk Management Programme (FCERM)	There are a total of 6 strategically outlined FCERM schemes planned in the region from 2021 to 2022. This is illustrated in Figure 2.	Coastal Groups (local authority led) Natural Resources Wales Welsh Government Environment Agency Defra
Local Development Plans (LDPs)	The latest local development plans have been incorportated into the plan and future iterations of LDPs will be amended into the DWMP in future cycles.	Local Councils
Other Stakeholders and Non-governmental Organisation (NGOs)	Within this cycle other stakeholder groups have not yet been engaged.	None yet engaged.



Data is available from: https://gov.wales/flood-and-coastal-erosion-risk-management-programme-2022-2023

Figure 2 - Flood and Coastal Investment overview

3.0 Risk

We have assessed our likely performance from now to 2050 against the objectives that we set in our most recent business plan. The results of this assessment are presented in the following sections.

To understand future performance, we need to estimate how much population will change by, the degree to which climate change will impact Wales and areas of England that boarder our company, and how further surface water connected to the sewer network might increase the amount and rate at which rainfall drains into our sewers.

Urban creep is the term used to explain loss of green spaces, for example when new driveways or house extensions are built. It often leads to more rainwater entering sewers. Our forecasts suggest that urban creep will add up to 0.63 metres squared of impermeable ground per house per year.

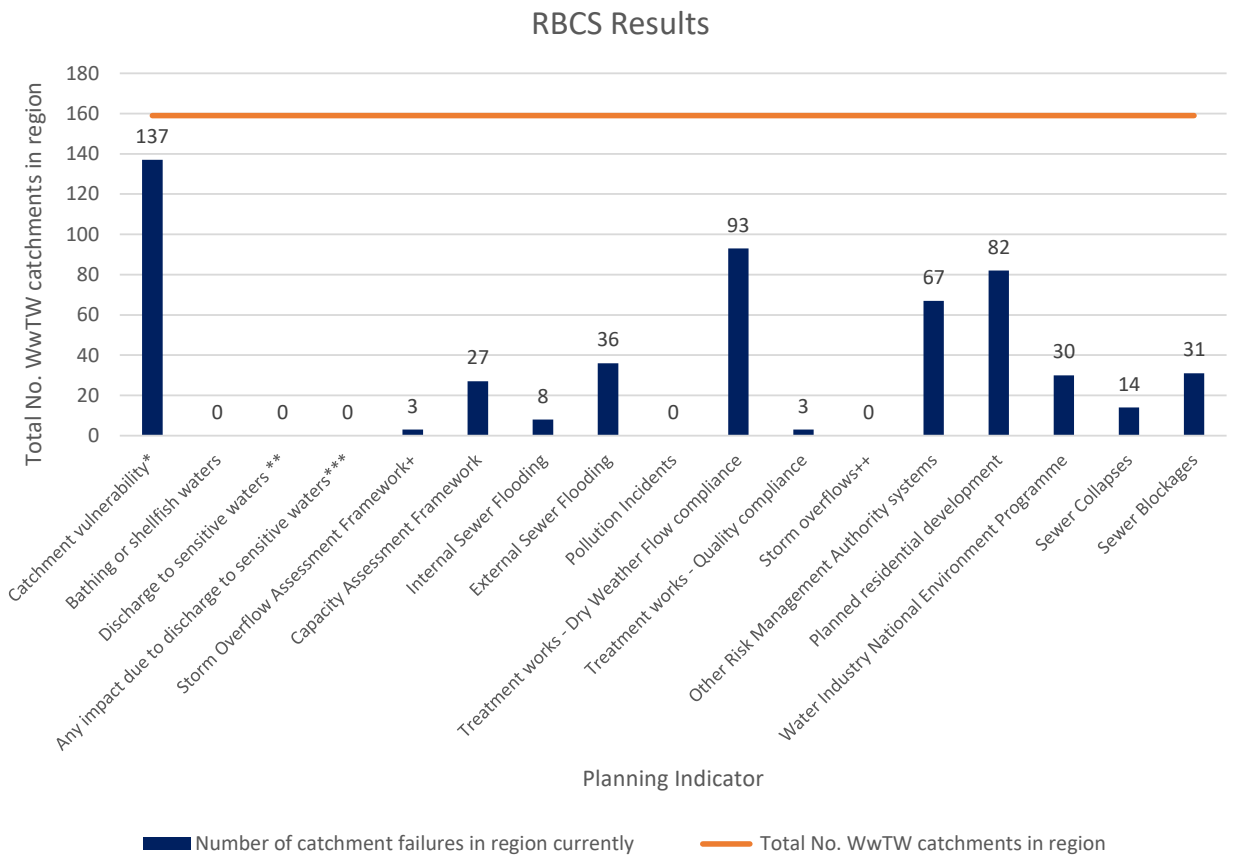
The population in the Wye region is set to decrease to 206800 by 2050, a change of -17% based on our future projections. However there are major developments in localised areas that will contribute to future pressures on the network, including development at Wonastow Road, Monmouth and Llandrindod Wells.

Climate change is predicted to increase the intensity of storms by around 15% in this region. In a typical year, winters are likely to be warmer and wetter, and summers generally drier. More intense rainfall will happen more frequently.

3.1 Risk Based Catchment Screening

The Risk Based Catchment Screening (RBCS) is the initial screening process to determine if a more detailed risk assessment is required. The assessment screens catchments against planning indicators which have been stipulated in the national guidance for DWMPs. A catchment will pass through to a more detailed risk assessment if it fails against one or more of these indicators, the results are shown in Figure 3.

For the Wye catchment the biggest concerns indicated by the RBCS are catchment vulnerability (based on a vulnerability assessment of flooding due to local characteristics, such as topography) followed by dry weather flow treatment works compliance.



* To sewer flooding due to extreme wet weather events.
** Categorised as a "planned" scheduled action within the Natural Resources Wales Action Database or considered as "Remedy" on Natural England Designated Sites system.
**** Categorised as a "identified" scheduled action within the Natural Resources Wales Action Database or considered as "Threat" on Natural England Designated Sites system.
+ Frequency investigation triggered.
++Overflow risks not covered by other indicators.

Figure 3 - Risk Based Catchment Screening results

3.2 Baseline Risk And Vulnerability Assessment (BRAVA)

Following on from the RBCS, the Baseline Risk and Vulnerability Assessment (BRAVA) highlights current and future risk. The risk scores are driven by company targets which were set in our last business plan. These targets were subdivided according to population or sewer length, depending on the measure, to derive a target for each river basin catchment.

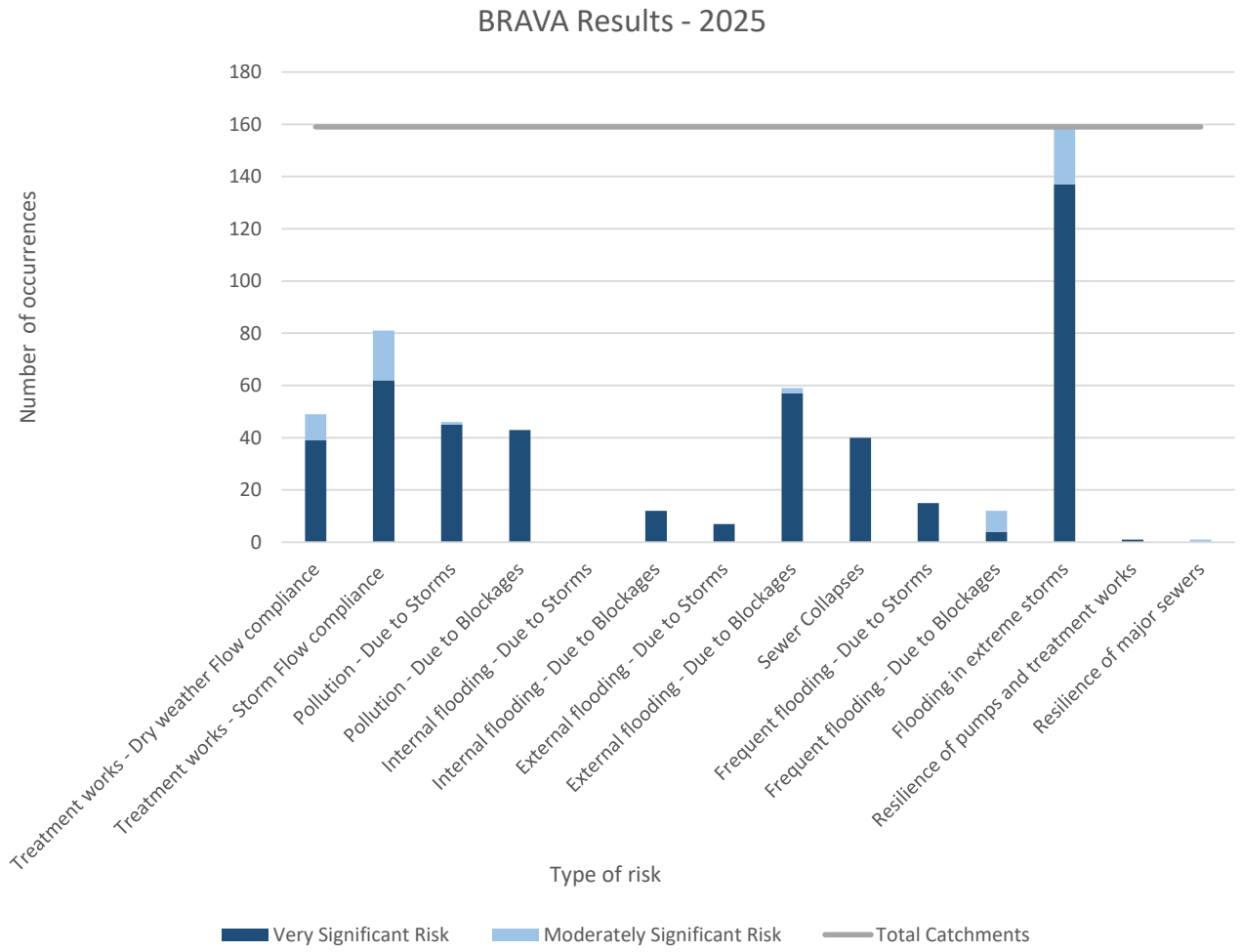


Figure 4 - BRAVA 2025 Summary

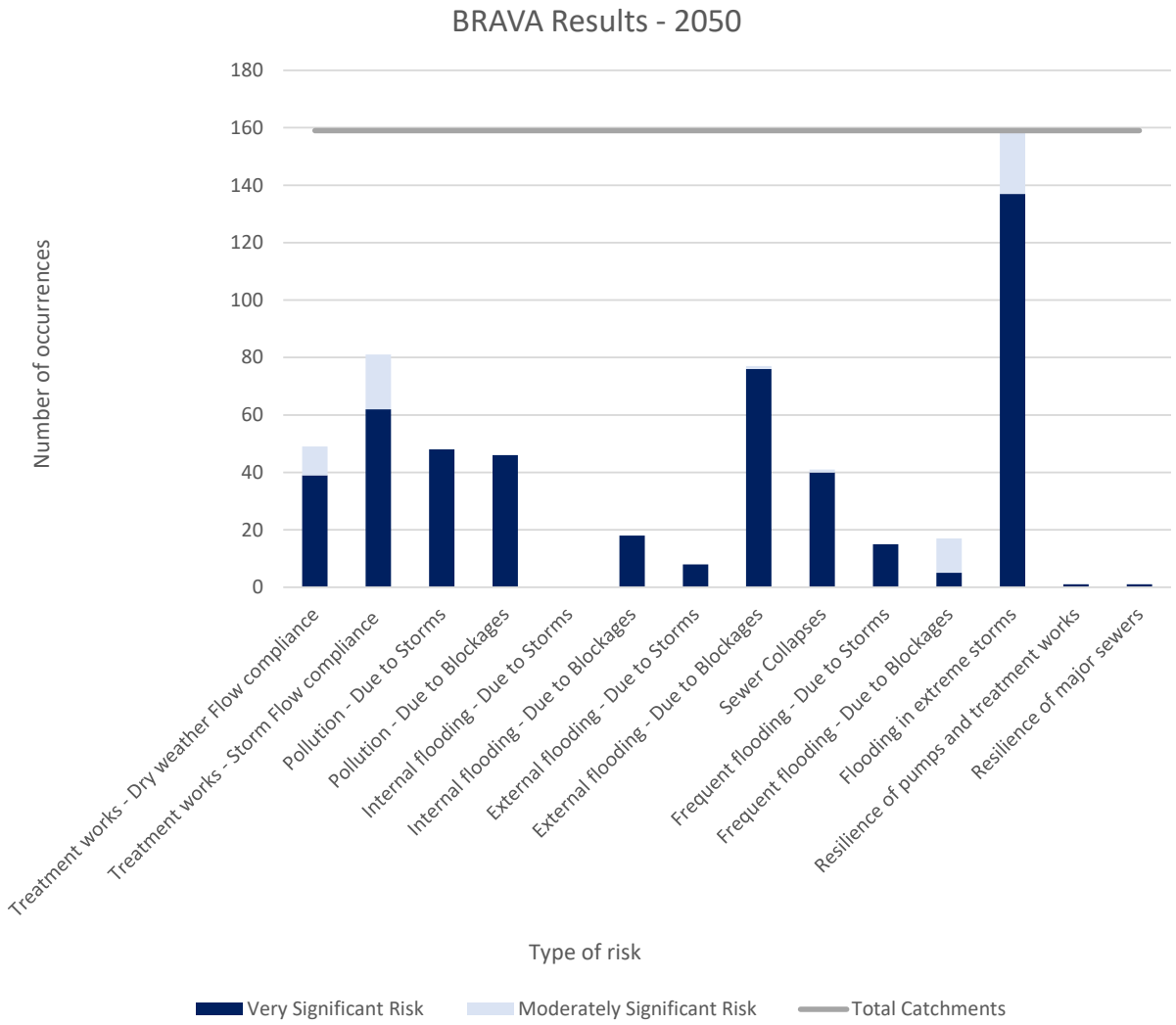


Figure 5 - BRAVA 2050 Summary

In both 2025 and 2050, risk of flooding in extreme storms is the biggest concern in the Wye catchment.

Figures 6 and 7 indicate the current and predicted risk of flooding, pollution, and both flooding and pollution caused by lack of capacity (termed 'hydraulic overload') across our networks. These maps illustrate where the issues occur and can be used to target where we want to work with the community and stakeholders to resolve issues. By working together, we can combine knowledge and resources to deliver the best outcomes for local communities and the environment. We want to include your feedback in our decision-making process.

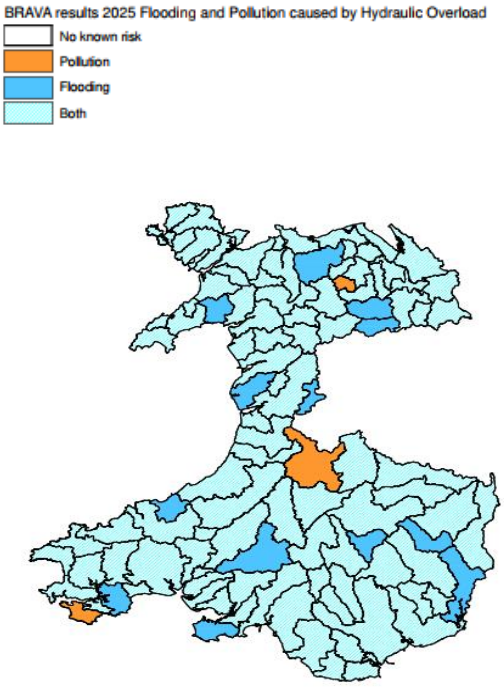


Figure 6 - Associated Strategic Planning Areas priority (2025)

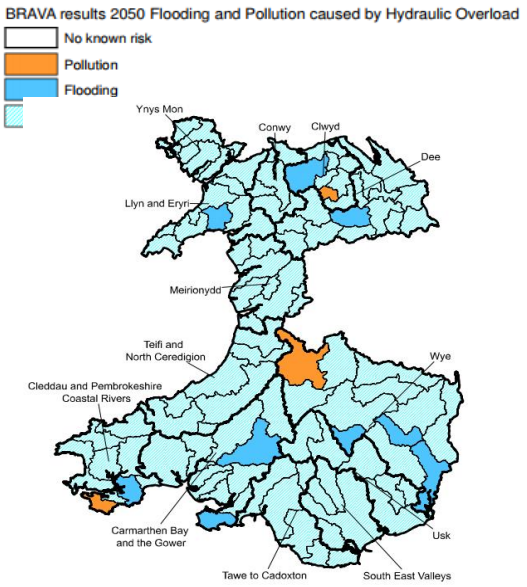


Figure 7 - Associated Strategic Planning Area priority (2050)

4.0 Supply Demand

Supply-demand is an assessment of the capacity of our treatment works. It approximately assesses whether all the treatment works in a region can collectively cope with current and future flows in dry weather. The suitability of the treatment works dry weather consents is tested against forecast future growth and changes in water consumption. This assesses the region's capacity, with no allowance for error, to treat the predicted changes in DWF in the future with no spare treatment works capacity.

Table 2 shows the supply-demand assessment for this region. Where a region may not have adequate capacity, it is flagged dark blue for further investigation. There may be local incapacity issues at individual treatment works within the region.

L2 Area	2025	2030	2035	2040	2045	2050
Wye						

Table 2 - Supply Demand Balance

5.0 Options

Over time the pressures on our sewerage network change due to influences such as catchment growth, creep of rainwater into the network, or influences such as climate change impacting rainfall patterns. To ensure the plan is robust over the 30-year planning horizon we have tested various types of schemes, and combination of schemes, to ensure a robust journey plan is delivered. Figure 8 shows the journey plan scheme types that are most likely to be beneficial in this region across the plan.

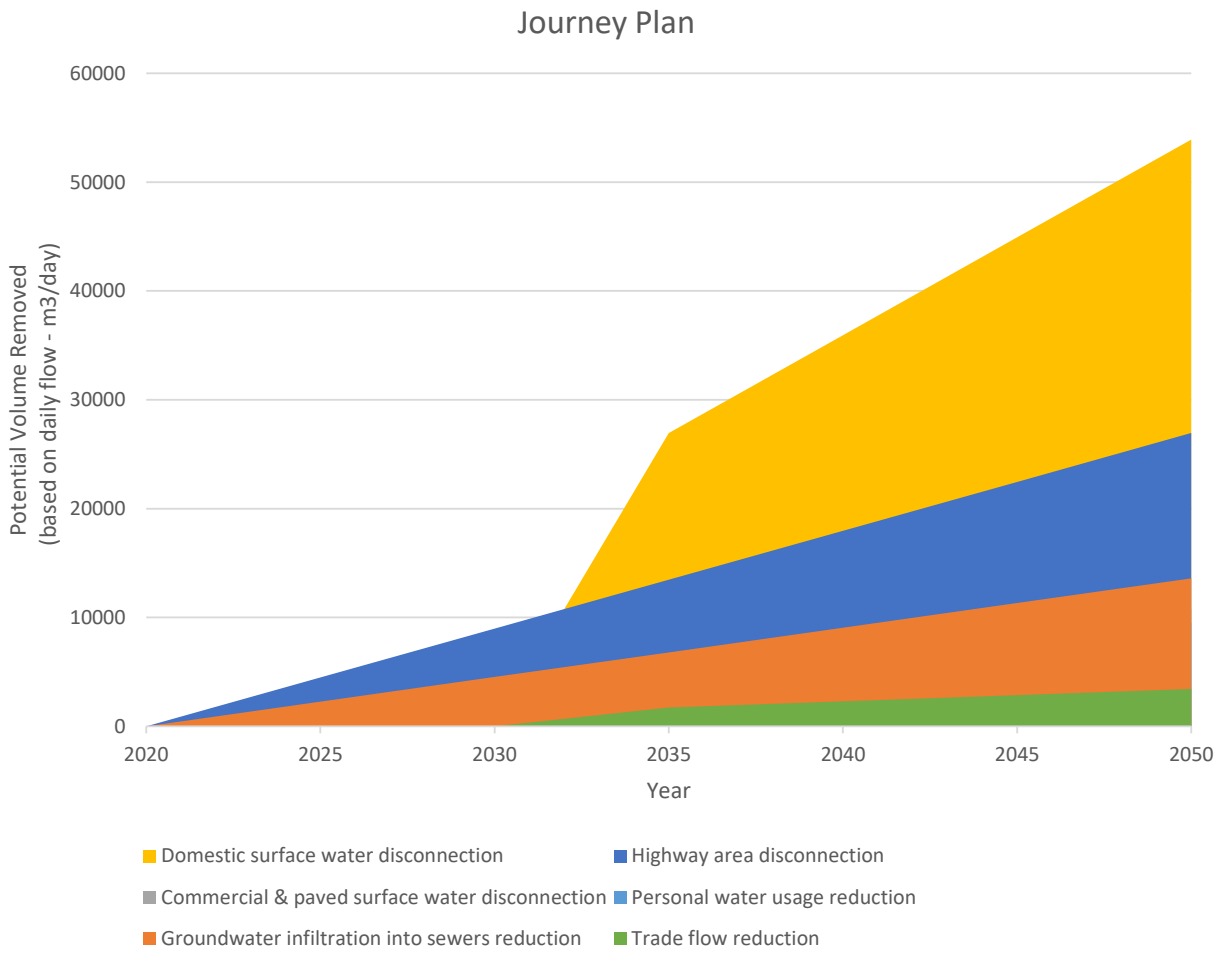


Figure 8 - Journey Plan

We have undertaken analysis to determine the likely costs to mitigate future predicted pollution and flooding. We assess combined sewer overflows based on the number of times they are predicted to spill in a 'typical year'. Table 3 illustrates both the size and cost of potential mitigation measures required to mitigate risk to varying standards. The assessment calculates the impact of rainfall and drainage contribution to the network relative to today's cost.

Mitigating the risk posed by flooding has been assessed in terms of the probability of occurrence, we use the size of a storm event that has the probabilty of occuring once every 30 years. Table 4 illustrates both the size and cost of potential mitigation measures to mitigate varying flood risk types. These have been assessed against a 'typical year' of rainfall.

The choice of scenarios for storm overflow mitigation in Table 3 is a separate cost and would be required in addition to the choice of scenarios for flooding protection in Table 4. The chosen scenarios for Storm overflows and flooding are to be added together.

Choice of Scenario	Current Scenario (£)	2030 Scenario (£)	2050 Scenario (£)
Maintain Existing Performance*	-	£215,000,000	£338,500,000
40 spills in a Typical Year	£74,000,000	£66,000,000	£62,000,000
20 spills in a Typical Year	£121,000,000	£118,000,000	£129,000,000
10 spills in a Typical Year	£163,000,000	£161,000,000	£180,000,000
0 spills in a Typical Year	£460,000,000	£473,000,000	£508,000,000
Equivalent No. Principality Stadiums Full of Water in 10 spills scenario	1.26	1.47	1.61

* Maintain is a considered scenario where we will continue to maintain the current level of service within the region and improve the network and address known and emerging risk.

Table 3 - Summary of Combined Sewer Overflow Option Investment Strategy Costs

Choice of Scenario	Current Scenario (£)	2050 Scenario (£)	2050 Resilience Scenario (£) 1 in 50 yr. (Storm Dennis)
Internal escapes	£18,000,000	£23,000,000	£32,000,000
External escapes in gardens	£14,000,000	£18,000,000	£27,000,000
Escapes in highways	£88,000,000	£110,000,000	£177,000,000
No future flooding	-	£145,000,000	£562,000,000
Total	£120,000,000	£296,000,000	£798,000,000

Table 4 - Summary of Flooding Option Investments Strategy Costs

Tables 3 and 4 are strategic cost indications to illustrate the level of investment needed to provide protection against drainage and network failure, pollution events and flooding, internal and external to properties. The solutions developed highlight the level of investment required to bring our entire network up to the level of protection required to be resilient for future risk and demands. The range of scenarios is to provide a choice for understanding and discussion of future direction.

We are beginning to break down the investment indicated in Table 3 and 4 by creating practical schemes ready for delivery these schemes are designed as 100% traditional, 100% sustainable or green and 100% mixture of the 2. These packages have then been analysed in terms of their long term benefit and environmental and social cost to society and one has been chosen for inclusion as our preferred best value option. The areas where we have started our delivery programme aims to provide protection, to our worst served customers and rivers designated as Special Areas of Conservation (SAC) under the Habitat Directive, as a priority against drainage and network failure which result in pollution events and flooding. The solutions developed highlight the level of investment required to bring our network to the level of protection required to mitigate against these risks.

More detailed information can be seen in the Level 3 reports. For more information on the methodology see the plan main report.

If you want to work with us to develop joint projects to reduce the risk of flooding and protect the environment, please get in touch.

We will continue to work with Welsh Government, Regulators and Local Authorities about the pace, scale and affordability of improvements to be made.

We will be consulting on the preferred approach to planning and once its concluded the next stage is to develop the pipeline of options to meet the pace scale and affordability discussed with Welsh Government and our regulators.

DWMP Tactial Planning Catchment Summary

Afon Chwefru - source to conf R Irfon

1.0 Introduction

This Drainage and Wastewater Management Plan (DWMP) sets out how Dŵr Cymru Welsh Water (DCWW) will manage and improve its assets to maintain a resilient and robust wastewater drainage system. The plan aims to manage flooding and pollution from our wastewater assets in the future, for our customers and our environment by working collaboratively with stakeholders, regulators and local authorities to provide a complete partnership in tackling current and future problems.

1.1 Catchment Information

The Afon Chwefru - source to conf R Irfon planning catchment lies within the Wye river basin catchment, (see Figure 1 below), it consists of 8 wastewater catchments (see Figure 2 below). There is a combined population of 1727, this is set to decrease to 1572 by 2050, a change of -9%. There is a total sewer length of 21km, with a foul sewer length of 17km, a surface water length of 0km and a combined sewer length of 2km. There are 8 Wastewater Treatment Works (WwTW), 5 Sewerage Pumping Stations (SPSs), and 6 Combined Storm Overflows (CSOs) across this tactical planning unit.

The Afon Chwefru - source to conf R Irfon catchment covers an area stretching from Beulah and Builth Road in the north as far as Llanwrtyd-Wells and Tirabad in the south. The geography of the catchment is predominantly forest and rural.

There are several main rivers within the L3 including the River Irfon and River Wye. The catchment covers several major urban areas including Town Beulach and Llanwrtyd-Wells.

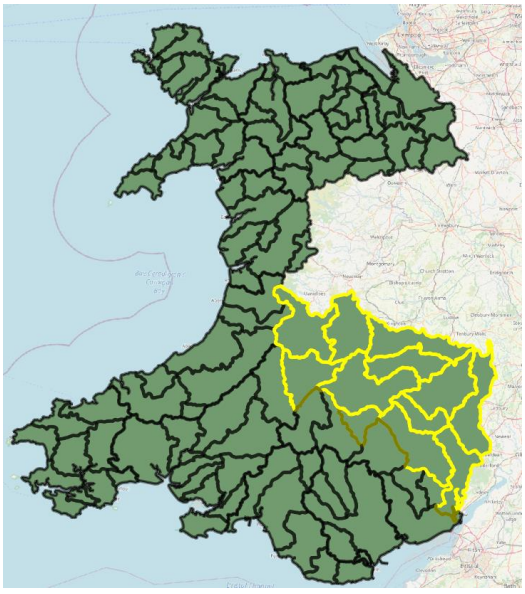


Figure 1 - River basin location detailing the associated tactial planning catchments

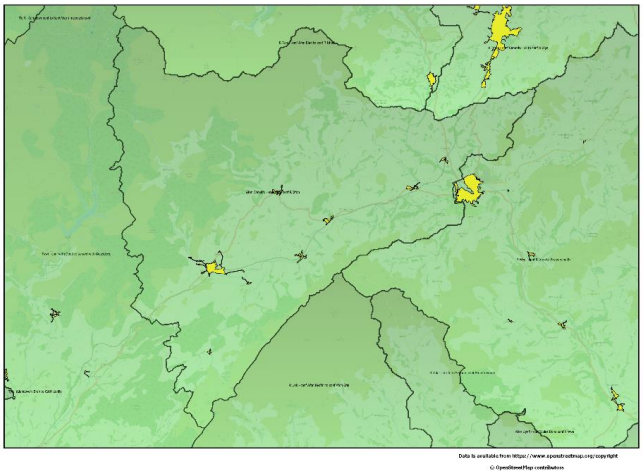


Figure 2- Tactical planning catchments

2.0 Stakeholder Engagement

The DWMP aims to enable DCWW to work collaboratively with stakeholders, regulators and local authorities to tackle current and future challenges. DCWW has identified stakeholder objectives that align with the aims of the DWMP and goals of other management plans. Table 1 details the main opportunities we have identified but this is not intended to be exhaustive. Note that these stakeholders have their own planning processes and plans which do not necessarily align with those of DCWW.

Scheme Information
Stakeholder engagement meetings area scheduled to commence in 2022. These meetings will be held between DCWW and the respective parties, such as NRW, EA, Councils and ENGO's. Further information of the outcome and points of focus towards short and long term strategy planning will be provided in the next cycle of the DWMP assessment.

Table 1 - Current and future investigation schemes

3.0 Risk

We have assessed our likely performance from now to 2050 against the objectives that we set in our most recent business plan. The results of this assessment are presented in the following sections.

To understand future performance, we need to estimate how much population will change by, the degree to which climate change will impact Wales and areas of England that border our company, and how further surface water connected to the sewer network might increase the amount and rate at which rainfall drains into our sewers.

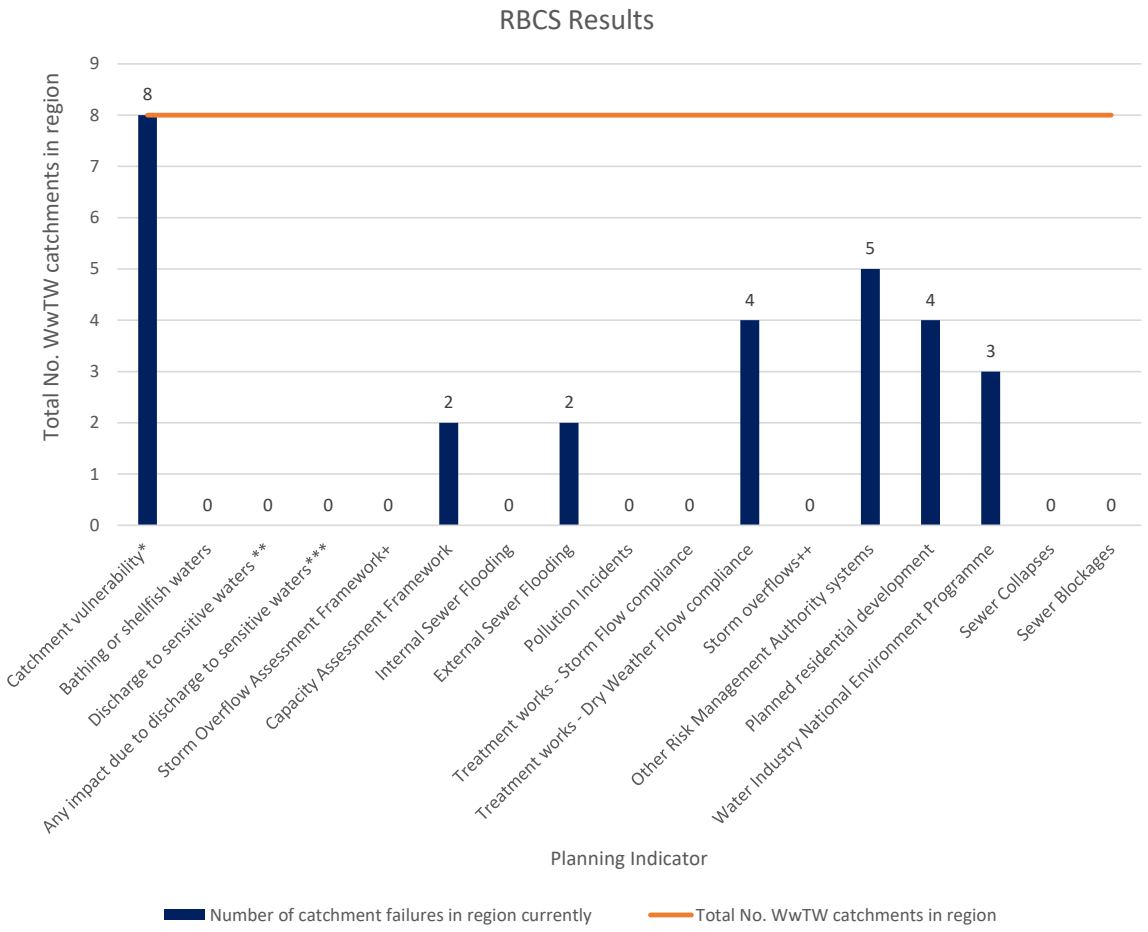
Urban creep is the term used to explain loss of green spaces, for example when new driveways or house extensions are built. It often leads to more rainwater entering sewers. Our forecasts suggest that urban creep will add up to 0.63 metres squared of impermeable ground per house per year.

Climate change is predicted to increase the intensity of storms by around 15% in this region. In a typical year, winters are likely to be warmer and wetter, and summers generally drier. More intense rainfall will happen more frequently. The population in the Wye region is set to decrease to 1600 by 2050, a change of -9% based on our future projections. However there are major developments in localised areas that will contribute to future pressures on the network, including OS 1451 Meadow View, Station Road and OS 2664 Caemawr, off Ffos Road

3.1 Risk Based Catchment Screening

The Risk Based Catchment Screening (RBCS) is the initial screening process to determine if a more detailed risk assessment is required. The assessment screens catchments against planning indicators which have been stipulated in the national guidance for DWMPs. A catchment will pass through to a more detailed risk assessment if it fails against one or more of these indicators, the results are shown in Figure 3.

For this strategic planning area the biggest concerns indicated by the RBCS are firstly Catchment Vulnerability, followed by Other Risk Management Authority Systems.



*To sewer flooding due to extreme wet weather events.
**Categorised as a "planned" scheduled action within the Natural Resources Wales Action Database or considered as "Remedy" on Natural England Designated Sites system.
***Categorised as a "identified" scheduled action within the Natural Resources Wales Action Database or considered as "Threat" on Natural England Designated Sites system.
+Frequency investigation triggered.
++Overflow risks not covered by other indicators,

Figure 3 - Risk Based Catchment Screening results

3.2 Baseline Risk And Vulnerability Assessment (BRAVA)

Following on from the RBCS, the Baseline Risk and Vulnerability Assessment (BRAVA) highlights current and future risk. The risk scores are driven by company targets which were set in our last business plan. These targets were subdivided according to population or sewer length, depending on the measure, to derive a target for each river basin catchment.

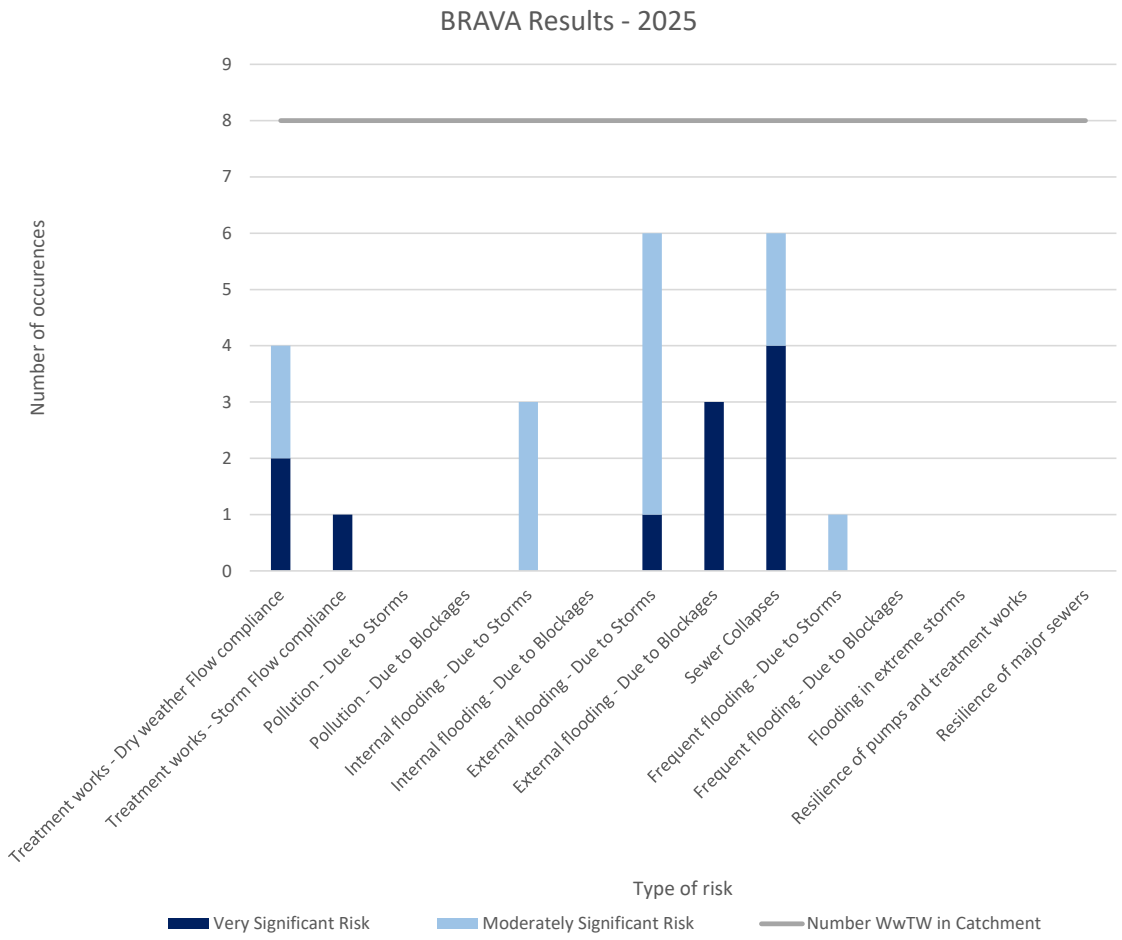


Figure 4 - BRAVA 2025 Summary

In 2025, Sewer Collapses followed by External flooding- due to blockages and External flooding- due to storms are the biggest concerns in this strategic planning area.

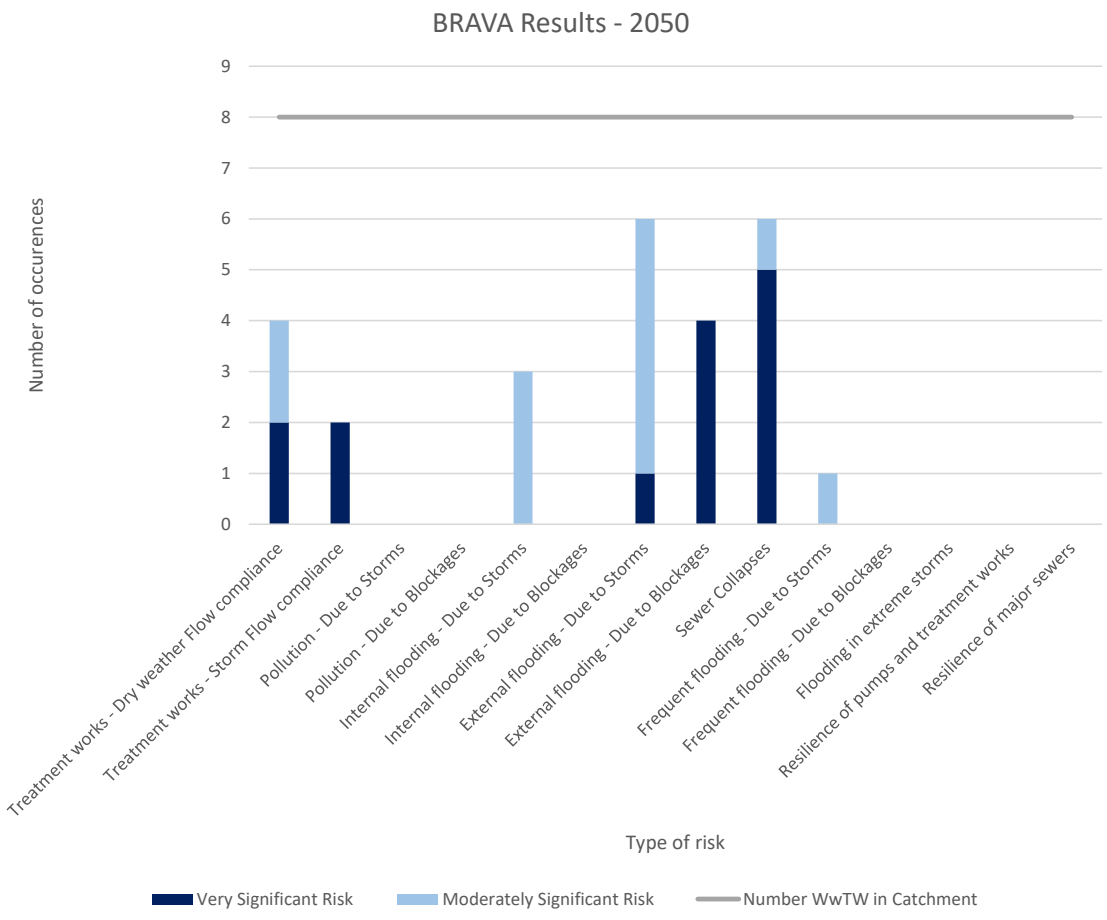


Figure 5 - BRAVA 2050 Summary

In 2050, Sewer collapses followed by External Flooding-Due to blockages are the biggest concerns in this strategic planning area.

Figures 6 and 7 indicate the current and predicted risk of flooding, pollution, and both flooding and pollution caused by lack of capacity (termed 'hydraulic overload') across our networks. These maps illustrate where the issues occur and can be used to target where we want to work with the community and stakeholders to resolve issues. By working together, we can combine knowledge and resources to deliver the best outcomes for local communities and the environment. We want to include your feedback in our decision-making process.

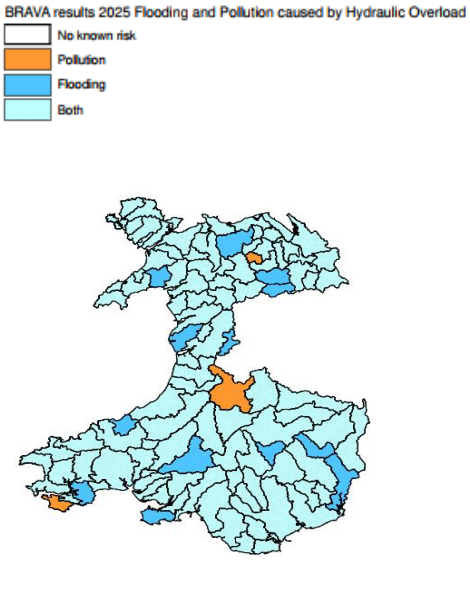


Figure 6 - Associated Strategic Planning Areas priority (2025)

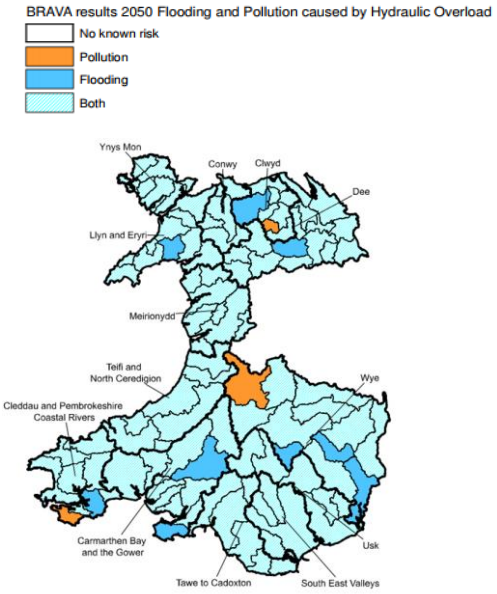


Figure 7 - Associated Strategic Planning Areas priority (2050)

3.3 Water Quality

Water quality is the classification of the quality of watercourses or water bodies in accordance to its physical, biological and chemical properties. Water quality is an important factor of environmental monitoring, ensuring that not only the water body is safe but the surrounding habitat and ecosystem is also.

Water quality status is categorised from 1 to 4, with 4 being the worst case. The priority status is based on the significance towards the risk factors triggering water quality. Afon Chwefru - source to conf R Irfon has a water quality priority status for 2050 of 1 which indicates targeted investment to mitigate and focus during AMP11.

4.0 Supply Demand

Supply-demand is an assessment of the capacity of our treatment works. It approximately assesses whether all the treatment works in a region can collectively cope with current and future flows in dry and wet weather. There are two parts to the assessment: dry weather flow (DWF) and a wet weather capacity assessment.

For the DWF part of the assessment, the suitability of the dry weather consents is tested against forecast future growth and changes in water consumption. Results for three scenarios are provided: the 0% headroom scenario assesses the region's capability for treating the predicted changes in DWF in the future with no allowance for error, with no spare treatment works capacity. The other scenarios indicate resilience - i.e. could we cope if we had flows 10% or 20% higher than estimated?

The wet weather assessment takes storm consent values where available as an indication of treatment works capacity and estimates the amount of incoming flow the treatment works is able to treat across a year. Again, three scenarios are shown, with differing treatment "targets" - i.e. if we wanted to ensure that 70% of the wet weather flows in a catchment were treated, could the treatment works cope? Changes in rainfall due to climate change and changing dry weather flows within the region mean that the percentage of flow treated across a year can change in the future.

Table 2 shows the supply-demand assessment for this region. Where a region may not have adequate capacity under a given scenario, it is flagged dark blue for further investigation. There may be local incapacity issues at individual works within the region.

L3 Area	Headroom	2025	2030	2035	2040	2045	2050
Afon Chwefru - source to conf R Irfon	0%						
	10%						
	20%						
	Treatment Target	2025	2030	2035	2040	2045	2050
	70%						
	80%						
	90%						

Table 2 - Supply Demand Balance

5.0 Options

Over time the pressures on our sewerage network change due to influences such as catchment growth, creep of rainwater into the network, or influences such as climate change impacting rainfall patterns. To ensure the plan is robust over the 30-year planning horizon and to account for the uniqueness of each catchment we have tested various types of schemes, and combination of schemes, to ensure a robust 'best value' plan is delivered.

The types of schemes tested are detailed in Table 3 and can be categorised into either improving network resilience to rainfall or improving network headroom in dry weather flow conditions.

Improving Resilience		
10% Reduction in area draining to the combined sewers	Represents removal of runoff from large commercial buildings.	Short term
25% Reduction reduction in area draining to the combined sewers	Represents removal of area runoff from non-residential paved areas where there is only one stakeholder (e.g. Local Authority or Highways Agency).	Medium term
50% Reduction reduction in area draining to the combined sewers	Represents removal of runoff from any connected area including residential properties. There are likely to be multiple stakeholders to engage with.	Long term
Improving Headroom		
Reducing infiltration	Reducing infiltration into sewers by 50%, which could be achieved by relining or replacing the public sewers .	Medium term
Reducing water use	Represents a reduction in water use per person to around 100l per person per day by 2050 by application of water efficiency measures	Medium term
Reducing trade flow	Reduce trade flows by around 25% by application of water efficiency measures.	Long term

Table 3 - Risk mitigation details

We have undertaken an analysis of all our wastewater catchments to determine the benefit in terms of potential volume of water removed from our systems for each scheme type to determine a journey plan, (see Figure 8 below), which provides the direction of the best scheme types to undertake in this catchment for the most benefit against predicted future risk from growth, creep and climate change.

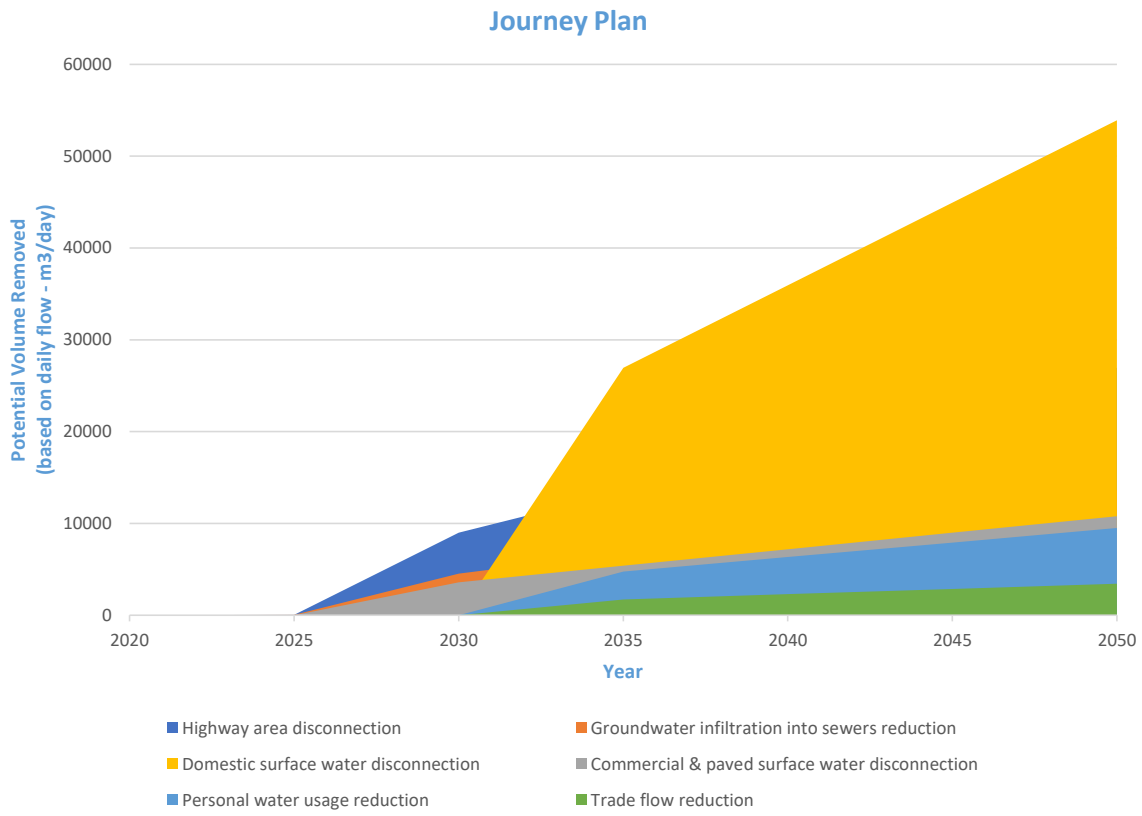


Figure 8 - Journey Plan

Approaches to managing risk

We have undertaken analysis to determine the likely costs to mitigate future predicted pollution and flooding. We assess combined sewer overflows based on the number of times they are predicted to spill in a 'typical year'. Table 4 illustrates the cost of potential measures to mitigate risk to varying standards. The assessment calculates the impact of rainfall and drainage contributions to the network relative to today's costs.

Mitigating the risk posed by flooding has been assessed in terms of probability of occurrence, we use the size of a storm event that has the probability of occurring once every 30 years. Table 5 illustrates the cost of potential mitigation measures to mitigate varying flood risk types.

The choice of scenarios for storm overflow mitigation in Table 4 is a separate cost and would be required in addition to the choice of scenarios for flooding protection in Table 5. The chosen scenarios for Storm overflows nd flooding are to be added together.

Choice of Scenario	Current Scenario (£)	2030 Scenario (£)	2050 Scenario (£)
Maintain Existing Performance*	-	£21,000,000	£29,000,000
40 spills in a Typical Year	£8,000,000	£8,000,000	£8,000,000
20 spills in a Typical Year	£10,000,000	£10,000,000	£10,000,000
10 spills in a Typical Year	£12,000,000	£12,000,000	£13,000,000
0 spills in a Typical Year	£21,000,000	£22,000,000	£23,000,000
Equivalent No. Olympic Swimming Pools in 10 spills scenario	80.00	127.00	138.00

* Maintain is a considered scenario where we will continue to maintain the current level of service within the region and improve the network and address known and emerging risk.

Table 4 - Summary of Combined Sewer Overflow option investments

Choice of Scenario	Current Scenario (£)	2050 Scenario (£)	2050 Resilience Scenario (£) 1 in 50 yr (Storm Dennis)
Internal escapes	£0	£0	£0
External escapes in gardens	£1,000,000	£1,000,000	£1,000,000
Escapes in highways	£2,000,000	£2,000,000	£4,000,000
No future flooding	-	£3,000,000	£10,000,000
Total	£3,000,000	£6,000,000	£15,000,000

Table 5 - Summary of Flooding option investments

We have developed solutions which aim to provide protection against drainage and network failure, pollution events and flooding, internal and external to properties. The solutions developed highlight the level of investment required to bring our entire network up to the level of protection required to be resilient for future risk and demands. The range of scenarios is to provide a choice for understanding and discussion of future direction.

We are beginning to break down the investment indicated in Table 4 and 5 by creating practical schemes ready for delivery these schemes are designed as 100% traditional, 100% sustainable or green and 100% mixture of the 2. These packages have then been analysed in terms of their long term benefit and environmental and social cost to society and one has been chosen for inclusion as our preferred best value option. The areas where we have started our delivery programme aims to provide protection, to our worst served customers and rivers designated as Special Areas of Conservation (SAC) under the

DWMP Tactial Planning Catchment Summary

Afon Llynfi - conf Dulas Bk to conf R Wye

1.0 Introduction

This Drainage and Wastewater Management Plan (DWMP) sets out how Dŵr Cymru Welsh Water (DCWW) will manage and improve its assets to maintain a resilient and robust wastewater drainage system. The plan aims to manage flooding and pollution from our wastewater assets in the future, for our customers and our environment by working collaboratively with stakeholders, regulators and local authorities to provide a complete partnership in tackling current and future problems.

1.1 Catchment Information

The Afon Llynfi - conf Dulas Bk to conf R Wye planning catchment lies within the Wye river basin catchment, (see Figure 1 below), it consists of 4 wastewater catchments (see Figure 2 below). There is a combined population of 3282, this is set to decrease to 2986 by 2050, a change of -9%. There is a total sewer length of 35km, with a foul sewer length of 24km, a surface water length of 3km and a combined sewer length of 7km. There are 4 Wastewater Treatment Works (WwTW), 5 Sewerage Pumping Stations (SPSs), and 9 Combined Storm Overflows (CSOs) across this tactical planning unit.

The Afon Llynfi - conf Dulas Bk to conf R Wye catchment covers an area stretching from Felindre and Bronllys in the north as far as Llangasty Tal-y-llyn. The geography of the catchment is predominantly rural.

There are several main rivers within the L3 including the Rivers River Llynft and B4560. The catchment covers several major urban areas including Town Talgarth and Llangorse.

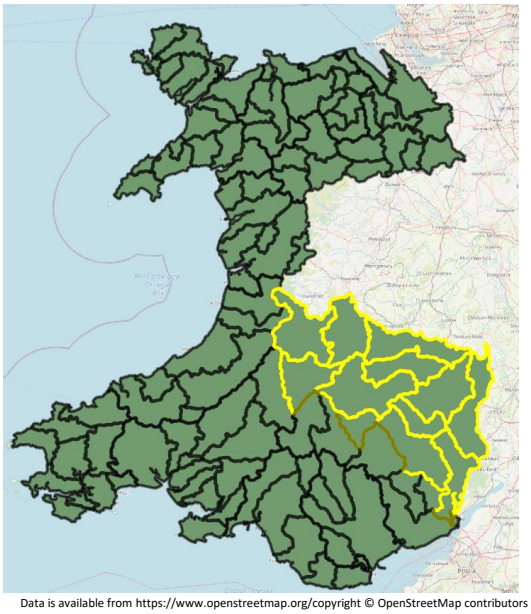


Figure 1 - River basin location detailing the associated tactial planning catchments

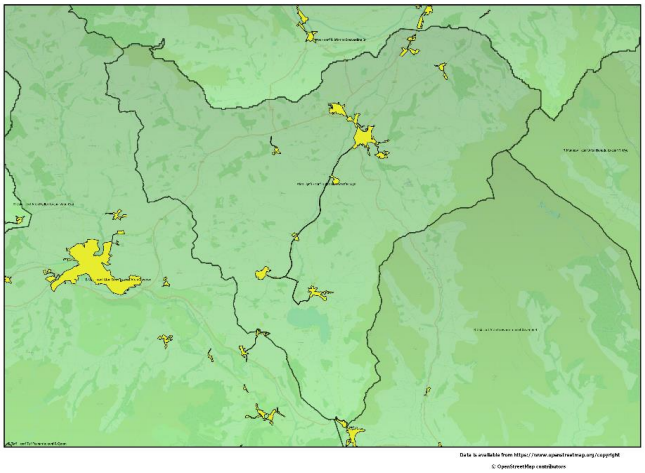


Figure 2- Tactical planning catchments

2.0 Stakeholder Engagement

The DWMP aims to enable DCWW to work collaboratively with stakeholders, regulators and local authorities to tackle current and future challenges. DCWW has identified stakeholder objectives that align with the aims of the DWMP and goals of other management plans. Table 1 details the main opportunities we have identified but this is not intended to be exhaustive. Note that these stakeholders have their own planning processes and plans which do not necessarily align with those of DCWW.

Scheme Information
Stakeholder engagement meetings area scheduled to commence in 2022. These meetings will be held between DCWW and the respective parties, such as NRW, EA, Councils and ENGO's. Further information of the outcome and points of focus towards short and long term strategy planning will be provided in the next cycle of the DWMP assessment.

Table 1 - Current and future investigation schemes

3.0 Risk

We have assessed our likely performance from now to 2050 against the objectives that we set in our most recent business plan. The results of this assessment are presented in the following sections.

To understand future performance, we need to estimate how much population will change by, the degree to which climate change will impact Wales and areas of England that border our company, and how further surface water connected to the sewer network might increase the amount and rate at which rainfall drains into our sewers.

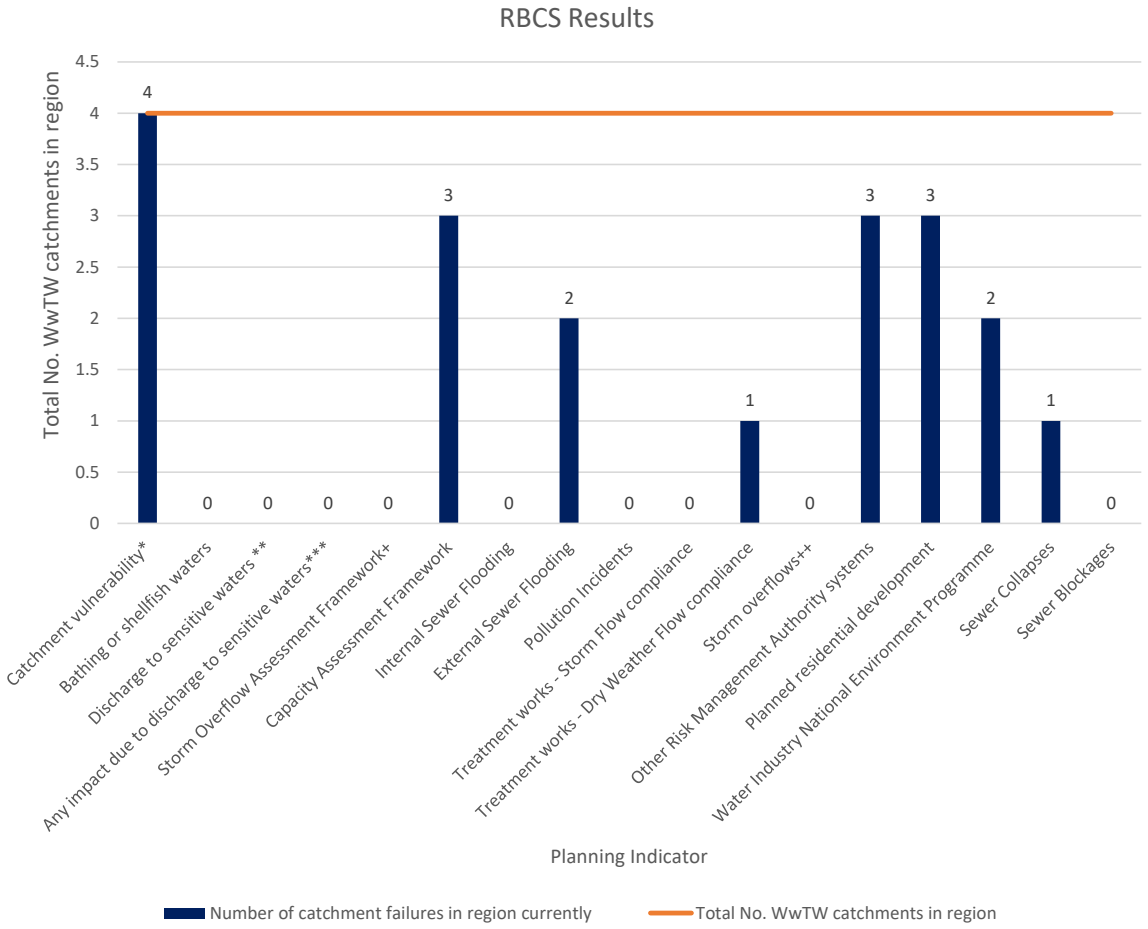
Urban creep is the term used to explain loss of green spaces, for example when new driveways or house extensions are built. It often leads to more rainwater entering sewers. Our forecasts suggest that urban creep will add up to 0.63 metres squared of impermeable ground per house per year.

Climate change is predicted to increase the intensity of storms by around 15% in this region. In a typical year, winters are likely to be warmer and wetter, and summers generally drier. More intense rainfall will happen more frequently. The population in the Wye region is set to decrease to 3000 by 2050, a change of -9% based on our future projections. However there are major developments in localised areas that will contribute to future pressures on the network, including Former Mid Wales Hospital and Land between/adj Gwernyfed Avenue, Three Cocks.

3.1 Risk Based Catchment Screening

The Risk Based Catchment Screening (RBCS) is the initial screening process to determine if a more detailed risk assessment is required. The assessment screens catchments against planning indicators which have been stipulated in the national guidance for DWMPs. A catchment will pass through to a more detailed risk assessment if it fails against one or more of these indicators, the results are shown in Figure 3.

For this strategic planning area the biggest concerns indicated by the RBCS are firstly Catchment Vulnerability, followed by Capacity Assessment Framework, Other Risk Management Authority systems and Planned residential development.



*To sewer flooding due to extreme wet weather events.
**Categorised as a "planned" scheduled action within the Natural Resources Wales Action Database or considered as "Remedy" on Natural England Designated Sites system.
***Categorised as a "identified" scheduled action within the Natural Resources Wales Action Database or considered as "Threat" on Natural England Designated Sites system.
+Frequency investigation triggered.
++Overflow risks not covered by other indicators,

Figure 3 - Risk Based Catchment Screening results

3.2 Baseline Risk And Vulnerability Assessment (BRAVA)

Following on from the RBCS, the Baseline Risk and Vulnerability Assessment (BRAVA) highlights current and future risk. The risk scores are driven by company targets which were set in our last business plan. These targets were subdivided according to population or sewer length, depending on the measure, to derive a target for each river basin catchment.

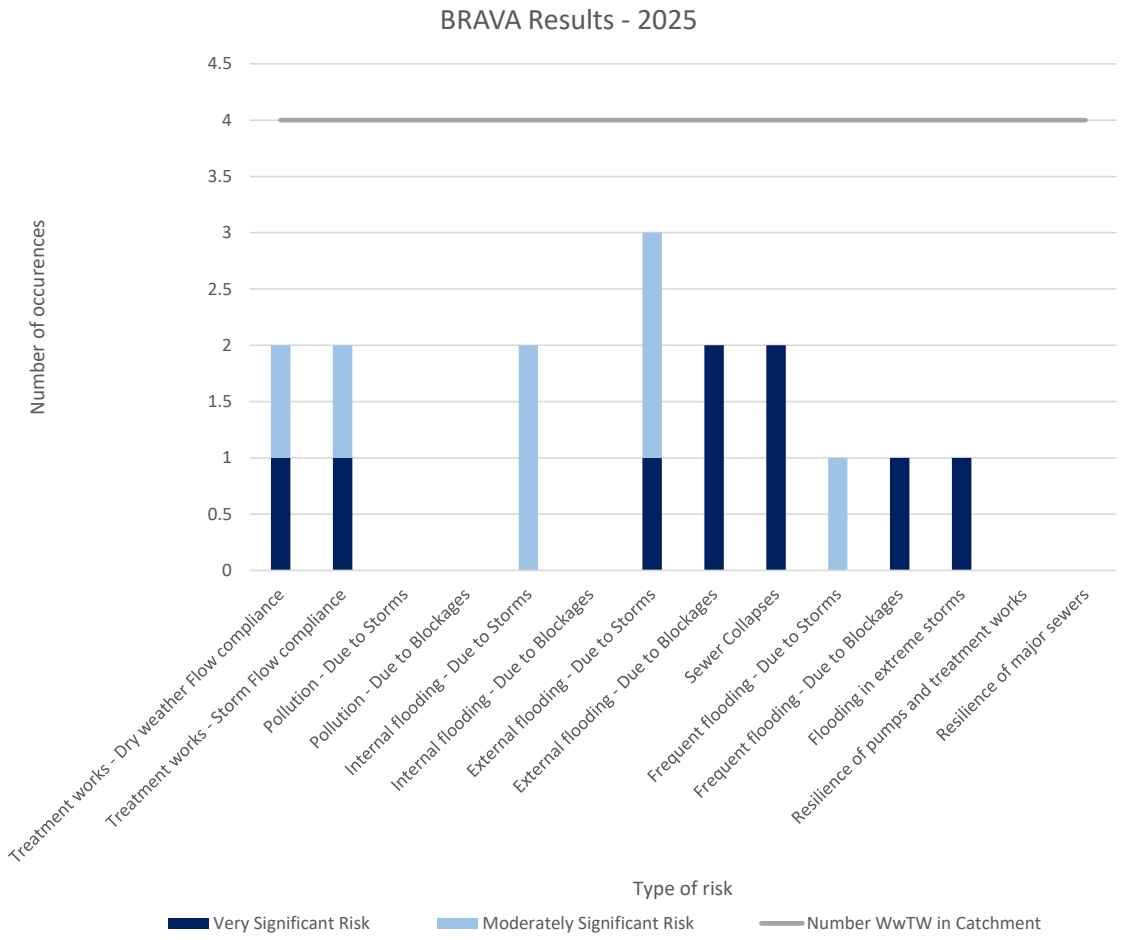


Figure 4 - BRAVA 2025 Summary

In 2025, External flooding- due to blockages and Sewer Collapses are the biggest concerns in this strategic planning area.

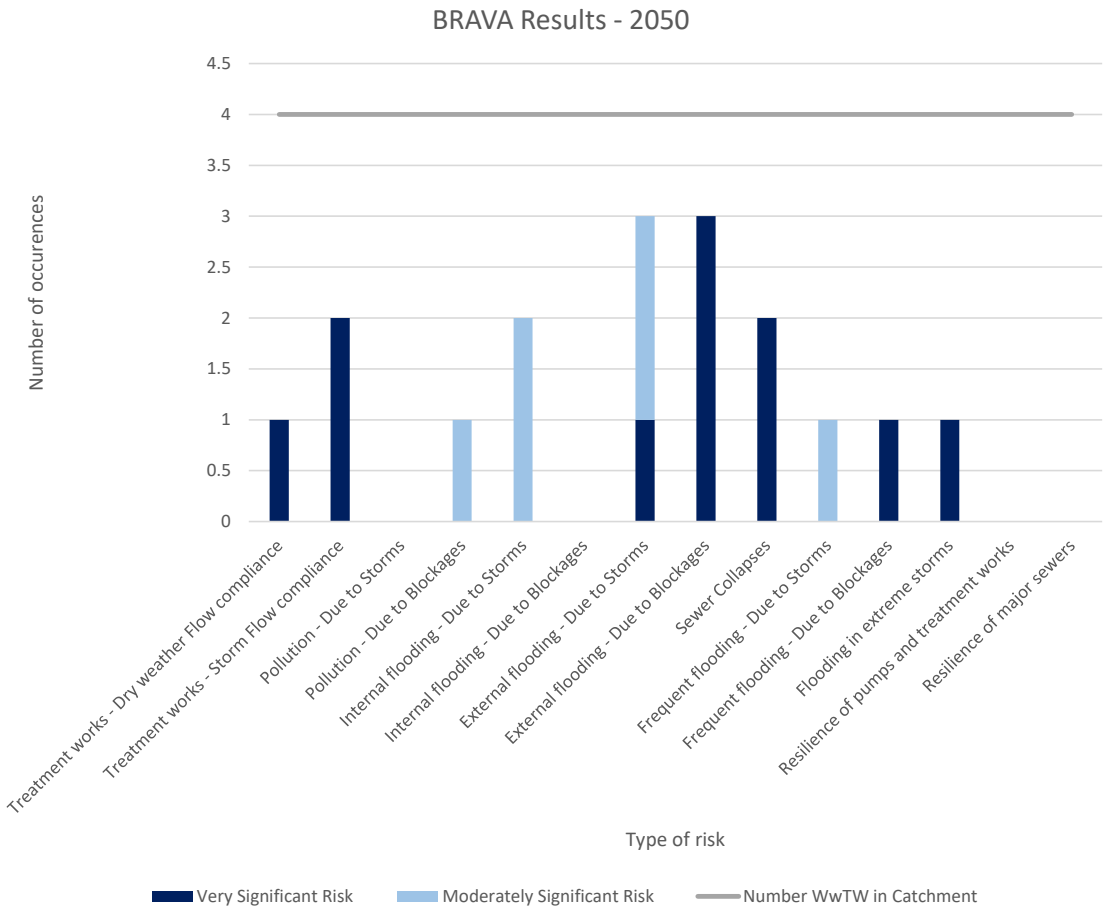


Figure 5 - BRAVA 2050 Summary

In 2050, External flooding- due to blockages followed by Sewer Collapses are the biggest concerns in this strategic planning area.

Figures 6 and 7 indicate the current and predicted risk of flooding, pollution, and both flooding and pollution caused by lack of capacity (termed 'hydraulic overload') across our networks. These maps illustrate where the issues occur and can be used to target where we want to work with the community and stakeholders to resolve issues. By working together, we can combine knowledge and resources to deliver the best outcomes for local communities and the environment. We want to include your feedback in our decision-making process.

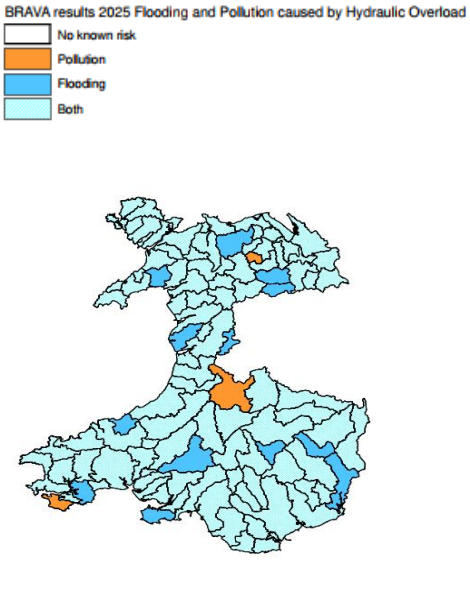


Figure 6 - Associated Strategic Planning Areas priority (2025)

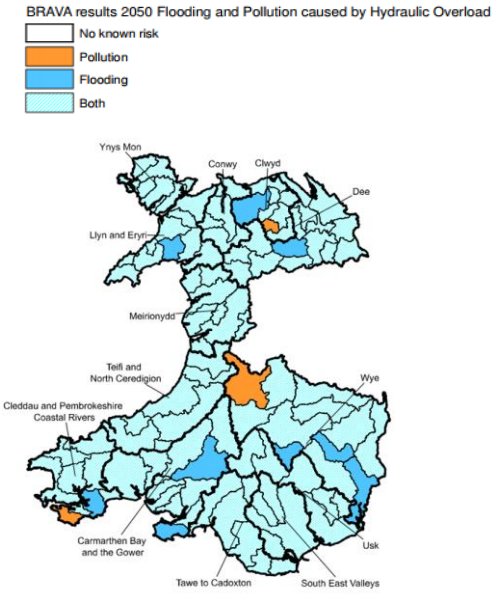


Figure 7 - Associated Strategic Planning Areas priority (2050)

3.3 Water Quality

Water quality is the classification of the quality of watercourses or water bodies in accordance to its physical, biological and chemical properties. Water quality is an important factor of environmental monitoring, ensuring that not only the water body is safe but the surrounding habitat and ecosystem is also.

Water quality status is categorised from 1 to 4, with 4 being the worst case. The priority status is based on the significance towards the risk factors triggering water quality. Afon Llynfi - conf Dulas Bk to conf R Wye has a water quality priority status for 2050 of 2 which indicates targeted investment to mitigate and focus during AMP10.

4.0 Supply Demand

Supply-demand is an assessment of the capacity of our treatment works. It approximately assesses whether all the treatment works in a region can collectively cope with current and future flows in dry and wet weather. There are two parts to the assessment: dry weather flow (DWF) and a wet weather capacity assessment.

For the DWF part of the assessment, the suitability of the dry weather consents is tested against forecast future growth and changes in water consumption. Results for three scenarios are provided: the 0% headroom scenario assesses the region's capability for treating the predicted changes in DWF in the future with no allowance for error, with no spare treatment works capacity. The other scenarios indicate resilience - i.e. could we cope if we had flows 10% or 20% higher than estimated?

The wet weather assessment takes storm consent values where available as an indication of treatment works capacity and estimates the amount of incoming flow the treatment works is able to treat across a year. Again, three scenarios are shown, with differing treatment "targets" - i.e. if we wanted to ensure that 70% of the wet weather flows in a catchment were treated, could the treatment works cope? Changes in rainfall due to climate change and changing dry weather flows within the region mean that the percentage of flow treated across a year can change in the future.

Table 2 shows the supply-demand assessment for this region. Where a region may not have adequate capacity under a given scenario, it is flagged dark blue for further investigation. There may be local incapacity issues at individual works within the region.

L3 Area	Headroom	2025	2030	2035	2040	2045	2050
Afon Llynfi - conf Dulas Bk to conf R Wye	0%						
	10%						
	20%						
	Treatment Target	2025	2030	2035	2040	2045	2050
	70%						
	80%						
	90%						

Table 2 - Supply Demand Balance

5.0 Options

Over time the pressures on our sewerage network change due to influences such as catchment growth, creep of rainwater into the network, or influences such as climate change impacting rainfall patterns. To ensure the plan is robust over the 30-year planning horizon and to account for the uniqueness of each catchment we have tested various types of schemes, and combination of schemes, to ensure a robust 'best value' plan is delivered.

The types of schemes tested are detailed in Table 3 and can be categorised into either improving network resilience to rainfall or improving network headroom in dry weather flow conditions.

Improving Resilience		
10% Reduction in area draining to the combined sewers	Represents removal of runoff from large commercial buildings.	Short term
25% Reduction reduction in area draining to the combined sewers	Represents removal of area runoff from non-residential paved areas where there is only one stakeholder (e.g. Local Authority or Highways Agency).	Medium term
50% Reduction reduction in area draining to the combined sewers	Represents removal of runoff from any connected area including residential properties. There are likely to be multiple stakeholders to engage with.	Long term
Improving Headroom		
Reducing infiltration	Reducing infiltration into sewers by 50%, which could be achieved by relining or replacing the public sewers .	Medium term
Reducing water use	Represents a reduction in water use per person to around 100l per person per day by 2050 by application of water efficiency measures	Medium term
Reducing trade flow	Reduce trade flows by around 25% by application of water efficiency measures.	Long term

Table 3 - Risk mitigation details

We have undertaken an analysis of all our wastewater catchments to determine the benefit in terms of potential volume of water removed from our systems for each scheme type to determine a journey plan, (see Figure 8 below), which provides the direction of the best scheme types to undertake in this catchment for the most benefit against predicted future risk from growth, creep and climate change.

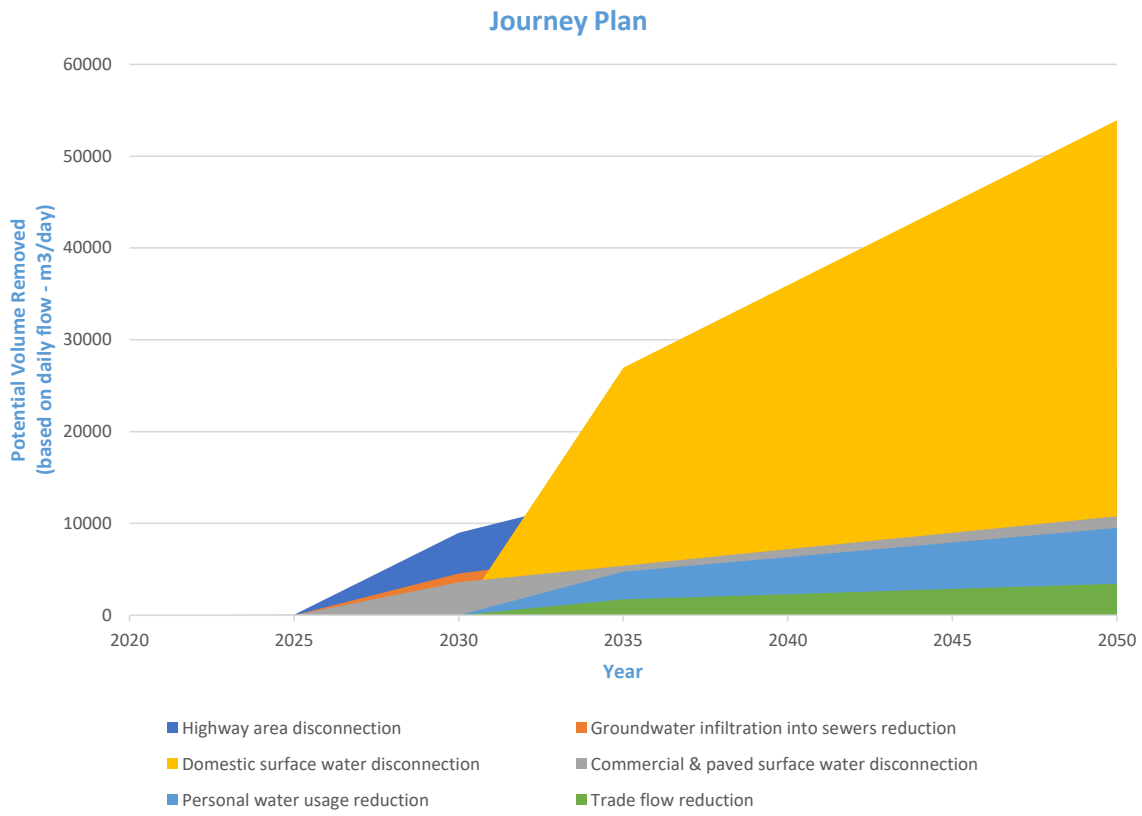


Figure 8 - Journey Plan

Approaches to managing risk

We have undertaken analysis to determine the likely costs to mitigate future predicted pollution and flooding. We assess combined sewer overflows based on the number of times they are predicted to spill in a 'typical year'. Table 4 illustrates the cost of potential measures to mitigate risk to varying standards. The assessment calculates the impact of rainfall and drainage contributions to the network relative to today's costs.

Mitigating the risk posed by flooding has been assessed in terms of probability of occurrence, we use the size of a storm event that has the probability of occurring once every 30 years. Table 5 illustrates the cost of potential mitigation measures to mitigate varying flood risk types.

The choice of scenarios for storm overflow mitigation in Table 4 is a separate cost and would be required in addition to the choice of scenarios for flooding protection in Table 5. The chosen scenarios for Storm overflows nd flooding are to be added together.

Choice of Scenario	Current Scenario (£)	2030 Scenario (£)	2050 Scenario (£)
Maintain Existing Performance*	-	£21,000,000	£34,000,000
40 spills in a Typical Year	£3,000,000	£3,000,000	£3,000,000
20 spills in a Typical Year	£7,000,000	£7,000,000	£7,000,000
10 spills in a Typical Year	£10,000,000	£10,000,000	£12,000,000
0 spills in a Typical Year	£21,000,000	£22,000,000	£27,000,000
Equivalent No. Olympic Swimming Pools in 10 spills scenario	26.00	28.00	31.00

* Maintain is a considered scenario where we will continue to maintain the current level of service within the region and improve the network and address known and emerging risk.

Table 4 - Summary of Combined Sewer Overflow option investments

Choice of Scenario	Current Scenario (£)	2050 Scenario (£)	2050 Resilience Scenario (£) 1 in 50 yr (Storm Dennis)
Internal escapes	£0	£0	£0
External escapes in gardens	£0	£0	£0
Escapes in highways	£2,000,000	£2,000,000	£4,000,000
No future flooding	-	£1,000,000	£4,000,000
Total	£2,000,000	£3,000,000	£8,000,000

Table 5 - Summary of Flooding option investments

We have developed solutions which aim to provide protection against drainage and network failure, pollution events and flooding, internal and external to properties. The solutions developed highlight the level of investment required to bring our entire network up to the level of protection required to be resilient for future risk and demands. The range of scenarios is to provide a choice for understanding and discussion of future direction.

We are beginning to break down the investment indicated in Table 4 and 5 by creating practical schemes ready for delivery these schemes are designed as 100% traditional, 100% sustainable or green and 100% mixture of the 2. These packages have then been analysed in terms of their long term benefit and environmental and social cost to society and one has been chosen for inclusion as our preferred best value option. The areas where we have started our delivery programme aims to provide protection, to our worst served customers and rivers designated as Special Areas of Conservation (SAC) under the

For more information on the methodology developed to carry out the assessments see the DWMP plan main report.

If you want to work with us to develop joint projects to reduce the risk of flooding and protect the environment, please get in touch.

We will continue to work with Welsh Government, Regulators and Local Authorities about the pace, scale and affordability of improvements to be made.

We will be consulting on the preferred approach to planning and once its concluded the next stage is to develop the pipeline of options to meet the pace scale and affordability discussed with Welsh Government and our regulators.

Table 6 - Summary of solutions put forward are a first cycle preferred plan before SEA/HRA

L4 Catchments	No. Schemes
THREE COCKS ABERLLYNFI SWK	0
LLANFILO SWK	0
VELINDRE SWK	0
TALGARTH SWK	0

DWMP Tactial Planning Catchment Summary

R Arrow - conf Gilwern Bk to conf R Lugg

1.0 Introduction

This Drainage and Wastewater Management Plan (DWMP) sets out how Dŵr Cymru Welsh Water (DCWW) will manage and improve its assets to maintain a resilient and robust wastewater drainage system. The plan aims to manage flooding and pollution from our wastewater assets in the future, for our customers and our environment by working collaboratively with stakeholders, regulators and local authorities to provide a complete partnership in tackling current and future problems.

1.1 Catchment Information

The R Arrow - conf Gilwern Bk to conf R Lugg planning catchment lies within the Wye river basin catchment, (see Figure 1 below), it consists of 7 wastewater catchments (see Figure 2 below). There is a combined population of 5162, this is set to increase to 5801 by 2050, a change of 12%. There is a total sewer length of 38km, with a foul sewer length of 18km, a surface water length of 2km and a combined sewer length of 16km. There are 7 Wastewater Treatment Works (WwTW), 6 Sewerage Pumping Stations (SPSs), and 8 Combined Storm Overflows (CSOs) across this tactical planning unit.

The R Arrow - conf Gilwern Bk to conf R Lugg catchment covers an area stretching from Titley in the north as far as Weobley in the South. The geography of the catchment is predominantly rural.

There are several main rivers within the L3 including the river Arrow. The catchment covers several major urban areas including Town Kington and Pembridge.

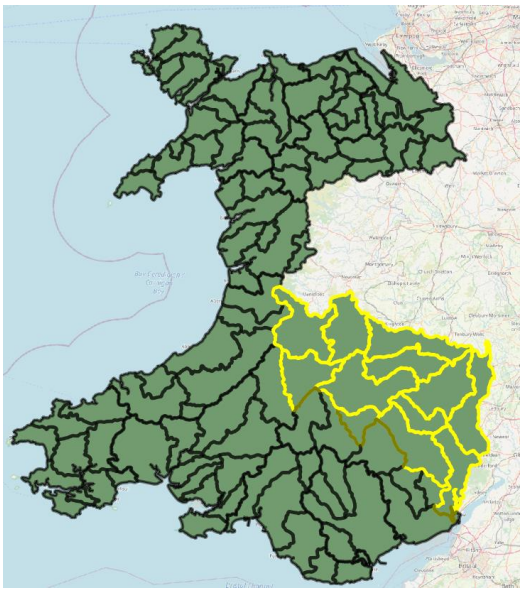


Figure 1 - River basin location detailing the associated tactial planning catchments

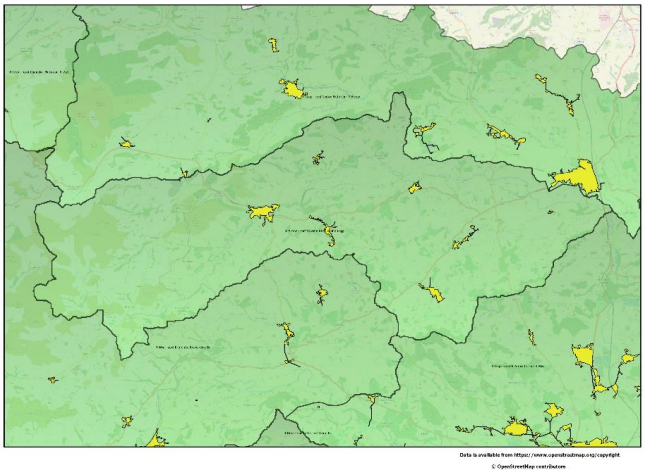


Figure 2- Tactical planning catchments

2.0 Stakeholder Engagement

The DWMP aims to enable DCWW to work collaboratively with stakeholders, regulators and local authorities to tackle current and future challenges. DCWW has identified stakeholder objectives that align with the aims of the DWMP and goals of other management plans. Table 1 details the main opportunities we have identified but this is not intended to be exhaustive. Note that these stakeholders have their own planning processes and plans which do not necessarily align with those of DCWW.

Scheme Information
Stakeholder engagement meetings area scheduled to commence in 2022. These meetings will be held between DCWW and the respective parties, such as NRW, EA, Councils and ENGO's. Further information of the outcome and points of focus towards short and long term strategy planning will be provided in the next cycle of the DWMP assessment.

Table 1 - Current and future investigation schemes

3.0 Risk

We have assessed our likely performance from now to 2050 against the objectives that we set in our most recent business plan. The results of this assessment are presented in the following sections.

To understand future performance, we need to estimate how much population will change by, the degree to which climate change will impact Wales and areas of England that border our company, and how further surface water connected to the sewer network might increase the amount and rate at which rainfall drains into our sewers.

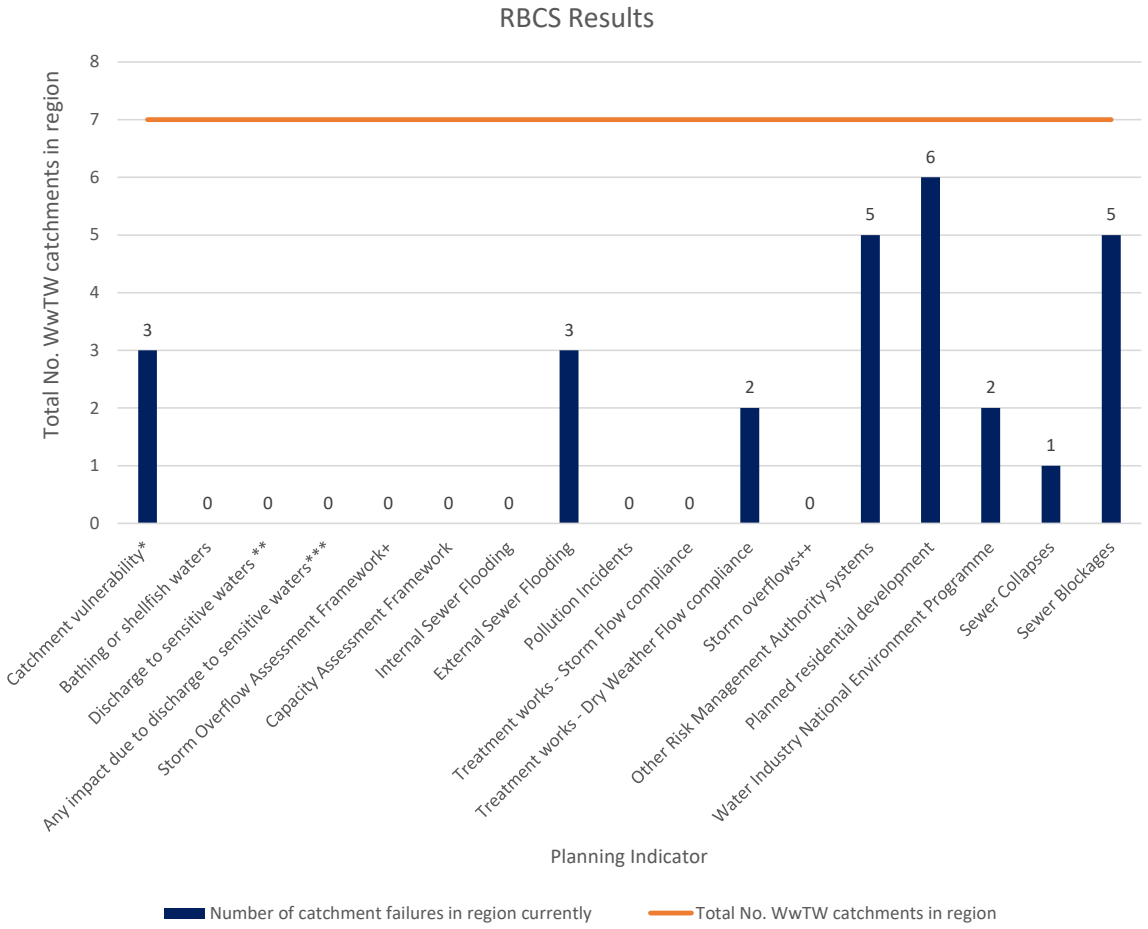
Urban creep is the term used to explain loss of green spaces, for example when new driveways or house extensions are built. It often leads to more rainwater entering sewers. Our forecasts suggest that urban creep will add up to 0.63 metres squared of impermeable ground per house per year.

Climate change is predicted to increase the intensity of storms by around 15% in this region. In a typical year, winters are likely to be warmer and wetter, and summers generally drier. More intense rainfall will happen more frequently. The population in the Wye region is set to increase to 5800 by 2050, a change of 12% based on our future projections.

3.1 Risk Based Catchment Screening

The Risk Based Catchment Screening (RBCS) is the initial screening process to determine if a more detailed risk assessment is required. The assessment screens catchments against planning indicators which have been stipulated in the national guidance for DWMPs. A catchment will pass through to a more detailed risk assessment if it fails against one or more of these indicators, the results are shown in Figure 3.

For this strategic planning area the biggest concerns indicated by the RBCS is Planned residential development followed by Other Risk Management Authority systems and Sewer Blockages .



*To sewer flooding due to extreme wet weather events.
**Categorised as a "planned" scheduled action within the Natural Resources Wales Action Database or considered as "Remedy" on Natural England Designated Sites system.
***Categorised as a "identified" scheduled action within the Natural Resources Wales Action Database or considered as "Threat" on Natural England Designated Sites system.
+Frequency investigation triggered.
++Overflow risks not covered by other indicators,

Figure 3 - Risk Based Catchment Screening results

3.2 Baseline Risk And Vulnerability Assessment (BRAVA)

Following on from the RBCS, the Baseline Risk and Vulnerability Assessment (BRAVA) highlights current and future risk. The risk scores are driven by company targets which were set in our last business plan. These targets were subdivided according to population or sewer length, depending on the measure, to derive a target for each river basin catchment.

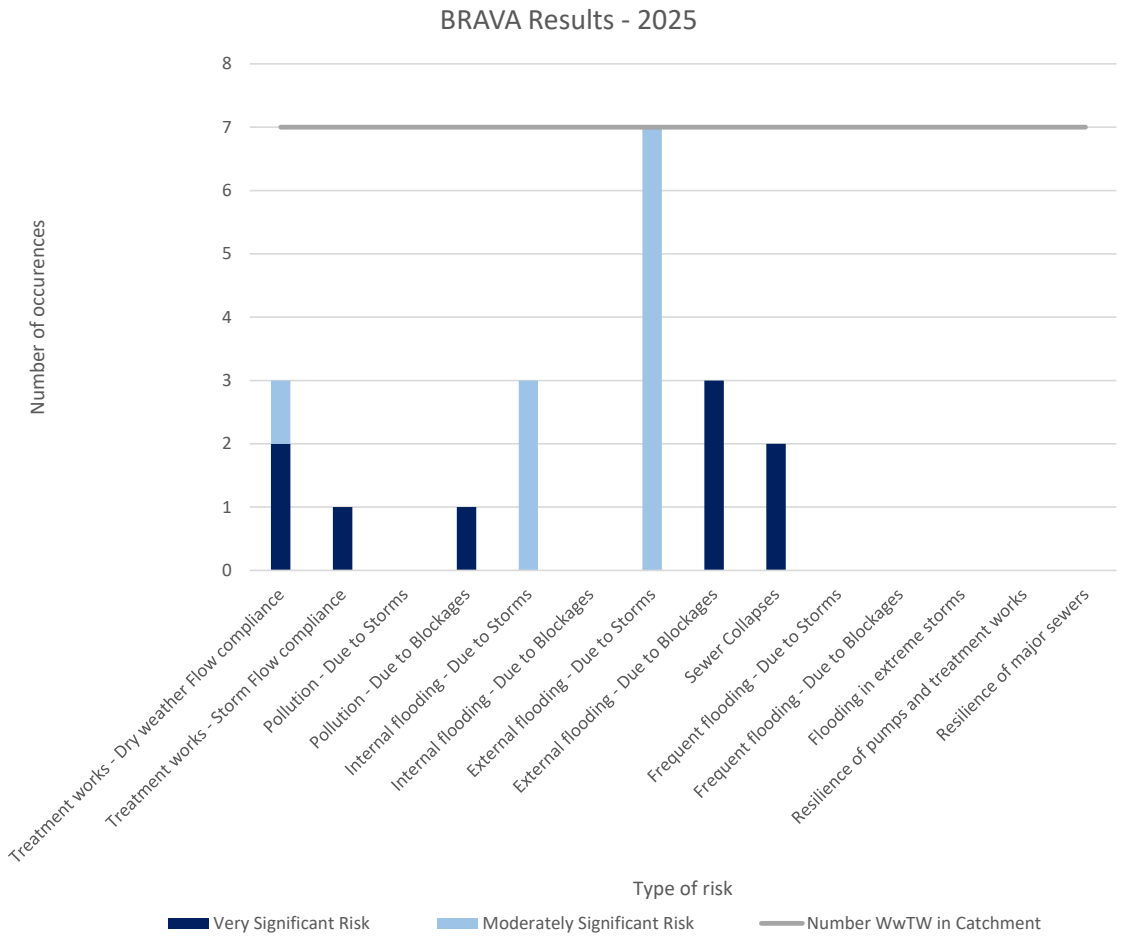


Figure 4 - BRAVA 2025 Summary

In 2025, External flooding- due to blockages and External flooding- due to Storms are the biggest concerns in this strategic planning area.

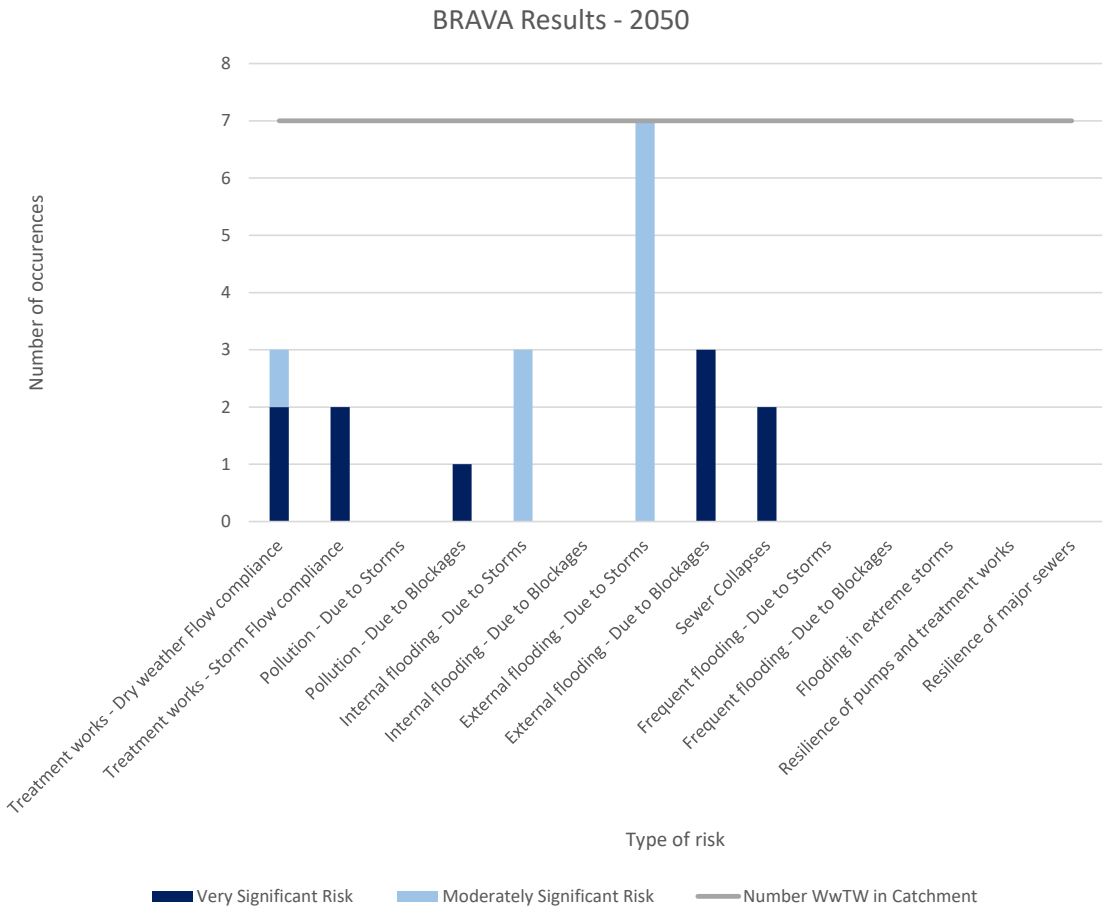


Figure 5 - BRAVA 2050 Summary

In 2050, External flooding- due to blockages and External flooding- due to Storms are the biggest concerns in this strategic planning area.

Figures 6 and 7 indicate the current and predicted risk of flooding, pollution, and both flooding and pollution caused by lack of capacity (termed 'hydraulic overload') across our networks. These maps illustrate where the issues occur and can be used to target where we want to work with the community and stakeholders to resolve issues. By working together, we can combine knowledge and resources to deliver the best outcomes for local communities and the environment. We want to include your feedback in our decision-making process.

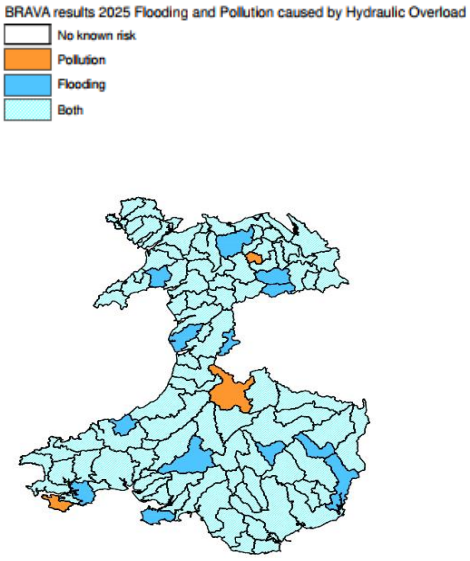


Figure 6 - Associated Strategic Planning Areas priority (2025)

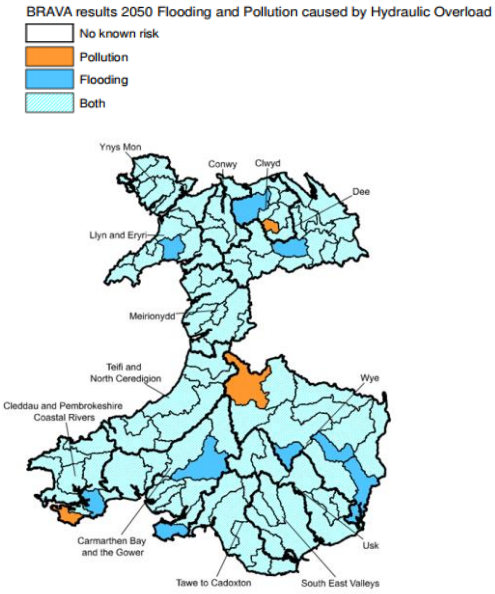


Figure 7 - Associated Strategic Planning Areas priority (2050)

3.3 Water Quality

Water quality is the classification of the quality of watercourses or water bodies in accordance to its physical, biological and chemical properties. Water quality is an important factor of environmental monitoring, ensuring that not only the water body is safe but the surrounding habitat and ecosystem is also.

Water quality status is categorised from 1 to 4, with 4 being the worst case. The priority status is based on the significance towards the risk factors triggering water quality. R Arrow - conf Gilwern Bk to conf R Lugg has a water quality priority status for 2050 of 3 which indicates targeted investment to mitigate and focus during AMP9.

4.0 Supply Demand

Supply-demand is an assessment of the capacity of our treatment works. It approximately assesses whether all the treatment works in a region can collectively cope with current and future flows in dry and wet weather. There are two parts to the assessment: dry weather flow (DWF) and a wet weather capacity assessment.

For the DWF part of the assessment, the suitability of the dry weather consents is tested against forecast future growth and changes in water consumption. Results for three scenarios are provided: the 0% headroom scenario assesses the region's capability for treating the predicted changes in DWF in the future with no allowance for error, with no spare treatment works capacity. The other scenarios indicate resilience - i.e. could we cope if we had flows 10% or 20% higher than estimated?

The wet weather assessment takes storm consent values where available as an indication of treatment works capacity and estimates the amount of incoming flow the treatment works is able to treat across a year. Again, three scenarios are shown, with differing treatment "targets" - i.e. if we wanted to ensure that 70% of the wet weather flows in a catchment were treated, could the treatment works cope? Changes in rainfall due to climate change and changing dry weather flows within the region mean that the percentage of flow treated across a year can change in the future.

Table 2 shows the supply-demand assessment for this region. Where a region may not have adequate capacity under a given scenario, it is flagged dark blue for further investigation. There may be local incapacity issues at individual works within the region.

L3 Area	Headroom	2025	2030	2035	2040	2045	2050
R Arrow - conf Gilwern Bk to conf R Lugg	0%						
	10%						
	20%						
	Treatment Target	2025	2030	2035	2040	2045	2050
	70%						
	80%						
	90%						

Table 2 - Supply Demand Balance

5.0 Options

Over time the pressures on our sewerage network change due to influences such as catchment growth, creep of rainwater into the network, or influences such as climate change impacting rainfall patterns. To ensure the plan is robust over the 30-year planning horizon and to account for the uniqueness of each catchment we have tested various types of schemes, and combination of schemes, to ensure a robust 'best value' plan is delivered.

The types of schemes tested are detailed in Table 3 and can be categorised into either improving network resilience to rainfall or improving network headroom in dry weather flow conditions.

Improving Resilience		
10% Reduction in area draining to the combined sewers	Represents removal of runoff from large commercial buildings.	Short term
25% Reduction reduction in area draining to the combined sewers	Represents removal of area runoff from non-residential paved areas where there is only one stakeholder (e.g. Local Authority or Highways Agency).	Medium term
50% Reduction reduction in area draining to the combined sewers	Represents removal of runoff from any connected area including residential properties. There are likely to be multiple stakeholders to engage with.	Long term
Improving Headroom		
Reducing infiltration	Reducing infiltration into sewers by 50%, which could be achieved by relining or replacing the public sewers .	Medium term
Reducing water use	Represents a reduction in water use per person to around 100l per person per day by 2050 by application of water efficiency measures	Medium term
Reducing trade flow	Reduce trade flows by around 25% by application of water efficiency measures.	Long term

Table 3 - Risk mitigation details

We have undertaken an analysis of all our wastewater catchments to determine the benefit in terms of potential volume of water removed from our systems for each scheme type to determine a journey plan, (see Figure 8 below), which provides the direction of the best scheme types to undertake in this catchment for the most benefit against predicted future risk from growth, creep and climate change.

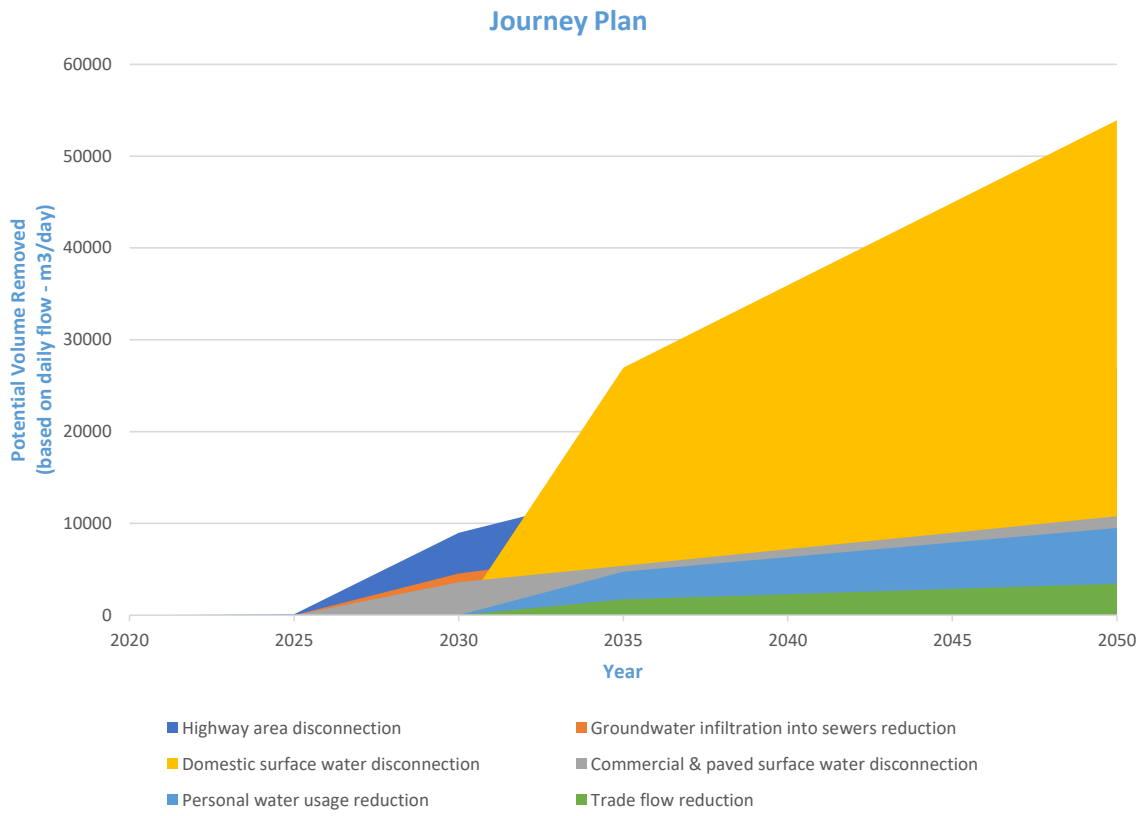


Figure 8 - Journey Plan

Approaches to managing risk

We have undertaken analysis to determine the likely costs to mitigate future predicted pollution and flooding. We assess combined sewer overflows based on the number of times they are predicted to spill in a 'typical year'. Table 4 illustrates the cost of potential measures to mitigate risk to varying standards. The assessment calculates the impact of rainfall and drainage contributions to the network relative to today's costs.

Mitigating the risk posed by flooding has been assessed in terms of probability of occurrence, we use the size of a storm event that has the probability of occurring once every 30 years. Table 5 illustrates the cost of potential mitigation measures to mitigate varying flood risk types.

The choice of scenarios for storm overflow mitigation in Table 4 is a separate cost and would be required in addition to the choice of scenarios for flooding protection in Table 5. The chosen scenarios for Storm overflows nd flooding are to be added together.

Choice of Scenario	Current Scenario (£)	2030 Scenario (£)	2050 Scenario (£)
Maintain Existing Performance*	-	£24,000,000	£39,000,000
40 spills in a Typical Year	£4,000,000	£4,000,000	£4,000,000
20 spills in a Typical Year	£9,000,000	£8,000,000	£10,000,000
10 spills in a Typical Year	£12,000,000	£12,000,000	£15,000,000
0 spills in a Typical Year	£25,000,000	£26,000,000	£30,000,000
Equivalent No. Olympic Swimming Pools in 10 spills scenario	34.00	38.00	41.00

* Maintain is a considered scenario where we will continue to maintain the current level of service within the region and improve the network and address known and emerging risk.

Table 4 - Summary of Combined Sewer Overflow option investments

Choice of Scenario	Current Scenario (£)	2050 Scenario (£)	2050 Resilience Scenario (£) 1 in 50 yr (Storm Dennis)
Internal escapes	£0	£0	£0
External escapes in gardens	£0	£0	£0
Escapes in highways	£2,000,000	£2,000,000	£3,000,000
No future flooding	-	£3,000,000	£9,000,000
Total	£2,000,000	£5,000,000	£12,000,000

Table 5 - Summary of Flooding option investments

We have developed solutions which aim to provide protection against drainage and network failure, pollution events and flooding, internal and external to properties. The solutions developed highlight the level of investment required to bring our entire network up to the level of protection required to be resilient for future risk and demands. The range of scenarios is to provide a choice for understanding and discussion of future direction.

We are beginning to break down the investment indicated in Table 4 and 5 by creating practical schemes ready for delivery these schemes are designed as 100% traditional, 100% sustainable or green and 100% mixture of the 2. These packages have then been analysed in terms of their long term benefit and environmental and social cost to society and one has been chosen for inclusion as our preferred best value option. The areas where we have started our delivery programme aims to provide protection, to our worst served customers and rivers designated as Special Areas of Conservation (SAC) under the

For more information on the methodology developed to carry out the assessments see the DWMP plan main report.

If you want to work with us to develop joint projects to reduce the risk of flooding and protect the environment, please get in touch.

We will continue to work with Welsh Government, Regulators and Local Authorities about the pace, scale and affordability of improvements to be made.

We will be consulting on the preferred approach to planning and once its concluded the next stage is to develop the pipeline of options to meet the pace scale and affordability discussed with Welsh Government and our regulators.

Table 6 - Summary of solutions put forward are a first cycle preferred plan before SEA/HRA

L4 Catchments	No. Schemes
KINGTON	0
LYONSHALL	0
WEOBLEY	0
PEMBRIDGE	0
DILWYN	0
TITLEY SWK	0
IVINGTON (NR LEOMINSTER)	0

DWMP Tactial Planning Catchment Summary

R Dore - source to conf Worm Bk

1.0 Introduction

This Drainage and Wastewater Management Plan (DWMP) sets out how Dŵr Cymru Welsh Water (DCWW) will manage and improve its assets to maintain a resilient and robust wastewater drainage system. The plan aims to manage flooding and pollution from our wastewater assets in the future, for our customers and our environment by working collaboratively with stakeholders, regulators and local authorities to provide a complete partnership in tackling current and future problems.

1.1 Catchment Information

The R Dore - source to conf Worm Bk planning catchment lies within the Wye river basin catchment, (see Figure 1 below), it consists of 7 wastewater catchments (see Figure 2 below). There is a combined population of 3678, this is set to decrease to 2632 by 2050, a change of -28%. There is a total sewer length of 20km, with a foul sewer length of 18km, a surface water length of 1km and a combined sewer length of 0km. There are 7 Wastewater Treatment Works (WwTW), 4 Sewerage Pumping Stations (SPSs), and 4 Combined Storm Overflows (CSOs) across this tactical planning unit.

The R Dore - source to conf Worm Bk catchment covers an area stretching from Dorstone in the north as far as Pontrilas in the south. The geography of the catchment is predominantly rural.

There are several main rivers within the L3 including the rivers Dore and Dulas Brook. The catchment covers several major urban areas including Town Peterchurch and Pontrilas.

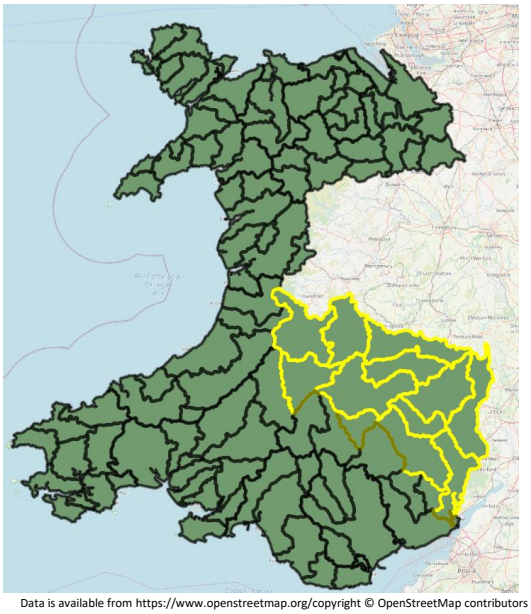


Figure 1 - River basin location detailing the associated tactial planning catchments

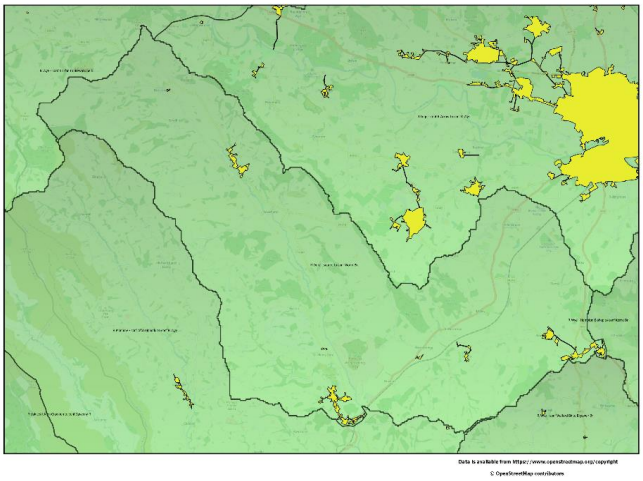


Figure 2- Tactical planning catchments

2.0 Stakeholder Engagement

The DWMP aims to enable DCWW to work collaboratively with stakeholders, regulators and local authorities to tackle current and future challenges. DCWW has identified stakeholder objectives that align with the aims of the DWMP and goals of other management plans. Table 1 details the main opportunities we have identified but this is not intended to be exhaustive. Note that these stakeholders have their own planning processes and plans which do not necessarily align with those of DCWW.

Scheme Information
Stakeholder engagement meetings area scheduled to commence in 2022. These meetings will be held between DCWW and the respective parties, such as NRW, EA, Councils and ENGO's. Further information of the outcome and points of focus towards short and long term strategy planning will be provided in the next cycle of the DWMP assessment.

Table 1 - Current and future investigation schemes

3.0 Risk

We have assessed our likely performance from now to 2050 against the objectives that we set in our most recent business plan. The results of this assessment are presented in the following sections.

To understand future performance, we need to estimate how much population will change by, the degree to which climate change will impact Wales and areas of England that border our company, and how further surface water connected to the sewer network might increase the amount and rate at which rainfall drains into our sewers.

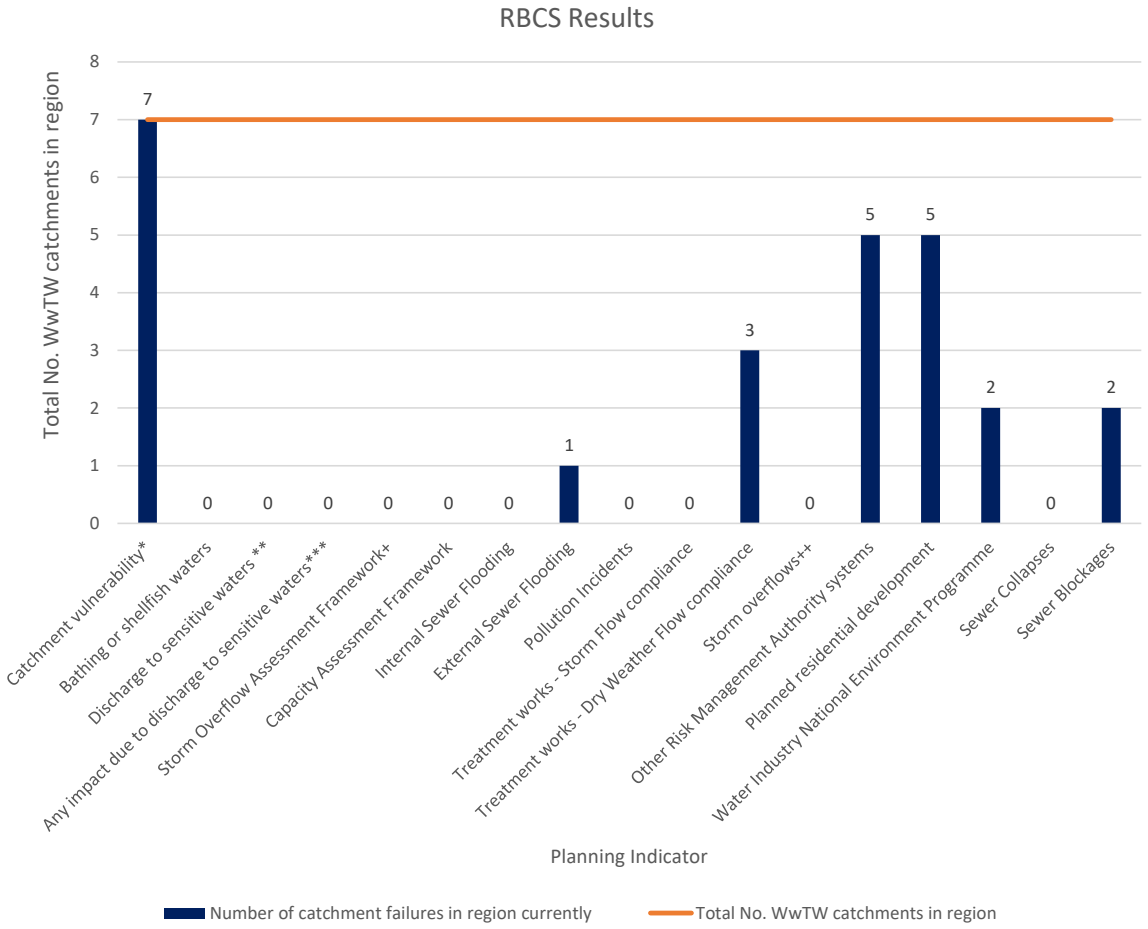
Urban creep is the term used to explain loss of green spaces, for example when new driveways or house extensions are built. It often leads to more rainwater entering sewers. Our forecasts suggest that urban creep will add up to 0.63 metres squared of impermeable ground per house per year.

Climate change is predicted to increase the intensity of storms by around 15% in this region. In a typical year, winters are likely to be warmer and wetter, and summers generally drier. More intense rainfall will happen more frequently. The population in the Wye region is set to decrease to 2600 by 2050, a change of -28% based on our future projections.

3.1 Risk Based Catchment Screening

The Risk Based Catchment Screening (RBCS) is the initial screening process to determine if a more detailed risk assessment is required. The assessment screens catchments against planning indicators which have been stipulated in the national guidance for DWMPs. A catchment will pass through to a more detailed risk assessment if it fails against one or more of these indicators, the results are shown in Figure 3.

For this strategic planning area the biggest concerns indicated by the RBCS is Catchment Vulnerability followed by Planned Residential Development and Other Risk Management Authority systems.



*To sewer flooding due to extreme wet weather events.
**Categorised as a "planned" scheduled action within the Natural Resources Wales Action Database or considered as "Remedy" on Natural England Designated Sites system.
***Categorised as a "identified" scheduled action within the Natural Resources Wales Action Database or considered as "Threat" on Natural England Designated Sites system.
+Frequency investigation triggered.
++Overflow risks not covered by other indicators,

Figure 3 - Risk Based Catchment Screening results

3.2 Baseline Risk And Vulnerability Assessment (BRAVA)

Following on from the RBCS, the Baseline Risk and Vulnerability Assessment (BRAVA) highlights current and future risk. The risk scores are driven by company targets which were set in our last business plan. These targets were subdivided according to population or sewer length, depending on the measure, to derive a target for each river basin catchment.

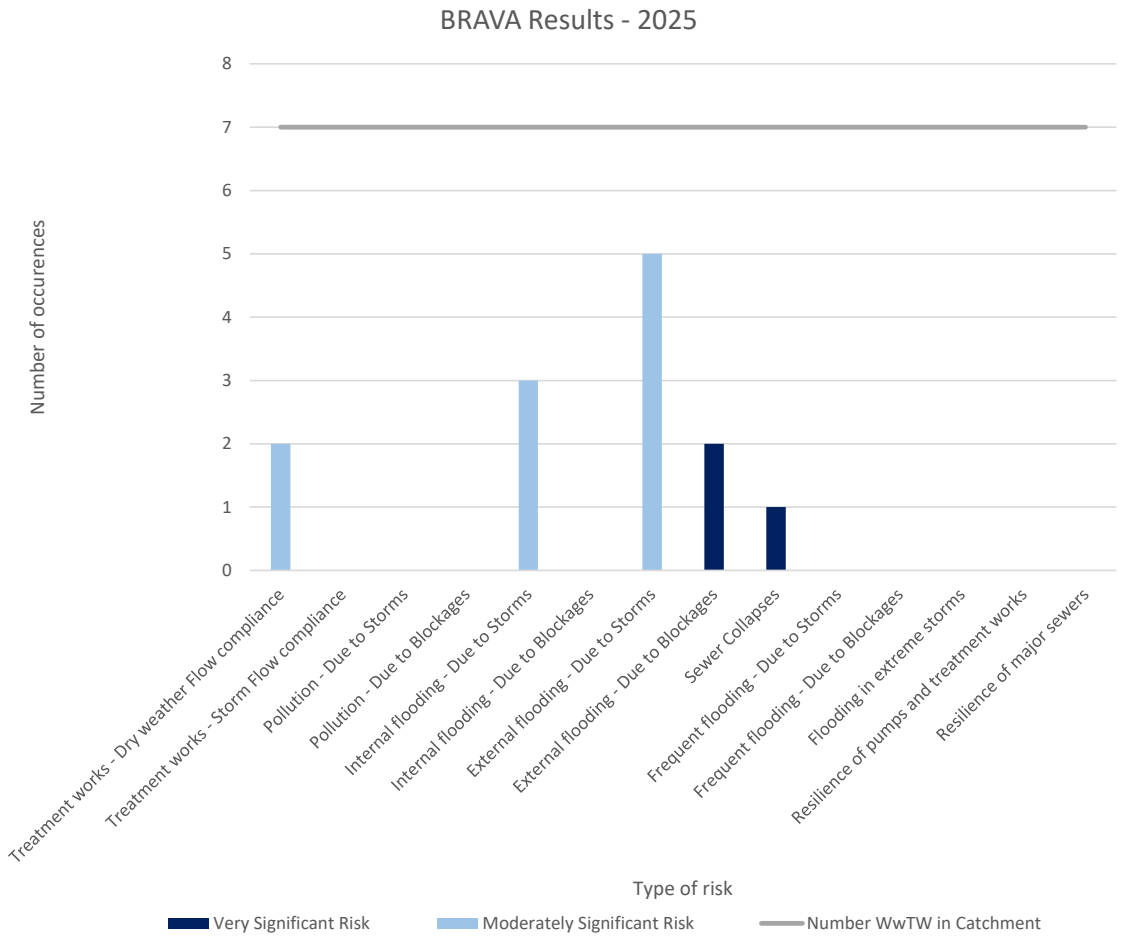


Figure 4 - BRAVA 2025 Summary

In 2025, External flooding - due to blockages and External flooding - due to storms are some of the biggest concerns.

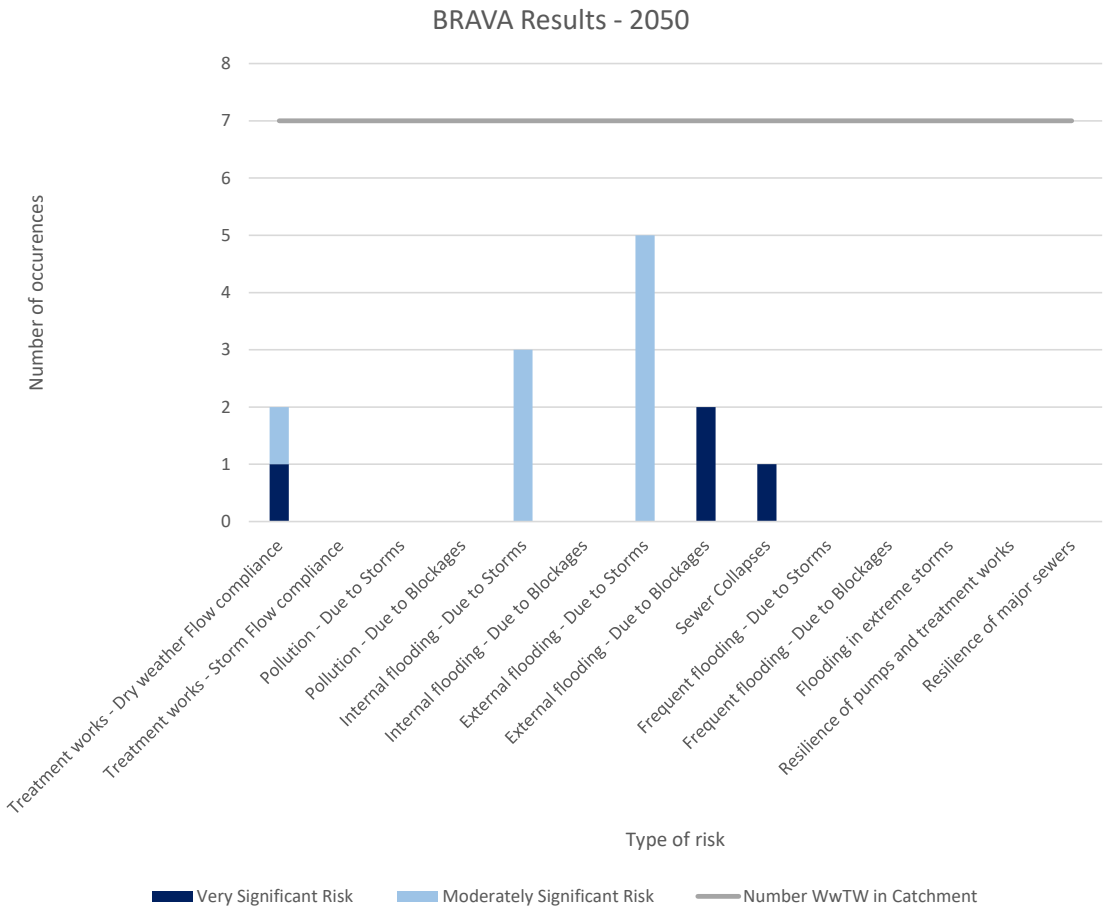


Figure 5 - BRAVA 2050 Summary

In 2050, External flooding - due to blockages and External flooding - due to storms are some of the biggest concerns.

Figures 6 and 7 indicate the current and predicted risk of flooding, pollution, and both flooding and pollution caused by lack of capacity (termed 'hydraulic overload') across our networks. These maps illustrate where the issues occur and can be used to target where we want to work with the community and stakeholders to resolve issues. By working together, we can combine knowledge and resources to deliver the best outcomes for local communities and the environment. We want to include your feedback in our decision-making process.

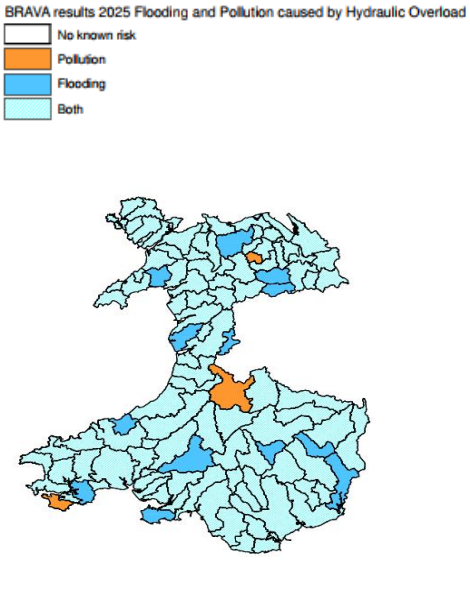


Figure 6 - Associated Strategic Planning Areas priority (2025)

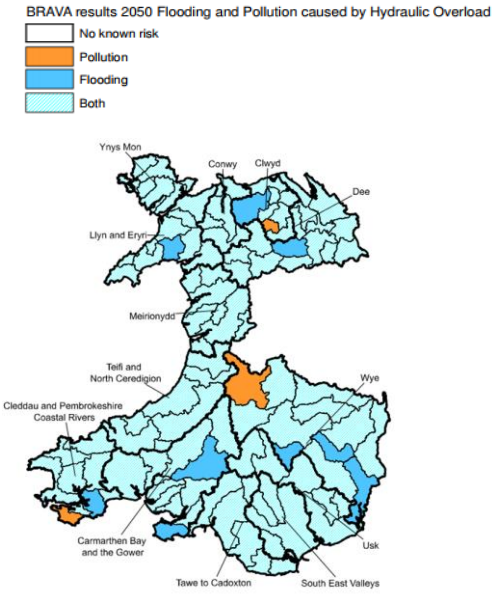


Figure 7 - Associated Strategic Planning Areas priority (2050)

3.3 Water Quality

Water quality is the classification of the quality of watercourses or water bodies in accordance to its physical, biological and chemical properties. Water quality is an important factor of environmental monitoring, ensuring that not only the water body is safe but the surrounding habitat and ecosystem is also.

Water quality status is categorised from 1 to 4, with 4 being the worst case. The priority status is based on the significance towards the risk factors triggering water quality. R Dore - source to conf Worm Bk has a water quality priority status for 2050 of 2 which indicates targeted investment to mitigate and focus during AMP10.

4.0 Supply Demand

Supply-demand is an assessment of the capacity of our treatment works. It approximately assesses whether all the treatment works in a region can collectively cope with current and future flows in dry and wet weather. There are two parts to the assessment: dry weather flow (DWF) and a wet weather capacity assessment.

For the DWF part of the assessment, the suitability of the dry weather consents is tested against forecast future growth and changes in water consumption. Results for three scenarios are provided: the 0% headroom scenario assesses the region's capability for treating the predicted changes in DWF in the future with no allowance for error, with no spare treatment works capacity. The other scenarios indicate resilience - i.e. could we cope if we had flows 10% or 20% higher than estimated?

The wet weather assessment takes storm consent values where available as an indication of treatment works capacity and estimates the amount of incoming flow the treatment works is able to treat across a year. Again, three scenarios are shown, with differing treatment "targets" - i.e. if we wanted to ensure that 70% of the wet weather flows in a catchment were treated, could the treatment works cope? Changes in rainfall due to climate change and changing dry weather flows within the region mean that the percentage of flow treated across a year can change in the future.

Table 2 shows the supply-demand assessment for this region. Where a region may not have adequate capacity under a given scenario, it is flagged dark blue for further investigation. There may be local incapacity issues at individual works within the region.

L3 Area	Headroom	2025	2030	2035	2040	2045	2050
R Dore - source to conf Worm Bk	0%						
	10%						
	20%						
	Treatment Target	2025	2030	2035	2040	2045	2050
	70%						
	80%						
	90%						

Table 2 - Supply Demand Balance

5.0 Options

Over time the pressures on our sewerage network change due to influences such as catchment growth, creep of rainwater into the network, or influences such as climate change impacting rainfall patterns. To ensure the plan is robust over the 30-year planning horizon and to account for the uniqueness of each catchment we have tested various types of schemes, and combination of schemes, to ensure a robust 'best value' plan is delivered.

The types of schemes tested are detailed in Table 3 and can be categorised into either improving network resilience to rainfall or improving network headroom in dry weather flow conditions.

Improving Resilience		
10% Reduction in area draining to the combined sewers	Represents removal of runoff from large commercial buildings.	Short term
25% Reduction reduction in area draining to the combined sewers	Represents removal of area runoff from non-residential paved areas where there is only one stakeholder (e.g. Local Authority or Highways Agency).	Medium term
50% Reduction reduction in area draining to the combined sewers	Represents removal of runoff from any connected area including residential properties. There are likely to be multiple stakeholders to engage with.	Long term
Improving Headroom		
Reducing infiltration	Reducing infiltration into sewers by 50%, which could be achieved by relining or replacing the public sewers .	Medium term
Reducing water use	Represents a reduction in water use per person to around 100l per person per day by 2050 by application of water efficiency measures	Medium term
Reducing trade flow	Reduce trade flows by around 25% by application of water efficiency measures.	Long term

Table 3 - Risk mitigation details

We have undertaken an analysis of all our wastewater catchments to determine the benefit in terms of potential volume of water removed from our systems for each scheme type to determine a journey plan, (see Figure 8 below), which provides the direction of the best scheme types to undertake in this catchment for the most benefit against predicted future risk from growth, creep and climate change.

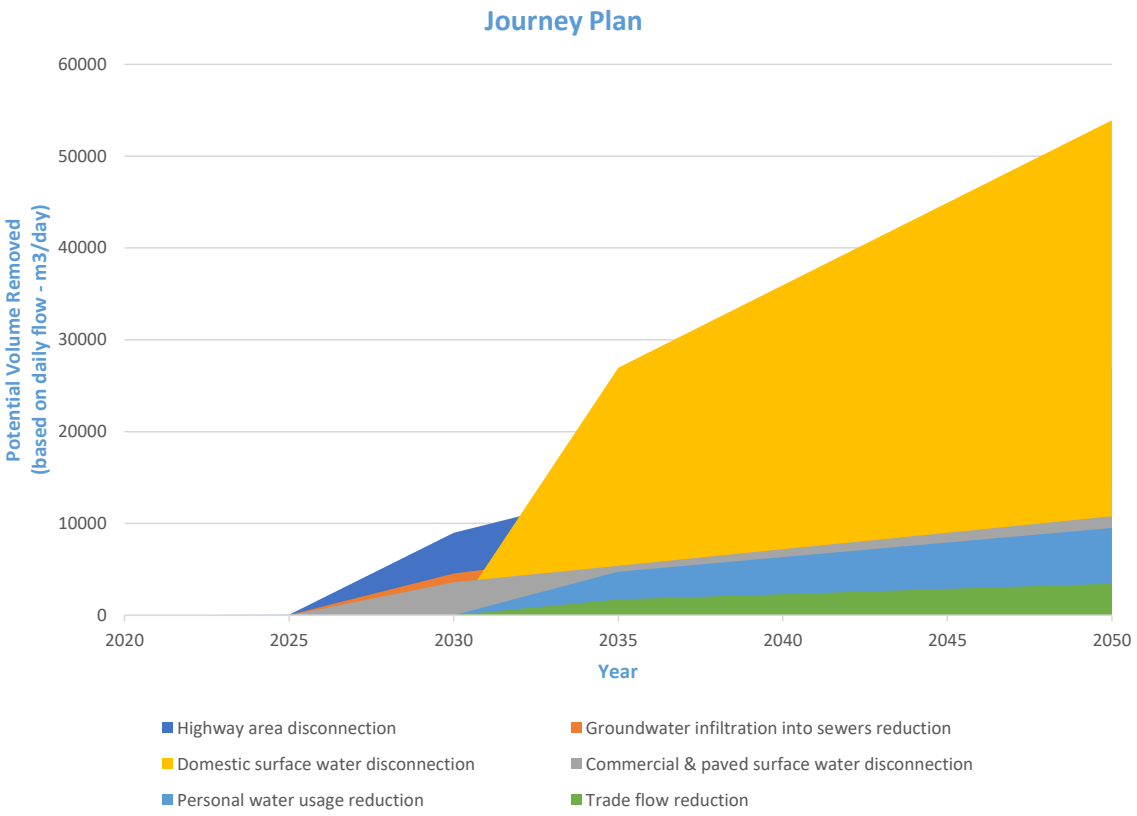


Figure 8 - Journey Plan

Approaches to managing risk

We have undertaken analysis to determine the likely costs to mitigate future predicted pollution and flooding. We assess combined sewer overflows based on the number of times they are predicted to spill in a 'typical year'. Table 4 illustrates the cost of potential measures to mitigate risk to varying standards. The assessment calculates the impact of rainfall and drainage contributions to the network relative to today's costs.

Mitigating the risk posed by flooding has been assessed in terms of probability of occurrence, we use the size of a storm event that has the probability of occurring once every 30 years. Table 5 illustrates the cost of potential mitigation measures to mitigate varying flood risk types.

The choice of scenarios for storm overflow mitigation in Table 4 is a separate cost and would be required in addition to the choice of scenarios for flooding protection in Table 5. The chosen scenarios for Storm overflows nd flooding are to be added together.

Choice of Scenario	Current Scenario (£)	2030 Scenario (£)	2050 Scenario (£)
Maintain Existing Performance*	-	£0	£0
40 spills in a Typical Year	£0	£0	£0
20 spills in a Typical Year	£0	£0	£0
10 spills in a Typical Year	£0	£0	£0
0 spills in a Typical Year	£0	£0	£0
Equivalent No. Olympic Swimming Pools in 10 spills scenario	0.00	0.00	0.00

* Maintain is a considered scenario where we will continue to maintain the current level of service within the region and improve the network and address known and emerging risk.

Table 4 - Summary of Combined Sewer Overflow option investments

Choice of Scenario	Current Scenario (£)	2050 Scenario (£)	2050 Resilience Scenario (£) 1 in 50 yr (Storm Dennis)
Internal escapes	£0	£0	£0
External escapes in gardens	£1,000,000	£1,000,000	£1,000,000
Escapes in highways	£1,000,000	£2,000,000	£2,000,000
No future flooding	-	£3,000,000	£9,000,000
Total	£2,000,000	£6,000,000	£12,000,000

Table 5 - Summary of Flooding option investments

We have developed solutions which aim to provide protection against drainage and network failure, pollution events and flooding, internal and external to properties. The solutions developed highlight the level of investment required to bring our entire network up to the level of protection required to be resilient for future risk and demands. The range of scenarios is to provide a choice for understanding and discussion of future direction.

We are beginning to break down the investment indicated in Table 4 and 5 by creating practical schemes ready for delivery these schemes are designed as 100% traditional, 100% sustainable or green and 100% mixture of the 2. These packages have then been analysed in terms of their long term benefit and environmental and social cost to society and one has been chosen for inclusion as our preferred best value option. The areas where we have started our delivery programme aims to provide protection, to our worst served customers and rivers designated as Special Areas of Conservation (SAC) under the

For more information on the methodology developed to carry out the assessments see the DWMP plan main report.

If you want to work with us to develop joint projects to reduce the risk of flooding and protect the environment, please get in touch.

We will continue to work with Welsh Government, Regulators and Local Authorities about the pace, scale and affordability of improvements to be made.

We will be consulting on the preferred approach to planning and once its concluded the next stage is to develop the pipeline of options to meet the pace scale and affordability discussed with Welsh Government and our regulators.

Table 6 - Summary of solutions put forward are a first cycle preferred plan before SEA/HRA

L4 Catchments	No. Schemes
PONTRILAS STW	0
PETERCHURCH SWK	0
DORSTONE (NR HAY-ON-WYE) OAKLAND PL SWK	0
ABBEYDORE	0
KILPECK STW	0
WORMBRIDGE (SW OF HEREFORD)	0
MUCH DEWCHURCH STW	0

DWMP Tactial Planning Catchment Summary

R Ithon - conf Camddwr Bk to conf R Wye

1.0 Introduction

This Drainage and Wastewater Management Plan (DWMP) sets out how Dŵr Cymru Welsh Water (DCWW) will manage and improve its assets to maintain a resilient and robust wastewater drainage system. The plan aims to manage flooding and pollution from our wastewater assets in the future, for our customers and our environment by working collaboratively with stakeholders, regulators and local authorities to provide a complete partnership in tackling current and future problems.

1.1 Catchment Information

The R Ithon - conf Camddwr Bk to conf R Wye planning catchment lies within the Wye river basin catchment, (see Figure 1 below), it consists of 8 wastewater catchments (see Figure 2 below). There is a combined population of 7798, this is set to decrease to 7432 by 2050, a change of -5%. There is a total sewer length of 63km, with a foul sewer length of 27km, a surface water length of 9km and a combined sewer length of 26km. There are 8 Wastewater Treatment Works (WwTW), 13 Sewerage Pumping Stations (SPSs), and 12 Combined Storm Overflows (CSOs) across this tactical planning unit.

The R Ithon - conf Camddwr Bk to conf R Wye catchment covers an area stretching from Llanbister in the north as far as Llandrindod Wells in the South. The geography of the catchment is predominantly rural.

There are several main rivers within the L3 including the River Ithon, Crichell Brook and Camddwr Brook. The catchment covers several major urban areas including Town Llandrindod and Crossgates.

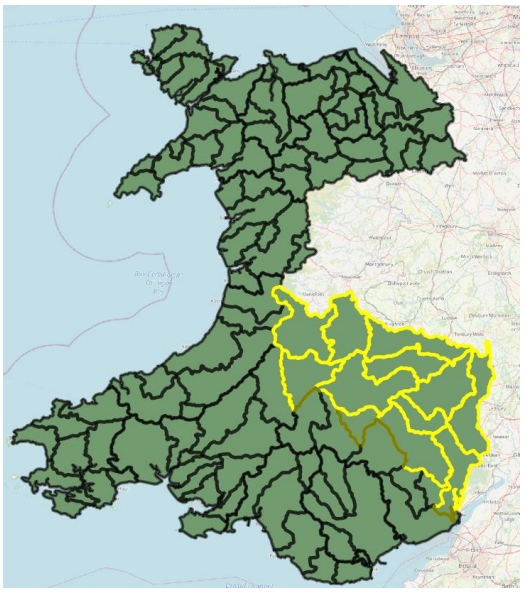


Figure 1 - River basin location detailing the associated tactial planning catchments

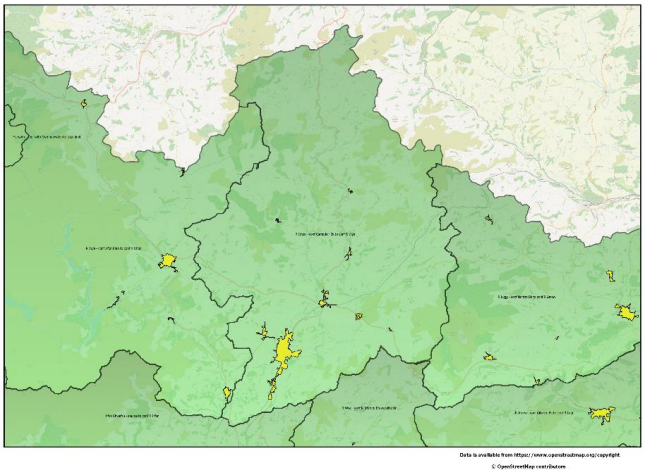


Figure 2- Tactical planning catchments

2.0 Stakeholder Engagement

The DWMP aims to enable DCWW to work collaboratively with stakeholders, regulators and local authorities to tackle current and future challenges. DCWW has identified stakeholder objectives that align with the aims of the DWMP and goals of other management plans. Table 1 details the main opportunities we have identified but this is not intended to be exhaustive. Note that these stakeholders have their own planning processes and plans which do not necessarily align with those of DCWW.

Scheme Information
Stakeholder engagement meetings area scheduled to commence in 2022. These meetings will be held between DCWW and the respective parties, such as NRW, EA, Councils and ENGO's. Further information of the outcome and points of focus towards short and long term strategy planning will be provided in the next cycle of the DWMP assessment.

Table 1 - Current and future investigation schemes

3.0 Risk

We have assessed our likely performance from now to 2050 against the objectives that we set in our most recent business plan. The results of this assessment are presented in the following sections.

To understand future performance, we need to estimate how much population will change by, the degree to which climate change will impact Wales and areas of England that border our company, and how further surface water connected to the sewer network might increase the amount and rate at which rainfall drains into our sewers.

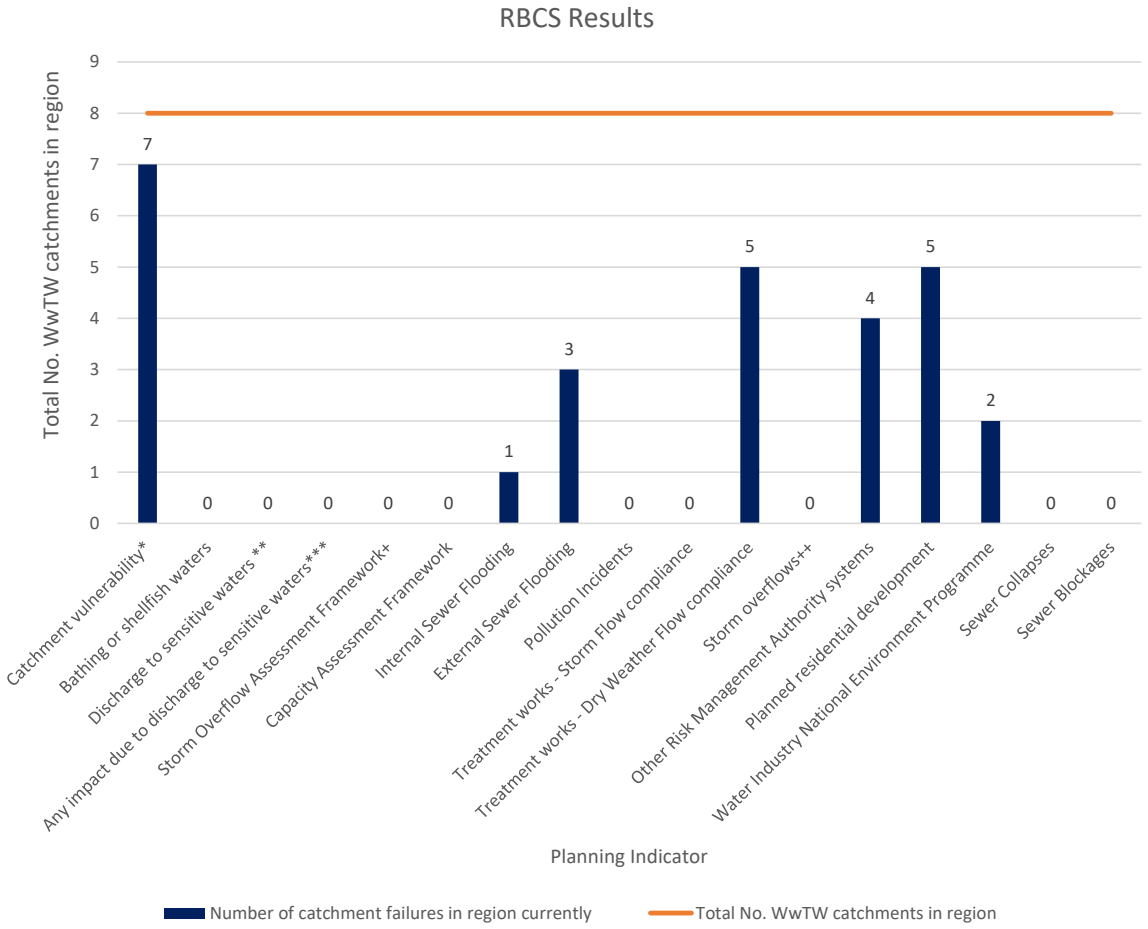
Urban creep is the term used to explain loss of green spaces, for example when new driveways or house extensions are built. It often leads to more rainwater entering sewers. Our forecasts suggest that urban creep will add up to 0.63 metres squared of impermeable ground per house per year.

Climate change is predicted to increase the intensity of storms by around 15% in this region. In a typical year, winters are likely to be warmer and wetter, and summers generally drier. More intense rainfall will happen more frequently. The population in the Wye region is set to decrease to 7400 by 2050, a change of -5% based on our future projections. However there are major developments in localised areas that will contribute to future pressures on the network, including Land at Ridgebourne Drive and Land East of Ithon Road, Llandrindod Wells.

3.1 Risk Based Catchment Screening

The Risk Based Catchment Screening (RBCS) is the initial screening process to determine if a more detailed risk assessment is required. The assessment screens catchments against planning indicators which have been stipulated in the national guidance for DWMPs. A catchment will pass through to a more detailed risk assessment if it fails against one or more of these indicators, the results are shown in Figure 3.

For this strategic planning area the biggest concerns indicated by the RBCS are Catchment Vulnerability, followed by Treatment works compliance - dry and Planned residential development.



*To sewer flooding due to extreme wet weather events.
**Categorised as a "planned" scheduled action within the Natural Resources Wales Action Database or considered as "Remedy" on Natural England Designated Sites system.
***Categorised as a "identified" scheduled action within the Natural Resources Wales Action Database or considered as "Threat" on Natural England Designated Sites system.
+Frequency investigation triggered.
++Overflow risks not covered by other indicators,

Figure 3 - Risk Based Catchment Screening results

3.2 Baseline Risk And Vulnerability Assessment (BRAVA)

Following on from the RBCS, the Baseline Risk and Vulnerability Assessment (BRAVA) highlights current and future risk. The risk scores are driven by company targets which were set in our last business plan. These targets were subdivided according to population or sewer length, depending on the measure, to derive a target for each river basin catchment.

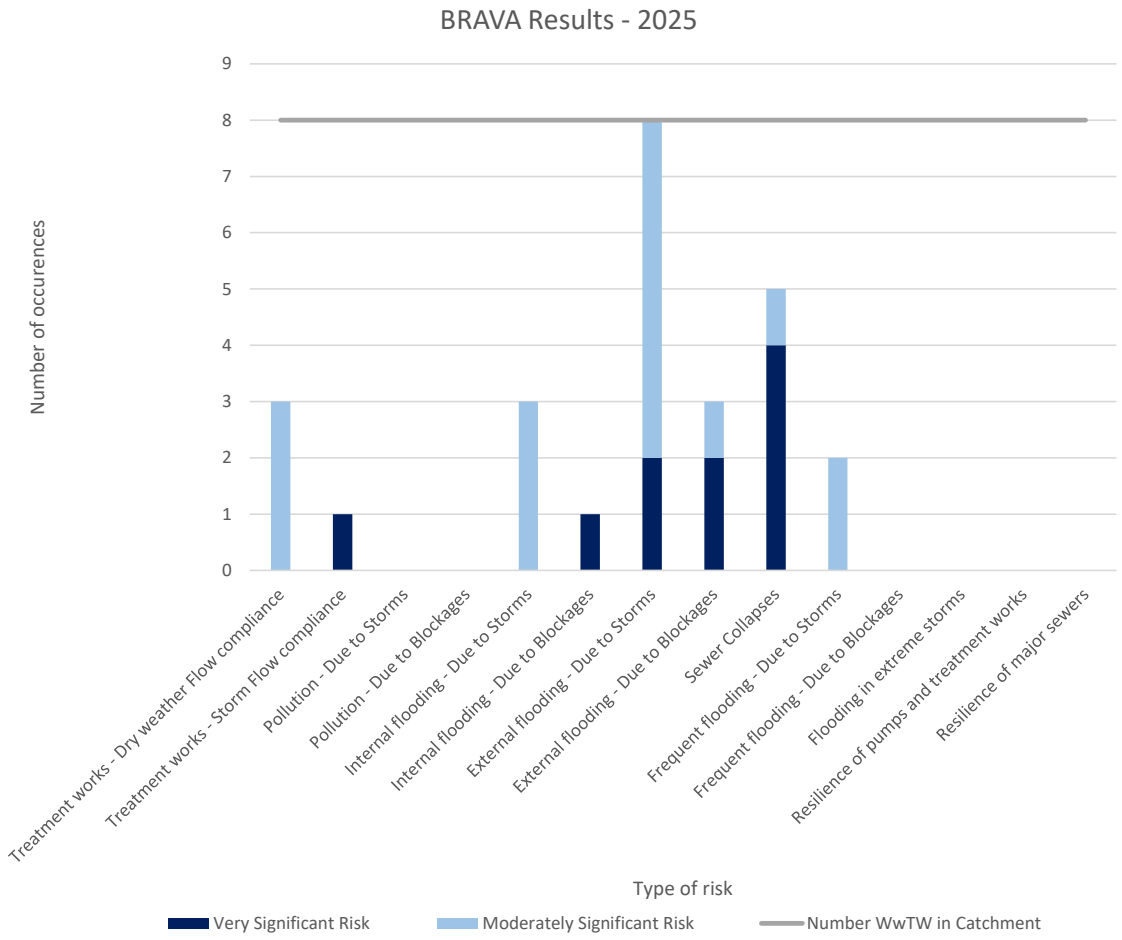


Figure 4 - BRAVA 2025 Summary

In 2025, Sewer collapses and External Flooding- due to storms are the biggest concerns in this strategic planning area.

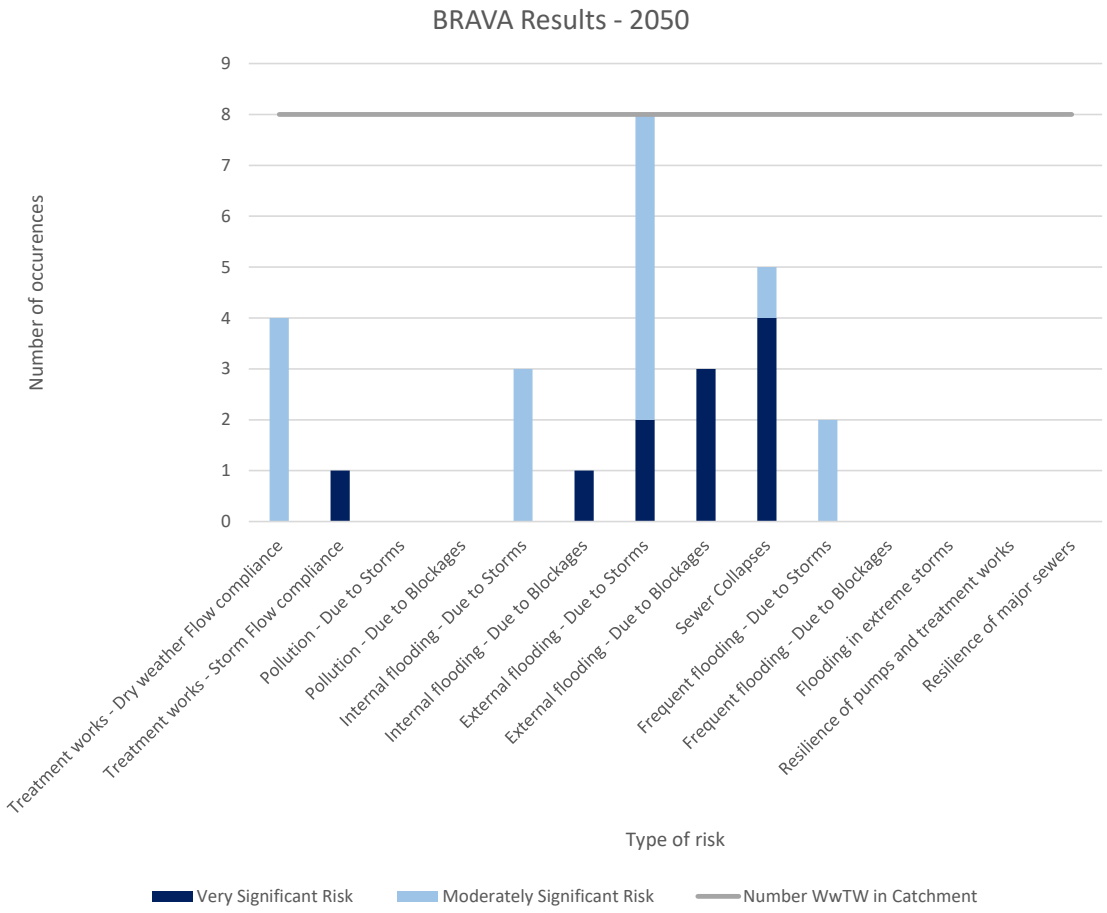


Figure 5 - BRAVA 2050 Summary

In 2050, Sewer collapses and External Flooding- due to storms are the biggest concerns in this strategic planning area.

Figures 6 and 7 indicate the current and predicted risk of flooding, pollution, and both flooding and pollution caused by lack of capacity (termed 'hydraulic overload') across our networks. These maps illustrate where the issues occur and can be used to target where we want to work with the community and stakeholders to resolve issues. By working together, we can combine knowledge and resources to deliver the best outcomes for local communities and the environment. We want to include your feedback in our decision-making process.

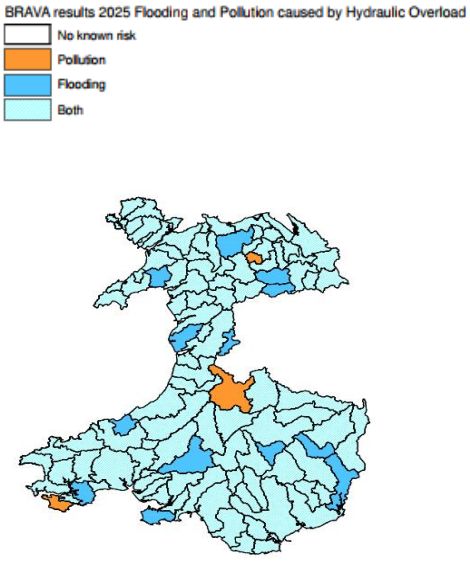


Figure 6 - Associated Strategic Planning Areas priority (2025)

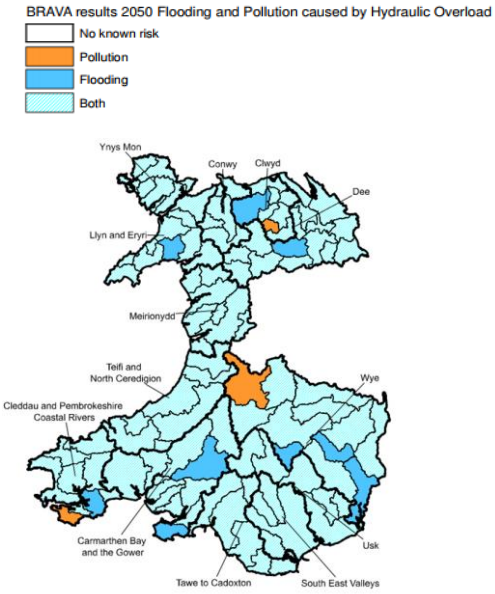


Figure 7 - Associated Strategic Planning Areas priority (2050)

3.3 Water Quality

Water quality is the classification of the quality of watercourses or water bodies in accordance to its physical, biological and chemical properties. Water quality is an important factor of environmental monitoring, ensuring that not only the water body is safe but the surrounding habitat and ecosystem is also.

Water quality status is categorised from 1 to 4, with 4 being the worst case. The priority status is based on the significance towards the risk factors triggering water quality. R Ithon - conf Camddwr Bk to conf R Wye has a water quality priority status for 2050 of 1 which indicates targeted investment to mitigate and focus during AMP11.

4.0 Supply Demand

Supply-demand is an assessment of the capacity of our treatment works. It approximately assesses whether all the treatment works in a region can collectively cope with current and future flows in dry and wet weather. There are two parts to the assessment: dry weather flow (DWF) and a wet weather capacity assessment.

For the DWF part of the assessment, the suitability of the dry weather consents is tested against forecast future growth and changes in water consumption. Results for three scenarios are provided: the 0% headroom scenario assesses the region's capability for treating the predicted changes in DWF in the future with no allowance for error, with no spare treatment works capacity. The other scenarios indicate resilience - i.e. could we cope if we had flows 10% or 20% higher than estimated?

The wet weather assessment takes storm consent values where available as an indication of treatment works capacity and estimates the amount of incoming flow the treatment works is able to treat across a year. Again, three scenarios are shown, with differing treatment "targets" - i.e. if we wanted to ensure that 70% of the wet weather flows in a catchment were treated, could the treatment works cope? Changes in rainfall due to climate change and changing dry weather flows within the region mean that the percentage of flow treated across a year can change in the future.

Table 2 shows the supply-demand assessment for this region. Where a region may not have adequate capacity under a given scenario, it is flagged dark blue for further investigation. There may be local incapacity issues at individual works within the region.

L3 Area	Headroom	2025	2030	2035	2040	2045	2050
R Ithon - conf Camddwr Bk to conf R Wye	0%						
	10%						
	20%						
	Treatment Target	2025	2030	2035	2040	2045	2050
	70%						
	80%						
	90%						

Table 2 - Supply Demand Balance

5.0 Options

Over time the pressures on our sewerage network change due to influences such as catchment growth, creep of rainwater into the network, or influences such as climate change impacting rainfall patterns. To ensure the plan is robust over the 30-year planning horizon and to account for the uniqueness of each catchment we have tested various types of schemes, and combination of schemes, to ensure a robust 'best value' plan is delivered.

The types of schemes tested are detailed in Table 3 and can be categorised into either improving network resilience to rainfall or improving network headroom in dry weather flow conditions.

Improving Resilience		
10% Reduction in area draining to the combined sewers	Represents removal of runoff from large commercial buildings.	Short term
25% Reduction reduction in area draining to the combined sewers	Represents removal of area runoff from non-residential paved areas where there is only one stakeholder (e.g. Local Authority or Highways Agency).	Medium term
50% Reduction reduction in area draining to the combined sewers	Represents removal of runoff from any connected area including residential properties. There are likely to be multiple stakeholders to engage with.	Long term
Improving Headroom		
Reducing infiltration	Reducing infiltration into sewers by 50%, which could be achieved by relining or replacing the public sewers .	Medium term
Reducing water use	Represents a reduction in water use per person to around 100l per person per day by 2050 by application of water efficiency measures	Medium term
Reducing trade flow	Reduce trade flows by around 25% by application of water efficiency measures.	Long term

Table 3 - Risk mitigation details

We have undertaken an analysis of all our wastewater catchments to determine the benefit in terms of potential volume of water removed from our systems for each scheme type to determine a journey plan, (see Figure 8 below), which provides the direction of the best scheme types to undertake in this catchment for the most benefit against predicted future risk from growth, creep and climate change.

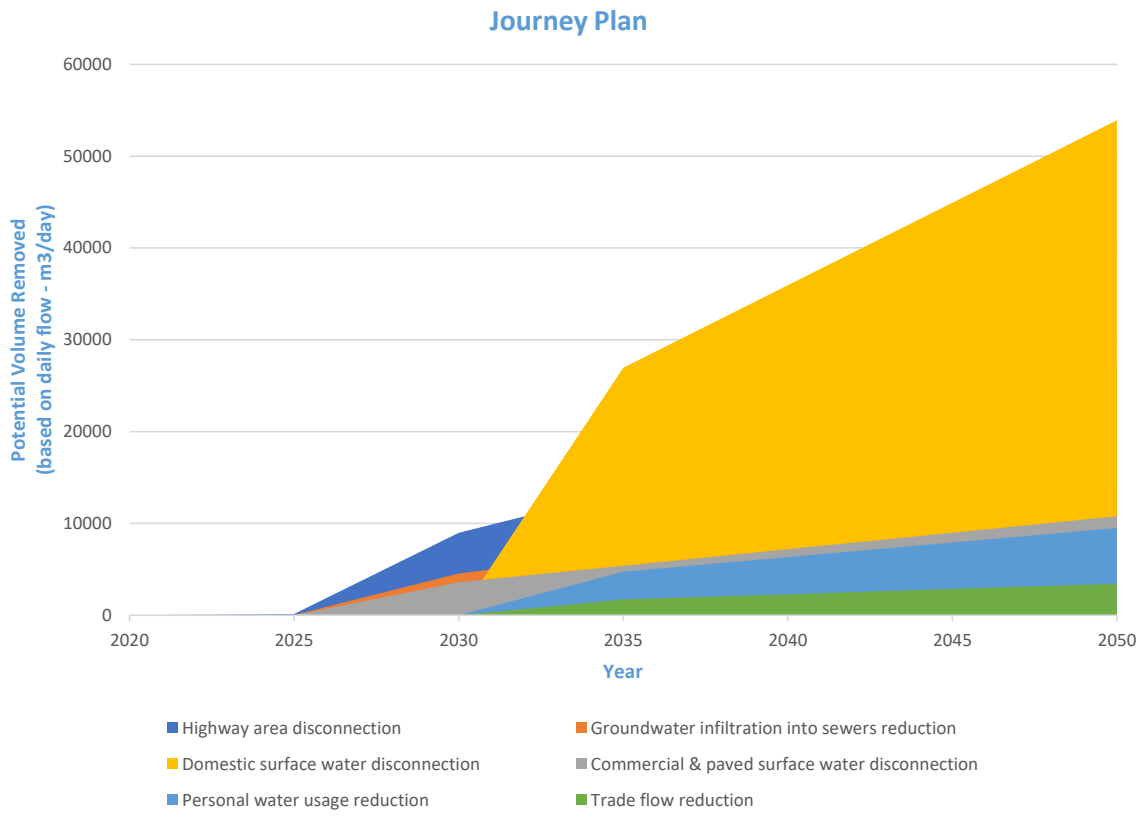


Figure 8 - Journey Plan

Approaches to managing risk

We have undertaken analysis to determine the likely costs to mitigate future predicted pollution and flooding. We assess combined sewer overflows based on the number of times they are predicted to spill in a 'typical year'. Table 4 illustrates the cost of potential measures to mitigate risk to varying standards. The assessment calculates the impact of rainfall and drainage contributions to the network relative to today's costs.

Mitigating the risk posed by flooding has been assessed in terms of probability of occurrence, we use the size of a storm event that has the probability of occurring once every 30 years. Table 5 illustrates the cost of potential mitigation measures to mitigate varying flood risk types.

The choice of scenarios for storm overflow mitigation in Table 4 is a separate cost and would be required in addition to the choice of scenarios for flooding protection in Table 5. The chosen scenarios for Storm overflows nd flooding are to be added together.

Choice of Scenario	Current Scenario (£)	2030 Scenario (£)	2050 Scenario (£)
Maintain Existing Performance*	-	£24,000,000	£39,000,000
40 spills in a Typical Year	£7,000,000	£7,000,000	£8,000,000
20 spills in a Typical Year	£10,000,000	£10,000,000	£12,000,000
10 spills in a Typical Year	£14,000,000	£12,000,000	£16,000,000
0 spills in a Typical Year	£27,000,000	£28,000,000	£32,000,000
Equivalent No. Olympic Swimming Pools in 10 spills scenario	49.00	54.00	58.00

* Maintain is a considered scenario where we will continue to maintain the current level of service within the region and improve the network and address known and emerging risk.

Table 4 - Summary of Combined Sewer Overflow option investments

Choice of Scenario	Current Scenario (£)	2050 Scenario (£)	2050 Resilience Scenario (£) 1 in 50 yr (Storm Dennis)
Internal escapes	£0	£0	£0
External escapes in gardens	£1,000,000	£1,000,000	£1,000,000
Escapes in highways	£7,000,000	£8,000,000	£13,000,000
No future flooding	-	£3,000,000	£10,000,000
Total	£8,000,000	£12,000,000	£24,000,000

Table 5 - Summary of Flooding option investments

We have developed solutions which aim to provide protection against drainage and network failure, pollution events and flooding, internal and external to properties. The solutions developed highlight the level of investment required to bring our entire network up to the level of protection required to be resilient for future risk and demands. The range of scenarios is to provide a choice for understanding and discussion of future direction.

We are beginning to break down the investment indicated in Table 4 and 5 by creating practical schemes ready for delivery these schemes are designed as 100% traditional, 100% sustainable or green and 100% mixture of the 2. These packages have then been analysed in terms of their long term benefit and environmental and social cost to society and one has been chosen for inclusion as our preferred best value option. The areas where we have started our delivery programme aims to provide protection, to our worst served customers and rivers designated as Special Areas of Conservation (SAC) under the

For more information on the methodology developed to carry out the assessments see the DWMP plan main report.

If you want to work with us to develop joint projects to reduce the risk of flooding and protect the environment, please get in touch.

We will continue to work with Welsh Government, Regulators and Local Authorities about the pace, scale and affordability of improvements to be made.

We will be consulting on the preferred approach to planning and once its concluded the next stage is to develop the pipeline of options to meet the pace scale and affordability discussed with Welsh Government and our regulators.

Table 6 - Summary of solutions put forward are a first cycle preferred plan before SEA/HRA

L4 Catchments	No. Schemes
LLANDRINDOD WELLS SWK	0
LLANDDEWI YSTRADENNI SWK	0
LLANYRE SWK	0
LLANBISTER SWK	0
LLANDEGLEY (NR LLANDRINDOD WELLS) SWK	0
ABBEYCWMHIR STW	0
CROSSGATES (N OF LLANDRINDOD WELLS) SWK	0
PENYBONT (NR LLANDRINDOD WELLS) SWK	0

DWMP Tactial Planning Catchment Summary

R Lugg - conf Norton Bk to conf R Arrow

1.0 Introduction

This Drainage and Wastewater Management Plan (DWMP) sets out how Dŵr Cymru Welsh Water (DCWW) will manage and improve its assets to maintain a resilient and robust wastewater drainage system. The plan aims to manage flooding and pollution from our wastewater assets in the future, for our customers and our environment by working collaboratively with stakeholders, regulators and local authorities to provide a complete partnership in tackling current and future problems.

1.1 Catchment Information

The R Lugg - conf Norton Bk to conf R Arrow planning catchment lies within the Wye river basin catchment, (see Figure 1 below), it consists of 10 wastewater catchments (see Figure 2 below). There is a combined population of 17948, this is set to increase to 21145 by 2050, a change of 18%. There is a total sewer length of 110km, with a foul sewer length of 63km, a surface water length of 17km and a combined sewer length of 27km. There are 10 Wastewater Treatment Works (WwTW), 26 Sewerage Pumping Stations (SPSs), and 14 Combined Storm Overflows (CSOs) across this tactical planning unit.

The R Lugg - conf Norton Bk to conf R Arrow catchment covers an area stretching from Llangunllo in the north as far as Leominster. The geography of the catchment is predominantly rural.

There are several main rivers within the L3 including the River Lugg and Pinsley Brook. The catchment covers several major urban areas including Town Leominster and Presteigne.

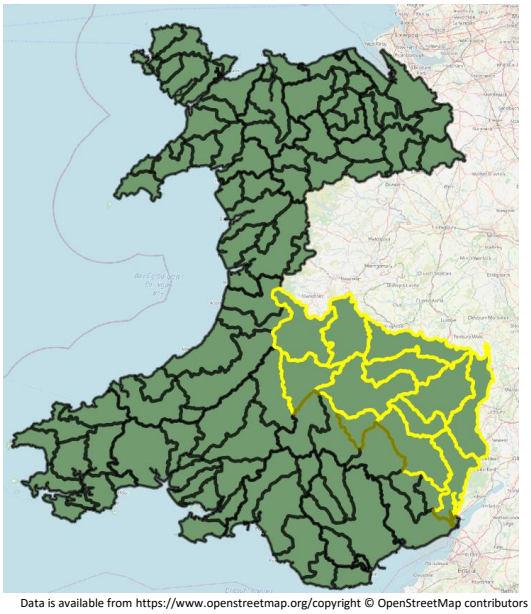


Figure 1 - River basin location detailing the associated tactial planning catchments

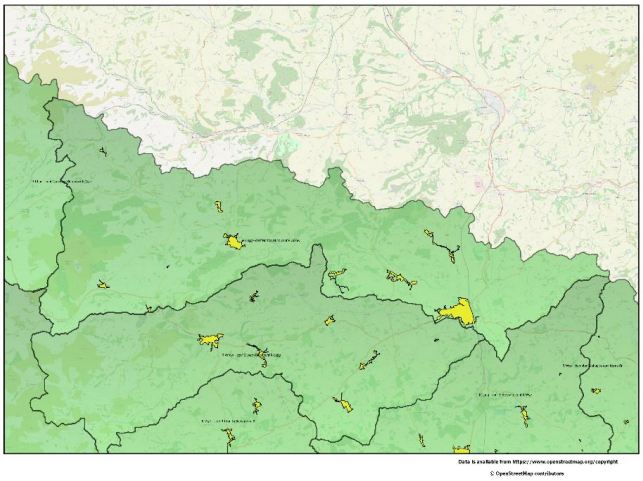


Figure 2- Tactical planning catchments

2.0 Stakeholder Engagement

The DWMP aims to enable DCWW to work collaboratively with stakeholders, regulators and local authorities to tackle current and future challenges. DCWW has identified stakeholder objectives that align with the aims of the DWMP and goals of other management plans. Table 1 details the main opportunities we have identified but this is not intended to be exhaustive. Note that these stakeholders have their own planning processes and plans which do not necessarily align with those of DCWW.

Scheme Information
Stakeholder engagement meetings area scheduled to commence in 2022. These meetings will be held between DCWW and the respective parties, such as NRW, EA, Councils and ENGO's. Further information of the outcome and points of focus towards short and long term strategy planning will be provided in the next cycle of the DWMP assessment.

Table 1 - Current and future investigation schemes

3.0 Risk

We have assessed our likely performance from now to 2050 against the objectives that we set in our most recent business plan. The results of this assessment are presented in the following sections.

To understand future performance, we need to estimate how much population will change by, the degree to which climate change will impact Wales and areas of England that border our company, and how further surface water connected to the sewer network might increase the amount and rate at which rainfall drains into our sewers.

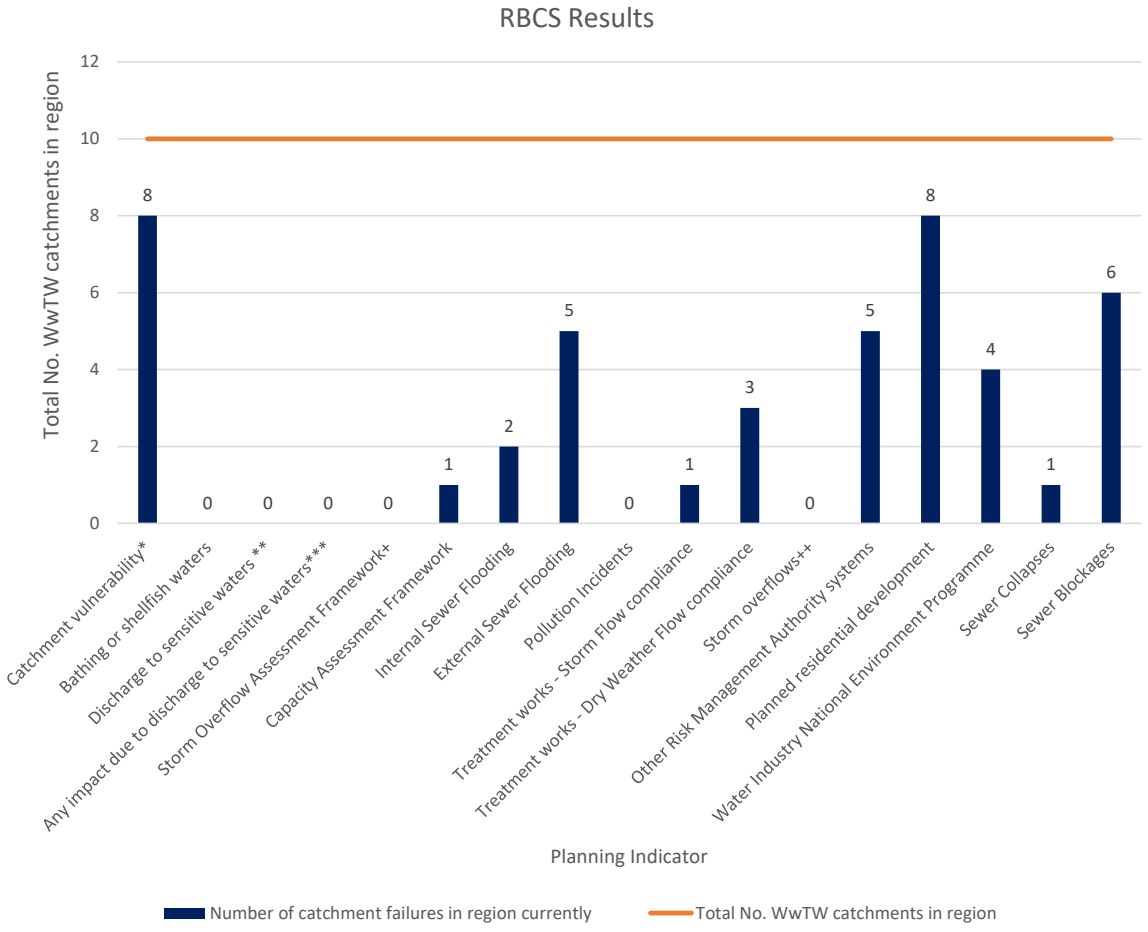
Urban creep is the term used to explain loss of green spaces, for example when new driveways or house extensions are built. It often leads to more rainwater entering sewers. Our forecasts suggest that urban creep will add up to 0.63 metres squared of impermeable ground per house per year.

Climate change is predicted to increase the intensity of storms by around 15% in this region. In a typical year, winters are likely to be warmer and wetter, and summers generally drier. More intense rainfall will happen more frequently. The population in the Wye region is set to increase to 21100 by 2050, a change of 18% based on our future projections. However there are major developments in localised areas that will contribute to future pressures on the network, including Kaye Presteigne Premises, off Lugg View, Prest and Land off Knighton Road, Presteigne.

3.1 Risk Based Catchment Screening

The Risk Based Catchment Screening (RBCS) is the initial screening process to determine if a more detailed risk assessment is required. The assessment screens catchments against planning indicators which have been stipulated in the national guidance for DWMPs. A catchment will pass through to a more detailed risk assessment if it fails against one or more of these indicators, the results are shown in Figure 3.

For this strategic planning area the biggest concerns indicated by the RBCS are Catchment Vulnerability and Planned residential development.



*To sewer flooding due to extreme wet weather events.
**Categorised as a "planned" scheduled action within the Natural Resources Wales Action Database or considered as "Remedy" on Natural England Designated Sites system.
***Categorised as a "identified" scheduled action within the Natural Resources Wales Action Database or considered as "Threat" on Natural England Designated Sites system.
+Frequency investigation triggered.
++Overflow risks not covered by other indicators,

Figure 3 - Risk Based Catchment Screening results

3.2 Baseline Risk And Vulnerability Assessment (BRAVA)

Following on from the RBCS, the Baseline Risk and Vulnerability Assessment (BRAVA) highlights current and future risk. The risk scores are driven by company targets which were set in our last business plan. These targets were subdivided according to population or sewer length, depending on the measure, to derive a target for each river basin catchment.

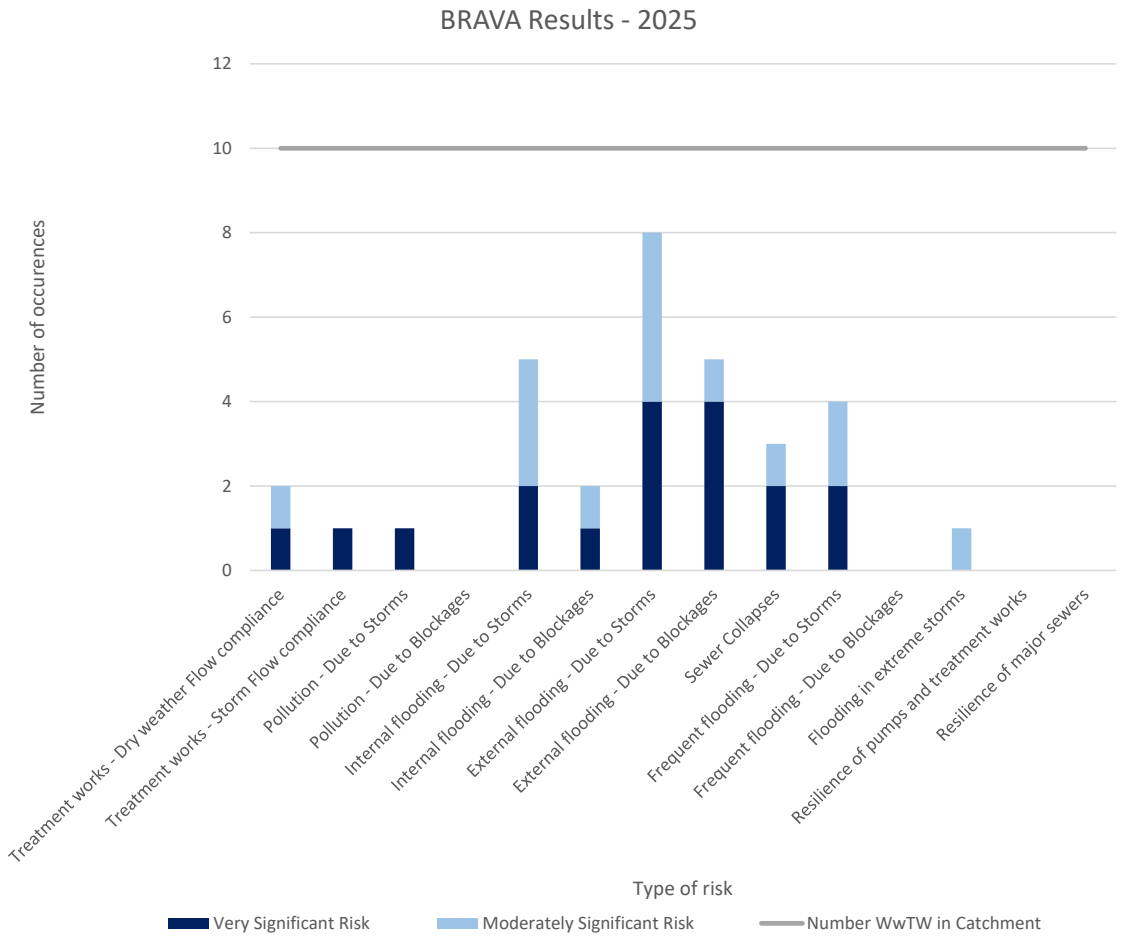


Figure 4 - BRAVA 2025 Summary

In 2025, External Flooding- due to blockages and External Flooding- due to storms are the biggest concerns in this strategic planning area.

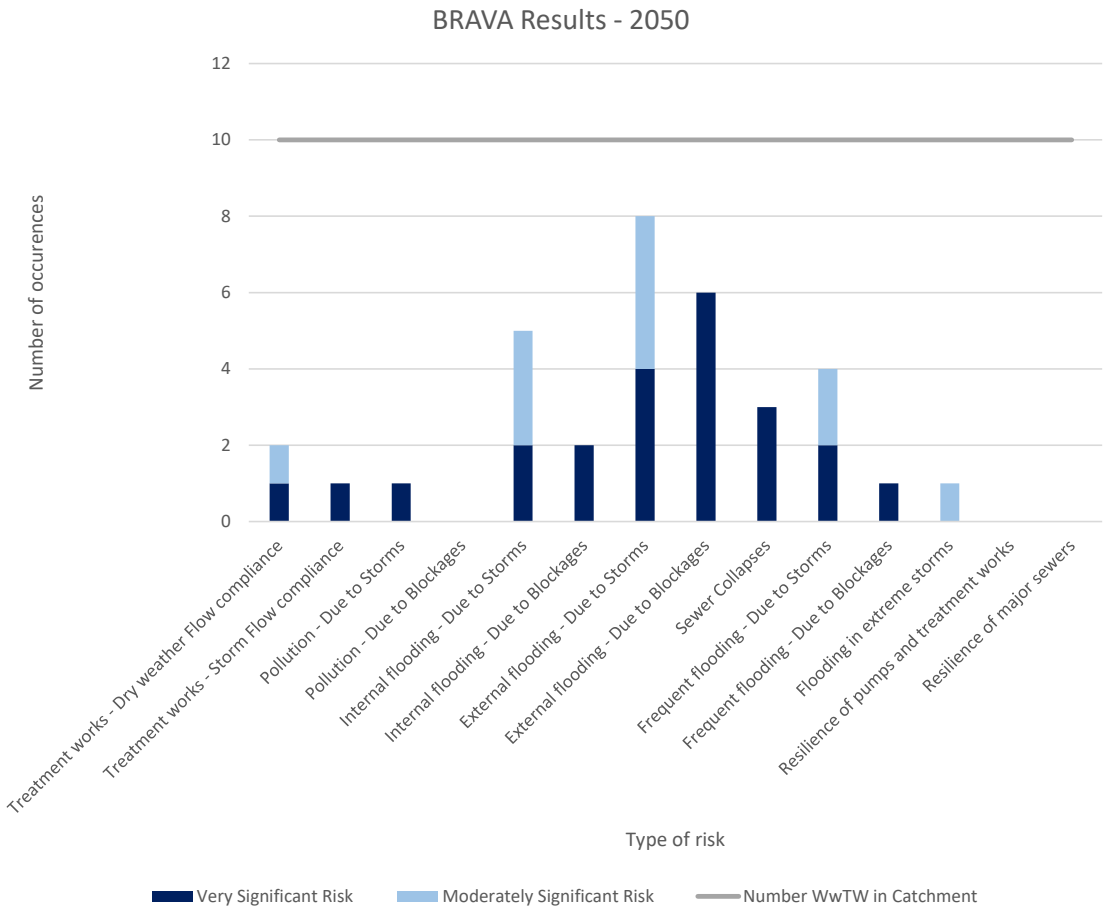


Figure 5 - BRAVA 2050 Summary

In 2050, External Flooding- due to blockages and External Flooding- due to storms are the biggest concerns in this strategic planning area.

Figures 6 and 7 indicate the current and predicted risk of flooding, pollution, and both flooding and pollution caused by lack of capacity (termed 'hydraulic overload') across our networks. These maps illustrate where the issues occur and can be used to target where we want to work with the community and stakeholders to resolve issues. By working together, we can combine knowledge and resources to deliver the best outcomes for local communities and the environment. We want to include your feedback in our decision-making process.

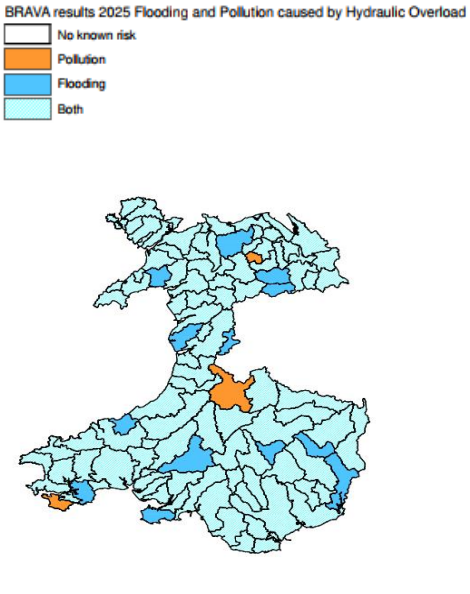


Figure 6 - Associated Strategic Planning Areas priority (2025)

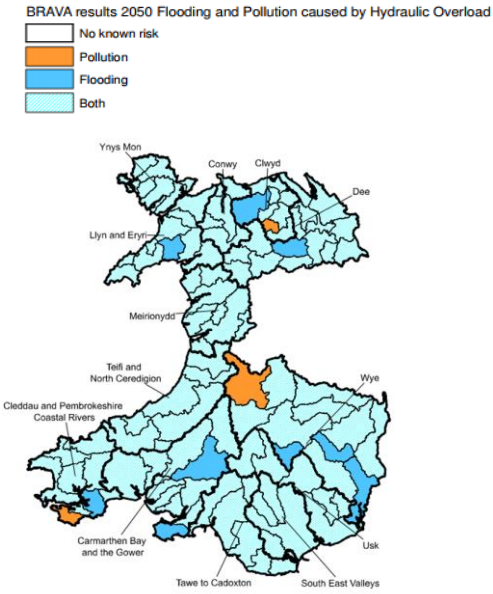


Figure 7 - Associated Strategic Planning Areas priority (2050)

3.3 Water Quality

Water quality is the classification of the quality of watercourses or water bodies in accordance to its physical, biological and chemical properties. Water quality is an important factor of environmental monitoring, ensuring that not only the water body is safe but the surrounding habitat and ecosystem is also.

Water quality status is categorised from 1 to 4, with 4 being the worst case. The priority status is based on the significance towards the risk factors triggering water quality. R Lugg - conf Norton Bk to conf R Arrow has a water quality priority status for 2050 of 3 which indicates targeted investment to mitigate and focus during AMP9.

4.0 Supply Demand

Supply-demand is an assessment of the capacity of our treatment works. It approximately assesses whether all the treatment works in a region can collectively cope with current and future flows in dry and wet weather. There are two parts to the assessment: dry weather flow (DWF) and a wet weather capacity assessment.

For the DWF part of the assessment, the suitability of the dry weather consents is tested against forecast future growth and changes in water consumption. Results for three scenarios are provided: the 0% headroom scenario assesses the region's capability for treating the predicted changes in DWF in the future with no allowance for error, with no spare treatment works capacity. The other scenarios indicate resilience - i.e. could we cope if we had flows 10% or 20% higher than estimated?

The wet weather assessment takes storm consent values where available as an indication of treatment works capacity and estimates the amount of incoming flow the treatment works is able to treat across a year. Again, three scenarios are shown, with differing treatment "targets" - i.e. if we wanted to ensure that 70% of the wet weather flows in a catchment were treated, could the treatment works cope? Changes in rainfall due to climate change and changing dry weather flows within the region mean that the percentage of flow treated across a year can change in the future.

Table 2 shows the supply-demand assessment for this region. Where a region may not have adequate capacity under a given scenario, it is flagged dark blue for further investigation. There may be local incapacity issues at individual works within the region.

L3 Area	Headroom	2025	2030	2035	2040	2045	2050
R Lugg - conf Norton Bk to conf R Arrow	0%						
	10%						
	20%						
	Treatment Target	2025	2030	2035	2040	2045	2050
	70%						
	80%						
	90%						

Table 2 - Supply Demand Balance

5.0 Options

Over time the pressures on our sewerage network change due to influences such as catchment growth, creep of rainwater into the network, or influences such as climate change impacting rainfall patterns. To ensure the plan is robust over the 30-year planning horizon and to account for the uniqueness of each catchment we have tested various types of schemes, and combination of schemes, to ensure a robust 'best value' plan is delivered.

The types of schemes tested are detailed in Table 3 and can be categorised into either improving network resilience to rainfall or improving network headroom in dry weather flow conditions.

Improving Resilience		
10% Reduction in area draining to the combined sewers	Represents removal of runoff from large commercial buildings.	Short term
25% Reduction reduction in area draining to the combined sewers	Represents removal of area runoff from non-residential paved areas where there is only one stakeholder (e.g. Local Authority or Highways Agency).	Medium term
50% Reduction reduction in area draining to the combined sewers	Represents removal of runoff from any connected area including residential properties. There are likely to be multiple stakeholders to engage with.	Long term
Improving Headroom		
Reducing infiltration	Reducing infiltration into sewers by 50%, which could be achieved by relining or replacing the public sewers .	Medium term
Reducing water use	Represents a reduction in water use per person to around 100l per person per day by 2050 by application of water efficiency measures	Medium term
Reducing trade flow	Reduce trade flows by around 25% by application of water efficiency measures.	Long term

Table 3 - Risk mitigation details

We have undertaken an analysis of all our wastewater catchments to determine the benefit in terms of potential volume of water removed from our systems for each scheme type to determine a journey plan, (see Figure 8 below), which provides the direction of the best scheme types to undertake in this catchment for the most benefit against predicted future risk from growth, creep and climate change.

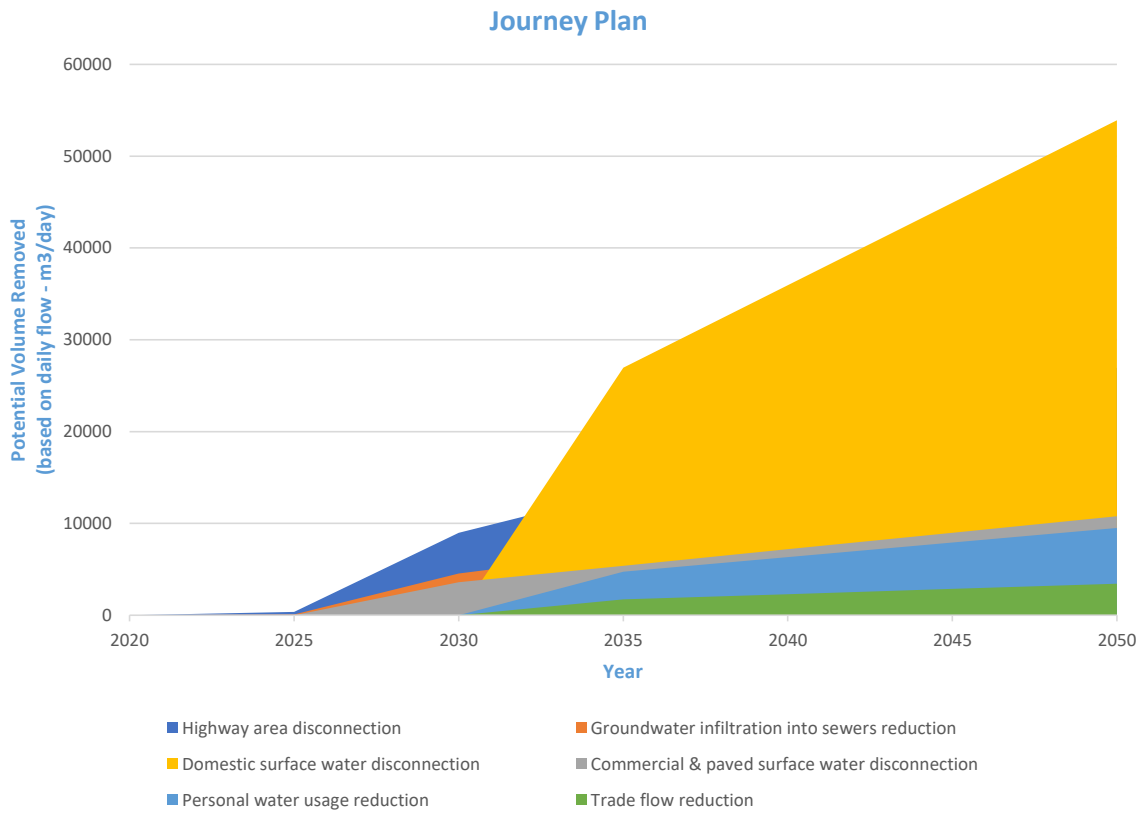


Figure 8 - Journey Plan

Approaches to managing risk

We have undertaken analysis to determine the likely costs to mitigate future predicted pollution and flooding. We assess combined sewer overflows based on the number of times they are predicted to spill in a 'typical year'. Table 4 illustrates the cost of potential measures to mitigate risk to varying standards. The assessment calculates the impact of rainfall and drainage contributions to the network relative to today's costs.

Mitigating the risk posed by flooding has been assessed in terms of probability of occurrence, we use the size of a storm event that has the probability of occurring once every 30 years. Table 5 illustrates the cost of potential mitigation measures to mitigate varying flood risk types.

The choice of scenarios for storm overflow mitigation in Table 4 is a separate cost and would be required in addition to the choice of scenarios for flooding protection in Table 5. The chosen scenarios for Storm overflows nd flooding are to be added together.

Choice of Scenario	Current Scenario (£)	2030 Scenario (£)	2050 Scenario (£)
Maintain Existing Performance*	-	£14,000,000	£20,000,000
40 spills in a Typical Year	£3,000,000	£3,000,000	£3,000,000
20 spills in a Typical Year	£5,000,000	£5,000,000	£5,000,000
10 spills in a Typical Year	£6,000,000	£6,000,000	£6,000,000
0 spills in a Typical Year	£14,000,000	£15,000,000	£15,000,000
Equivalent No. Olympic Swimming Pools in 10 spills scenario	22.00	24.00	26.00

* Maintain is a considered scenario where we will continue to maintain the current level of service within the region and improve the network and address known and emerging risk.

Table 4 - Summary of Combined Sewer Overflow option investments

Choice of Scenario	Current Scenario (£)	2050 Scenario (£)	2050 Resilience Scenario (£) 1 in 50 yr (Storm Dennis)
Internal escapes	£1,000,000	£2,000,000	£3,000,000
External escapes in gardens	£1,000,000	£2,000,000	£2,000,000
Escapes in highways	£29,000,000	£37,000,000	£67,000,000
No future flooding	-	£10,000,000	£49,000,000
Total	£31,000,000	£51,000,000	£121,000,000

Table 5 - Summary of Flooding option investments

We have developed solutions which aim to provide protection against drainage and network failure, pollution events and flooding, internal and external to properties. The solutions developed highlight the level of investment required to bring our entire network up to the level of protection required to be resilient for future risk and demands. The range of scenarios is to provide a choice for understanding and discussion of future direction.

We are beginning to break down the investment indicated in Table 4 and 5 by creating practical schemes ready for delivery these schemes are designed as 100% traditional, 100% sustainable or green and 100% mixture of the 2. These packages have then been analysed in terms of their long term benefit and environmental and social cost to society and one has been chosen for inclusion as our preferred best value option. The areas where we have started our delivery programme aims to provide protection, to our worst served customers and rivers designated as Special Areas of Conservation (SAC) under the

For more information on the methodology developed to carry out the assessments see the DWMP plan main report.

If you want to work with us to develop joint projects to reduce the risk of flooding and protect the environment, please get in touch.

We will continue to work with Welsh Government, Regulators and Local Authorities about the pace, scale and affordability of improvements to be made.

We will be consulting on the preferred approach to planning and once its concluded the next stage is to develop the pipeline of options to meet the pace scale and affordability discussed with Welsh Government and our regulators.

Table 6 - Summary of solutions put forward are a first cycle preferred plan before SEA/HRA

L4 Catchments	No. Schemes
LEOMINSTER WORCESTER ROAD	0
SHOBDON	0
KINGSLAND	0
LUSTON & YARPOLE	0
PRESTEIGNE	0
EVENJOBB (NR NEW RADNOR)	0
OLD RADNOR	0
LLANGUNLLO (W OF KNIGHTON) SWK	0
NEW RADNOR	0
NORTON (N OF PRESTEIGNE)	0

DWMP Tactial Planning Catchment Summary

R Lugg - conf R Arrow to conf R Wye

1.0 Introduction

This Drainage and Wastewater Management Plan (DWMP) sets out how Dŵr Cymru Welsh Water (DCWW) will manage and improve its assets to maintain a resilient and robust wastewater drainage system. The plan aims to manage flooding and pollution from our wastewater assets in the future, for our customers and our environment by working collaboratively with stakeholders, regulators and local authorities to provide a complete partnership in tackling current and future problems.

1.1 Catchment Information

The R Lugg - conf R Arrow to conf R Wye planning catchment lies within the Wye river basin catchment, (see Figure 1 below), it consists of 18 wastewater catchments (see Figure 2 below). There is a combined population of 135942, this is set to decrease to 97522 by 2050, a change of -28%. There is a total sewer length of 509km, with a foul sewer length of 240km, a surface water length of 104km and a combined sewer length of 160km. There are 18 Wastewater Treatment Works (WwTW), 103 Sewerage Pumping Stations (SPSs), and 28 Combined Storm Overflows (CSOs) across this tactical planning unit.

The R Lugg - conf R Arrow to conf R Wye catchment covers an area stretching from Sparrington in the north as far as Kingstone and Madley. The geography of the catchment is predominantly rural.

There are several main rivers within the L3 including the river Lugg and river Wye . The catchment covers several major urban areas including Town Bodenham and Hereford Eign and Rotherwas.

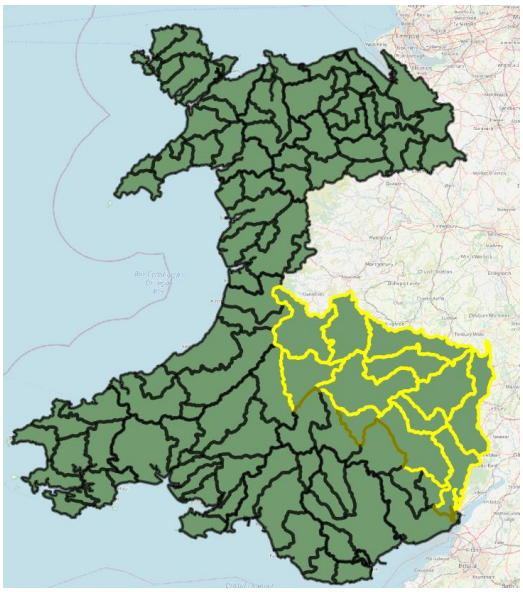


Figure 1 - River basin location detailing the associated tactial planning catchments

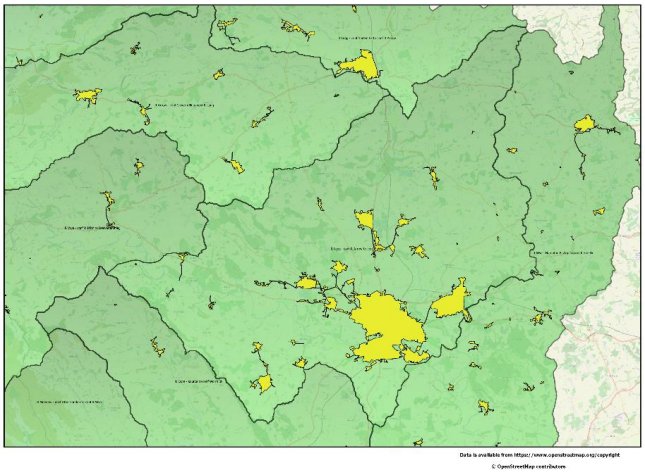


Figure 2- Tactical planning catchments

2.0 Stakeholder Engagement

The DWMP aims to enable DCWW to work collaboratively with stakeholders, regulators and local authorities to tackle current and future challenges. DCWW has identified stakeholder objectives that align with the aims of the DWMP and goals of other management plans. Table 1 details the main opportunities we have identified but this is not intended to be exhaustive. Note that these stakeholders have their own planning processes and plans which do not necessarily align with those of DCWW.

Scheme Information
Stakeholder engagement meetings area scheduled to commence in 2022. These meetings will be held between DCWW and the respective parties, such as NRW, EA, Councils and ENGO's. Further information of the outcome and points of focus towards short and long term strategy planning will be provided in the next cycle of the DWMP assessment.

Table 1 - Current and future investigation schemes

3.0 Risk

We have assessed our likely performance from now to 2050 against the objectives that we set in our most recent business plan. The results of this assessment are presented in the following sections.

To understand future performance, we need to estimate how much population will change by, the degree to which climate change will impact Wales and areas of England that border our company, and how further surface water connected to the sewer network might increase the amount and rate at which rainfall drains into our sewers.

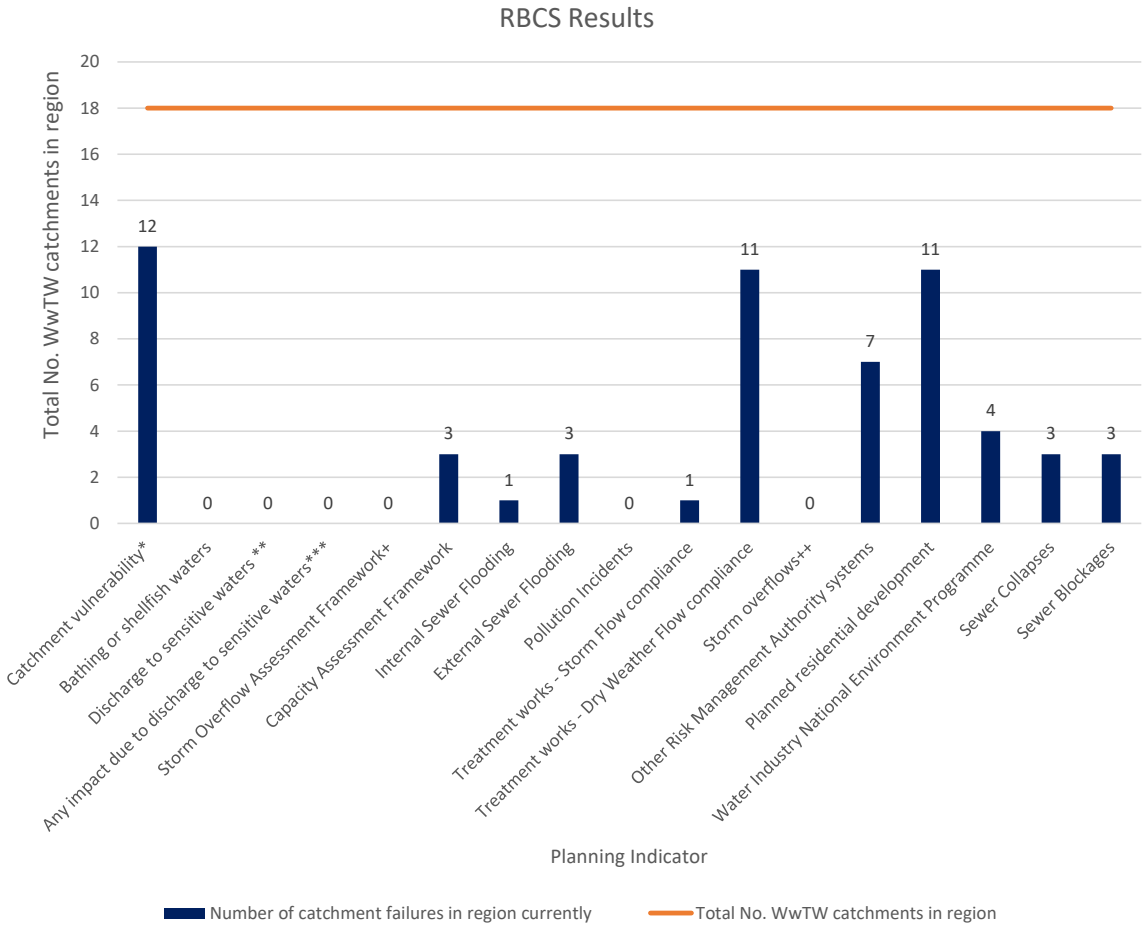
Urban creep is the term used to explain loss of green spaces, for example when new driveways or house extensions are built. It often leads to more rainwater entering sewers. Our forecasts suggest that urban creep will add up to 0.63 metres squared of impermeable ground per house per year.

Climate change is predicted to increase the intensity of storms by around 15% in this region. In a typical year, winters are likely to be warmer and wetter, and summers generally drier. More intense rainfall will happen more frequently. The population in the Wye region is set to decrease to 97500 by 2050, a change of -28% based on our future projections. However there are major developments in localised areas that will contribute to future pressures on the network, including Tudor Road, Wyesham and Wonastow Road, Monmouth.

3.1 Risk Based Catchment Screening

The Risk Based Catchment Screening (RBCS) is the initial screening process to determine if a more detailed risk assessment is required. The assessment screens catchments against planning indicators which have been stipulated in the national guidance for DWMPs. A catchment will pass through to a more detailed risk assessment if it fails against one or more of these indicators, the results are shown in Figure 3.

For this strategic planning area the biggest concerns indicated by the RBCS are Catchment Vulnerability, followed by Treatment works compliance - dry and Planned residential development.



*To sewer flooding due to extreme wet weather events.
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+Frequency investigation triggered.
++Overflow risks not covered by other indicators,

Figure 3 - Risk Based Catchment Screening results

3.2 Baseline Risk And Vulnerability Assessment (BRAVA)

Following on from the RBCS, the Baseline Risk and Vulnerability Assessment (BRAVA) highlights current and future risk. The risk scores are driven by company targets which were set in our last business plan. These targets were subdivided according to population or sewer length, depending on the measure, to derive a target for each river basin catchment.

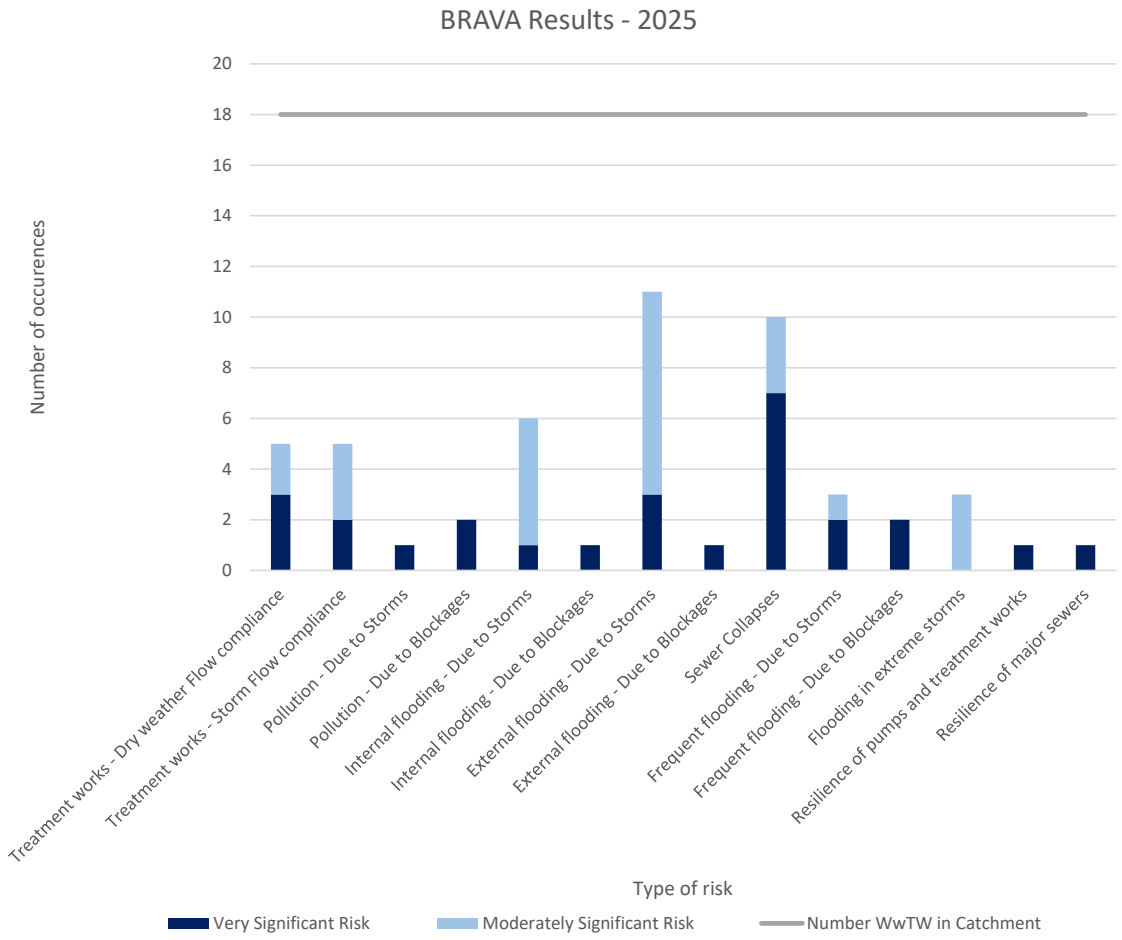


Figure 4 - BRAVA 2025 Summary

In 2025, Sewer collapses and External Flooding- due to storms are the biggest concerns in this strategic planning area.

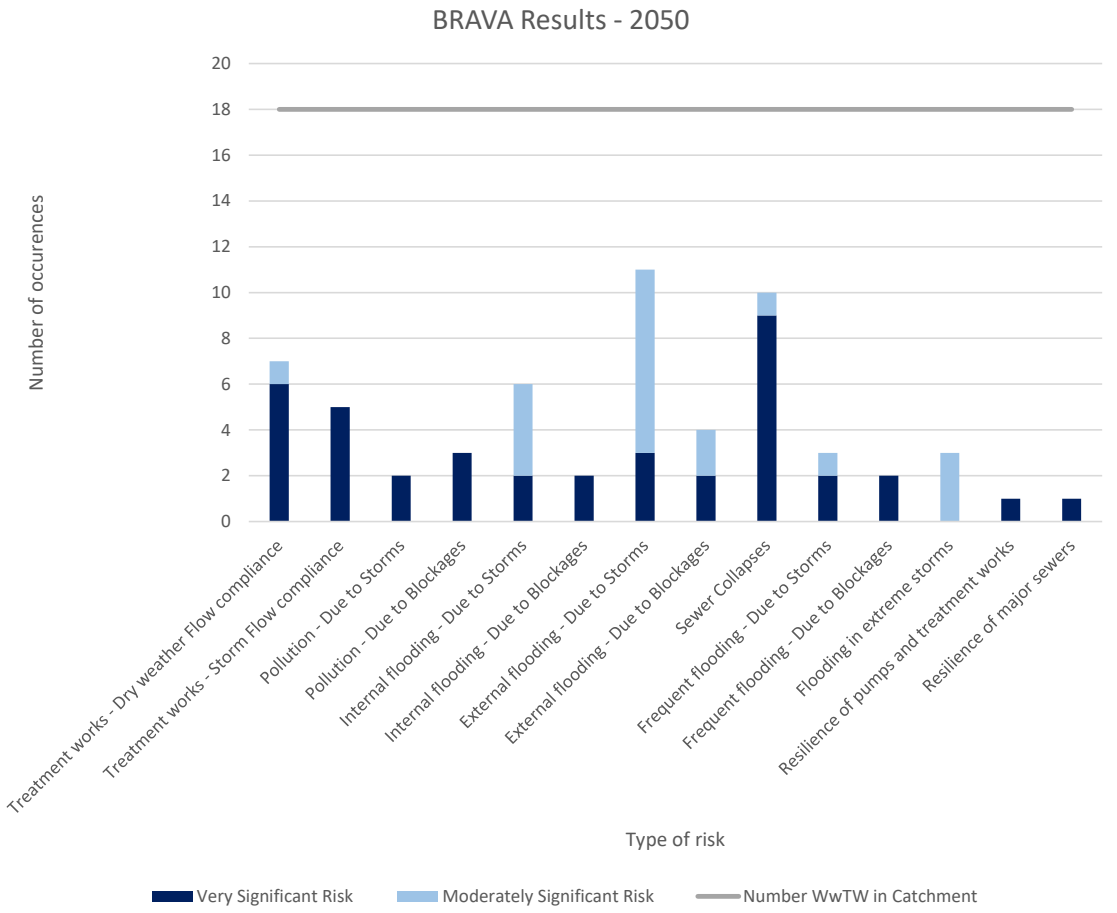


Figure 5 - BRAVA 2050 Summary

In 2050, Sewer collapses followed by Treatment works compliance - dry and External Flooding - due to storms are the biggest concerns.

Figures 6 and 7 indicate the current and predicted risk of flooding, pollution, and both flooding and pollution caused by lack of capacity (termed 'hydraulic overload') across our networks. These maps illustrate where the issues occur and can be used to target where we want to work with the community and stakeholders to resolve issues. By working together, we can combine knowledge and resources to deliver the best outcomes for local communities and the environment. We want to include your feedback in our decision-making process.

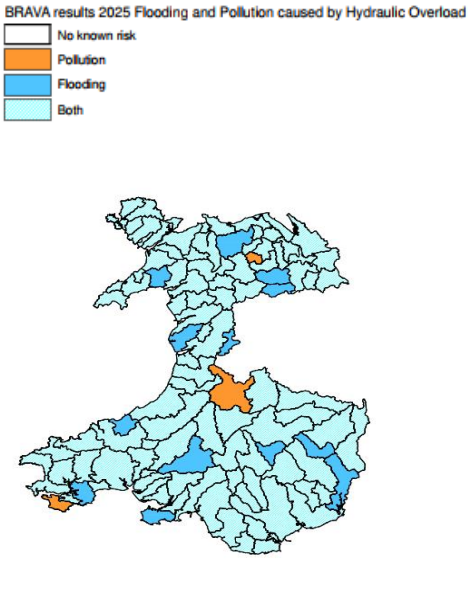


Figure 6 - Associated Strategic Planning Areas priority (2025)

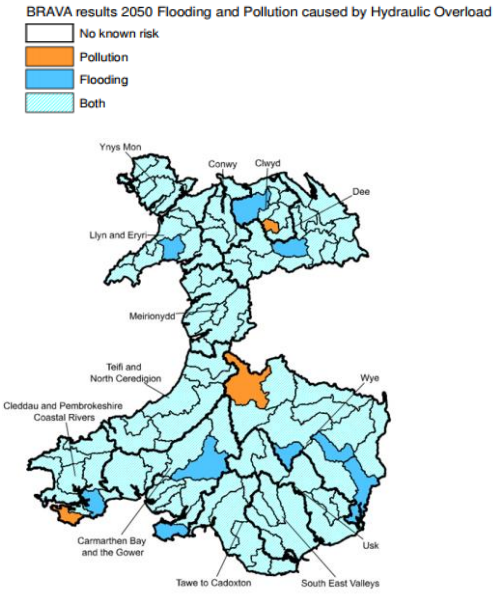


Figure 7 - Associated Strategic Planning Areas priority (2050)

3.3 Water Quality

Water quality is the classification of the quality of watercourses or water bodies in accordance to its physical, biological and chemical properties. Water quality is an important factor of environmental monitoring, ensuring that not only the water body is safe but the surrounding habitat and ecosystem is also.

Water quality status is categorised from 1 to 4, with 4 being the worst case. The priority status is based on the significance towards the risk factors triggering water quality. R Lugg - conf R Arrow to conf R Wye has a water quality priority status for 2050 of 2 which indicates targeted investment to mitigate and focus during AMP10.

4.0 Supply Demand

Supply-demand is an assessment of the capacity of our treatment works. It approximately assesses whether all the treatment works in a region can collectively cope with current and future flows in dry and wet weather. There are two parts to the assessment: dry weather flow (DWF) and a wet weather capacity assessment.

For the DWF part of the assessment, the suitability of the dry weather consents is tested against forecast future growth and changes in water consumption. Results for three scenarios are provided: the 0% headroom scenario assesses the region's capability for treating the predicted changes in DWF in the future with no allowance for error, with no spare treatment works capacity. The other scenarios indicate resilience - i.e. could we cope if we had flows 10% or 20% higher than estimated?

The wet weather assessment takes storm consent values where available as an indication of treatment works capacity and estimates the amount of incoming flow the treatment works is able to treat across a year. Again, three scenarios are shown, with differing treatment "targets" - i.e. if we wanted to ensure that 70% of the wet weather flows in a catchment were treated, could the treatment works cope? Changes in rainfall due to climate change and changing dry weather flows within the region mean that the percentage of flow treated across a year can change in the future.

Table 2 shows the supply-demand assessment for this region. Where a region may not have adequate capacity under a given scenario, it is flagged dark blue for further investigation. There may be local incapacity issues at individual works within the region.

L3 Area	Headroom	2025	2030	2035	2040	2045	2050
R Lugg - conf R Arrow to conf R Wye	0%						
	10%						
	20%						
	Treatment Target	2025	2030	2035	2040	2045	2050
	70%						
	80%						
	90%						

Table 2 - Supply Demand Balance

5.0 Options

Over time the pressures on our sewerage network change due to influences such as catchment growth, creep of rainwater into the network, or influences such as climate change impacting rainfall patterns. To ensure the plan is robust over the 30-year planning horizon and to account for the uniqueness of each catchment we have tested various types of schemes, and combination of schemes, to ensure a robust 'best value' plan is delivered.

The types of schemes tested are detailed in Table 3 and can be categorised into either improving network resilience to rainfall or improving network headroom in dry weather flow conditions.

Improving Resilience		
10% Reduction in area draining to the combined sewers	Represents removal of runoff from large commercial buildings.	Short term
25% Reduction reduction in area draining to the combined sewers	Represents removal of area runoff from non-residential paved areas where there is only one stakeholder (e.g. Local Authority or Highways Agency).	Medium term
50% Reduction reduction in area draining to the combined sewers	Represents removal of runoff from any connected area including residential properties. There are likely to be multiple stakeholders to engage with.	Long term
Improving Headroom		
Reducing infiltration	Reducing infiltration into sewers by 50%, which could be achieved by relining or replacing the public sewers .	Medium term
Reducing water use	Represents a reduction in water use per person to around 100l per person per day by 2050 by application of water efficiency measures	Medium term
Reducing trade flow	Reduce trade flows by around 25% by application of water efficiency measures.	Long term

Table 3 - Risk mitigation details

We have undertaken an analysis of all our wastewater catchments to determine the benefit in terms of potential volume of water removed from our systems for each scheme type to determine a journey plan, (see Figure 8 below), which provides the direction of the best scheme types to undertake in this catchment for the most benefit against predicted future risk from growth, creep and climate change.

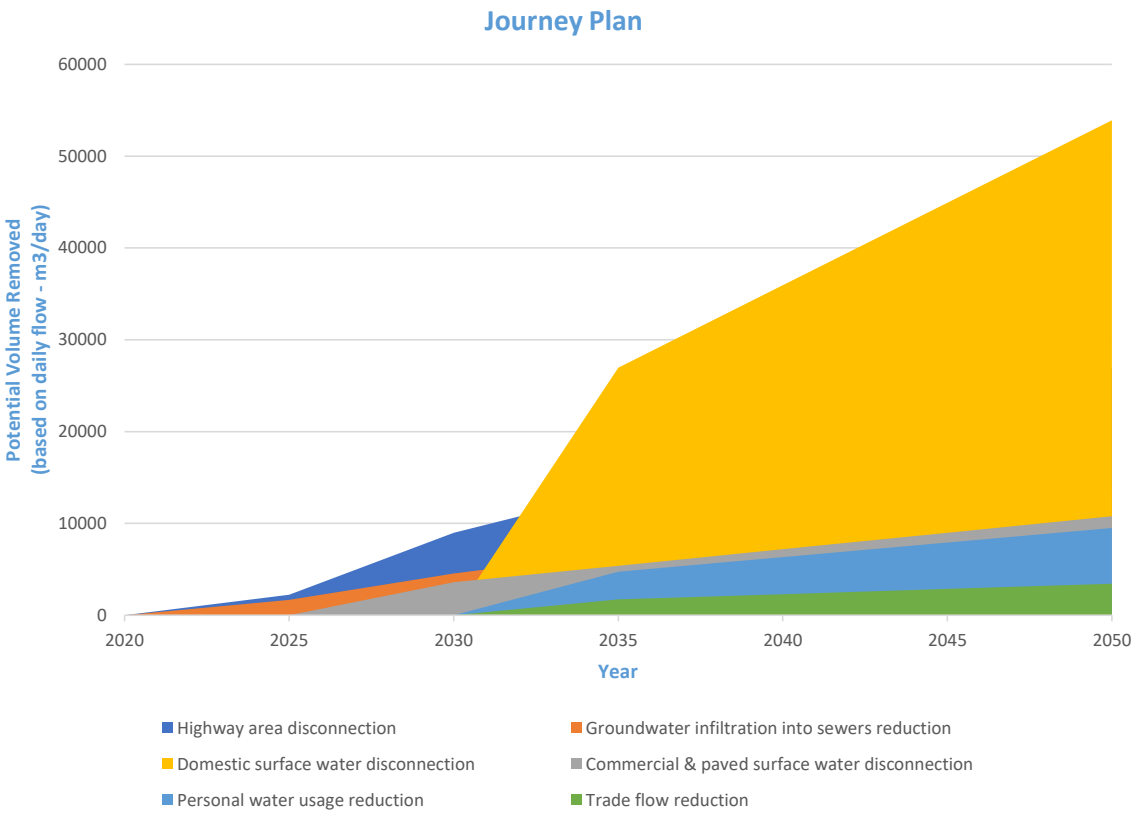


Figure 8 - Journey Plan

Approaches to managing risk

We have undertaken analysis to determine the likely costs to mitigate future predicted pollution and flooding. We assess combined sewer overflows based on the number of times they are predicted to spill in a 'typical year'. Table 4 illustrates the cost of potential measures to mitigate risk to varying standards. The assessment calculates the impact of rainfall and drainage contributions to the network relative to today's costs.

Mitigating the risk posed by flooding has been assessed in terms of probability of occurrence, we use the size of a storm event that has the probability of occurring once every 30 years. Table 5 illustrates the cost of potential mitigation measures to mitigate varying flood risk types.

The choice of scenarios for storm overflow mitigation in Table 4 is a separate cost and would be required in addition to the choice of scenarios for flooding protection in Table 5. The chosen scenarios for Storm overflows nd flooding are to be added together.

Choice of Scenario	Current Scenario (£)	2030 Scenario (£)	2050 Scenario (£)
Maintain Existing Performance*	-	£13,000,000	£21,000,000
40 spills in a Typical Year	£6,000,000	£6,000,000	£6,000,000
20 spills in a Typical Year	£13,000,000	£13,000,000	£13,000,000
10 spills in a Typical Year	£20,000,000	£20,000,000	£21,000,000
0 spills in a Typical Year	£163,000,000	£165,000,000	£170,000,000
Equivalent No. Olympic Swimming Pools in 10 spills scenario	129.00	133.00	140.00

* Maintain is a considered scenario where we will continue to maintain the current level of service within the region and improve the network and address known and emerging risk.

Table 4 - Summary of Combined Sewer Overflow option investments

Choice of Scenario	Current Scenario (£)	2050 Scenario (£)	2050 Resilience Scenario (£) 1 in 50 yr (Storm Dennis)
Internal escapes	£9,000,000	£11,000,000	£15,000,000
External escapes in gardens	£4,000,000	£6,000,000	£8,000,000
Escapes in highways	£19,000,000	£24,000,000	£37,000,000
No future flooding	-	£55,000,000	£273,000,000
Total	£32,000,000	£96,000,000	£333,000,000

Table 5 - Summary of Flooding option investments

We have developed solutions which aim to provide protection against drainage and network failure, pollution events and flooding, internal and external to properties. The solutions developed highlight the level of investment required to bring our entire network up to the level of protection required to be resilient for future risk and demands. The range of scenarios is to provide a choice for understanding and discussion of future direction.

We are beginning to break down the investment indicated in Table 4 and 5 by creating practical schemes ready for delivery these schemes are designed as 100% traditional, 100% sustainable or green and 100% mixture of the 2. These packages have then been analysed in terms of their long term benefit and environmental and social cost to society and one has been chosen for inclusion as our preferred best value option. The areas where we have started our delivery programme aims to provide protection, to our worst served customers and rivers designated as Special Areas of Conservation (SAC) under the

For more information on the methodology developed to carry out the assessments see the DWMP plan main report.

If you want to work with us to develop joint projects to reduce the risk of flooding and protect the environment, please get in touch.

We will continue to work with Welsh Government, Regulators and Local Authorities about the pace, scale and affordability of improvements to be made.

We will be consulting on the preferred approach to planning and once its concluded the next stage is to develop the pipeline of options to meet the pace scale and affordability discussed with Welsh Government and our regulators.

Table 6 - Summary of solutions put forward are a first cycle preferred plan before SEA/HRA

L4 Catchments	No. Schemes
ROTHERWAS (HEREFORD) STW	0
KINGSTONE & MADLEY (W OF HEREFORD)	0
MORETON-ON-LUGG STW	0
CANON PYON	0
BODENHAM	0
PRESTON WYNNE	0
PIPE & LYDE (N OF HEREFORD)	0
CLEHONGER - Cage Brook	0
STAUNTON-ON-WYE SWK	0
EATON BISHOP (NR HEREFORD)	0
ULLINGSWICK DINMARSH	0
MOCCAS SWK	0
PRESTON-ON-WYE SWK	0
BULLOCKS BRIDGE (NR ULLINGSWICK)	0
SPARRINGTON	0
BREDWARDINE STW	0
OCLE PYCHARD	0
HEREFORD EIGN	0

DWMP Tactial Planning Catchment Summary

R Monnow - conf Afon Honddu to conf R Wye

1.0 Introduction

This Drainage and Wastewater Management Plan (DWMP) sets out how Dŵr Cymru Welsh Water (DCWW) will manage and improve its assets to maintain a resilient and robust wastewater drainage system. The plan aims to manage flooding and pollution from our wastewater assets in the future, for our customers and our environment by working collaboratively with stakeholders, regulators and local authorities to provide a complete partnership in tackling current and future problems.

1.1 Catchment Information

The R Monnow - conf Afon Honddu to conf R Wye planning catchment lies within the Wye river basin catchment, (see Figure 1 below), it consists of 15 wastewater catchments (see Figure 2 below). There is a combined population of 14334, this is set to increase to 14934 by 2050, a change of 4%. There is a total sewer length of 122km, with a foul sewer length of 79km, a surface water length of 31km and a combined sewer length of 11km. There are 15 Wastewater Treatment Works (WwTW), 17 Sewerage Pumping Stations (SPSs), and 9 Combined Storm Overflows (CSOs) across this tactical planning unit.

The R Monnow - conf Afon Honddu to conf R Wye catchment covers an area stretching from Longtown and Kentchurch in the north as far as Cwmcaravan to the south. The geography of the catchment is predominantly rural.

There are several main rivers within the L3 including the River Trothy and River Monmow. The catchment covers several major urban areas including Town Monmouth.

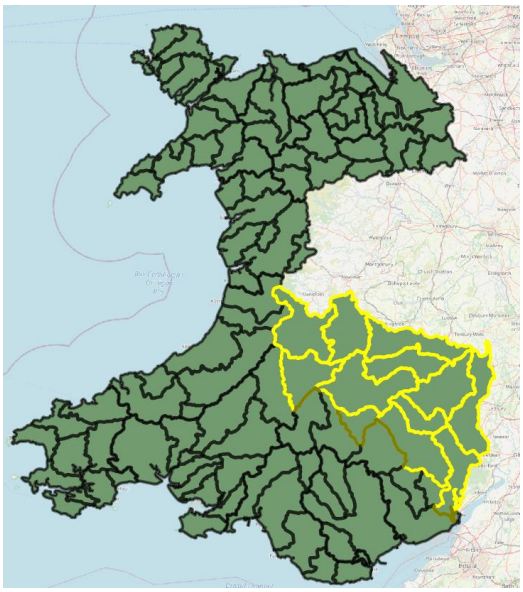


Figure 1 - River basin location detailing the associated tactial planning catchments

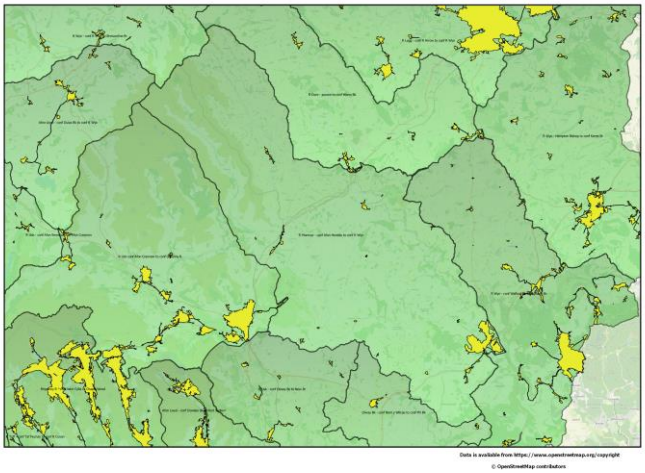


Figure 2- Tactical planning catchments

2.0 Stakeholder Engagement

The DWMP aims to enable DCWW to work collaboratively with stakeholders, regulators and local authorities to tackle current and future challenges. DCWW has identified stakeholder objectives that align with the aims of the DWMP and goals of other management plans. Table 1 details the main opportunities we have identified but this is not intended to be exhaustive. Note that these stakeholders have their own planning processes and plans which do not necessarily align with those of DCWW.

Scheme Information
Stakeholder engagement meetings area scheduled to commence in 2022. These meetings will be held between DCWW and the respective parties, such as NRW, EA, Councils and ENGO's. Further information of the outcome and points of focus towards short and long term strategy planning will be provided in the next cycle of the DWMP assessment.

Table 1 - Current and future investigation schemes

3.0 Risk

We have assessed our likely performance from now to 2050 against the objectives that we set in our most recent business plan. The results of this assessment are presented in the following sections.

To understand future performance, we need to estimate how much population will change by, the degree to which climate change will impact Wales and areas of England that border our company, and how further surface water connected to the sewer network might increase the amount and rate at which rainfall drains into our sewers.

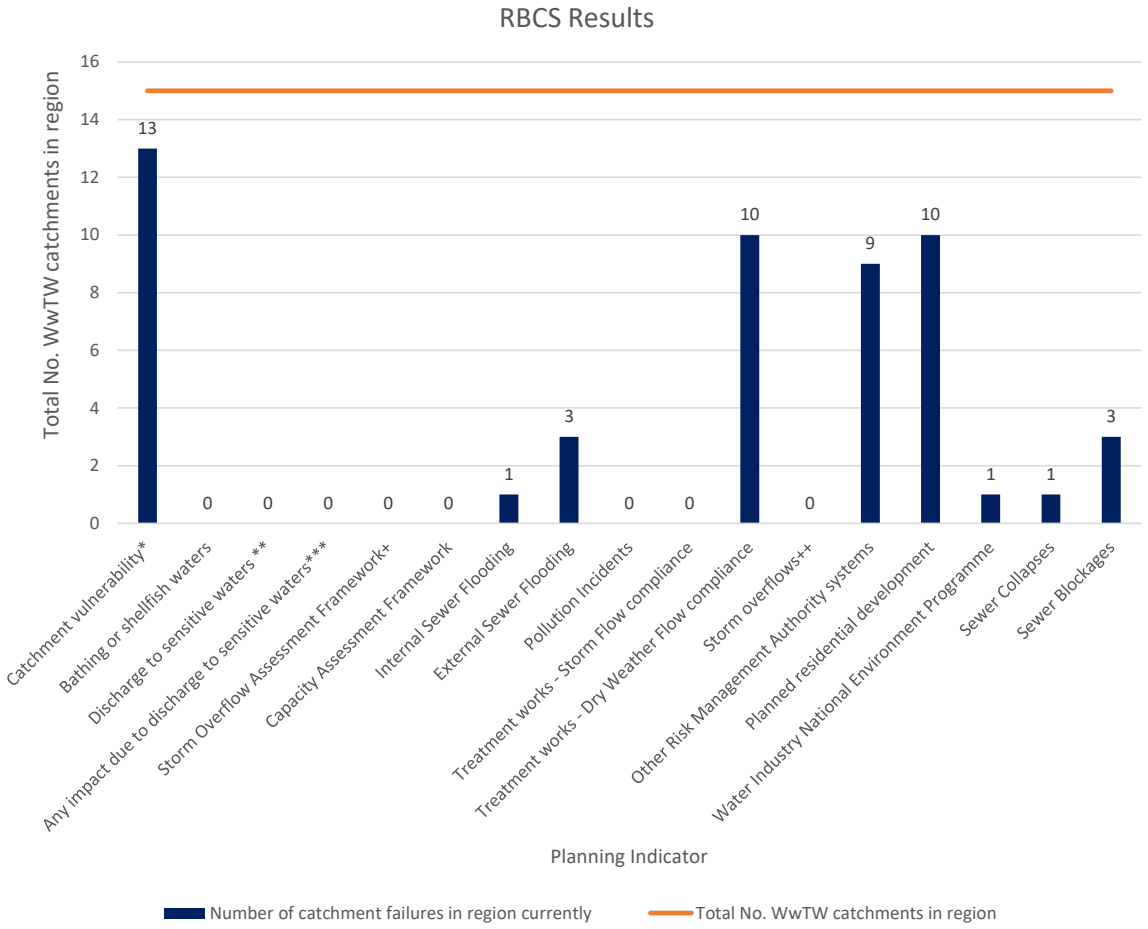
Urban creep is the term used to explain loss of green spaces, for example when new driveways or house extensions are built. It often leads to more rainwater entering sewers. Our forecasts suggest that urban creep will add up to 0.63 metres squared of impermeable ground per house per year.

Climate change is predicted to increase the intensity of storms by around 15% in this region. In a typical year, winters are likely to be warmer and wetter, and summers generally drier. More intense rainfall will happen more frequently. The population in the Wye region is set to increase to 14900 by 2050, a change of 4% based on our future projections. However there are major developments in localised areas that will contribute to future pressures on the network, including Tudor Road, Wyesham and Wonastow Road, Monmouth.

3.1 Risk Based Catchment Screening

The Risk Based Catchment Screening (RBCS) is the initial screening process to determine if a more detailed risk assessment is required. The assessment screens catchments against planning indicators which have been stipulated in the national guidance for DWMPs. A catchment will pass through to a more detailed risk assessment if it fails against one or more of these indicators, the results are shown in Figure 3.

For this strategic planning area the biggest concerns indicated by the RBCS is Catchment Vulnerability followed by Treatment works compliance - dry and Planned residential development.



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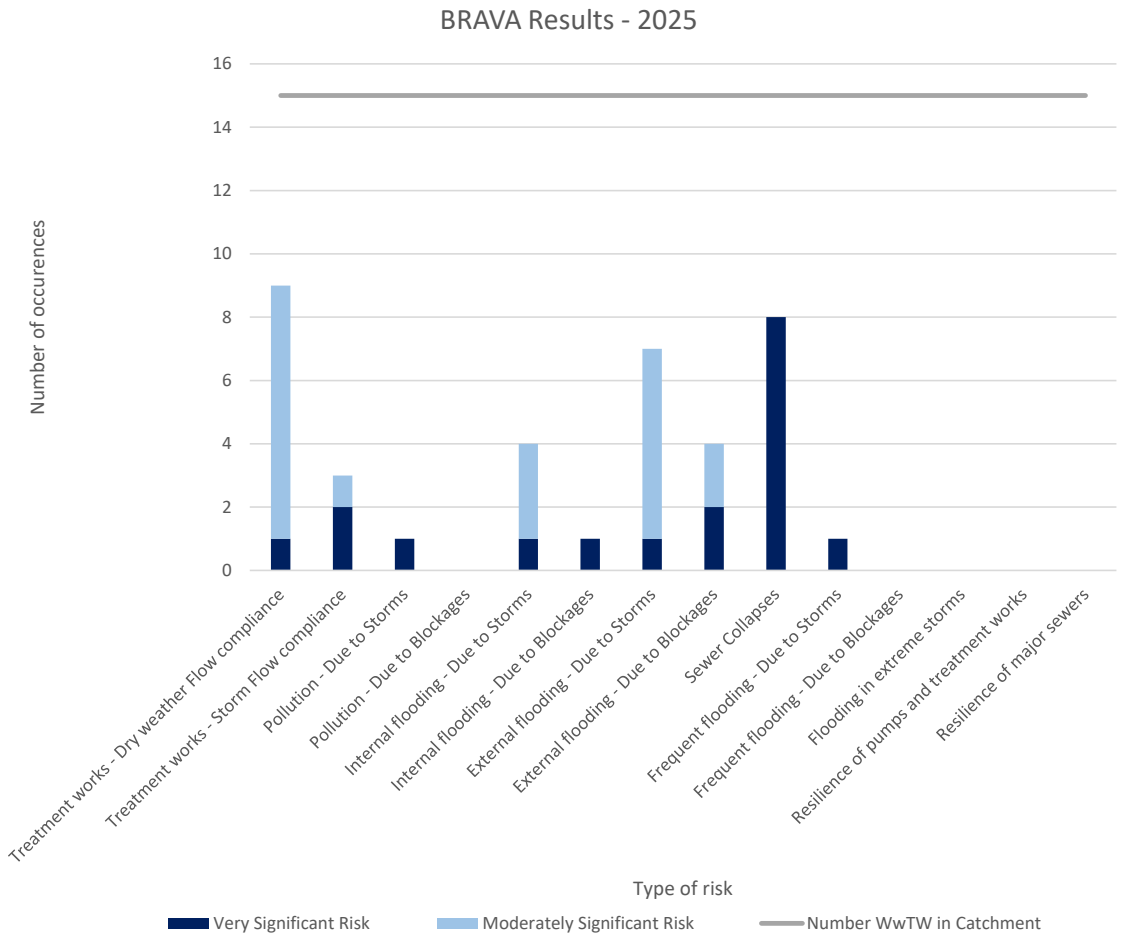
***Categorised as a "identified" scheduled action within the Natural Resources Wales Action Database or considered as "Threat" on Natural England Designated Sites system.
+Frequency investigation triggered.
++Overflow risks not covered by other indicators,

Figure 3 - Risk Based Catchment Screening results

3.2 Baseline Risk And Vulnerability Assessment (BRAVA)

Following on from the RBCS, the Baseline Risk and Vulnerability Assessment (BRAVA) highlights current and future risk. The risk scores are driven by company targets which were set in our last business plan. These targets were subdivided according to population or sewer length, depending on the measure, to derive a target for each river basin catchment.



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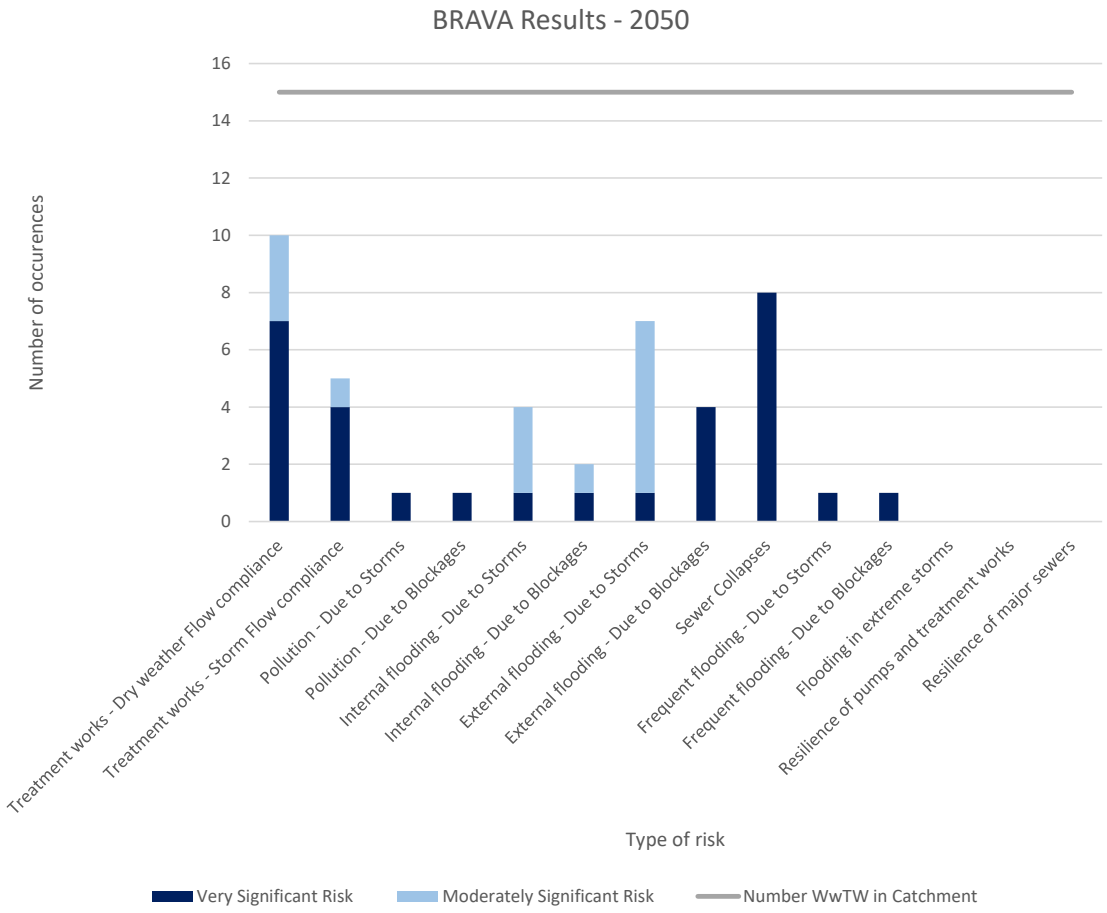
In 2025, Sewer collapses and Treatment works compliance - dry are the biggest concerns in this strategic planning area.



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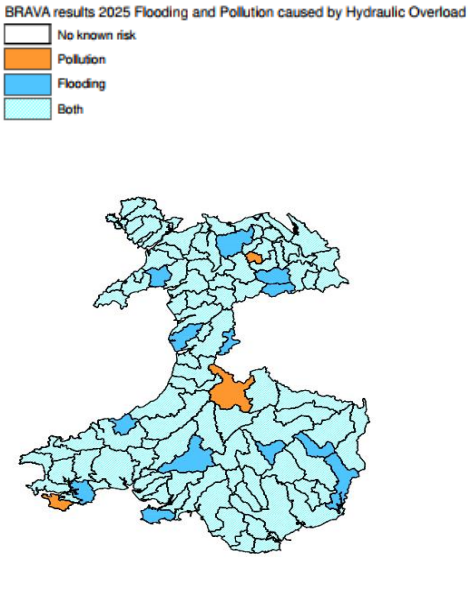

Figure 6 - Associated Strategic Planning Areas priority (2025)

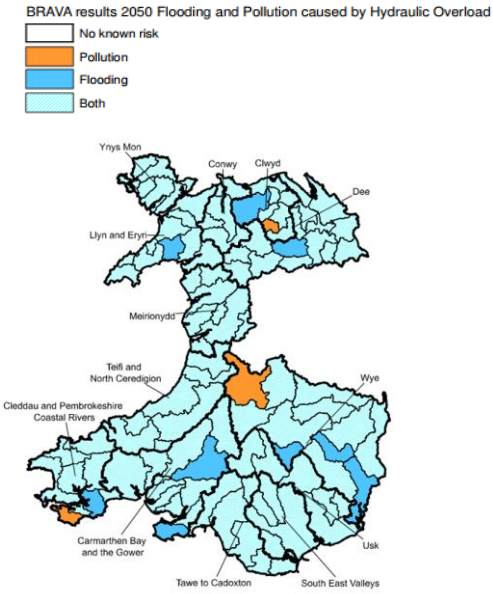

Figure 7 - Associated Strategic Planning Areas priority (2050)

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Water quality is the classification of the quality of watercourses or water bodies in accordance to its physical, biological and chemical properties. Water quality is an important factor of environmental monitoring, ensuring that not only the water body is safe but the surrounding habitat and ecosystem is also.

Water quality status is categorised from 1 to 4, with 4 being the worst case. The priority status is based on the significance towards the risk factors triggering water quality. R Monnow - conf Afon Honddu to conf R Wye has a water quality priority status for 2050 of 1 which indicates targeted investment to mitigate and focus during AMP11.

4.0 Supply Demand

Supply-demand is an assessment of the capacity of our treatment works. It approximately assesses whether all the treatment works in a region can collectively cope with current and future flows in dry and wet weather. There are two parts to the assessment: dry weather flow (DWF) and a wet weather capacity assessment.

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Table 2 shows the supply-demand assessment for this region. Where a region may not have adequate capacity under a given scenario, it is flagged dark blue for further investigation. There may be local incapacity issues at individual works within the region.

L3 Area	Headroom	2025	2030	2035	2040	2045	2050
R Monnow - conf Afon Honddu to conf R Wye	0%						
	10%						
	20%						
	Treatment Target	2025	2030	2035	2040	2045	2050
	70%						
	80%						
	90%						

Table 2 - Supply Demand Balance

5.0 Options

Over time the pressures on our sewerage network change due to influences such as catchment growth, creep of rainwater into the network, or influences such as climate change impacting rainfall patterns. To ensure the plan is robust over the 30-year planning horizon and to account for the uniqueness of each catchment we have tested various types of schemes, and combination of schemes, to ensure a robust 'best value' plan is delivered.

The types of schemes tested are detailed in Table 3 and can be categorised into either improving network resilience to rainfall or improving network headroom in dry weather flow conditions.

Improving Resilience		
10% Reduction in area draining to the combined sewers	Represents removal of runoff from large commercial buildings.	Short term
25% Reduction reduction in area draining to the combined sewers	Represents removal of area runoff from non-residential paved areas where there is only one stakeholder (e.g. Local Authority or Highways Agency).	Medium term
50% Reduction reduction in area draining to the combined sewers	Represents removal of runoff from any connected area including residential properties. There are likely to be multiple stakeholders to engage with.	Long term
Improving Headroom		
Reducing infiltration	Reducing infiltration into sewers by 50%, which could be achieved by relining or replacing the public sewers .	Medium term
Reducing water use	Represents a reduction in water use per person to around 100l per person per day by 2050 by application of water efficiency measures	Medium term
Reducing trade flow	Reduce trade flows by around 25% by application of water efficiency measures.	Long term

Table 3 - Risk mitigation details

We have undertaken an analysis of all our wastewater catchments to determine the benefit in terms of potential volume of water removed from our systems for each scheme type to determine a journey plan, (see Figure 8 below), which provides the direction of the best scheme types to undertake in this catchment for the most benefit against predicted future risk from growth, creep and climate change.

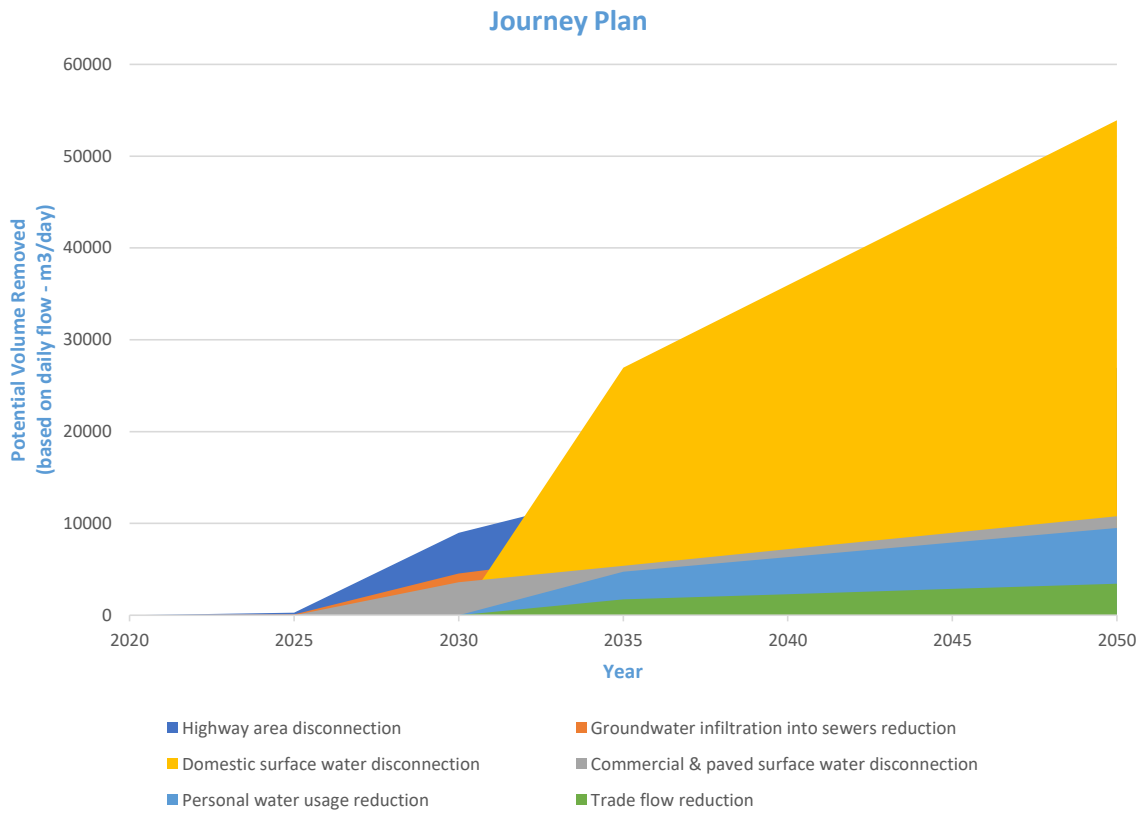

Figure 8 - Journey Plan

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The choice of scenarios for storm overflow mitigation in Table 4 is a separate cost and would be required in addition to the choice of scenarios for flooding protection in Table 5. The chosen scenarios for Storm overflows nd flooding are to be added together.

Choice of Scenario	Current Scenario (£)	2030 Scenario (£)	2050 Scenario (£)
Maintain Existing Performance*	-	£4,000,000	£5,000,000
40 spills in a Typical Year	£7,000,000	£3,000,000	£1,000,000
20 spills in a Typical Year	£8,000,000	£7,000,000	£7,000,000
10 spills in a Typical Year	£9,000,000	£8,000,000	£8,000,000
0 spills in a Typical Year	£21,000,000	£21,000,000	£21,000,000
Equivalent No. Olympic Swimming Pools in 10 spills scenario	55.00	69.00	80.00

* Maintain is a considered scenario where we will continue to maintain the current level of service within the region and improve the network and address known and emerging risk.

Table 4 - Summary of Combined Sewer Overflow option investments

Choice of Scenario	Current Scenario (£)	2050 Scenario (£)	2050 Resilience Scenario (£) 1 in 50 yr (Storm Dennis)
Internal escapes	£0	£1,000,000	£1,000,000
External escapes in gardens	£2,000,000	£2,000,000	£4,000,000
Escapes in highways	£3,000,000	£4,000,000	£6,000,000
No future flooding	-	£11,000,000	£35,000,000
Total	£5,000,000	£18,000,000	£46,000,000

Table 5 - Summary of Flooding option investments

We have developed solutions which aim to provide protection against drainage and network failure, pollution events and flooding, internal and external to properties. The solutions developed highlight the level of investment required to bring our entire network up to the level of protection required to be resilient for future risk and demands. The range of scenarios is to provide a choice for understanding and discussion of future direction.

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We will be consulting on the preferred approach to planning and once its concluded the next stage is to develop the pipeline of options to meet the pace scale and affordability discussed with Welsh Government and our regulators.

Table 6 - Summary of solutions put forward are a first cycle preferred plan before SEA/HRA

L4 Catchments	No. Schemes
MONMOUTH WWTW (WYESHAM)	0
LONGTOWN (HEREFORDSHIRE) STW	0
PENRHOS (N OF RAGLAN)	0
CWMYOY	0
LLANVAPLEY	0
LLANTILIO CROSSENNY	0
ROCKFIELD (N OF MONMOUTH)	0
CROSS ASH WWTW	0
LLANDDEWI RHYDDERCH	0
CRABS CASTLE	0
KENTCHURCH (HEREFORDSHIRE) PARKSIDE	0
DINGESTOW STW	0
GROSMONT	0
GARWAY (NNW OF MONMOUTH) FAIRVIEW NO 1	0
LLANFIHANGEL CRUCORNEY PANDY	0

DWMP Tactial Planning Catchment Summary

R Wye - conf Afon Elan to conf R Ithon

1.0 Introduction

This Drainage and Wastewater Management Plan (DWMP) sets out how Dŵr Cymru Welsh Water (DCWW) will manage and improve its assets to maintain a resilient and robust wastewater drainage system. The plan aims to manage flooding and pollution from our wastewater assets in the future, for our customers and our environment by working collaboratively with stakeholders, regulators and local authorities to provide a complete partnership in tackling current and future problems.

1.1 Catchment Information

The R Wye - conf Afon Elan to conf R Ithon planning catchment lies within the Wye river basin catchment, (see Figure 1 below), it consists of 8 wastewater catchments (see Figure 2 below). There is a combined population of 3182, this is set to decrease to 2946 by 2050, a change of -7%. There is a total sewer length of 31km, with a foul sewer length of 12km, a surface water length of 8km and a combined sewer length of 10km. There are 8 Wastewater Treatment Works (WwTW), 5 Sewerage Pumping Stations (SPSs), and 8 Combined Storm Overflows (CSOs) across this tactical planning unit.

The R Wye - conf Afon Elan to conf R Ithon catchment covers an area stretching from Eisteddfa Gurig along A44 in the north as far as Newbridge-On-Wye in the south. The geography of the catchment is predominantly rural and mountainous.

There are several main rivers within the L3 including the rivers Wye and Afon Elan. The catchment covers several major urban areas including Town Llangurig and Rhayder.

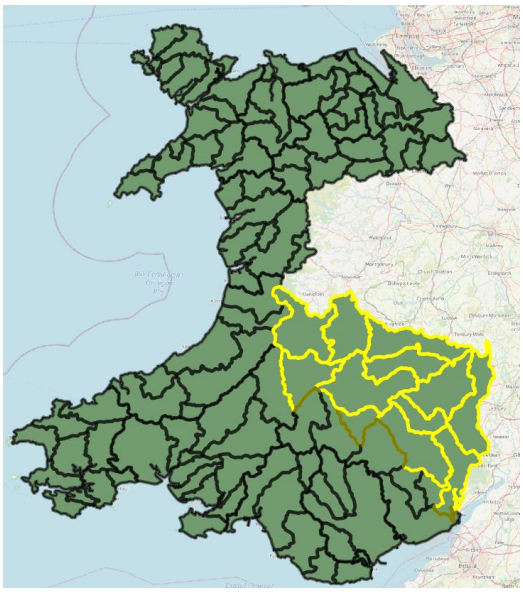


Figure 1 - River basin location detailing the associated tactial planning catchments

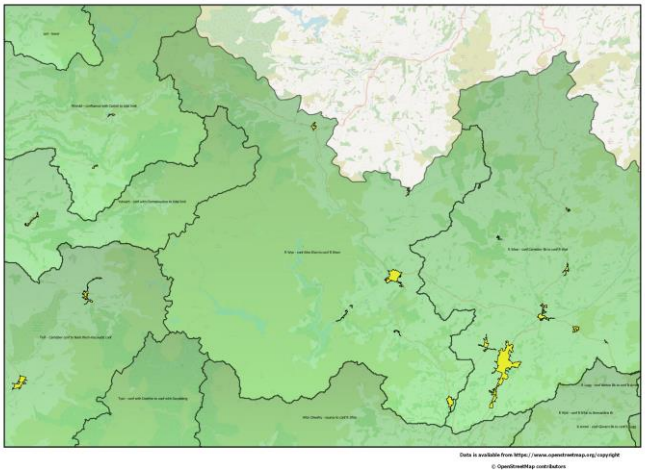


Figure 2- Tactical planning catchments

2.0 Stakeholder Engagement

The DWMP aims to enable DCWW to work collaboratively with stakeholders, regulators and local authorities to tackle current and future challenges. DCWW has identified stakeholder objectives that align with the aims of the DWMP and goals of other management plans. Table 1 details the main opportunities we have identified but this is not intended to be exhaustive. Note that these stakeholders have their own planning processes and plans which do not necessarily align with those of DCWW.

Scheme Information
Stakeholder engagement meetings area scheduled to commence in 2022. These meetings will be held between DCWW and the respective parties, such as NRW, EA, Councils and ENGO's. Further information of the outcome and points of focus towards short and long term strategy planning will be provided in the next cycle of the DWMP assessment.

Table 1 - Current and future investigation schemes

3.0 Risk

We have assessed our likely performance from now to 2050 against the objectives that we set in our most recent business plan. The results of this assessment are presented in the following sections.

To understand future performance, we need to estimate how much population will change by, the degree to which climate change will impact Wales and areas of England that border our company, and how further surface water connected to the sewer network might increase the amount and rate at which rainfall drains into our sewers.

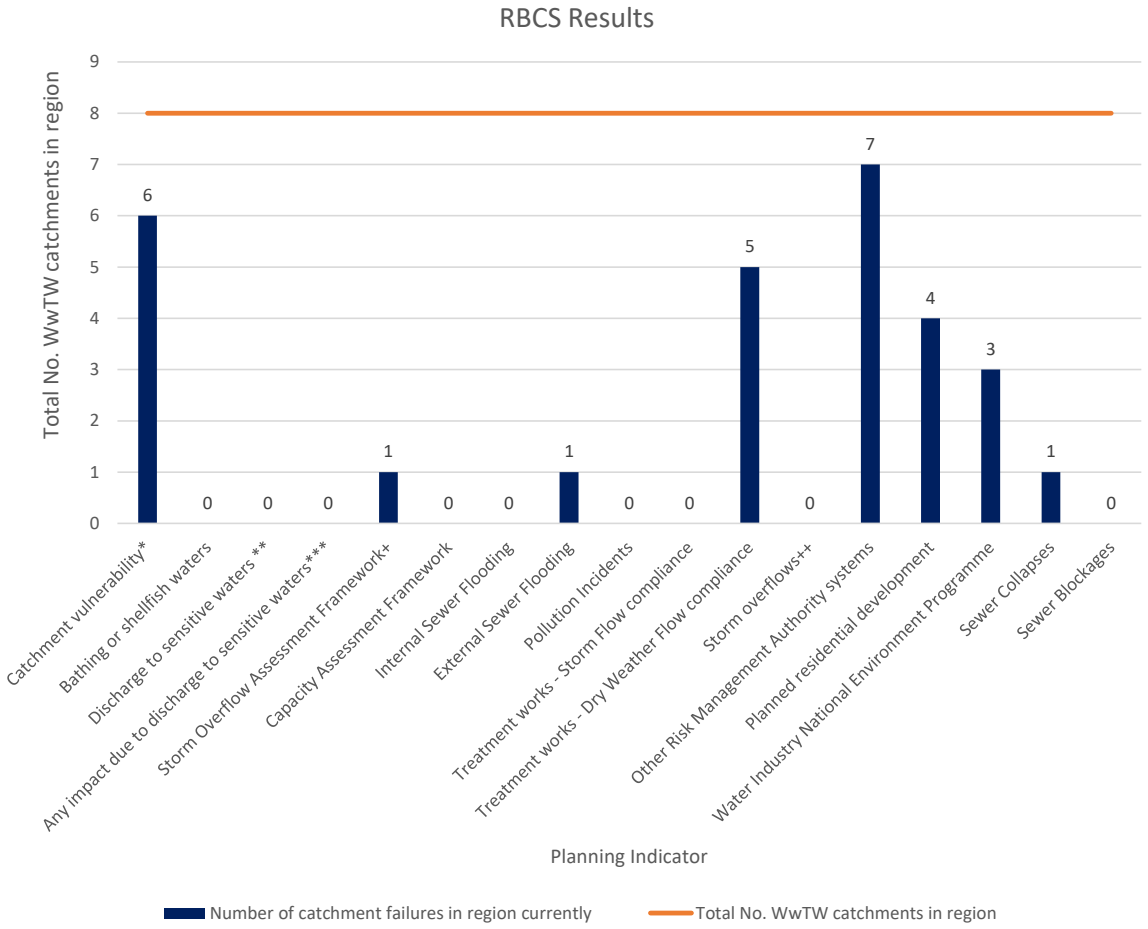
Urban creep is the term used to explain loss of green spaces, for example when new driveways or house extensions are built. It often leads to more rainwater entering sewers. Our forecasts suggest that urban creep will add up to 0.63 metres squared of impermeable ground per house per year.

Climate change is predicted to increase the intensity of storms by around 15% in this region. In a typical year, winters are likely to be warmer and wetter, and summers generally drier. More intense rainfall will happen more frequently. The population in the Wye region is set to decrease to 2900 by 2050, a change of -7% based on our future projections. However there are major developments in localised areas that will contribute to future pressures on the network, including Tir Gia and Land adj. Maesllan, Llangurig.

3.1 Risk Based Catchment Screening

The Risk Based Catchment Screening (RBCS) is the initial screening process to determine if a more detailed risk assessment is required. The assessment screens catchments against planning indicators which have been stipulated in the national guidance for DWMPs. A catchment will pass through to a more detailed risk assessment if it fails against one or more of these indicators, the results are shown in Figure 3.

For this strategic planning area the biggest concerns indicated by the RBCS is Other Risk Management Authority systems followed by Catchment vulnerability.



*To sewer flooding due to extreme wet weather events.
**Categorised as a "planned" scheduled action within the Natural Resources Wales Action Database or considered as "Remedy" on Natural England Designated Sites system.
***Categorised as a "identified" scheduled action within the Natural Resources Wales Action Database or considered as "Threat" on Natural England Designated Sites system.
+Frequency investigation triggered.
++Overflow risks not covered by other indicators,

Figure 3 - Risk Based Catchment Screening results

3.2 Baseline Risk And Vulnerability Assessment (BRAVA)

Following on from the RBCS, the Baseline Risk and Vulnerability Assessment (BRAVA) highlights current and future risk. The risk scores are driven by company targets which were set in our last business plan. These targets were subdivided according to population or sewer length, depending on the measure, to derive a target for each river basin catchment.

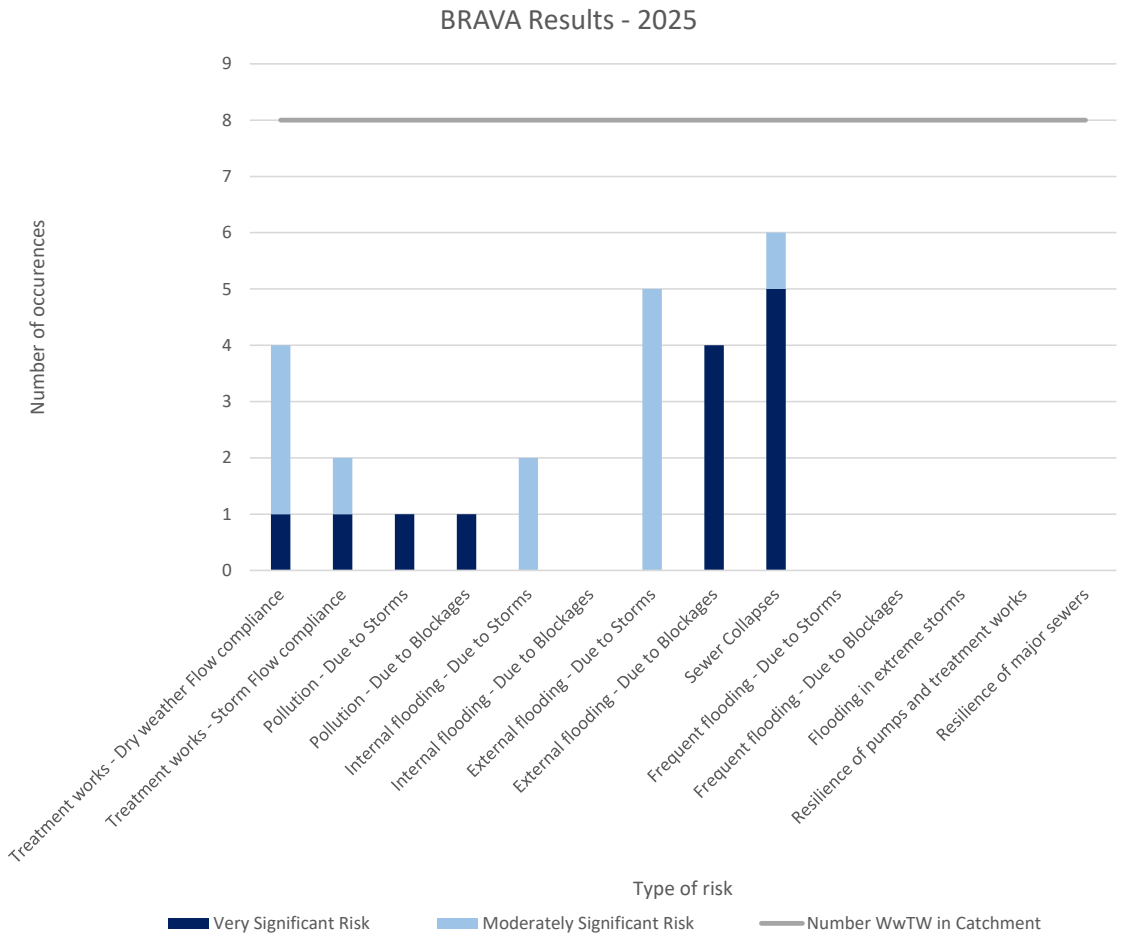


Figure 4 - BRAVA 2025 Summary

In 2025, Sewer collapses followed by External Flooding- due to blockages are the biggest concerns in this strategic area.

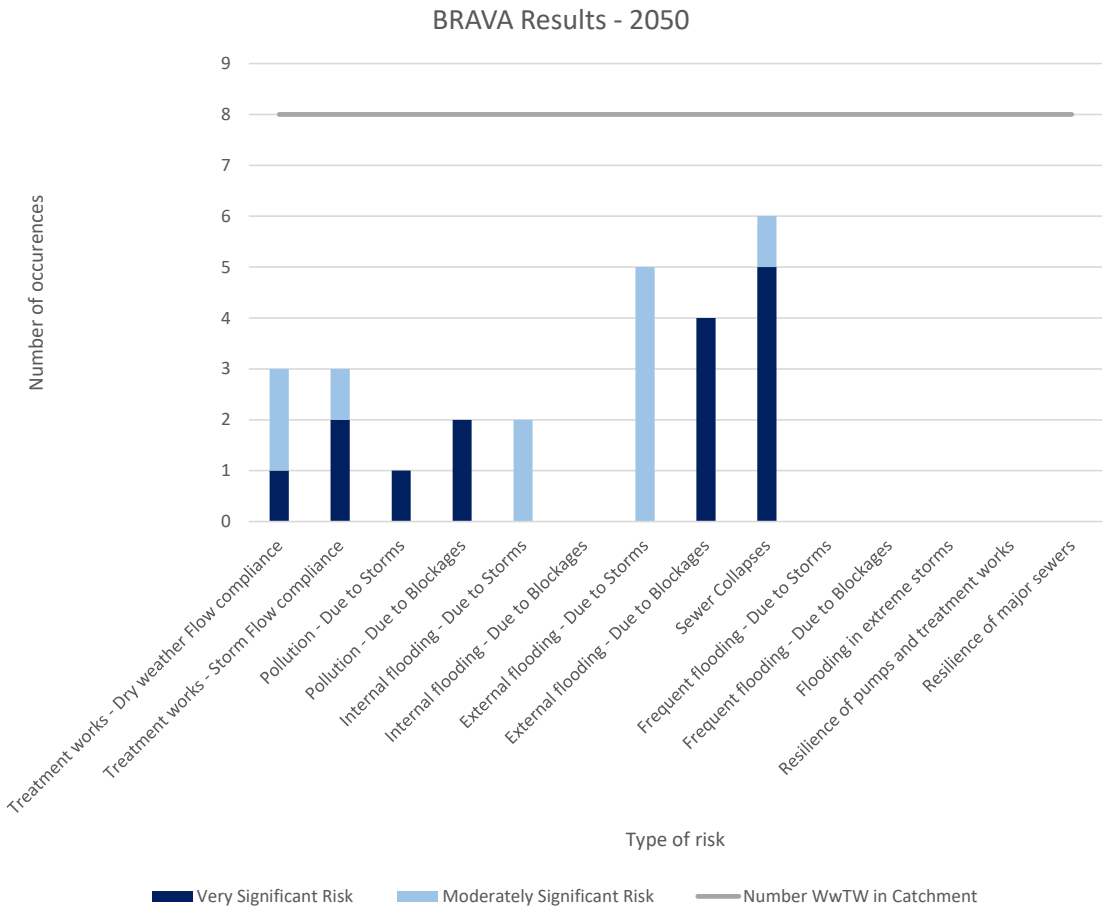


Figure 5 - BRAVA 2050 Summary

In 2050, Sewer collapses followed by External flooding due to blockages are the biggest concerns in this strategic planning area.

Figures 6 and 7 indicate the current and predicted risk of flooding, pollution, and both flooding and pollution caused by lack of capacity (termed 'hydraulic overload') across our networks. These maps illustrate where the issues occur and can be used to target where we want to work with the community and stakeholders to resolve issues. By working together, we can combine knowledge and resources to deliver the best outcomes for local communities and the environment. We want to include your feedback in our decision-making process.

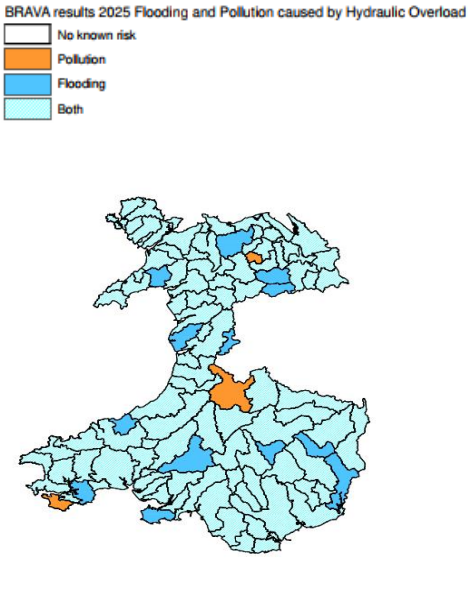


Figure 6 - Associated Strategic Planning Areas priority (2025)

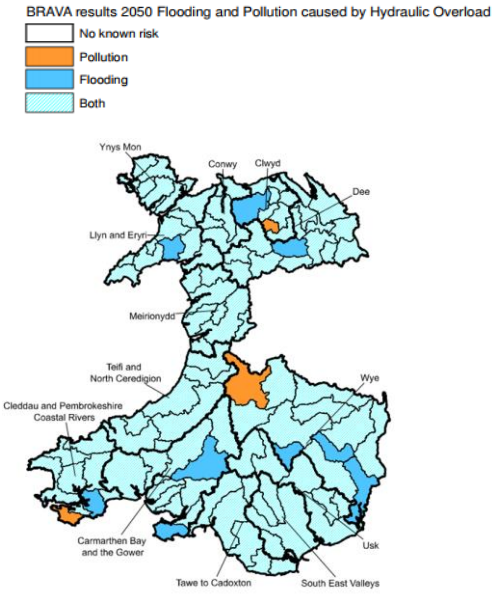


Figure 7 - Associated Strategic Planning Areas priority (2050)

3.3 Water Quality

Water quality is the classification of the quality of watercourses or water bodies in accordance to its physical, biological and chemical properties. Water quality is an important factor of environmental monitoring, ensuring that not only the water body is safe but the surrounding habitat and ecosystem is also.

Water quality status is categorised from 1 to 4, with 4 being the worst case. The priority status is based on the significance towards the risk factors triggering water quality. R Wye - conf Afon Elan to conf R Ithon has a water quality priority status for 2050 of 4 which indicates targeted investment to mitigate and focus during AMP8.

4.0 Supply Demand

Supply-demand is an assessment of the capacity of our treatment works. It approximately assesses whether all the treatment works in a region can collectively cope with current and future flows in dry and wet weather. There are two parts to the assessment: dry weather flow (DWF) and a wet weather capacity assessment.

For the DWF part of the assessment, the suitability of the dry weather consents is tested against forecast future growth and changes in water consumption. Results for three scenarios are provided: the 0% headroom scenario assesses the region's capability for treating the predicted changes in DWF in the future with no allowance for error, with no spare treatment works capacity. The other scenarios indicate resilience - i.e. could we cope if we had flows 10% or 20% higher than estimated?

The wet weather assessment takes storm consent values where available as an indication of treatment works capacity and estimates the amount of incoming flow the treatment works is able to treat across a year. Again, three scenarios are shown, with differing treatment "targets" - i.e. if we wanted to ensure that 70% of the wet weather flows in a catchment were treated, could the treatment works cope? Changes in rainfall due to climate change and changing dry weather flows within the region mean that the percentage of flow treated across a year can change in the future.

Table 2 shows the supply-demand assessment for this region. Where a region may not have adequate capacity under a given scenario, it is flagged dark blue for further investigation. There may be local incapacity issues at individual works within the region.

L3 Area	Headroom	2025	2030	2035	2040	2045	2050
R Wye - conf Afon Elan to conf R Ithon	0%						
	10%						
	20%						
	Treatment Target	2025	2030	2035	2040	2045	2050
	70%						
	80%						
	90%						

Table 2 - Supply Demand Balance

5.0 Options

Over time the pressures on our sewerage network change due to influences such as catchment growth, creep of rainwater into the network, or influences such as climate change impacting rainfall patterns. To ensure the plan is robust over the 30-year planning horizon and to account for the uniqueness of each catchment we have tested various types of schemes, and combination of schemes, to ensure a robust 'best value' plan is delivered.

The types of schemes tested are detailed in Table 3 and can be categorised into either improving network resilience to rainfall or improving network headroom in dry weather flow conditions.

Improving Resilience		
10% Reduction in area draining to the combined sewers	Represents removal of runoff from large commercial buildings.	Short term
25% Reduction reduction in area draining to the combined sewers	Represents removal of area runoff from non-residential paved areas where there is only one stakeholder (e.g. Local Authority or Highways Agency).	Medium term
50% Reduction reduction in area draining to the combined sewers	Represents removal of runoff from any connected area including residential properties. There are likely to be multiple stakeholders to engage with.	Long term
Improving Headroom		
Reducing infiltration	Reducing infiltration into sewers by 50%, which could be achieved by relining or replacing the public sewers .	Medium term
Reducing water use	Represents a reduction in water use per person to around 100l per person per day by 2050 by application of water efficiency measures	Medium term
Reducing trade flow	Reduce trade flows by around 25% by application of water efficiency measures.	Long term

Table 3 - Risk mitigation details

We have undertaken an analysis of all our wastewater catchments to determine the benefit in terms of potential volume of water removed from our systems for each scheme type to determine a journey plan, (see Figure 8 below), which provides the direction of the best scheme types to undertake in this catchment for the most benefit against predicted future risk from growth, creep and climate change.

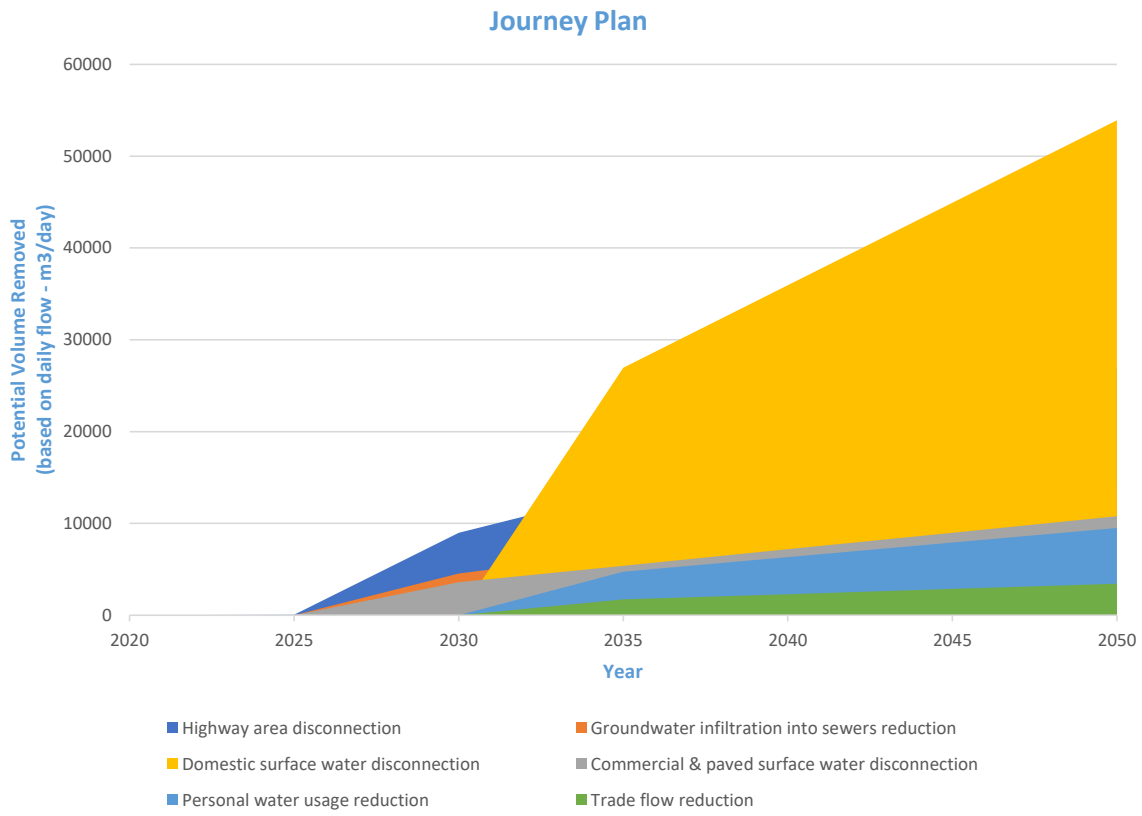


Figure 8 - Journey Plan

Approaches to managing risk

We have undertaken analysis to determine the likely costs to mitigate future predicted pollution and flooding. We assess combined sewer overflows based on the number of times they are predicted to spill in a 'typical year'. Table 4 illustrates the cost of potential measures to mitigate risk to varying standards. The assessment calculates the impact of rainfall and drainage contributions to the network relative to today's costs.

Mitigating the risk posed by flooding has been assessed in terms of probability of occurrence, we use the size of a storm event that has the probability of occurring once every 30 years. Table 5 illustrates the cost of potential mitigation measures to mitigate varying flood risk types.

The choice of scenarios for storm overflow mitigation in Table 4 is a separate cost and would be required in addition to the choice of scenarios for flooding protection in Table 5. The chosen scenarios for Storm overflows nd flooding are to be added together.

Choice of Scenario	Current Scenario (£)	2030 Scenario (£)	2050 Scenario (£)
Maintain Existing Performance*	-	£10,000,000	£15,000,000
40 spills in a Typical Year	£4,000,000	£4,000,000	£4,000,000
20 spills in a Typical Year	£5,000,000	£5,000,000	£5,000,000
10 spills in a Typical Year	£6,000,000	£6,000,000	£6,000,000
0 spills in a Typical Year	£11,000,000	£11,000,000	£11,000,000
Equivalent No. Olympic Swimming Pools in 10 spills scenario	26.00	39.00	42.00

* Maintain is a considered scenario where we will continue to maintain the current level of service within the region and improve the network and address known and emerging risk.

Table 4 - Summary of Combined Sewer Overflow option investments

Choice of Scenario	Current Scenario (£)	2050 Scenario (£)	2050 Resilience Scenario (£) 1 in 50 yr (Storm Dennis)
Internal escapes	£1,000,000	£1,000,000	£1,000,000
External escapes in gardens	£0	£0	£0
Escapes in highways	£1,000,000	£2,000,000	£2,000,000
No future flooding	-	£3,000,000	£9,000,000
Total	£2,000,000	£6,000,000	£12,000,000

Table 5 - Summary of Flooding option investments

We have developed solutions which aim to provide protection against drainage and network failure, pollution events and flooding, internal and external to properties. The solutions developed highlight the level of investment required to bring our entire network up to the level of protection required to be resilient for future risk and demands. The range of scenarios is to provide a choice for understanding and discussion of future direction.

We are beginning to break down the investment indicated in Table 4 and 5 by creating practical schemes ready for delivery these schemes are designed as 100% traditional, 100% sustainable or green and 100% mixture of the 2. These packages have then been analysed in terms of their long term benefit and environmental and social cost to society and one has been chosen for inclusion as our preferred best value option. The areas where we have started our delivery programme aims to provide protection, to our worst served customers and rivers designated as Special Areas of Conservation (SAC) under the

For more information on the methodology developed to carry out the assessments see the DWMP plan main report.

If you want to work with us to develop joint projects to reduce the risk of flooding and protect the environment, please get in touch.

We will continue to work with Welsh Government, Regulators and Local Authorities about the pace, scale and affordability of improvements to be made.

We will be consulting on the preferred approach to planning and once its concluded the next stage is to develop the pipeline of options to meet the pace scale and affordability discussed with Welsh Government and our regulators.

Table 6 - Summary of solutions put forward are a first cycle preferred plan before SEA/HRA

L4 Catchments	No. Schemes
RHAYADER SWK	0
LLANGURIG SWK	0
NEWBRIDGE-ON-WYE SWK	0
ELAN VALLEY HOTEL SWK	0
ELAN (GLAN-YR-AFON) SWK	0
ELAN VILLAGE OXIGEST UNITS SWK	0
LLANWRTHWL SWK	0
PANT-Y-DWR SWK	0

DWMP Tactial Planning Catchment Summary

R Wye - conf R Irfon to Brewardine Br

1.0 Introduction

This Drainage and Wastewater Management Plan (DWMP) sets out how Dŵr Cymru Welsh Water (DCWW) will manage and improve its assets to maintain a resilient and robust wastewater drainage system. The plan aims to manage flooding and pollution from our wastewater assets in the future, for our customers and our environment by working collaboratively with stakeholders, regulators and local authorities to provide a complete partnership in tackling current and future problems.

1.1 Catchment Information

The R Wye - conf R Irfon to Brewardine Br planning catchment lies within the Wye river basin catchment, (see Figure 1 below), it consists of 16 wastewater catchments (see Figure 2 below). There is a combined population of 8781, this is set to decrease to 7527 by 2050, a change of -14%. There is a total sewer length of 72km, with a foul sewer length of 42km, a surface water length of 8km and a combined sewer length of 19km. There are 16 Wastewater Treatment Works (WwTW), 27 Sewerage Pumping Stations (SPSs), and 17 Combined Storm Overflows (CSOs) across this tactical planning unit.

The R Wye - conf R Irfon to Brewardine Br catchment covers an area stretching from Builth Wells in the north as far as Glasbury in the south. The geography of the catchment is predominantly rural and mountainous.

There are several main rivers within the L3 including the rivers Wye and Edw. The catchment covers several major urban areas including Town Builth Wells and Hay on Wye.

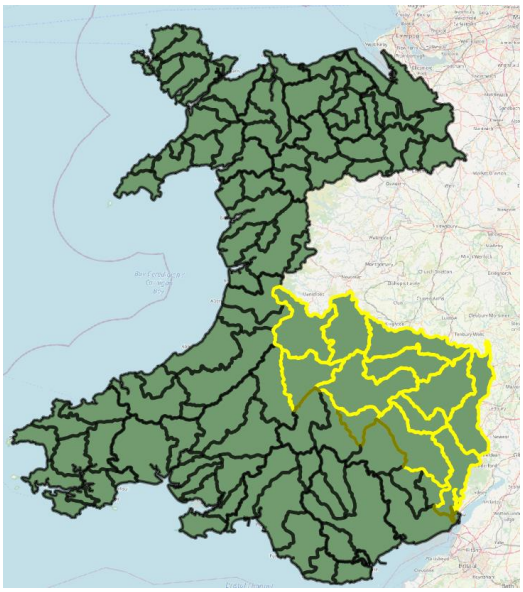


Figure 1 - River basin location detailing the associated tactial planning catchments

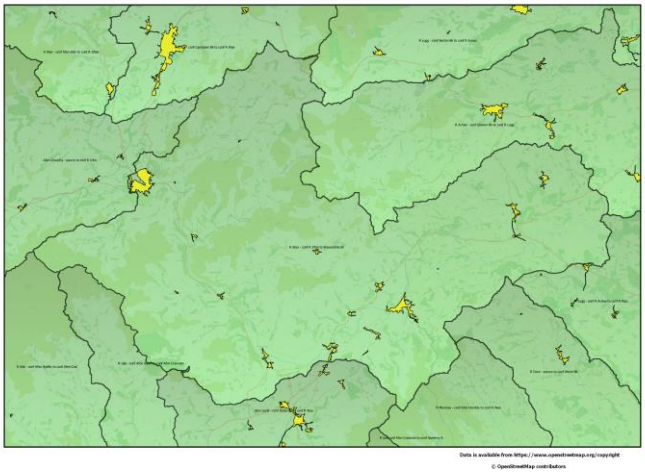


Figure 2- Tactical planning catchments

2.0 Stakeholder Engagement

The DWMP aims to enable DCWW to work collaboratively with stakeholders, regulators and local authorities to tackle current and future challenges. DCWW has identified stakeholder objectives that align with the aims of the DWMP and goals of other management plans. Table 1 details the main opportunities we have identified but this is not intended to be exhaustive. Note that these stakeholders have their own planning processes and plans which do not necessarily align with those of DCWW.

Scheme Information
Stakeholder engagement meetings area scheduled to commence in 2022. These meetings will be held between DCWW and the respective parties, such as NRW, EA, Councils and ENGO's. Further information of the outcome and points of focus towards short and long term strategy planning will be provided in the next cycle of the DWMP assessment.

Table 1 - Current and future investigation schemes

3.0 Risk

We have assessed our likely performance from now to 2050 against the objectives that we set in our most recent business plan. The results of this assessment are presented in the following sections.

To understand future performance, we need to estimate how much population will change by, the degree to which climate change will impact Wales and areas of England that border our company, and how further surface water connected to the sewer network might increase the amount and rate at which rainfall drains into our sewers.

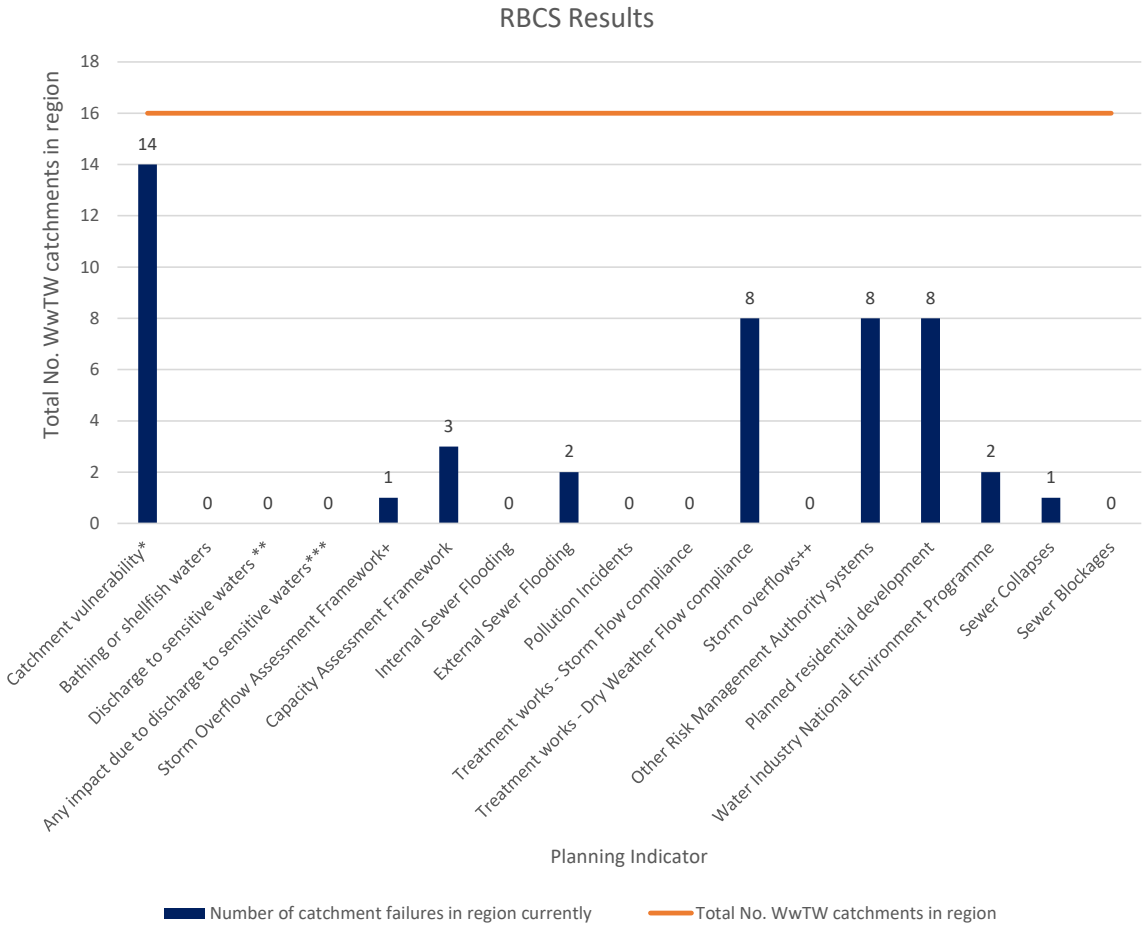
Urban creep is the term used to explain loss of green spaces, for example when new driveways or house extensions are built. It often leads to more rainwater entering sewers. Our forecasts suggest that urban creep will add up to 0.63 metres squared of impermeable ground per house per year.

Climate change is predicted to increase the intensity of storms by around 15% in this region. In a typical year, winters are likely to be warmer and wetter, and summers generally drier. More intense rainfall will happen more frequently. The population in the Wye region is set to decrease to 7500 by 2050, a change of -14% based on our future projections. However there are major developments in localised areas that will contribute to future pressures on the network, including Land west of Primary school, Builth Wells and Land adj Brecon Pharmaceuticals, Land at Gypsy Cas.

3.1 Risk Based Catchment Screening

The Risk Based Catchment Screening (RBCS) is the initial screening process to determine if a more detailed risk assessment is required. The assessment screens catchments against planning indicators which have been stipulated in the national guidance for DWMPs. A catchment will pass through to a more detailed risk assessment if it fails against one or more of these indicators, the results are shown in Figure 3.

For this strategic planning area the biggest concerns indicated by the RBCS are Catchment vulnerability followed by Treatment works compliance - dry, Other risk management authority systems and Planned residential development.



*To sewer flooding due to extreme wet weather events.
**Categorised as a "planned" scheduled action within the Natural Resources Wales Action Database or considered as "Remedy" on Natural England Designated Sites system.
***Categorised as a "identified" scheduled action within the Natural Resources Wales Action Database or considered as "Threat" on Natural England Designated Sites system.
+Frequency investigation triggered.
++Overflow risks not covered by other indicators,

Figure 3 - Risk Based Catchment Screening results

3.2 Baseline Risk And Vulnerability Assessment (BRAVA)

Following on from the RBCS, the Baseline Risk and Vulnerability Assessment (BRAVA) highlights current and future risk. The risk scores are driven by company targets which were set in our last business plan. These targets were subdivided according to population or sewer length, depending on the measure, to derive a target for each river basin catchment.

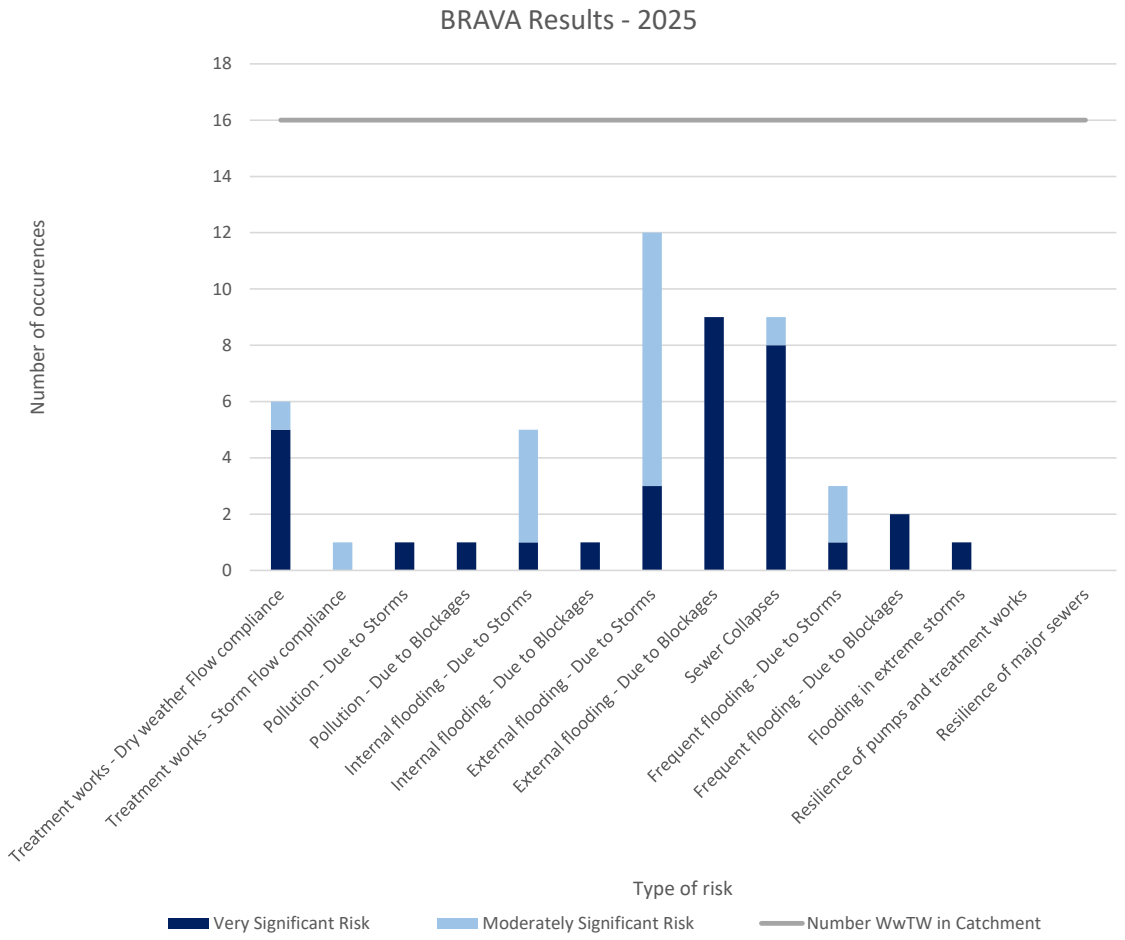


Figure 4 - BRAVA 2025 Summary

In 2025, External Flooding- due to blockages followed by Sewer collapses are the biggest concerns in this strategic area.

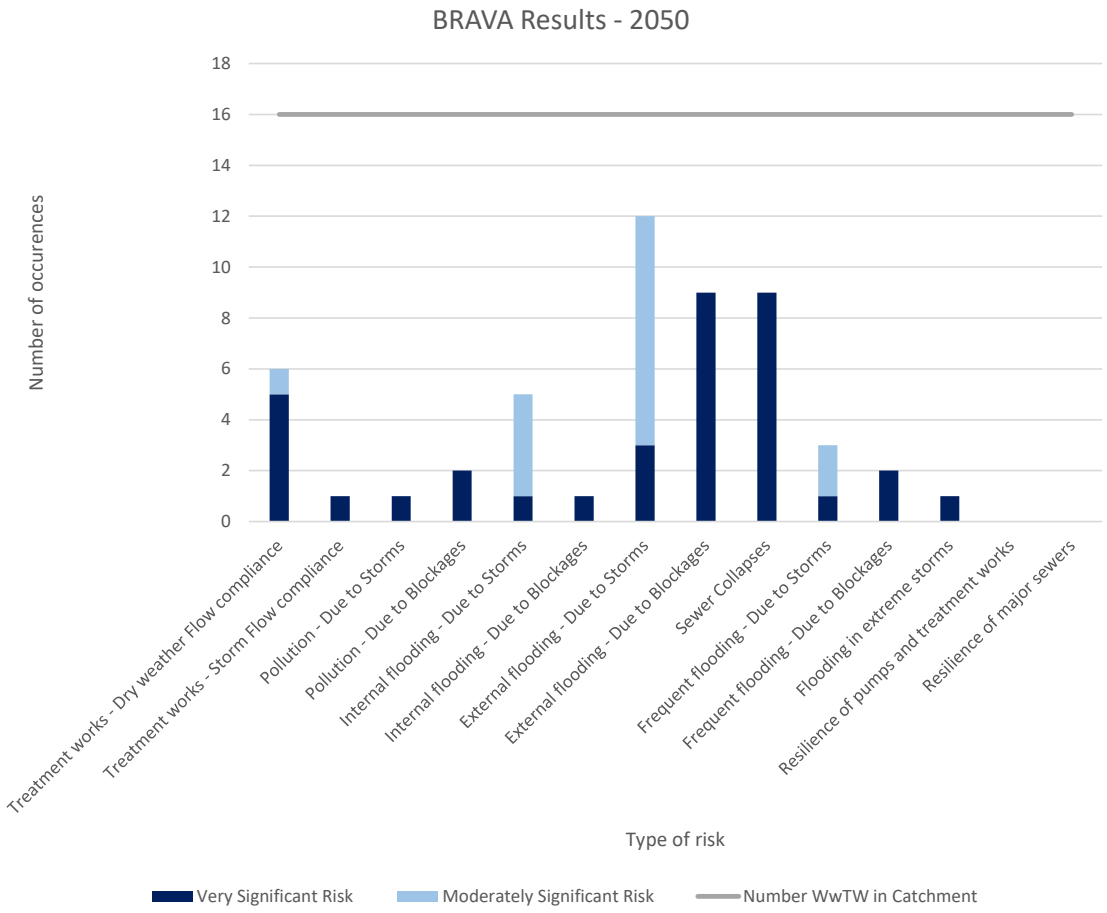


Figure 5 - BRAVA 2050 Summary

In 2050, Sewer collapses and External flooding due to blockages are the biggest concerns in this strategic planning area.

Figures 6 and 7 indicate the current and predicted risk of flooding, pollution, and both flooding and pollution caused by lack of capacity (termed 'hydraulic overload') across our networks. These maps illustrate where the issues occur and can be used to target where we want to work with the community and stakeholders to resolve issues. By working together, we can combine knowledge and resources to deliver the best outcomes for local communities and the environment. We want to include your feedback in our decision-making process.

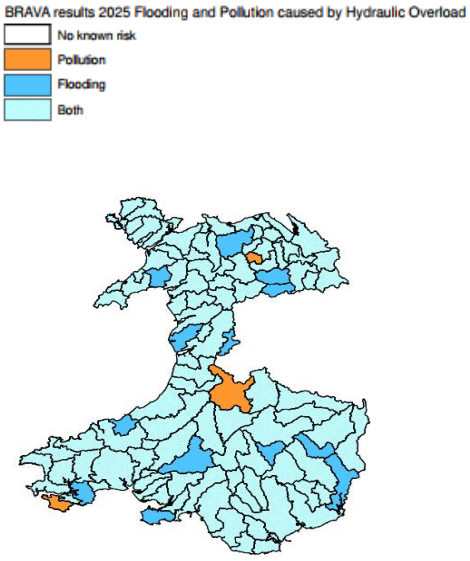


Figure 6 - Associated Strategic Planning Areas priority (2025)

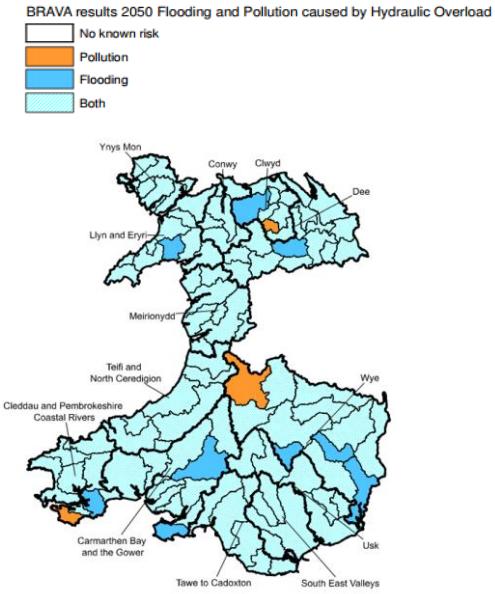


Figure 7 - Associated Strategic Planning Areas priority (2050)

3.3 Water Quality

Water quality is the classification of the quality of watercourses or water bodies in accordance to its physical, biological and chemical properties. Water quality is an important factor of environmental monitoring, ensuring that not only the water body is safe but the surrounding habitat and ecosystem is also.

Water quality status is categorised from 1 to 4, with 4 being the worst case. The priority status is based on the significance towards the risk factors triggering water quality. R Wye - conf R Irfon to Brewardine Br has a water quality priority status for 2050 of 2 which indicates targeted investment to mitigate and focus during AMP10.

4.0 Supply Demand

Supply-demand is an assessment of the capacity of our treatment works. It approximately assesses whether all the treatment works in a region can collectively cope with current and future flows in dry and wet weather. There are two parts to the assessment: dry weather flow (DWF) and a wet weather capacity assessment.

For the DWF part of the assessment, the suitability of the dry weather consents is tested against forecast future growth and changes in water consumption. Results for three scenarios are provided: the 0% headroom scenario assesses the region's capability for treating the predicted changes in DWF in the future with no allowance for error, with no spare treatment works capacity. The other scenarios indicate resilience - i.e. could we cope if we had flows 10% or 20% higher than estimated?

The wet weather assessment takes storm consent values where available as an indication of treatment works capacity and estimates the amount of incoming flow the treatment works is able to treat across a year. Again, three scenarios are shown, with differing treatment "targets" - i.e. if we wanted to ensure that 70% of the wet weather flows in a catchment were treated, could the treatment works cope? Changes in rainfall due to climate change and changing dry weather flows within the region mean that the percentage of flow treated across a year can change in the future.

Table 2 shows the supply-demand assessment for this region. Where a region may not have adequate capacity under a given scenario, it is flagged dark blue for further investigation. There may be local incapacity issues at individual works within the region.

L3 Area	Headroom	2025	2030	2035	2040	2045	2050
R Wye - conf R Irfon to Brewardine Br	0%						
	10%						
	20%						
	Treatment Target	2025	2030	2035	2040	2045	2050
	70%						
	80%						
	90%						

Table 2 - Supply Demand Balance

5.0 Options

Over time the pressures on our sewerage network change due to influences such as catchment growth, creep of rainwater into the network, or influences such as climate change impacting rainfall patterns. To ensure the plan is robust over the 30-year planning horizon and to account for the uniqueness of each catchment we have tested various types of schemes, and combination of schemes, to ensure a robust 'best value' plan is delivered.

The types of schemes tested are detailed in Table 3 and can be categorised into either improving network resilience to rainfall or improving network headroom in dry weather flow conditions.

Improving Resilience		
10% Reduction in area draining to the combined sewers	Represents removal of runoff from large commercial buildings.	Short term
25% Reduction reduction in area draining to the combined sewers	Represents removal of area runoff from non-residential paved areas where there is only one stakeholder (e.g. Local Authority or Highways Agency).	Medium term
50% Reduction reduction in area draining to the combined sewers	Represents removal of runoff from any connected area including residential properties. There are likely to be multiple stakeholders to engage with.	Long term
Improving Headroom		
Reducing infiltration	Reducing infiltration into sewers by 50%, which could be achieved by relining or replacing the public sewers .	Medium term
Reducing water use	Represents a reduction in water use per person to around 100l per person per day by 2050 by application of water efficiency measures	Medium term
Reducing trade flow	Reduce trade flows by around 25% by application of water efficiency measures.	Long term

Table 3 - Risk mitigation details

We have undertaken an analysis of all our wastewater catchments to determine the benefit in terms of potential volume of water removed from our systems for each scheme type to determine a journey plan, (see Figure 8 below), which provides the direction of the best scheme types to undertake in this catchment for the most benefit against predicted future risk from growth, creep and climate change.

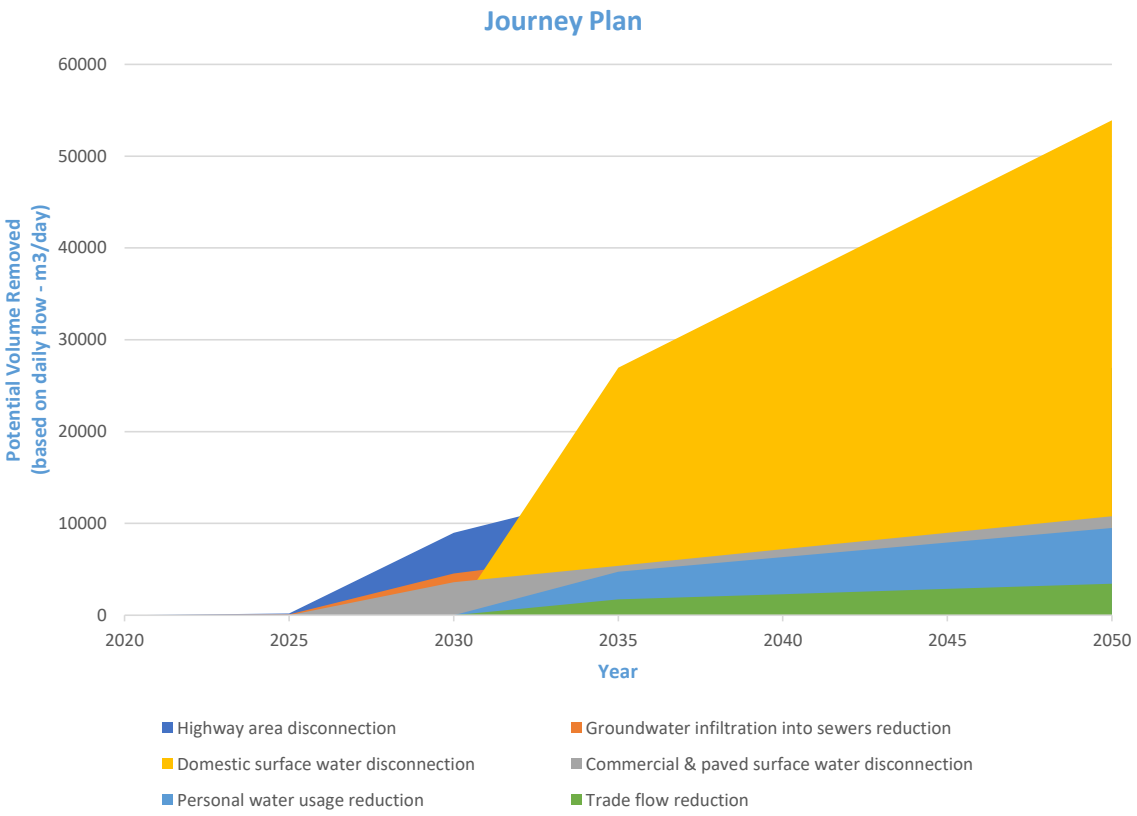


Figure 8 - Journey Plan

Approaches to managing risk

We have undertaken analysis to determine the likely costs to mitigate future predicted pollution and flooding. We assess combined sewer overflows based on the number of times they are predicted to spill in a 'typical year'. Table 4 illustrates the cost of potential measures to mitigate risk to varying standards. The assessment calculates the impact of rainfall and drainage contributions to the network relative to today's costs.

Mitigating the risk posed by flooding has been assessed in terms of probability of occurrence, we use the size of a storm event that has the probability of occurring once every 30 years. Table 5 illustrates the cost of potential mitigation measures to mitigate varying flood risk types.

The choice of scenarios for storm overflow mitigation in Table 4 is a separate cost and would be required in addition to the choice of scenarios for flooding protection in Table 5. The chosen scenarios for Storm overflows nd flooding are to be added together.

Choice of Scenario	Current Scenario (£)	2030 Scenario (£)	2050 Scenario (£)
Maintain Existing Performance*	-	£31,000,000	£49,000,000
40 spills in a Typical Year	£9,000,000	£9,000,000	£8,000,000
20 spills in a Typical Year	£17,000,000	£16,000,000	£17,000,000
10 spills in a Typical Year	£21,000,000	£22,000,000	£25,000,000
0 spills in a Typical Year	£41,000,000	£43,000,000	£47,000,000
Equivalent No. Olympic Swimming Pools in 10 spills scenario	104.00	114.00	123.00

* Maintain is a considered scenario where we will continue to maintain the current level of service within the region and improve the network and address known and emerging risk.

Table 4 - Summary of Combined Sewer Overflow option investments

Choice of Scenario	Current Scenario (£)	2050 Scenario (£)	2050 Resilience Scenario (£) 1 in 50 yr (Storm Dennis)
Internal escapes	£5,000,000	£7,000,000	£10,000,000
External escapes in gardens	£0	£0	£0
Escapes in highways	£5,000,000	£7,000,000	£10,000,000
No future flooding	-	£9,000,000	£26,000,000
Total	£10,000,000	£23,000,000	£46,000,000

Table 5 - Summary of Flooding option investments

We have developed solutions which aim to provide protection against drainage and network failure, pollution events and flooding, internal and external to properties. The solutions developed highlight the level of investment required to bring our entire network up to the level of protection required to be resilient for future risk and demands. The range of scenarios is to provide a choice for understanding and discussion of future direction.

We are beginning to break down the investment indicated in Table 4 and 5 by creating practical schemes ready for delivery these schemes are designed as 100% traditional, 100% sustainable or green and 100% mixture of the 2. These packages have then been analysed in terms of their long term benefit and environmental and social cost to society and one has been chosen for inclusion as our preferred best value option. The areas where we have started our delivery programme aims to provide protection, to our worst served customers and rivers designated as Special Areas of Conservation (SAC) under the

For more information on the methodology developed to carry out the assessments see the DWMP plan main report.

If you want to work with us to develop joint projects to reduce the risk of flooding and protect the environment, please get in touch.

We will continue to work with Welsh Government, Regulators and Local Authorities about the pace, scale and affordability of improvements to be made.

We will be consulting on the preferred approach to planning and once its concluded the next stage is to develop the pipeline of options to meet the pace scale and affordability discussed with Welsh Government and our regulators.

Table 6 - Summary of solutions put forward are a first cycle preferred plan before SEA/HRA

L4 Catchments	No. Schemes
HAY-ON-WYE SWK	0
LLYSWEN VILLAGE SWK	0
CLIFFORD SWK	0
EARDISLEY SWK	0
CLYRO SWK	0
FFORDLAS SWK	0
LLANFAREDD SWK	0
LLANIGON SWK	0
GWENDDWR SWK	0
LLOWES SWK	0
PAINSCASTLE SWK	0
ABEREDW STW	0
HUNDRED HOUSE (NE OF BUILTH WELLS) SWK	0
ERWOOD SWK	0
BUILTH WELLS STW	0
GLASBURY (SW OF HAY-ON-WYE) SWK	0

DWMP Tactial Planning Catchment Summary

R Wye - conf Walford Bk to Bigsweir Br

1.0 Introduction

This Drainage and Wastewater Management Plan (DWMP) sets out how Dŵr Cymru Welsh Water (DCWW) will manage and improve its assets to maintain a resilient and robust wastewater drainage system. The plan aims to manage flooding and pollution from our wastewater assets in the future, for our customers and our environment by working collaboratively with stakeholders, regulators and local authorities to provide a complete partnership in tackling current and future problems.

1.1 Catchment Information

The R Wye - conf Walford Bk to Bigsweir Br planning catchment lies within the Wye river basin catchment, (see Figure 1 below), it consists of 26 wastewater catchments (see Figure 2 below). There is a combined population of 25298, this is set to decrease to 17770 by 2050, a change of -30%. There is a total sewer length of 149km, with a foul sewer length of 41km, a surface water length of 9km and a combined sewer length of 95km. There are 26 Wastewater Treatment Works (WwTW), 29 Sewerage Pumping Stations (SPSs), and 16 Combined Storm Overflows (CSOs) across this tactical planning unit.

The R Wye - conf Walford Bk to Bigsweir Br catchment covers an area stretching from Orcop Hill in the north as far as Pwllmeyric. The geography of the catchment is predominantly rural.

There are several main rivers within the L3 including the rivers Wye and Garren Brook. The catchment covers several major urban areas including Town Coleford and St Briavels.

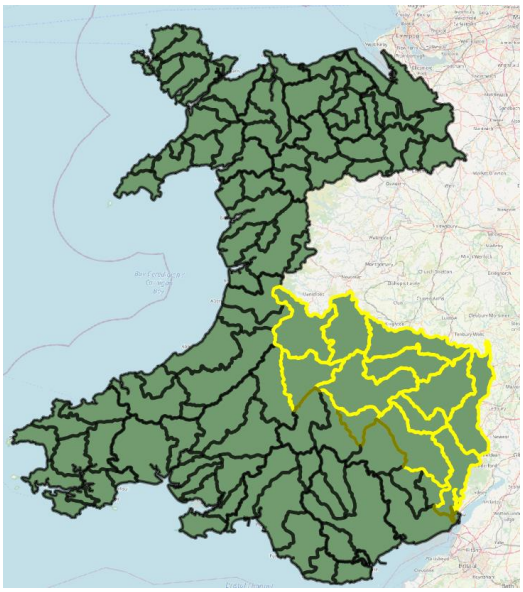


Figure 1 - River basin location detailing the associated tactial planning catchments

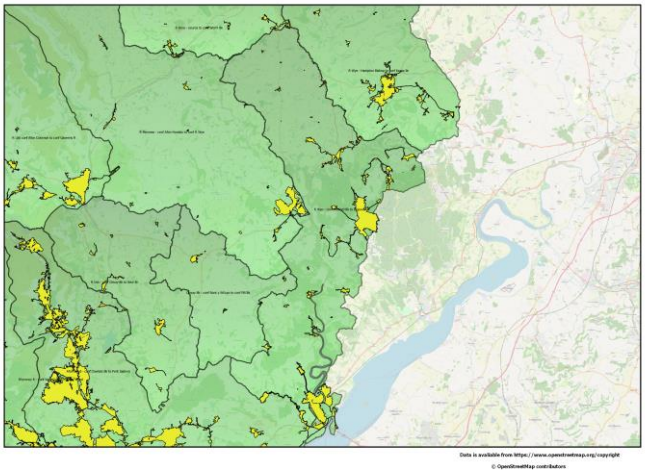


Figure 2- Tactical planning catchments

2.0 Stakeholder Engagement

The DWMP aims to enable DCWW to work collaboratively with stakeholders, regulators and local authorities to tackle current and future challenges. DCWW has identified stakeholder objectives that align with the aims of the DWMP and goals of other management plans. Table 1 details the main opportunities we have identified but this is not intended to be exhaustive. Note that these stakeholders have their own planning processes and plans which do not necessarily align with those of DCWW.

Scheme Information
Stakeholder engagement meetings area scheduled to commence in 2022. These meetings will be held between DCWW and the respective parties, such as NRW, EA, Councils and ENGO's. Further information of the outcome and points of focus towards short and long term strategy planning will be provided in the next cycle of the DWMP assessment.

Table 1 - Current and future investigation schemes

3.0 Risk

We have assessed our likely performance from now to 2050 against the objectives that we set in our most recent business plan. The results of this assessment are presented in the following sections.

To understand future performance, we need to estimate how much population will change by, the degree to which climate change will impact Wales and areas of England that border our company, and how further surface water connected to the sewer network might increase the amount and rate at which rainfall drains into our sewers.

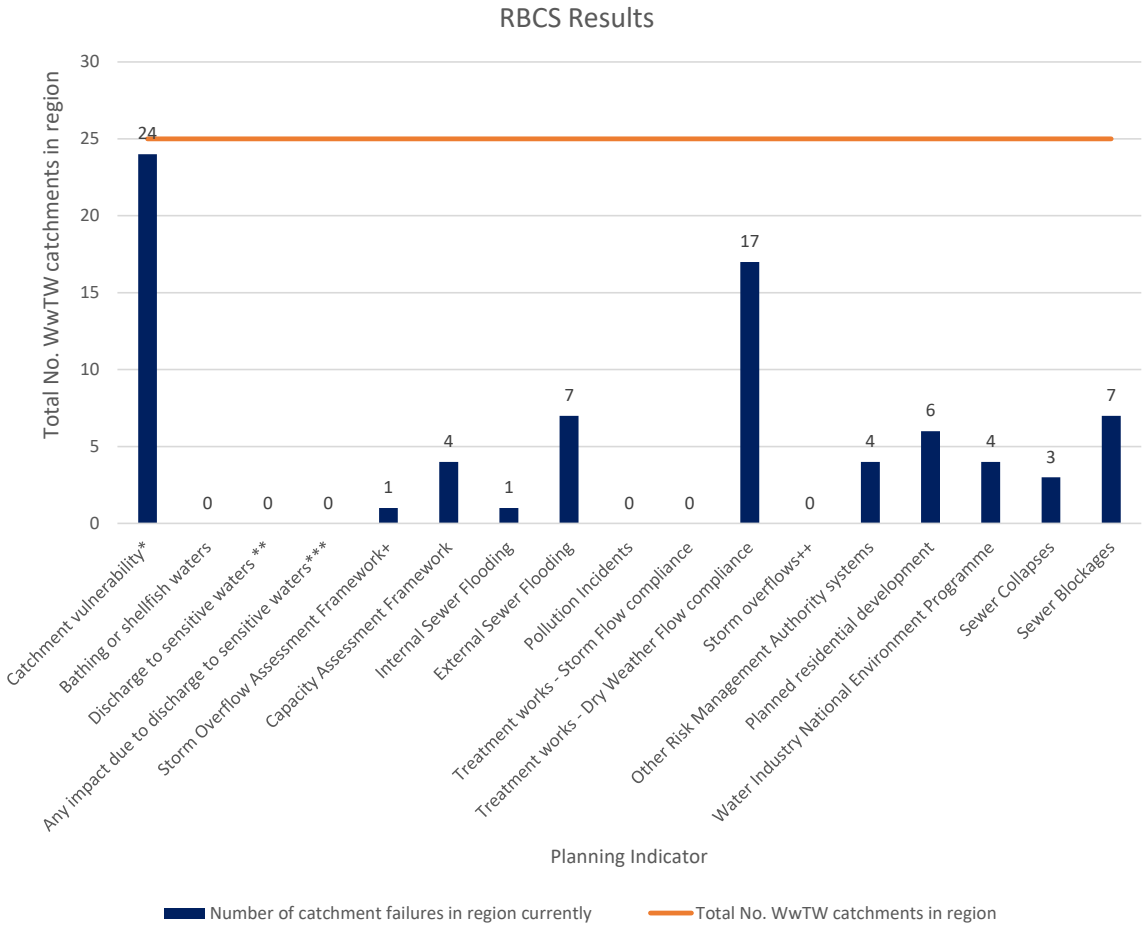
Urban creep is the term used to explain loss of green spaces, for example when new driveways or house extensions are built. It often leads to more rainwater entering sewers. Our forecasts suggest that urban creep will add up to 0.63 metres squared of impermeable ground per house per year.

Climate change is predicted to increase the intensity of storms by around 15% in this region. In a typical year, winters are likely to be warmer and wetter, and summers generally drier. More intense rainfall will happen more frequently. The population in the Wye region is set to decrease to 17800 by 2050, a change of -30% based on our future projections. However there are major developments in localised areas that will contribute to future pressures on the network, including Land at Poolway Farm, Coleford and North Road Broadwell.

3.1 Risk Based Catchment Screening

The Risk Based Catchment Screening (RBCS) is the initial screening process to determine if a more detailed risk assessment is required. The assessment screens catchments against planning indicators which have been stipulated in the national guidance for DWMPs. A catchment will pass through to a more detailed risk assessment if it fails against one or more of these indicators, the results are shown in Figure 3.

For this strategic planning area the biggest concerns indicated by the RBCS are Catchment Vulnerability, followed by Treatment works compliance - dry.



*To sewer flooding due to extreme wet weather events.
**Categorised as a "planned" scheduled action within the Natural Resources Wales Action Database or considered as "Remedy" on Natural England Designated Sites system.
***Categorised as a "identified" scheduled action within the Natural Resources Wales Action Database or considered as "Threat" on Natural England Designated Sites system.
+Frequency investigation triggered.
++Overflow risks not covered by other indicators,

Figure 3 - Risk Based Catchment Screening results

3.2 Baseline Risk And Vulnerability Assessment (BRAVA)

Following on from the RBCS, the Baseline Risk and Vulnerability Assessment (BRAVA) highlights current and future risk. The risk scores are driven by company targets which were set in our last business plan. These targets were subdivided according to population or sewer length, depending on the measure, to derive a target for each river basin catchment.

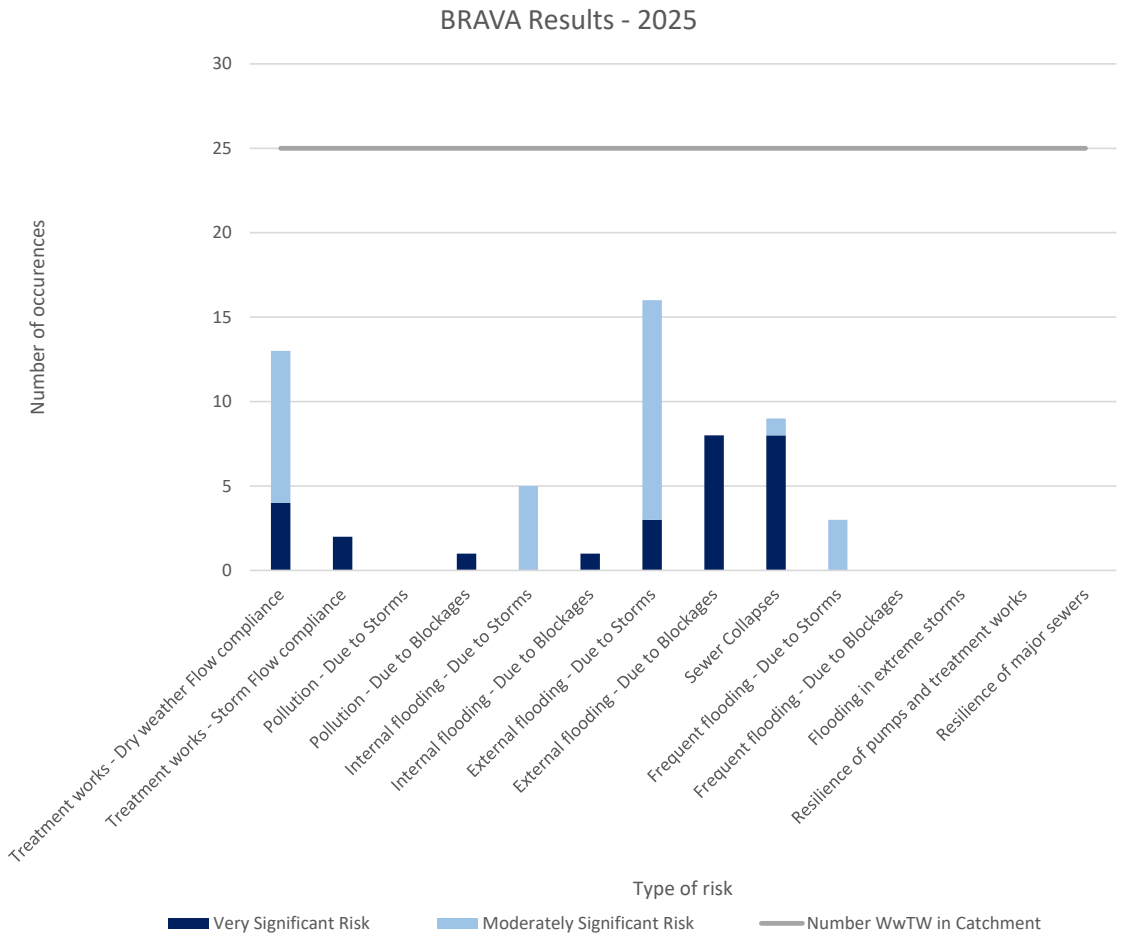


Figure 4 - BRAVA 2025 Summary

In 2025, Sewer collapses and External Flooding- due to blockages are the biggest concerns in this strategic area.

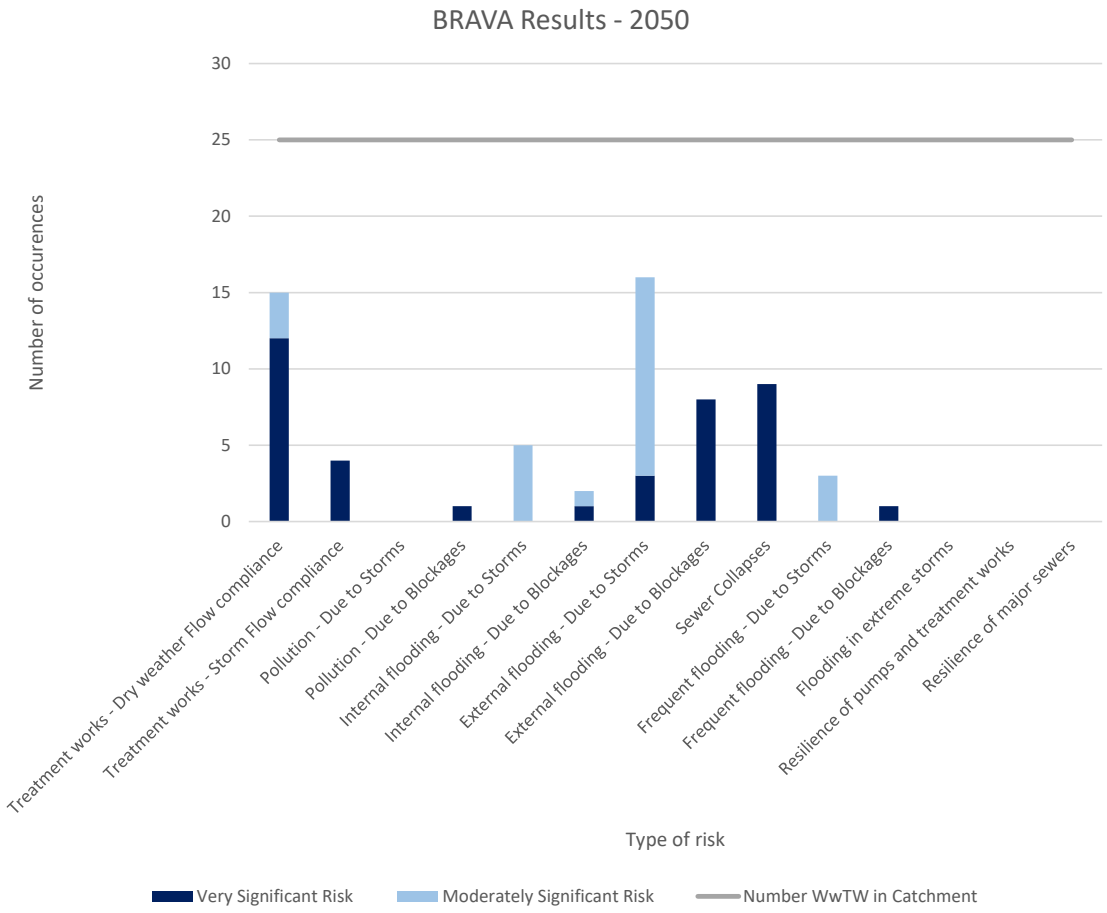


Figure 5 - BRAVA 2050 Summary

In 2050, Treatment works compliance - dry followed by Sewer collapses are the biggest concerns in this strategic planning area.

Figures 6 and 7 indicate the current and predicted risk of flooding, pollution, and both flooding and pollution caused by lack of capacity (termed 'hydraulic overload') across our networks. These maps illustrate where the issues occur and can be used to target where we want to work with the community and stakeholders to resolve issues. By working together, we can combine knowledge and resources to deliver the best outcomes for local communities and the environment. We want to include your feedback in our decision-making process.

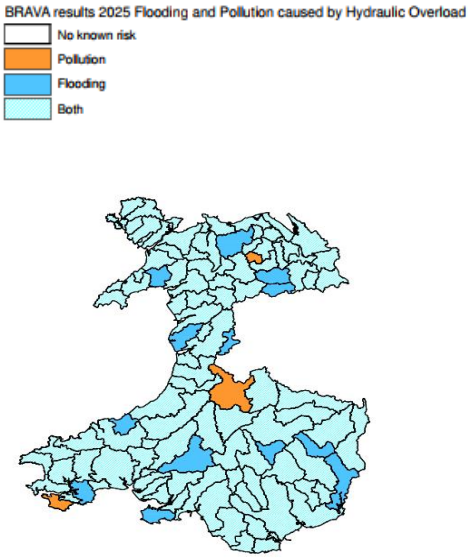


Figure 6 - Associated Strategic Planning Areas priority (2025)

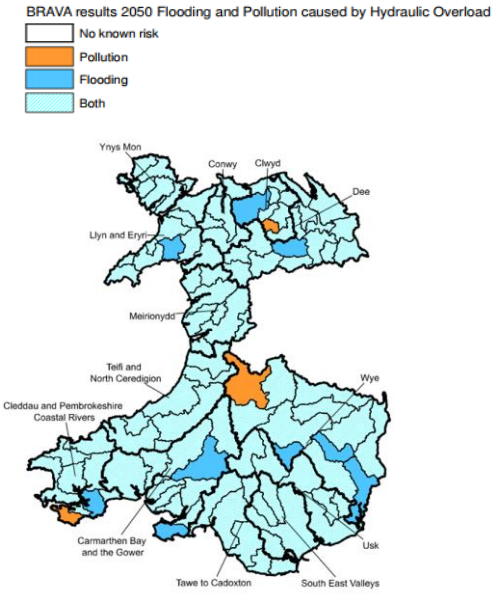


Figure 7 - Associated Strategic Planning Areas priority (2050)

3.3 Water Quality

Water quality is the classification of the quality of watercourses or water bodies in accordance to its physical, biological and chemical properties. Water quality is an important factor of environmental monitoring, ensuring that not only the water body is safe but the surrounding habitat and ecosystem is also.

Water quality status is categorised from 1 to 4, with 4 being the worst case. The priority status is based on the significance towards the risk factors triggering water quality. R Wye - conf Walford Bk to Bigsweir Br has a water quality priority status for 2050 of 2 which indicates targeted investment to mitigate and focus during AMP10.

4.0 Supply Demand

Supply-demand is an assessment of the capacity of our treatment works. It approximately assesses whether all the treatment works in a region can collectively cope with current and future flows in dry and wet weather. There are two parts to the assessment: dry weather flow (DWF) and a wet weather capacity assessment.

For the DWF part of the assessment, the suitability of the dry weather consents is tested against forecast future growth and changes in water consumption. Results for three scenarios are provided: the 0% headroom scenario assesses the region's capability for treating the predicted changes in DWF in the future with no allowance for error, with no spare treatment works capacity. The other scenarios indicate resilience - i.e. could we cope if we had flows 10% or 20% higher than estimated?

The wet weather assessment takes storm consent values where available as an indication of treatment works capacity and estimates the amount of incoming flow the treatment works is able to treat across a year. Again, three scenarios are shown, with differing treatment "targets" - i.e. if we wanted to ensure that 70% of the wet weather flows in a catchment were treated, could the treatment works cope? Changes in rainfall due to climate change and changing dry weather flows within the region mean that the percentage of flow treated across a year can change in the future.

Table 2 shows the supply-demand assessment for this region. Where a region may not have adequate capacity under a given scenario, it is flagged dark blue for further investigation. There may be local incapacity issues at individual works within the region.

L3 Area	Headroom	2025	2030	2035	2040	2045	2050
R Wye - conf Walford Bk to Bigsweir Br	0%						
	10%						
	20%						
	Treatment Target	2025	2030	2035	2040	2045	2050
	70%						
	80%						
	90%						

Table 2 - Supply Demand Balance

5.0 Options

Over time the pressures on our sewerage network change due to influences such as catchment growth, creep of rainwater into the network, or influences such as climate change impacting rainfall patterns. To ensure the plan is robust over the 30-year planning horizon and to account for the uniqueness of each catchment we have tested various types of schemes, and combination of schemes, to ensure a robust 'best value' plan is delivered.

The types of schemes tested are detailed in Table 3 and can be categorised into either improving network resilience to rainfall or improving network headroom in dry weather flow conditions.

Improving Resilience		
10% Reduction in area draining to the combined sewers	Represents removal of runoff from large commercial buildings.	Short term
25% Reduction reduction in area draining to the combined sewers	Represents removal of area runoff from non-residential paved areas where there is only one stakeholder (e.g. Local Authority or Highways Agency).	Medium term
50% Reduction reduction in area draining to the combined sewers	Represents removal of runoff from any connected area including residential properties. There are likely to be multiple stakeholders to engage with.	Long term
Improving Headroom		
Reducing infiltration	Reducing infiltration into sewers by 50%, which could be achieved by relining or replacing the public sewers .	Medium term
Reducing water use	Represents a reduction in water use per person to around 100l per person per day by 2050 by application of water efficiency measures	Medium term
Reducing trade flow	Reduce trade flows by around 25% by application of water efficiency measures.	Long term

Table 3 - Risk mitigation details

We have undertaken an analysis of all our wastewater catchments to determine the benefit in terms of potential volume of water removed from our systems for each scheme type to determine a journey plan, (see Figure 8 below), which provides the direction of the best scheme types to undertake in this catchment for the most benefit against predicted future risk from growth, creep and climate change.

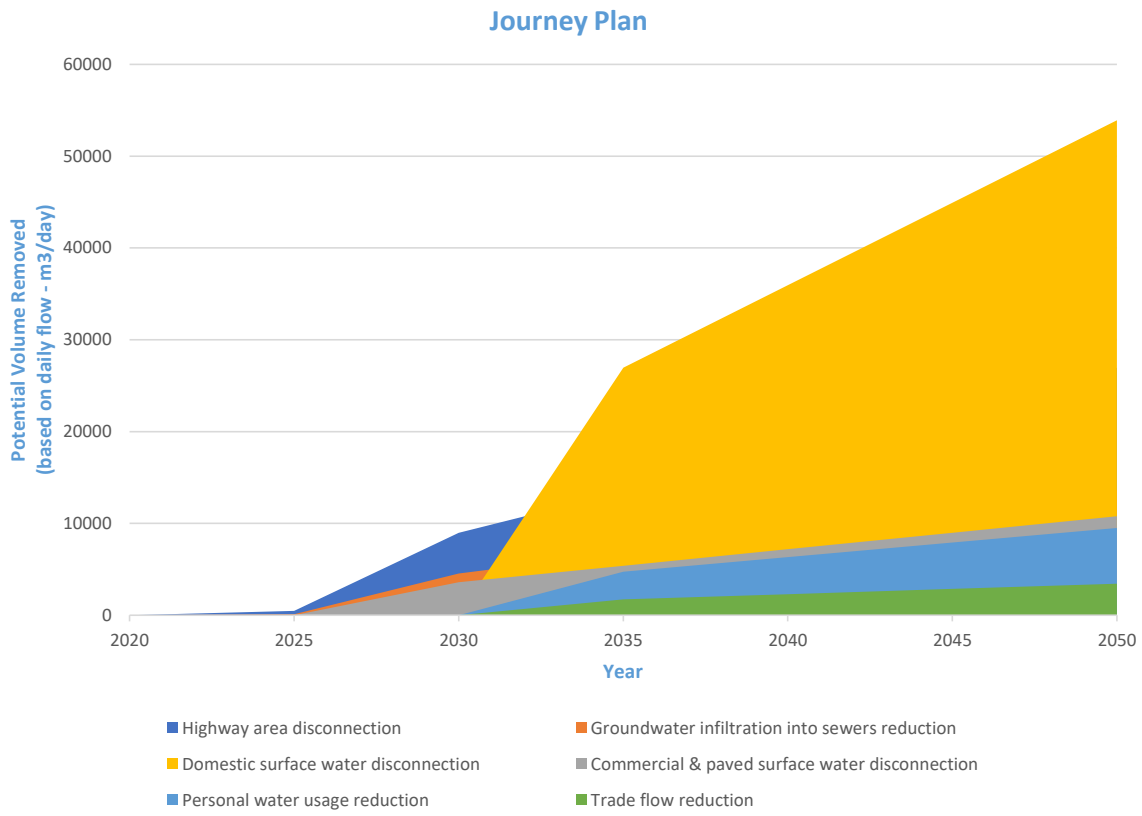


Figure 8 - Journey Plan

Approaches to managing risk

We have undertaken analysis to determine the likely costs to mitigate future predicted pollution and flooding. We assess combined sewer overflows based on the number of times they are predicted to spill in a 'typical year'. Table 4 illustrates the cost of potential measures to mitigate risk to varying standards. The assessment calculates the impact of rainfall and drainage contributions to the network relative to today's costs.

Mitigating the risk posed by flooding has been assessed in terms of probability of occurrence, we use the size of a storm event that has the probability of occurring once every 30 years. Table 5 illustrates the cost of potential mitigation measures to mitigate varying flood risk types.

The choice of scenarios for storm overflow mitigation in Table 4 is a separate cost and would be required in addition to the choice of scenarios for flooding protection in Table 5. The chosen scenarios for Storm overflows nd flooding are to be added together.

Choice of Scenario	Current Scenario (£)	2030 Scenario (£)	2050 Scenario (£)
Maintain Existing Performance*	-	£31,000,000	£49,000,000
40 spills in a Typical Year	£8,000,000	£8,000,000	£8,000,000
20 spills in a Typical Year	£14,000,000	£13,000,000	£14,000,000
10 spills in a Typical Year	£16,000,000	£16,000,000	£17,000,000
0 spills in a Typical Year	£32,000,000	£33,000,000	£38,000,000
Equivalent No. Olympic Swimming Pools in 10 spills scenario	82.00	91.00	99.00

* Maintain is a considered scenario where we will continue to maintain the current level of service within the region and improve the network and address known and emerging risk.

Table 4 - Summary of Combined Sewer Overflow option investments

Choice of Scenario	Current Scenario (£)	2050 Scenario (£)	2050 Resilience Scenario (£) 1 in 50 yr (Storm Dennis)
Internal escapes	£1,000,000	£2,000,000	£2,000,000
External escapes in gardens	£3,000,000	£3,000,000	£5,000,000
Escapes in highways	£8,000,000	£10,000,000	£15,000,000
No future flooding	-	£14,000,000	£40,000,000
Total	£12,000,000	£29,000,000	£62,000,000

Table 5 - Summary of Flooding option investments

We have developed solutions which aim to provide protection against drainage and network failure, pollution events and flooding, internal and external to properties. The solutions developed highlight the level of investment required to bring our entire network up to the level of protection required to be resilient for future risk and demands. The range of scenarios is to provide a choice for understanding and discussion of future direction.

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We will be consulting on the preferred approach to planning and once its concluded the next stage is to develop the pipeline of options to meet the pace scale and affordability discussed with Welsh Government and our regulators.

Table 6 - Summary of solutions put forward are a first cycle preferred plan before SEA/HRA

L4 Catchments	No. Schemes
NEWLAND (NR COLEFORD)	0
GOODRICH STW	0
STAUNTON (GLOUS)	0
THE NARTH (N OF CHEPSTOW) FOREST VIEW	0
BROADSTONE (CATBROOK)	0
LLANCLOUDY HILL VIEW	0
ORCOP (S OF HEREFORD) COPYWELL ESTATE	0
ST OWENS CROSS (PERRYFIELDS)	0
GLEWSTONE (VILLAS)	0
HAREWOOD END (NW OF ROSS-ON-WYE) NO 3	0
HAREWOOD END (NW OF ROSS-ON-WYE) NO 6	0
LLANWARNE MONKTON PLACE	0
LLANGARRON GARRON VIEW NO 2	0
LLANGARRON GARRON VIEW NO 3	0
RUARDEAN THE PLUDDS	0
HENTLAND (N OF MONMOUTH) PENCOED RISE	0
LLANGARRON HERBERTS HILL	0
BROCKWEIR	0
LLANDOGO STW	0
RUARDEAN WOODSIDE	0
TINTERN STW	0
ST BRIAVELS STW	0
RUARDEAN VILLAGE	0
LYDBROOK STW	0
Cophill	0