United Utilities Water

DRAFT Drainage and Wastewater Management Plan 2023

Derwent DWMP

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United Utilities

Water for the North West

Contents

Acronyms

For a list of acronyms, refer to document C0003.

1. Introduction to the DWMP

The Drainage and Wastewater Management Plan (DWMP) is a long-term plan setting out how we intend to maintain robust and resilient drainage and wastewater systems, now and in the future. This is the first time that we are developing the plan and we have taken a comprehensive approach as we recognise the importance of long-term planning.

The heart of the plan will be built around collaborative and innovative working whilst encompassing all activities relating to drainage, flooding and delivering a wastewater service that protects the environment. We have led on this plan, but have developed it in consultation with our partners as we will be delivering the DWMP in partnership with other organisations such as the Environment Agency and local councils.

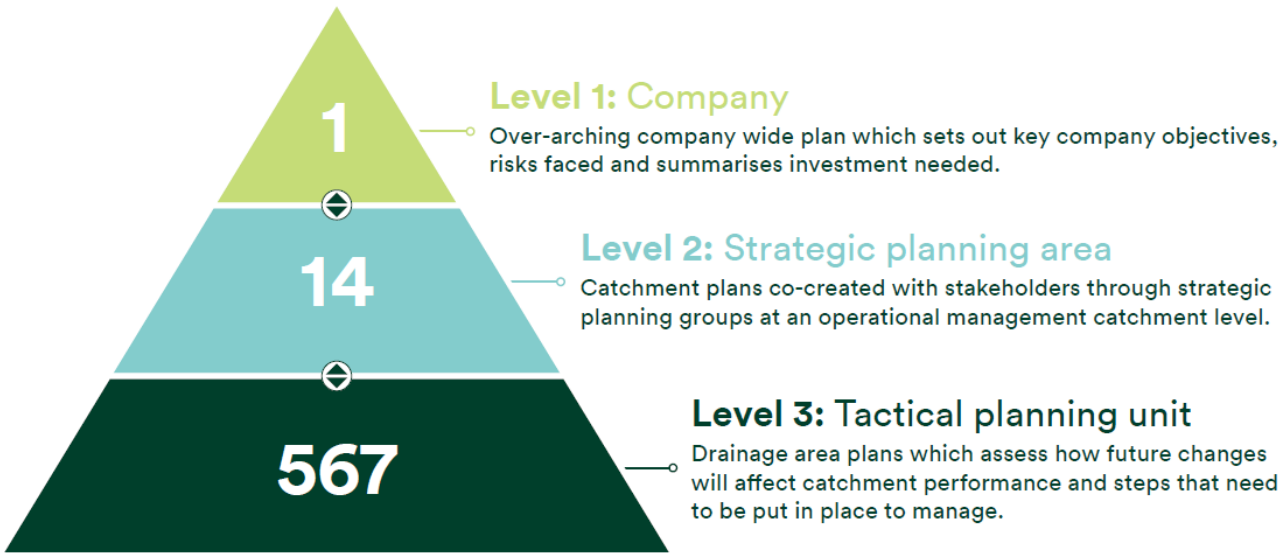
By developing the DWMP, we have an opportunity to:

- provide a basis for more collaborative and integrated planning alongside stakeholders across the region to tackle shared and interrelated risks relating to drainage, flooding and protecting the environment;
- strengthen partnership working with all key stakeholders to drive integrated investment in the environment and communities;
- develop a plan that will help address the increasing environmental expectations from customers and stakeholders and work towards the ambitions set out in Defra's 25-year plan;
- collectively explore innovative solutions such as Sustainable Drainage Systems (SuDS) and nature-based solutions to understand what is best for the North West; and
- embed Systems Thinking to better understand drainage and environmental interactions, and to maximise the potential for integrated solutions.

Throughout the DWMP process, we have engaged with stakeholders to share our data and findings, to ensure that the solutions delivered are co-created, drive efficiencies and will benefit the communities and environment that we live and work in.

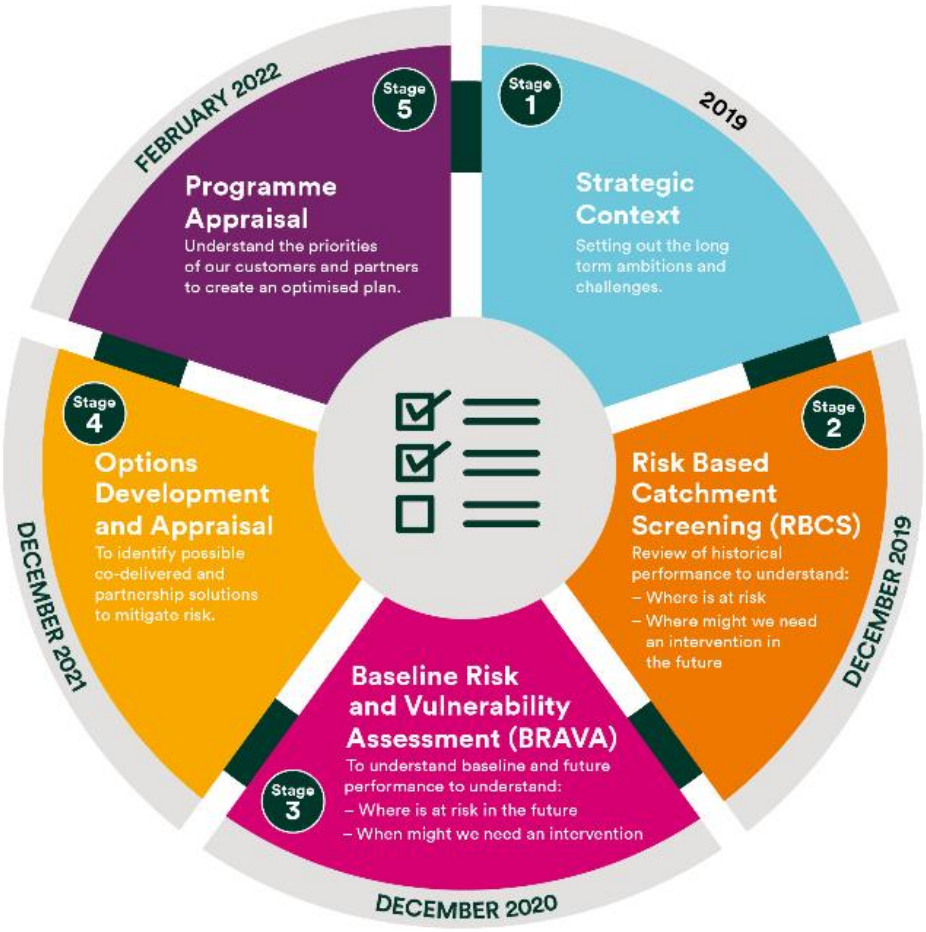
The plan will be set out at three levels (Figure 1) to maximise the potential for partnership working and for effective engagement between regulators and stakeholders at both company-wide level and more locally.

Figure 1 Geographical scales applied for planning and collaboration within DWMP



The plan is made up of five main stages (Figure 2) which each contribute to developing the most sustainable and effective future for the North West. These stages include setting out the long-term ambition for the region, identifying risk and understanding the possible interventions and solutions that could be developed.

Figure 2 Five stages of the DWMP



Across the North West, there are 14 Strategic Planning Areas (SPAs) and the purpose of this document is to share local, place-based information.

We will share the results from the different stages of the DWMP and how the DWMP plans to make a difference in the Derwent SPA.

2. Background to the Derwent catchment

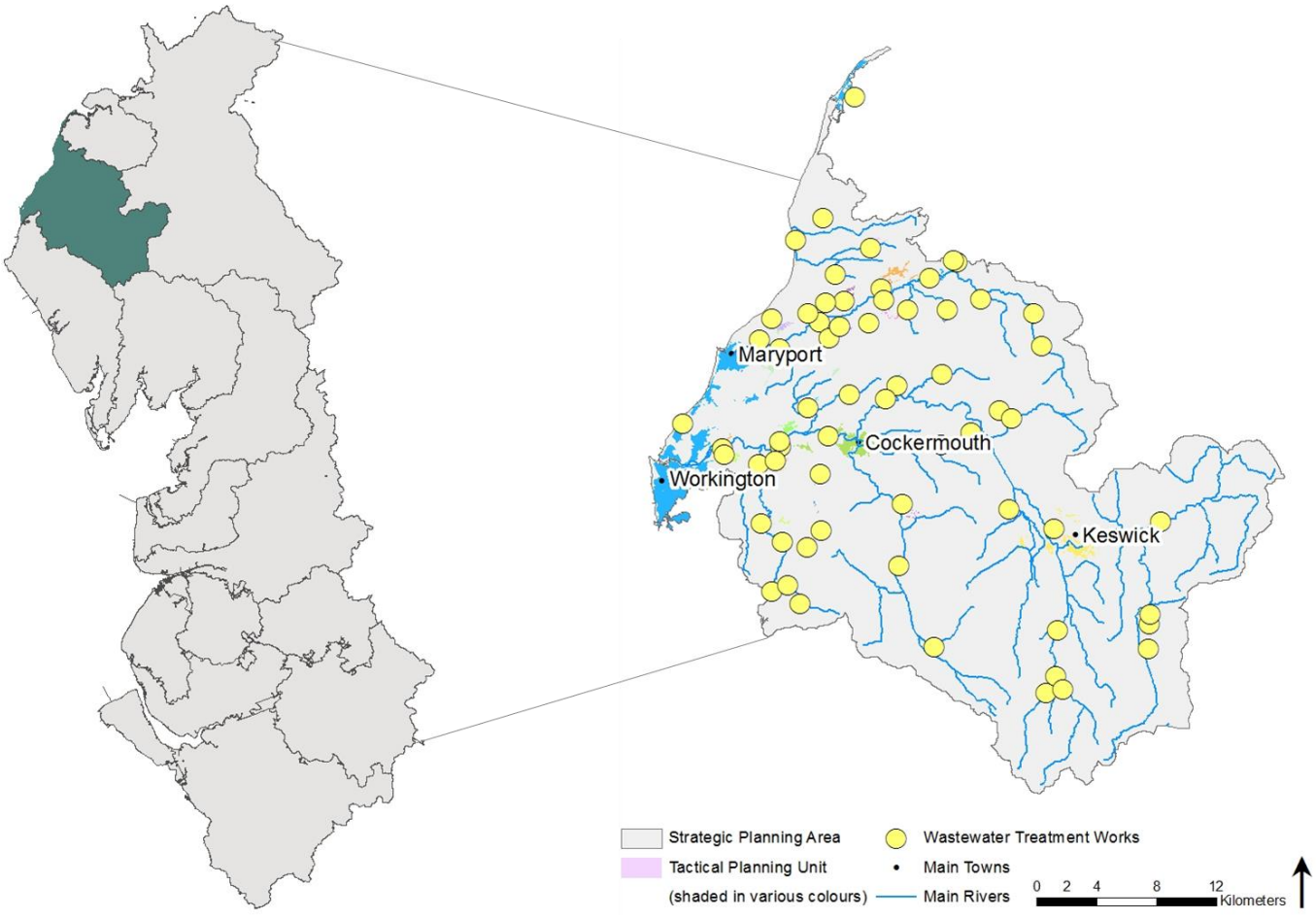
The Derwent catchment covers approximately 891.5km2 and is located in the north-west fells of the Lake District National Park. The land use mostly consists of meat and dairy farming as it is a rural catchment, with several designated conservation areas such as the River Derwent and the Tributaries Special Area of Conservation [1]. The River Derwent and Cocker are present within this catchment and they drain into the Irish Sea at Workington as well as lakes such as Bassenthwaite, Buttermere, Derwent Water, Crummock and Thirlmere reservoir which supplies water to the northwest region.

There are three main sub catchments:

- Cocker is located in the south of the catchment and consists of numerous popular tourist destinations such as Buttermere, Crummock Water and Loweswater Lakes [2].
- Derwent is located across the centre of the catchment, it has tourist locations such as Keswick and is also a sub catchment that is dominated by farmland [3].
- Ellen and West Coast is located along the northern part of the catchment, the River Ellen is there main body of water to exist here and it drains into the Irish Sea at Workington. This sub catchment is mostly dominated by livestock agriculture [4].

There are 64 wastewater tactical planning units (TPU, also known as wastewater treatment work (WwTW) drainage catchments) within the Derwent SPA. A TPU is the drainage catchment area encompassing all the sewers and wastewater assets e.g. pumping stations, which drain into the associated wastewater treatment works. The TPUs within the SPA vary in size from larger catchments such as Workington to smaller, rural catchments such as Swirls. The TPUs are highlighted in Figure 3.

Figure 3 Map of the Derwent SPA



There are numerous strategic management plans within the Derwent that are owned by various other organisations. Within the Derwent catchment, there are active management plans such as:

- The Environment Agency River Basin Management Plan (RBMP) and Flood Risk Management Plan (FRMP);
- Lead Local Flood Authority (LLFA) Surface Water Management Plans (SWMP);
- North West and North Wales Coastal Group Shoreline Management Plan (SMP); and
- Local council plans.

Each of these strategic plans focuses on managing particular risks and links to programmes of work. A high-level summary of these management plans is shown in Table 1.

The DWMP aims to collaborate, share best practice and to align with other strategic plans throughout the SPA. This will help to highlight common challenges, ambitions and goals where there are shared or interconnected risks and opportunities.

Table 1 Summary of stakeholder management plans

Management plan	Overview	Key aspects for the Derwent catchment
River Basin Management Plan (RBMP) [5] **Owner:** Environment Agency	A river basin district covers an entire river system, including river, lake, groundwater, estuarine and coastal water bodies. The RBMP aim is to improve the quality of our water environment to best support wildlife, agriculture, and businesses, and to boost regeneration and recreation.	The main reasons for not achieving good ecological status are physical modifications and pollution from abandoned mines, agriculture and rural are. Future challenges predicted by the Environment Agency include non-native species, physical modifications and pollution from agriculture, rural areas and wastewater.
Flood Risk Management Plan (FRMP) [6] **Owner:** Environment Agency	The FRMP is a strategic plan, which reviews and develops measures to manage the risk of flooding from rivers, the sea, surface water, groundwater and reservoirs. The plan outlines flood risk areas, hazards, and sets out measures and objectives to manage flood risk.	Within the catchment, there are risks of flooding from a variety of sources such as rivers, the sea, surface water, ordinary watercourses, sewers and reservoirs. There are approximately 6,000 people (8%) and 1,500 non-residential properties are at risk of fluvial and coastal flooding. Approximately 7% of agricultural land, 12% of SSSI sites and 100% of Ramsar sites are at risk of flooding in the catchment. The December 2015 storms affected numerous towns and villages across the catchment such as Keswick, Cockermouth, Flimby, Allonby, Workington, Braithwaite and Seatoller. Since then, a programme of recovery was put into place. The Cumbria Floods Partnership Group was also formed which will consider mitigation measures such as improvements to existing flood defences and upstream management options such as slow the flow. Across the Derwent catchment there are 27 measures from earlier plans to manage flood risk.
Shoreline Management Plan (SMP) [7] **Owner:** North West and North Wales Coastal Group	The SMP is a non-statutory, high level policy document for coastal flood and erosion risk management planning that was formally adopted in August 2016. It provides a large-	Between Workington and Riddick protection of current assets such as windfarms will continue in the short term. The SMP2 therefore recommends a managed realignment policy which will allow for the risks to heritage assets, the road and other

	scale assessment of the risks associated with coastal processes and helps to reduce these risks to people and the environment by identifying the most sustainable policies for managing flood and coastal erosion risks in the short term (0–20 years), medium term (20–50 years) and long term (50–100 years).	properties to be managed appropriately through minor short term works and adaptation measures.
Surface Water Management Plan (SWMP) **Owner:** Lead Local Flood Authority (LLFA) [8]	A SWMP is a plan which outlines the preferred surface water strategy for a location. Although owned and led by the LLFA, a SWMP is produced in collaboration with other drainage owners, water companies included. Partners work together to understand the surface water flood risk in an area and agree an approach to address these issues innovatively and in a cost-effective way, and where appropriate, in partnership. A SWMP is a long-term plan and should influence development. The decision on whether a SWMP is appropriate is down to the LLFA, generally they are produced for areas considered to experience a high flood risk. United Utilities Water (UUW) continues to work closely with LLFAs and supports the development of SWMPs where required, and the delivery of SWMPs where they are published.	
Catchment Based Approach (CaBA) Catchment Plan [5] [9] [10] **Owner:** West Cumbria Catchment Partnership	The aim of the partnership is to bring together stakeholders to create and deliver a focussed, sustainable and collaborative action plan to deliver benefits within the catchment.	The vision of the catchment partnership is to have healthy and sustainable water environments that benefit the economy, wildlife and people. The partnership aims to: • Improve water quality • Increase wildlife habitat • Reduce flood risk Over 50% of the catchment is deemed to be in unfavourable condition due to pressures such as invasive species and poor river management. Other pressures include physical modifications and pollution from abandoned mines, agriculture and rural areas.

2.1 Strategic Planning Group (SPG)

We appreciate that there are many organisations with formal roles and responsibilities relating to drainage, flooding and protection of the environment. By participating in the creation of a DWMP much more can be achieved compared to working on our plans in isolation.

Within DWMP, SPGs have been a key form of engagement with stakeholders across the region. SPGs have operated at a local, catchment scale to allow stakeholders to input into the identification of priority and shared risk locations, and develop an understanding of potential collaborative solutions to tackle shared risks. The SPGs have covered a wide range of issues including reducing flooding and improving water quality. A key driver is understanding where there may be potential to achieve multiple benefit through solutions.

Through the SPGs, we have been able to consult with strategic partners on the various stages of the DWMP (Figure 4) and share outputs as and when they become available. This has been a two-way process and stakeholders have had the opportunity to share information with us such as action plans, confirmed projects, priority areas and ambitions for the future which could be developed and delivered in partnership. We have been able to review and incorporate the information shared during the different stages of the DWMP process.

Within the Derwent SPA we have engaged with stakeholders such as:

- The Environment Agency;
- Cumbria County Council; and
- West Cumbria Rivers Trust (host of the West Cumbria Catchment Based Approach (CaBA) partnership).

More information on co-creation activity undertaken with the SPG can be found in Technical Appendix 2 - Stakeholder Engagement (TA2). The outputs from this activity in the Derwent catchment are outlined in Section 4.

Figure 4 DWMP framework for engagement

3. Risk identification

A key component of the DWMP has been around risk identification. This has been a mixture of both historical risk and forecast risk. Activities to understand this were completed through the Risk Based Catchment Screening (RBCS) and Baseline Risk and Vulnerability Assessment (BRAVA) stages. We have also undertaken numerous additional assessments to understand wider resilience and catchment risks.

Further detail on the approaches can be found in Technical Appendix 4 - Risk Based Catchment Screening (TA4) and Technical Appendix 5 - Understanding Future Risk (TA5).

3.1 Risk Based Catchment Screening (RBCS) and Horizon Scan

The RBCS stage is a series of high-level assessments that are used to review and screen each TPU to determine whether a more detailed assessment is required during the Baseline Risk and Vulnerability Assessment (BRAVA) stage.

The assessments are designed to span the key aspects of a wastewater company's responsibilities: from the network, to the treatment works, to its interaction with the environment. Examples of the assessments considered are internal sewer flooding, storm overflow performance, and pollution incidents. The assessments typically used three to five years of historical data.

Additional assessments termed 'horizon scanning' were undertaken to understand wider exogenous factors and opportunities that could inform future investment e.g. major infrastructure projects, private septic tank locations and potential major infrastructure projects (HS2 etc). Areas with potential future developments were also considered and further information on projected growth areas can be found within the associated Local Plans.

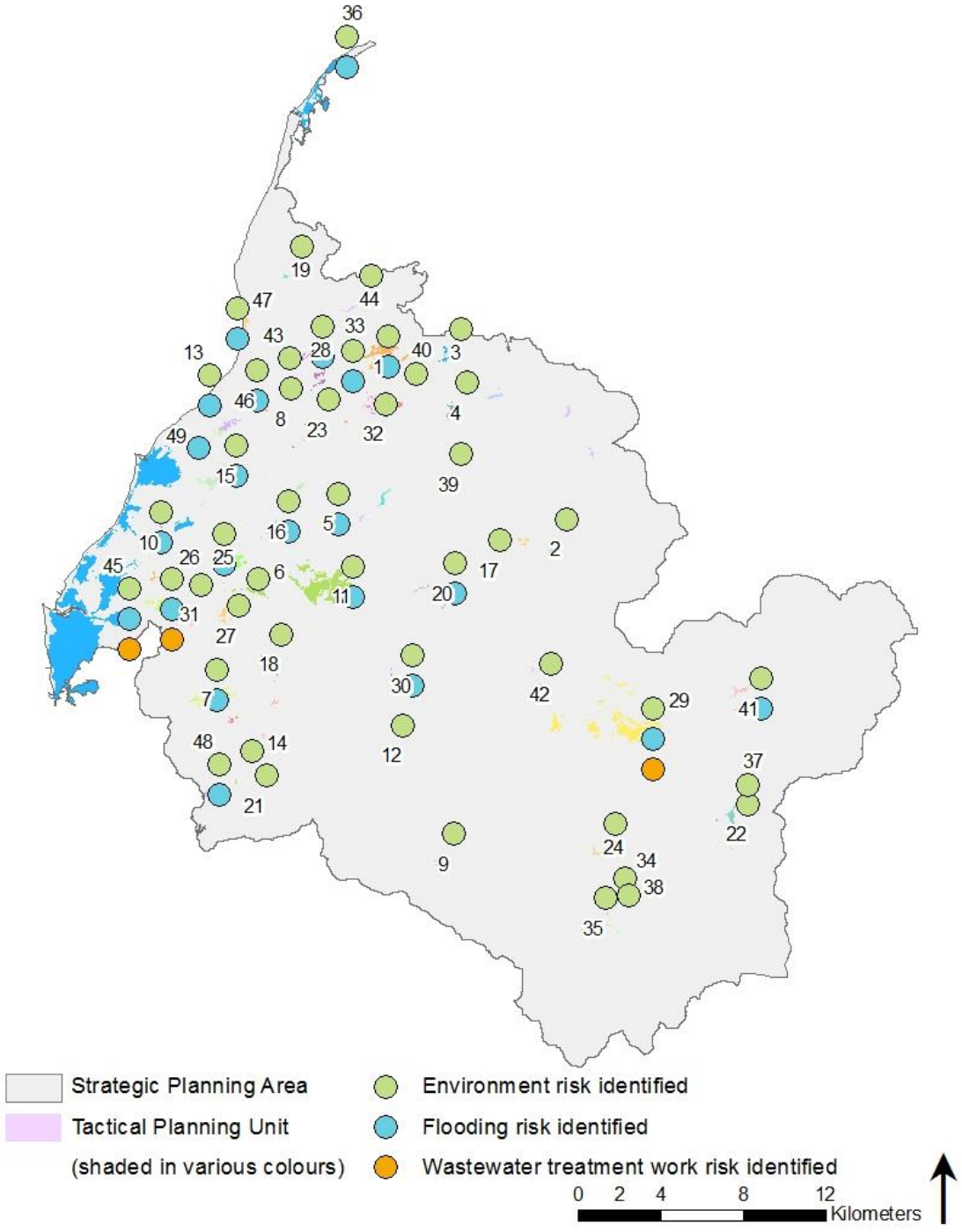
Within the Derwent SPA, the RBCS stage identified 50 out of 64 TPUs that required further investigation and therefore passed onto the BRAVA stage (outlined in Section 3.2). Figure 5 indicates which of the RBCS categories (environmental, flooding and wastewater treatment works capacity) have triggered within each TPU. There are numerous TPUs which did not trigger for RBCS across any of the categories and are therefore not shown in Figure 5. A list of these TPU's can be found in Table A.2 in the Appendix.

Environmental and flooding categories are the most common within the Derwent SPA (Figure 5), which is supported by the highest triggered RBCS assessments which are:

- Storm Overflow Assessment Framework - (48/64) – Environment; and
- External Sewer Flooding - (22/64) – Flooding.

Further detail on the approaches and assessment results can be found in TA4.

Figure 5 Map of the Risk Based Catchment Screening (RBCS) results for the Derwent SPA. Risk categories indicate areas triggering further investigation following Risk Based Catchment Screening. The TPU names corresponding to the numbers in the map can be found in Table A.1 in the Appendix. Those not triggered in RBCS can be found in Table A.2 in the Appendix



3.2 Baseline Risk and Vulnerability Assessment (BRAVA) and Resilience

The TPUs that were identified during RBCS were then taken forward into BRAVA, which aims to assess the baseline and future position of system performance against the DWMP planning objectives, to understand where there may be issues. It is also to understand wider resilience issues that could also impact upon the DWMP planning objectives. This stage considers risk at 2020, 2030 and 2050 design horizons.

In addition to BRAVA, a range of resilience assessments were undertaken and will have been incorporated throughout the plan to allow us to expand our understanding of wider core risks, such as how the water quality of rivers may change as a result of climate change. We have also assessed risks such as fluvial and/or coastal flooding and fluvial and/or coastal erosion and land stability.

Further detail on the approaches and assessment results can be found in TA5 and Technical Appendix 6 – Resilience (TA6).

The BRAVA and resilience results for the Derwent SPA are outlined in Table 2 to Table 5.

Table 2 Environmental BRAVA results

Tactical Planning Unit	Environmental					
	Pollution Assessment	Storm Overflow Performance		Bathing and Shellfish Spill Assessment		
	2020	2020	2050	2020	2030	2050
Allerby						
Allonby						
Asby						
Aspatria						
Bassenthwaite						
Birkby						
Blennerhasset						
Blind Crake						
Bothel						
Branthwaite						
Bridekirk						
Broughton Cross						
Bullgill						
Buttermere						
Camerton						
Cockermouth						
Cornhow						
Crosscanonby						
Crossgate						
Dearham						
Dovenby						
Dub Wath						
Eaglesfield						
Edderside						
Embleton						

BRAVA	
	No concern (forecast)
	Potential area of focus (forecast)
	Area of focus (forecast)
	Not assessed / Not applicable

Tactical Planning Unit	Environmental					
	Pollution Assessment	Storm Overflow Performance		Bathing and Shellfish Spill Assessment		
	2020	2020	2050	2020	2030	2050
Fell Dyke						
Fisher Place						
Gilcrux						
Grange In Borrowdale						
Great Broughton						
Great Clifton						
Grey Southern						
Hayton						
Keswick						
Little Clifton						
Lorton						
Plumbland						
Prospect & Oughterside						
Rosthwaite						
Seatoller						
Silloth						
Stannah						
Stonethwaite						
Sunderland						
Thornthwaite						
Threapland						
Threlkeld						
West Newton						
Westmoor End						
Workington						
Torpenhow						

Table 3 Flooding BRAVA results

Key

No concern (forecast)

Potential area of focus (forecast)

Area of focus (forecast)

Not assessed

Tactical Planning Unit	Flooding												
	Internal Flooding Risk			External Flooding Risk			Sewer Collapse Risk	Risk of flooding in a storm (1:50yr)		Flooding of open spaces			Blockage Assessment
	2020	2030	2050	2020	2030	2050	2020	2020	2050	2020	2030	2050	2020
Allerby													
Allonby													
Asby													
Aspatria													
Bassenthwaite													
Birkby													
Blennerhasset													
Blind Crake													
Bothel													
Branthwaite													
Bridekirk													
Broughton Cross													
Bullgill													
Buttermere													
Camerton													
Cockermouth													
Cornhow													
Crosscanonby													
Crossgate													

Tactical Planning Unit	Flooding												
	Internal Flooding Risk			External Flooding Risk			Sewer Collapse Risk	Risk of flooding in a storm (1:50yr)		Flooding of open spaces			Blockage Assessment
	2020	2030	2050	2020	2030	2050	2020	2020	2050	2020	2030	2050	2020
Dearham													
Dovenby													
Dub Wath													
Eaglesfield													
Edderside													
Embleton													
Fell Dyke													
Fisher Place													
Edderside													
Embleton													
Fell Dyke													
Fisher Place													
Gilcrux													
Grange In Borrowdale													
Great Broughton													
Great Clifton													
Grey Southern													
Hayton													
Keswick													
Little Clifton													
Lorton													
Plumbland													
Prospect & Oughterside													

Tactical Planning Unit	Flooding												
	Internal Flooding Risk			External Flooding Risk			Sewer Collapse Risk	Risk of flooding in a storm (1:50yr)		Flooding of open spaces			Blockage Assessment
	2020	2030	2050	2020	2030	2050	2020	2020	2050	2020	2030	2050	2020
Rosthwaite													
Seatoller													
Silloth													
Stannah													
Stonethwaite													
Sunderland													
Thornthwaite													
Threapland													
Threlkeld													
West Newton													
Westmoor End													
Workington													
Torpenhow													

Table 4 Wastewater treatment works BRAVA results

Tactical Planning Unit	Wastewater Treatment Works		
	Risk of wastewater treatment works (WwTW) capacity		
	2020	2030	2050
Blind Crake			
Bothel			
Branthwaite			
Bridekirk			
Cockermouth			
Crosscanonby			
Dearham			
Edderside			
Grange In Borrowdale			
Great Broughton			
Great Clifton			
Keswick			
Lorton			
Prospect & Oughterside			
Seatoller			
Silloth			
Workington			

BRAVA	
	No concern (forecast)
	Potential area of focus (forecast)
	Area of focus (forecast)
	Not assessed

Table 5 Environmental and flooding resilience results

Tactical Planning Unit	Resilience Assessment		
	Environmental		Flooding
	Potential for changes in the water quality of rivers as a result of climate change	Potential for changes in catchment contributions as a result of climate change	Outfall locking
	2050	2050	2020
Aspatria			
Bassenfell			
Bassenthwaite			
Birkby			
Blennerhasset			
Blind Crake			
Bothel			
Branthwaite			
Bridekirk			
Broughton Cross			
Bullgill			
Buttermere			
Camerton			
Cockermouth			
Crosscanonby			
Crossgate			
Dearham			
Dovenby			
Dub Wath			
Eaglesfield			
Edderside			
Embleton			
Fell Dyke			

Resilience	
	More resilient
	Less resilient
	Not assessed

Tactical Planning Unit	Resilience Assessment		
	Environmental	Flooding	
	Potential for changes in the water quality of rivers as a result of climate change	Potential for changes in catchment contributions as a result of climate change	Outfall locking
	2050	2050	2020
Gilcrux			
Grange In Borrowdale			
Great Broughton			
Great Clifton			
Greengill			
Grey Southern			
Hayton			
Ireby			
Keswick			
Little Clifton			
Lorton			
Mockerkin			
Pardshaw			
Plumbland			
Prospect & Oughterside			
Redmain			
Rosthwaite			
Stonethwaite			
Sunderland			
Thornthwaite			
Threapland			

Tactical Planning Unit	Resilience Assessment		
	Environmental	Flooding	
	Potential for changes in the water quality of rivers as a result of climate change	Potential for changes in catchment contributions as a result of climate change	Outfall locking
	2050	2050	2020
Threlkeld			
Torpenhow			
Uldale			
Ullock			
Wardhall Guards			
Watch Hill			
Watchhill West			
West Newton			
Workington			

3.3 Problem characterisation

3.3.1 Complex catchments

Complex catchments were determined through problem characterisation using a combination of a complex and strategic catchment scores based on strategic need (largely derived from growth and climate forecast models) and modelled risks in each of the TPU (largely based on BRAVA). Within the Derwent SPA, no TPUs were identified to be 'complex' based on problem characterisation.

3.3.2 Strategic growth catchments

Through the various risk identification assessments, a number of locations were identified through opportunity workshops that require more strategic analysis. These are areas with high growth, a high number of risks and multiple potential scenarios. Different bespoke scenarios are applied to strategic catchments based on the needs and drivers of the catchments to understand the variability of risk as a first step for optioneering, so that the range of options developed can mitigate a different range of scenarios.

As a result of this assessment the following TPUs in the Derwent SPA have been identified as having 'strategic growth':

- Workington.

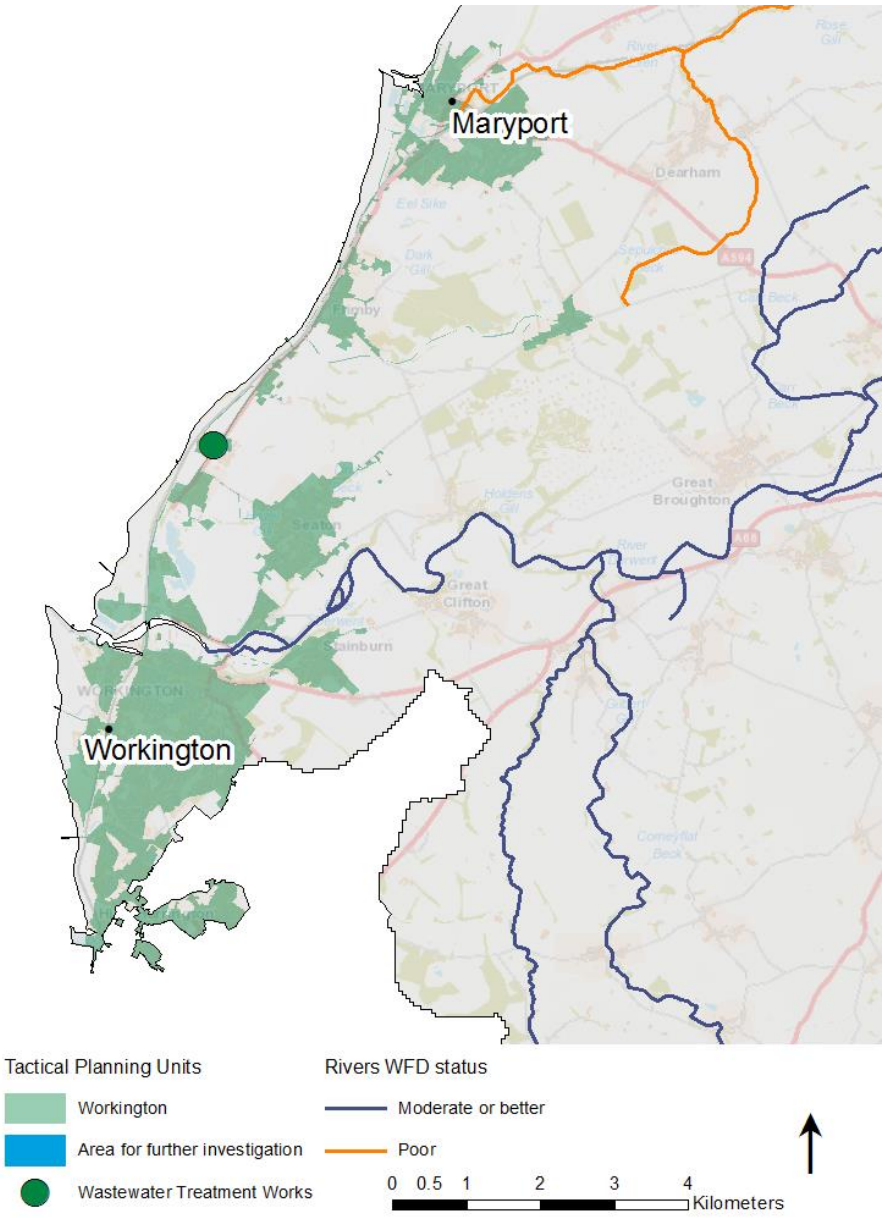
Note: Water Industry National Environment Programme (WINEP) and storm overflows guidance are still being developed. This could lead to significant changes in preferred options and could result in large-scale, short and long-term investment needs. This will be fully reviewed between draft and final DWMP publication, in addition to other aspects such as nutrient neutrality, bathing waters and shellfish water expectations. Between draft and final DWMPs the impact of storm overflow requirements will also require optimising against the other needs and opportunities.

3.3.3. Workington

The Workington TPU is to the west of the Derwent SPA (Figure 6), consisting of over 470km of sewer network which serves over 20,000 properties and a residential population of approximately 43,000 people, which is projected to increase 8% by 2050. The main watercourses are the Derwent (from the confluence with the Cocker to tidal) and the Ellen (lower), which are classed as 'moderate' and 'poor' respectively under the Water Framework Directive (WFD) 2019.

Workington is a complex catchment, with a number of storm overflows within the area, and uncertainty around medium and long term performance particularly with regards to meeting future new targets. The BRAVA process also identified risks for internal flooding, external flooding, flooding of open spaces, flooding in 1-in-50-year storm events, pollution, sewer collapse and blockages by 2050.

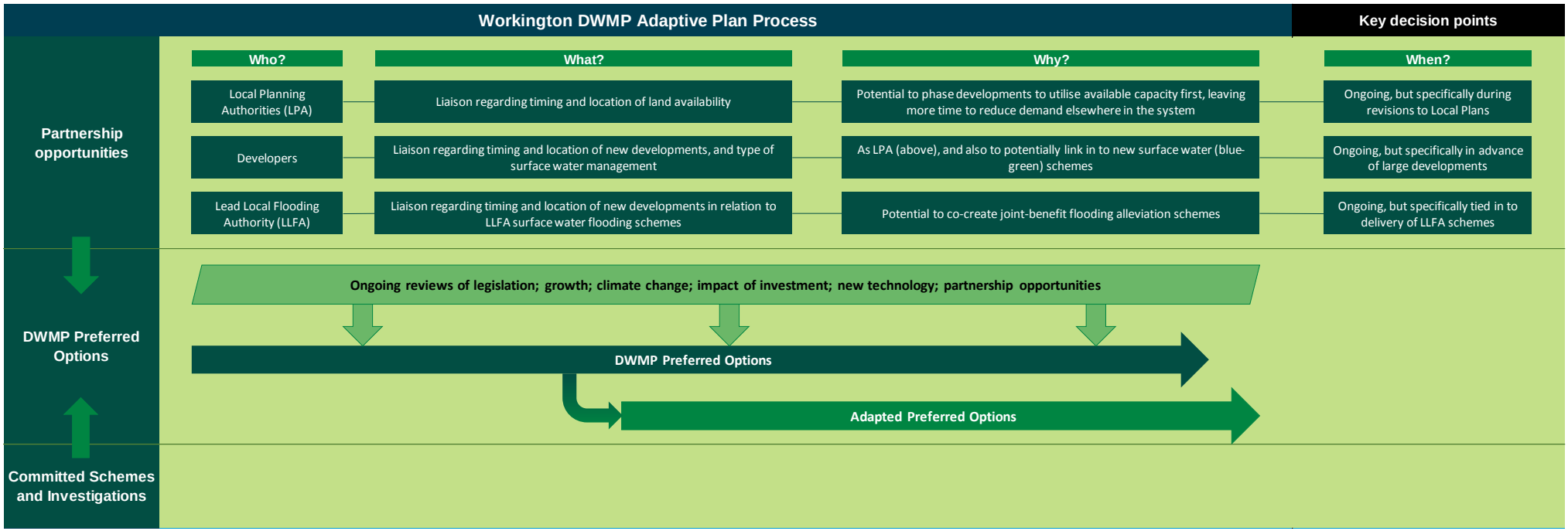
Figure 6 Map of the Workington TPU



3.3.3.1 Workington adaptive plan

The first part of the adaptive plan process (Figure 7) highlights the importance of partnership working and regular data reviews.

Figure 7 Workington adaptive planning process



Partnership working

In a catchment where growth is a significant factor in future performance, it is key to maintain regular conversations with those stakeholders that have knowledge about future developments and can potentially influence their impact. Key organisations include:

- Local Planning Authority;
- The Environment Agency;
- Lead Local Flood Authorities; and
- Housing developers.

The DWMP plan for each TPU is developed based on a number of data sources. Some of these are prone to change over time, which means that original assessments can become out of date. As data from these sources change, it makes sense to re-evaluate the DWMP plan to check the impact on the plan. Examples of data that change over time are shown in Table 6.

Table 6 Examples of data that change over time and can impact upon the plan

Type of data or information	Possible impacts of changes
Government legislation	More or less stringent requirements or regulations, which may require different levels of investment, and policy changes that may drive better or worse incentives on demand.
Development growth projections	These will vary with time in line with economic conditions, changing demographics, or government policy. This can result in the number of new houses and businesses growing at a different rate than originally forecast.
Climate change projections	As more climate data becomes available, climate projections are modified, which may indicate changes to temperature and rainfall patterns.
Impact of investment	As new drainage schemes or new strategies are implemented, we will continue to evaluate their performance. If they turn out to be more or less successful than anticipated, this may allow the extent of another option type to be reduced or increased accordingly.
Development of new technology	Over time, new technology provides opportunities to address and resolve risks differently, or more efficiently.
Partnership opportunities	We will work closely with key stakeholders to address risks jointly. Over time, these stakeholders may see changes in their own risks and funding levels, which may present opportunities for greater collaboration.

Figure 8 shows the second part of the Workington adaptive plan, reflecting the different option types identified as being appropriate for Workington. Each line represents a different option type – e.g. schools education programme. The plan shows that each option type will be regularly reviewed in line with the method described in part one. This allows new information and opportunities to be used to adapt the plan by either increasing or reducing the extent of some option types.

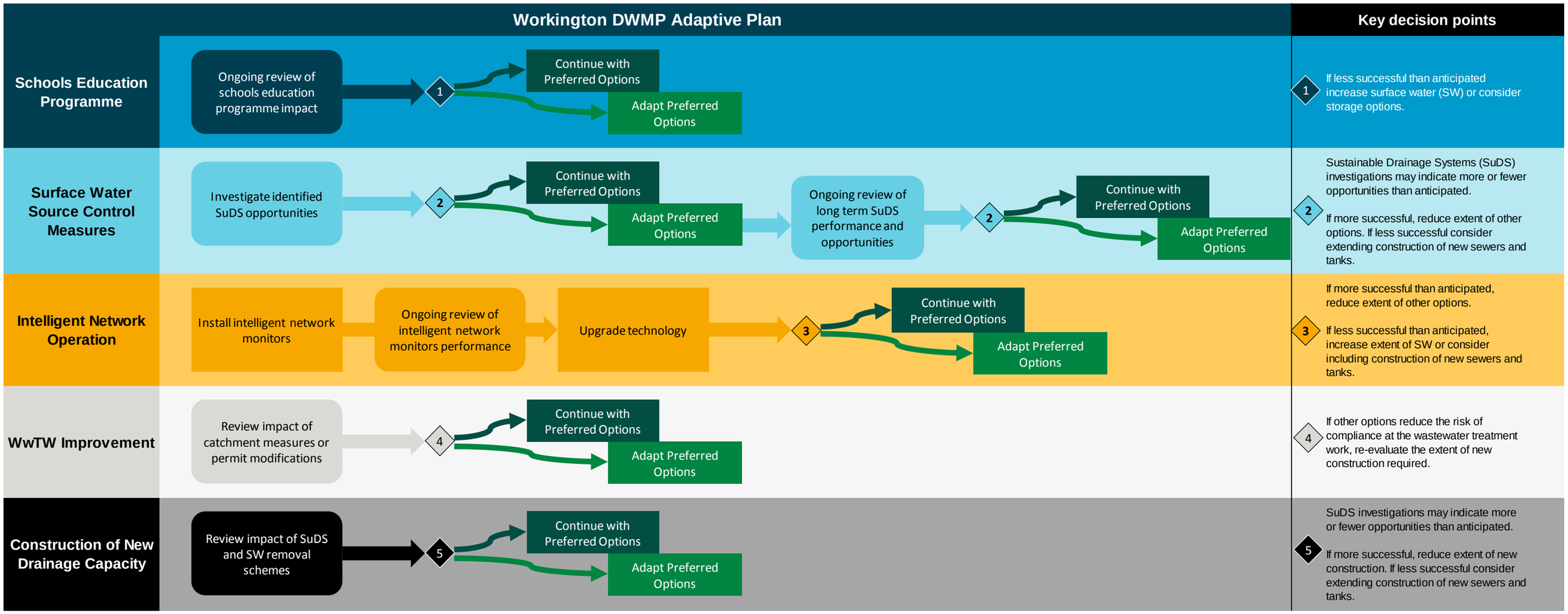
Within Workington, there are opportunities to carry out investigations before making final decisions on the final strategy. This means that we can properly evaluate options before committing to significant investment. These investigations will take into account things such as:

- Technical feasibility;
- Benefit of the work;
- Customer impact;
- Environmental impact; and
- Cost.

The adaptive plan below demonstrates multiple potential scenarios and pathways, and should be read in conjunction with the optimised DWMP plan for the relevant TPU (refer to Section 5.3).

The adaptive plan should be reviewed regularly in order to incorporate potential changes in key factors such as legislation, population growth and climate change, which could impact standards or targets, as highlighted in Figure 7. The adaptive plan may contain potential investigations which are currently excluded from the optimised DWMP plan (refer to Section 5.3) until there is more certainty. It is therefore important that both the adaptive plan and the optimised plan are developed together.

Figure 8 Workington adaptive plan – Possible adaptive pathways as knowledge and opportunities change over time



4. Options development

The approach for options development is an iterative screening process to identify most appropriate solutions for issues in each TPU. These solutions were taken forward for a best value assessment which will select the preferred option (Figure 9).

An options hierarchy was then used which has been endorsed by customers and stakeholders from across the North West to select preferred solutions (Figure 10). The hierarchy covers a range of option types from behavioural, to blue-green solutions e.g. SuDS and traditional grey solutions e.g. storage tanks across benefits such as reducing demand, better system management and creating capacity.

A key element to this has been built around co-development, co-funding and co-delivery through partnerships and third parties (for instances where a specific skill set is required).

Figure 9 Options development process

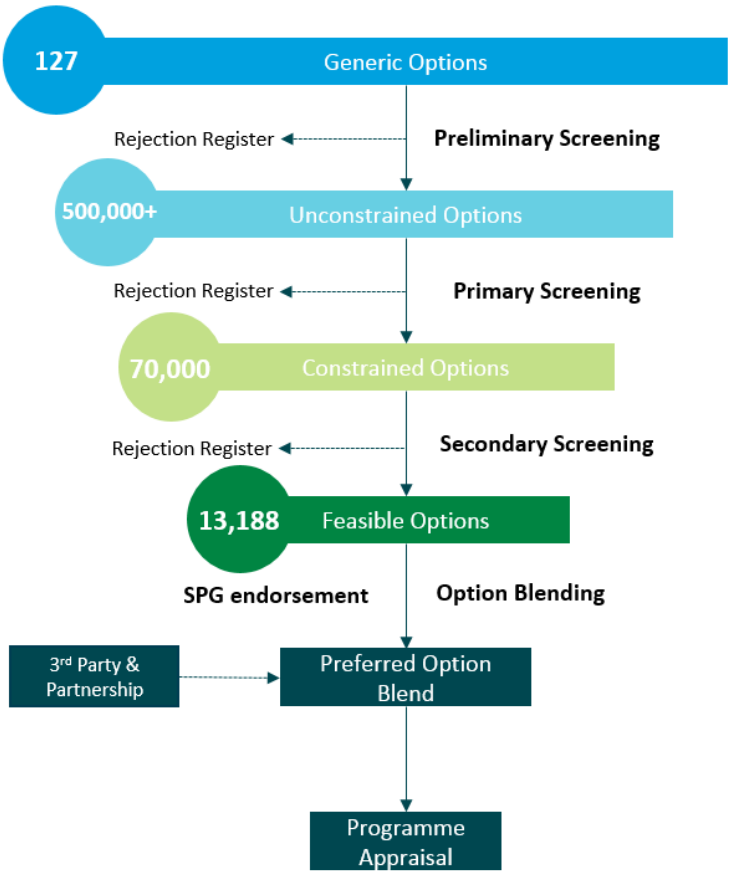
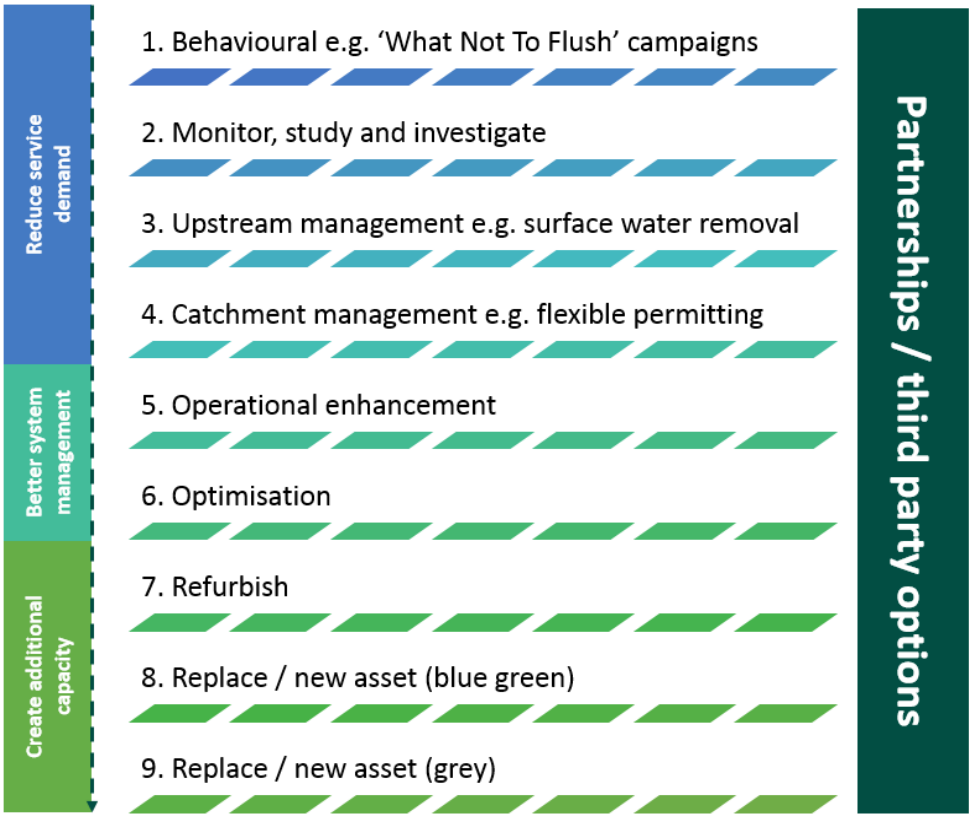


Figure 10 Options hierarchy



4.1 Derwent partnership options

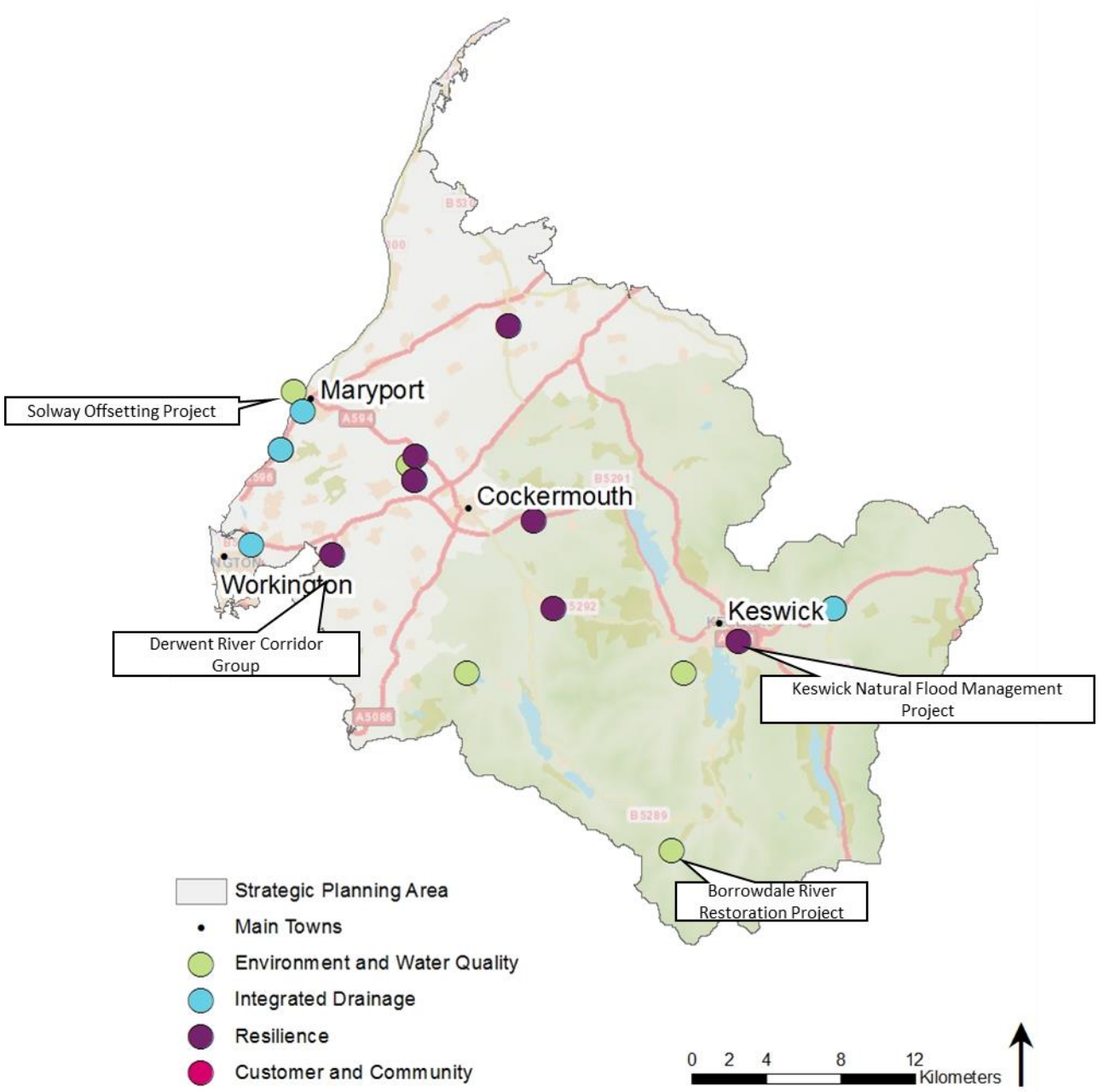
In order to identify and develop potential partnership options in the Derwent SPA, through the SPG we have shared the results from the risk identification stages such as BRAVA. This was done through a series of workshops and the purpose was to identify areas of shared risk and partnership opportunities which have been reviewed against the wider DWMP options development process (refer to Section 5.2).

The options shared were reviewed by the DWMP team and a second SPG workshop was held to gather additional information regarding potential partnership opportunities. This allowed us to understand timescales, likelihood of investment and potential organisations involved. An opportunities pipeline was consequently created using the outputs of this engagement. The pipeline includes opportunities at a range of different levels of maturity and confidence in development, as such these are not confirmed or necessarily funded schemes. However, they provide an indication of areas where we may be able to work collaboratively with partners in the future when more certainty is ascertained about need and funding. Examples of potential partnership locations are shown in Figure 11.

We have actively engaged with our SPGs to ensure that this is a collaborative process. Moving forwards, we are currently developing our Partnership Framework for the investment cycle 2025 – 2030 and beyond. The DWMP partnership opportunities pipeline will feed into this, forming an initial view of partners and opportunities. When developing the business plan, further engagement will be undertaken to where an opportunity is aligned to a 2025 – 2030 investment need. In addition to scheme specific collaboration opportunities, we recognise the need for more strategic partnerships and we will build on successes from historic partnerships in the North West.

For further information on our approach to partnership working, refer to TA2.

Figure 11 Overview of the potential partnership opportunities in the Derwent SPA



5. Options for the Derwent

5.1 Options considered

Following a number of iterative screening processes outlined in Section 4, a list of feasible options was developed for each TPU within the Derwent catchment. Options can be categorised into a number of categories:

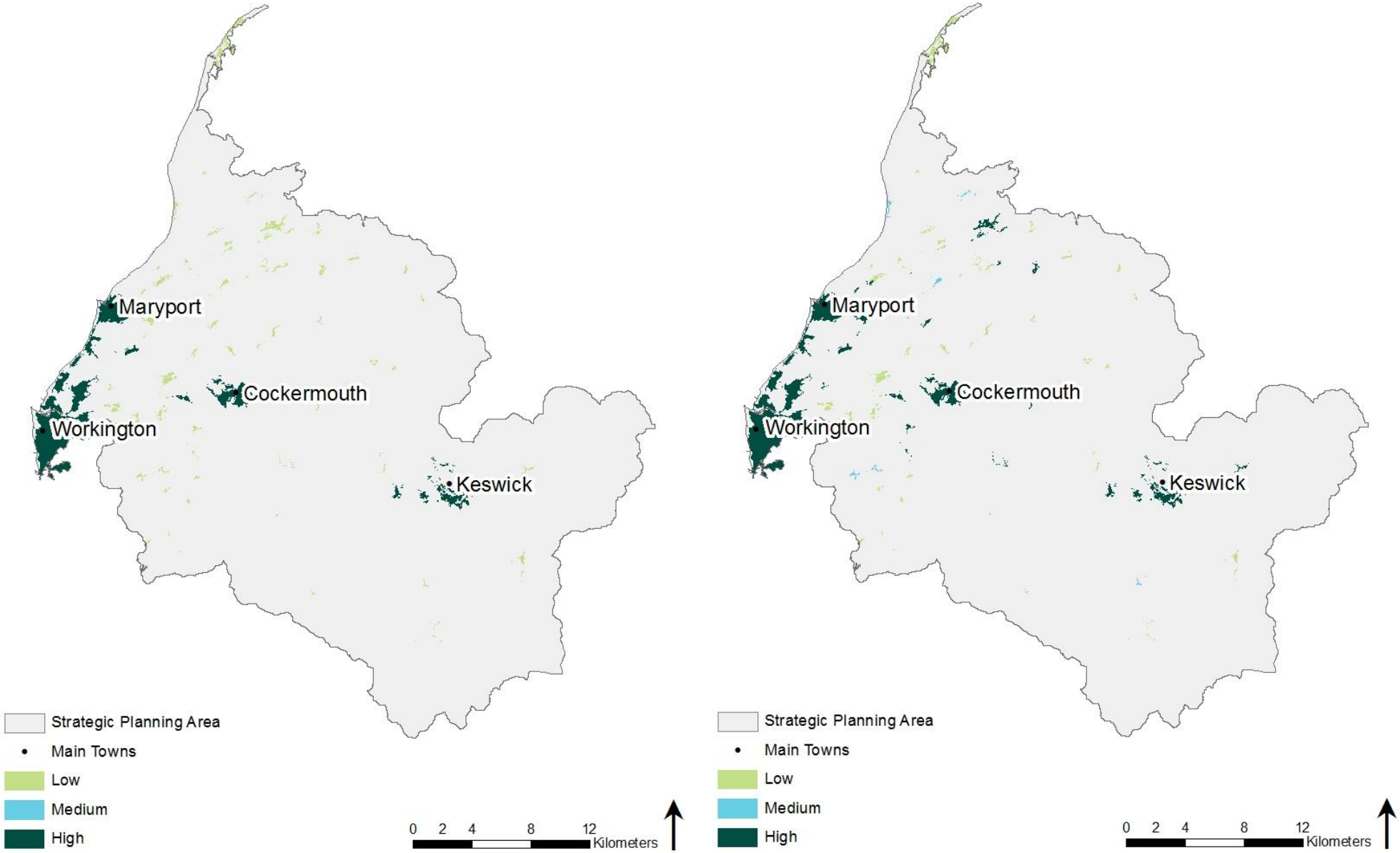
- Customer engagement;
- Monitor and investigate;
- Upstream management;
- Catchment management;
- Operational enhancement;
- Optimisation;
- Refurb/New asset (blue/green); and
- Refurb/New asset (grey).

Of these options a number can be considered regional options – those which could be implemented across the North West but may bring tangible benefits in some areas more than others. These can be investigated further ahead of investment cycle 2025 – 2030 where viable.

Across the Derwent SPA customer engagement options (Figure 12) comprising of options to work with customers to reduce demand and increase awareness of 'what not to flush' have been identified as having the potential to deliver the highest benefit in Cockermouth, Workington and Keswick TPUs.

Sustainable Drainage System (SuDS) options have been assessed, these form a key part of the strategy to manage rainwater from entering the sewer system in Workington and Keswick TPUs (Figure 12).

Figure 12 Maps show the benefit of implementing regional customer engagement (left) and sustainable drainage solutions (right) options across the Derwent SPA



5.2 Preferred options

Note: Water Industry National Environment Programme (WINEP) and storm overflows guidance are still being developed. This could lead to significant changes in preferred options and could result in large-scale, short and long term investment needs. This will be fully reviewed between draft and final DWMP publication, in addition to other aspects such as nutrient neutrality, bathing waters and shellfish water expectations. Between draft and final DWMPs the impact of storm overflow requirements will also require optimising against the other needs and opportunities detailed in this section to assess synergy/conflict and best value.

The data below do not include planned investment in addressing storm overflows. The future standards for overflows are currently the subject of the Government's Storm Overflow Discharge Reduction Plan Consultation, and the outcome is not yet determined, so it has not been possible to include these in the screening process described below.

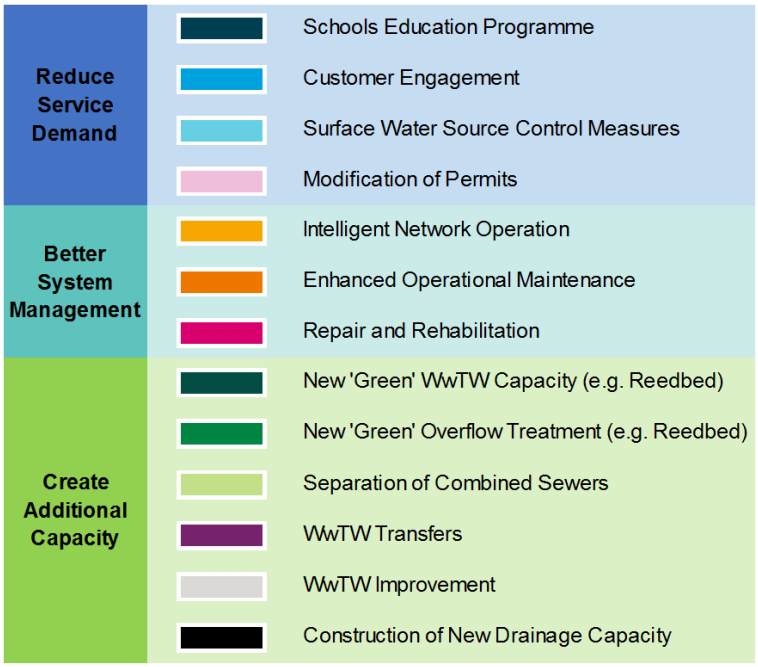
A high-level regional assessment has been carried out to estimate the likely investment requirements to address all overflow risks, but due to the uncertainty described above, this has not been broken down by Strategic Planning Areas. This information can be found in the DWMP main document.

Utilising data collected at the various stages of developing the DWMP (BRAVA, partnership opportunities and the data in Figure 12), preferred options were selected using a decision support tool and following the hierarchy principles. We have also included in this plan high confidence schemes that we believe are likely to have secured investment.

In addition the partnership opportunities highlighted in Section 4.1 are considered key for delivery of the options set out below. These will be investigated in detail in preparation for the investment plan for the period 2025-2030.

The following colour schemes are used for all charts and graphs in this section to represent each option type (Figure 13).

Figure 13 Option types



The first four option types are all grouped under the strategic heading of 'Reduce Service Demand', and are options that focus on either reducing the amount of wastewater that is produced, or preventing it from reaching the sewer network.

The second strategic group is 'Better System Management' and looks to try and manage and operate the existing assets in a more efficient or effective manner.

The final group is 'Create Additional Capacity'. This is about building new assets, for example storage tanks or new treatment work process units, where it is not possible or economical to reduce demand or improve operations any further.

Across the Upper Mersey SPA, the outcomes seen as a result of investment and benefit in each option type are shown in Figures 14, 15 and 16.

Figures 14 and 15 show how potential investment could be split between the three high-level option strategies – reduce demand, system management and new capacity – and then further sub-divides these into the individual option types.

Figure 14 shows potential options to address environmental planning objectives, which incorporate:

- Wastewater treatment work permit compliance;
- WINEP compliance; and
- Pollution of watercourses.

Figure 15 shows potential options to address flooding planning objectives, which incorporate:

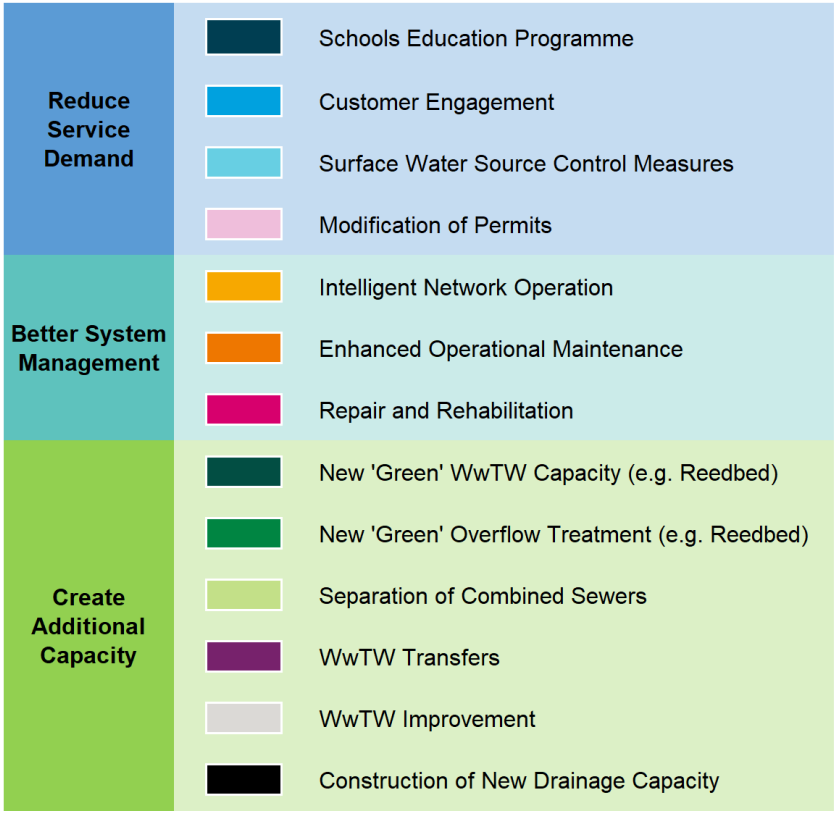
- Internal flooding;
- External flooding;
- Highway and open space flooding; and
- 1 in 50-year flooding.

Note that the percentages shown in Figures 14 and 15 are the proportions of investment within each planning objective type (flooding and environmental), but the total values of flooding and environmental investment are not equal. This split can be seen in more detail for each TPU in Section 5.3.

Figure 16 shows how these options could contribute to addressing the planning objectives – environmental and flooding.

Figure 14 Derwent Strategic Planning Area: Distribution of environmental investment by option type

This is an example of how investment in different options types may be used to address the environmental planning objectives. The vast majority of potential investment could be through improvements in wastewater treatment works. This chart does not show planned investment in improving overflow performance as these are not based on cost beneficial assessments.



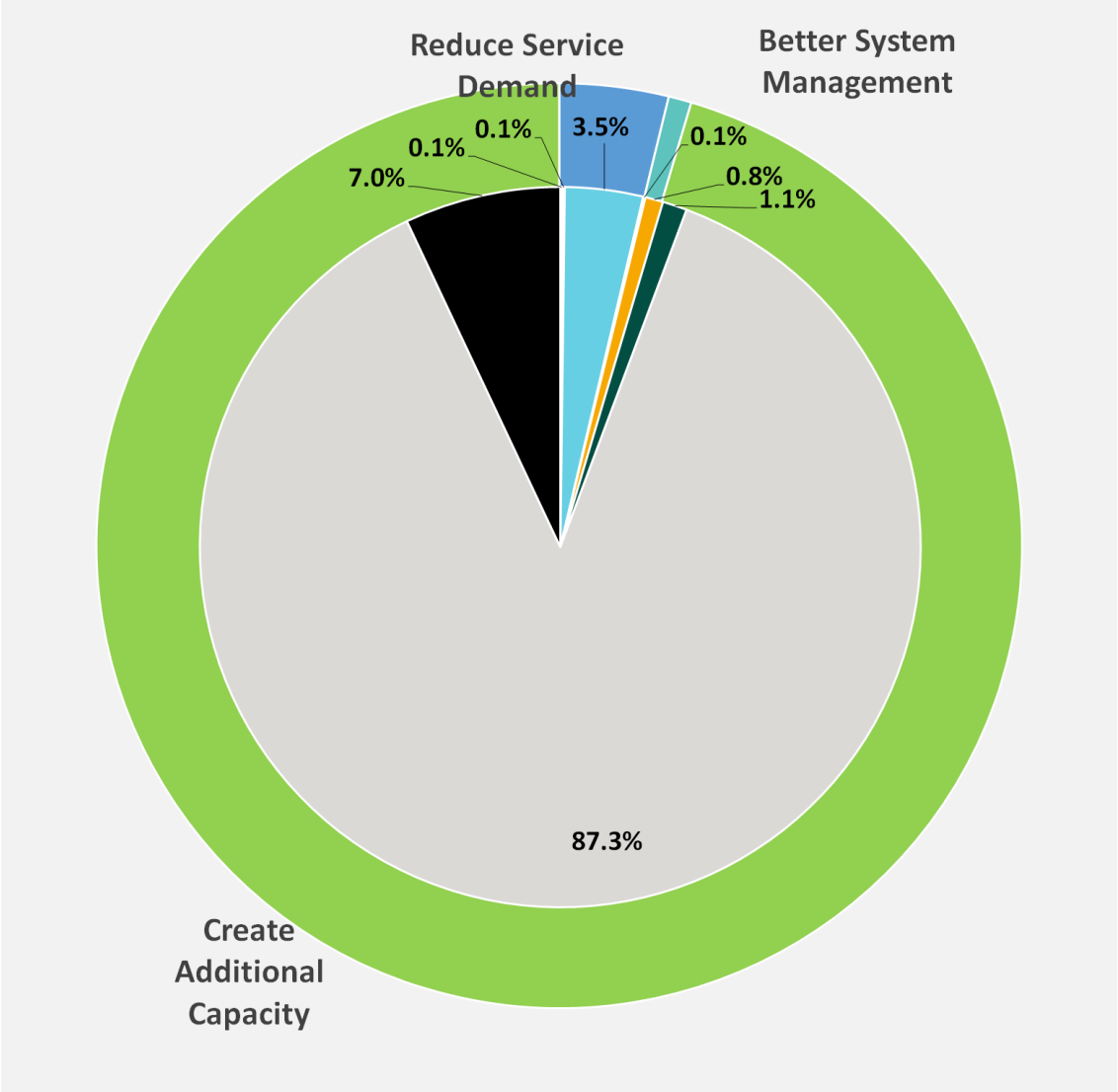


Figure 15 Derwent Strategic Planning Area: Distribution of flooding investment by option type

This is an example of how different options types may be used to address flooding planning objectives. Almost two thirds of the investment could be through a strategy to reduce demand on the sewer systems, seen here through surface water source control measures such as SuDS and schools and customer engagment programmes.

Around 7% of investment could be in improving existing system managment, and 25% could be in the construction of new stormwater storage tanks.

Reduce Service Demand	Schools Education Programme
	Customer Engagement
	Surface Water Source Control Measures
	Modification of Permits
Better System Management	Intelligent Network Operation
	Enhanced Operational Maintenance
	Repair and Rehabilitation
Create Additional Capacity	New 'Green' WwTW Capacity (e.g. Reedbed)
	New 'Green' Overflow Treatment (e.g. Reedbed)
	Separation of Combined Sewers
	WwTW Transfers
	WwTW Improvement
	Construction of New Drainage Capacity

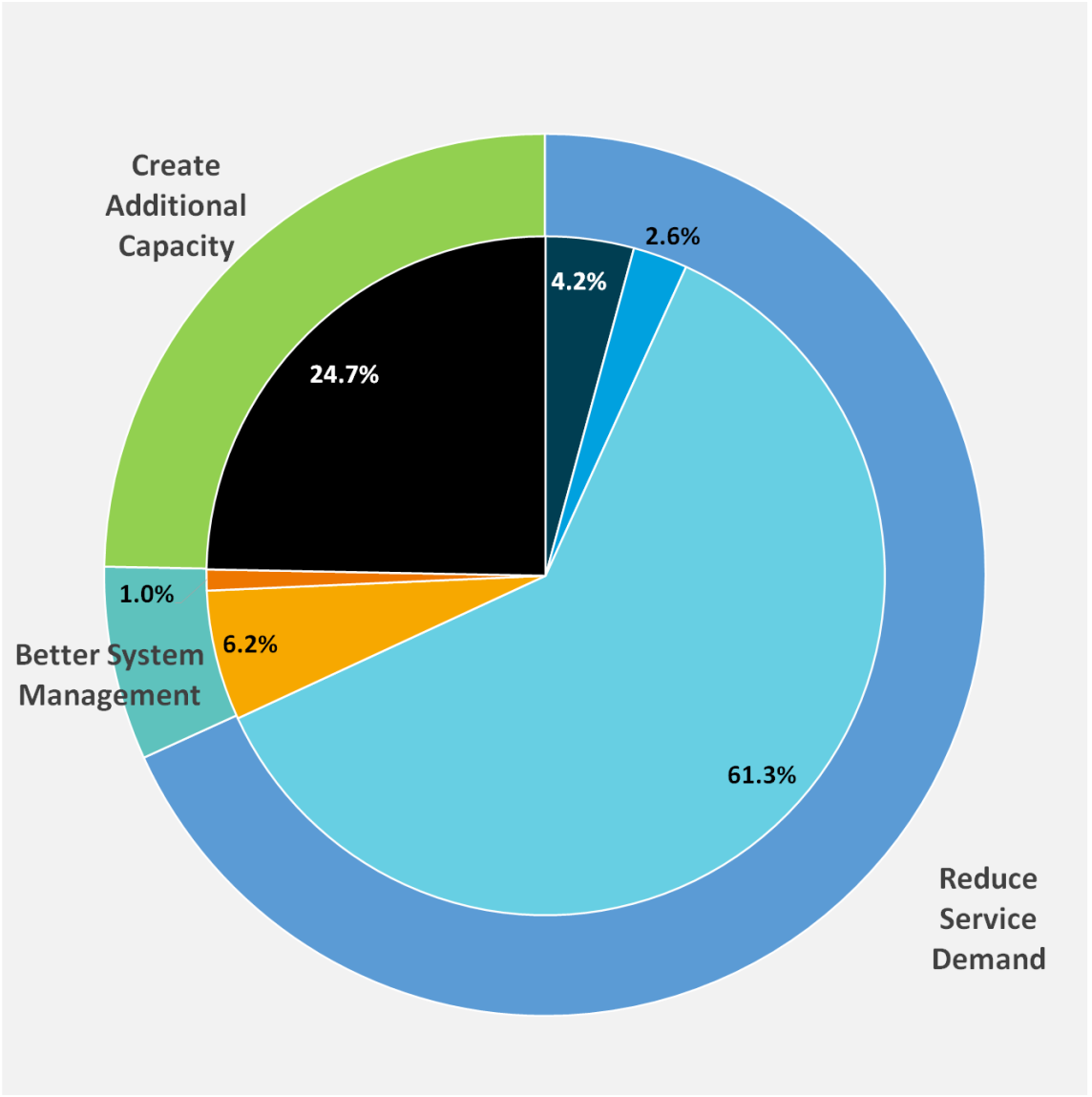
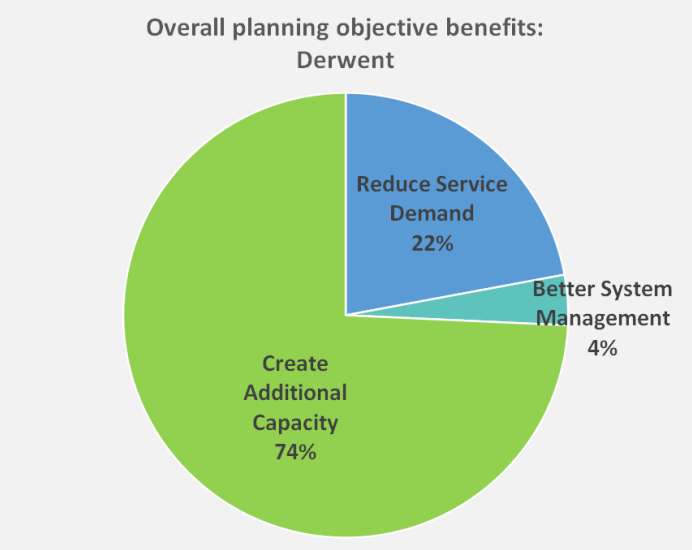


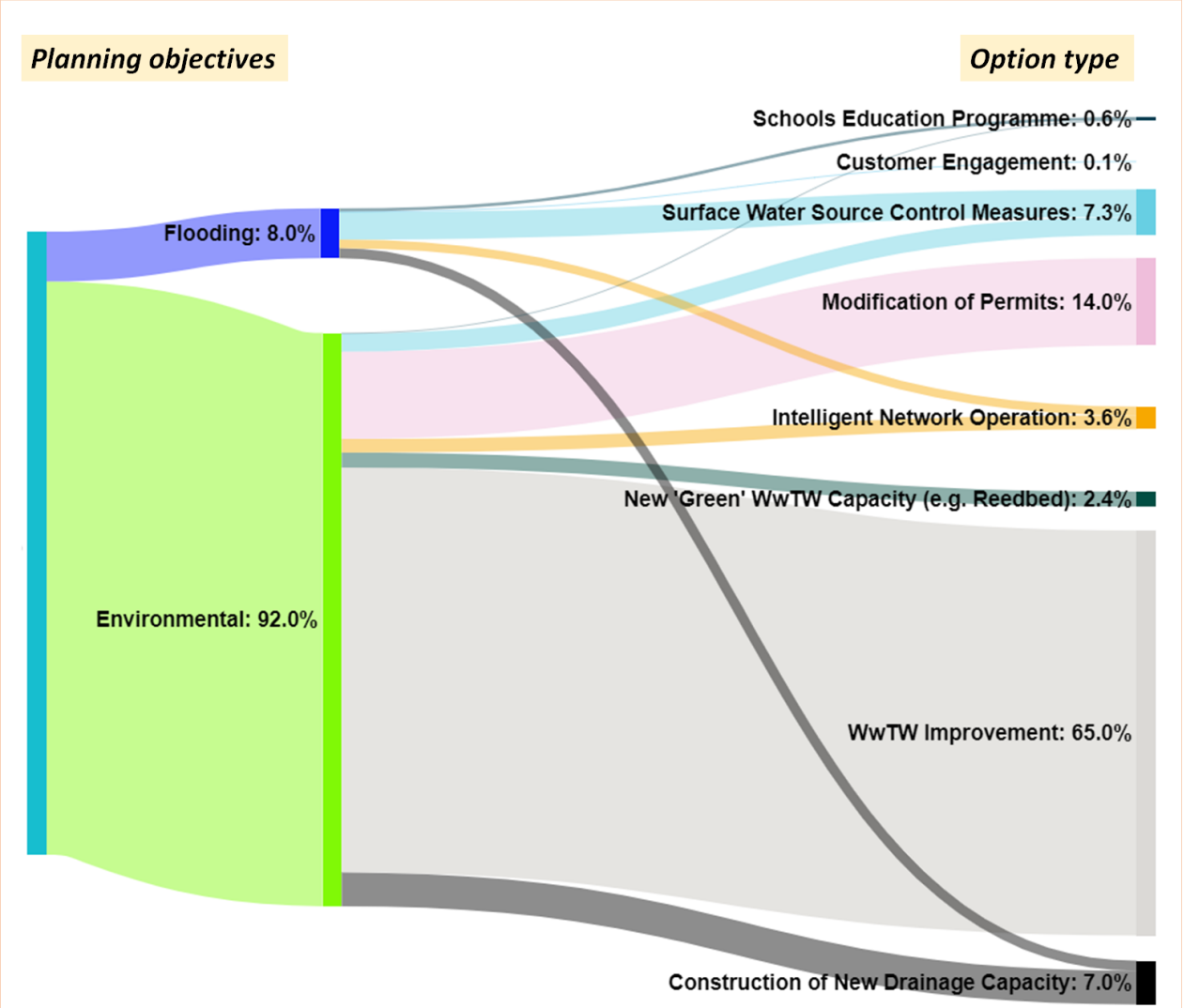
Figure 16 Distribution of benefit by option type within Derwent SPA

This page shows how different option types may be used to realise benefits against different planning objectives within the Derwent SPA.

United Utilities Water (UUW) commitments to improving flooding performance could be met through the reduction of surface water flows, schools and customer engagement programmes, installation of intelligent network operation systems, and the construction of new stormwater drainage capacity.

Environmental planning objectives could be met mainly through improvements to wastewater treatment works, including permit modifications and 'green' treatment, improved operational maintenance systems, and provision of stormwater storage capacity.



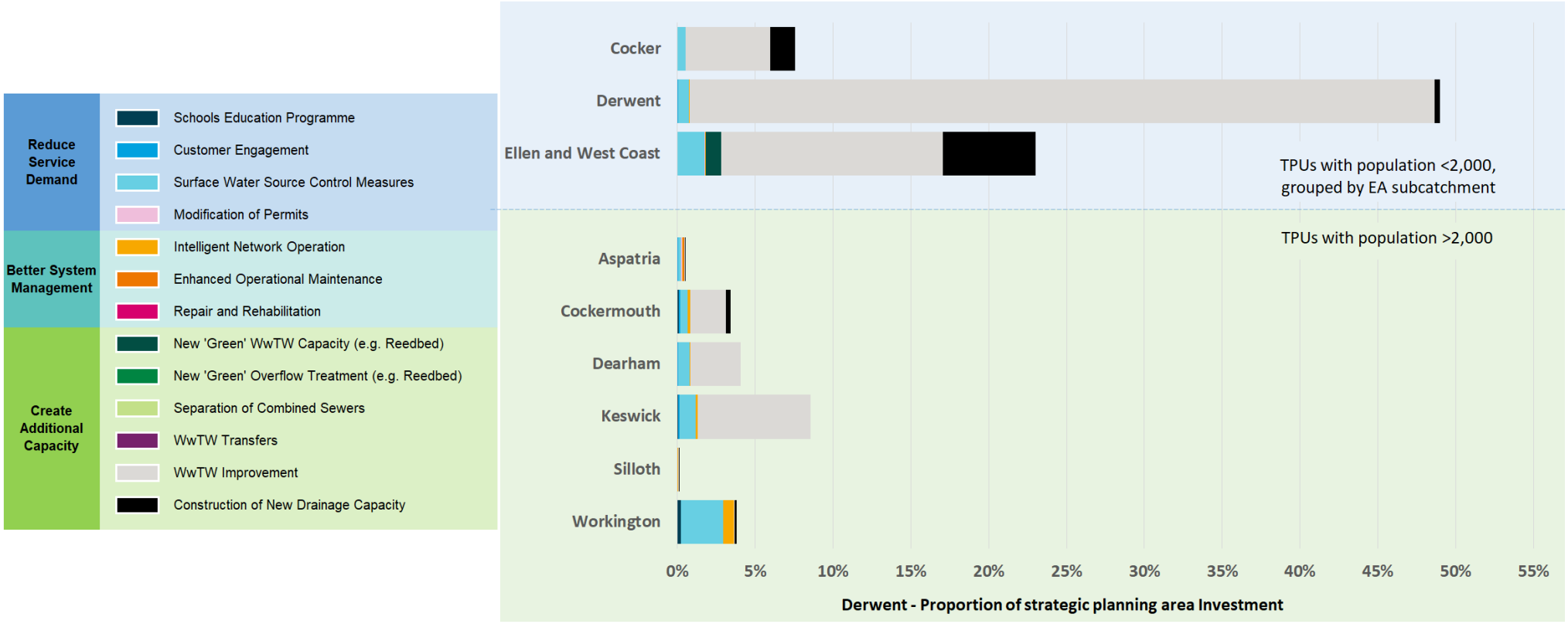


5.3 Overview of preferred options in each TPU

Figure 17 shows the proportion of Derwent catchment potential investment in each TPU, split up by option type. Note that the smaller TPUs within the catchment (those with less than 2,000 population) have been reported together at the top of the chart, grouped by SPA sub catchment (Environment Agency Operational Catchment boundaries).

It can be seen that in the Derwent catchment, the largest TPUs see the largest potential investment, which is split predominantly between surface water control, improved system management, and construction of new storm water storage tanks.

Figure 17 Proportion of investment seen in each TPU within the Derwent SPA



The following sub-sections show how investment could be split between different types of options to bring benefits to each TPU over the short, medium and long term. Some options, such as construction of new storm water storage tanks, occur at a single point in time; however the benefit of reduced flooding may be seen long into the future. Other options such as school education, are continual programmes that could help to encourage long-term sustainable behaviours, such as reduction in water use.

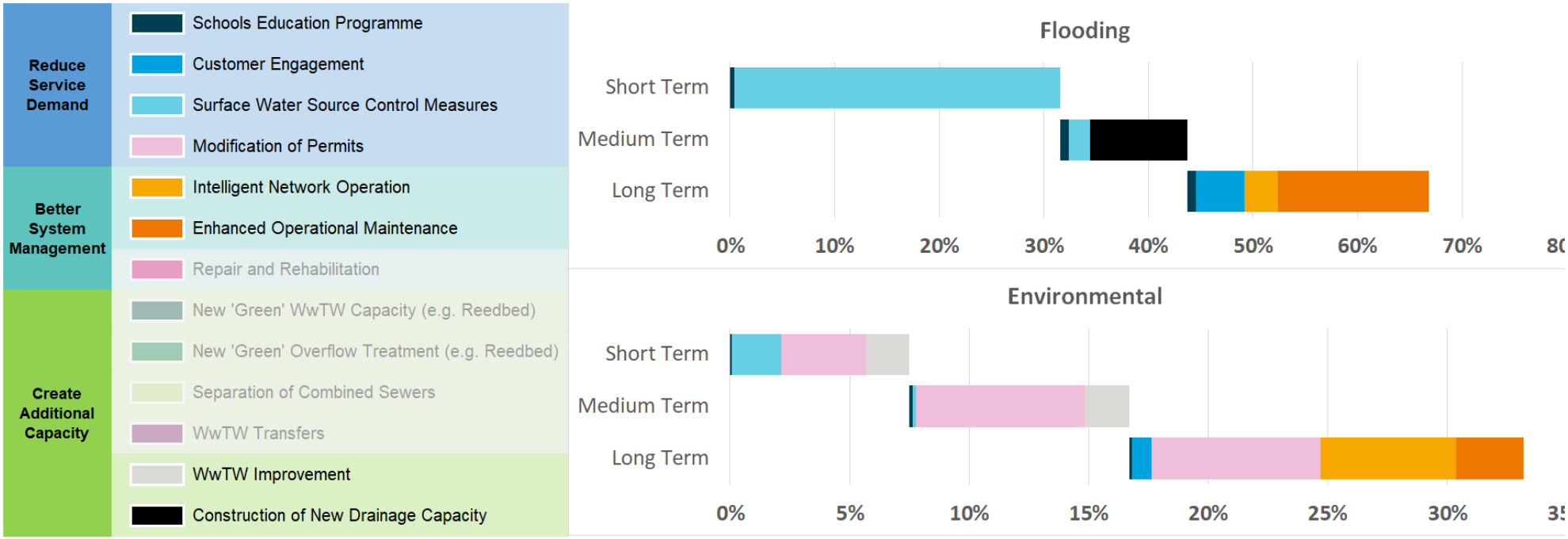
5.3.1 Aspatria

The results from the DWMP show that if we were to invest in Aspatria over the next 25 years, around 67% of the investment could be to address flooding risks, and around 33% of investment could be to address environmental risks (Figure 18).

In the short and medium term, potential investment could be through surface water source control measures, such as SuDS, improvements at wastewater treatment works, including modification of permits, school education programmes, and the construction of new storm water drainage capacity.

In the longer term, intelligent network monitoring systems could be installed, and implement enhanced operational maintenance programmes. School education programmes could continue and be supplemented by customer engagement programmes.

Figure 18 Short, medium and long-term investment in the Aspatria TPU, distributed by option type



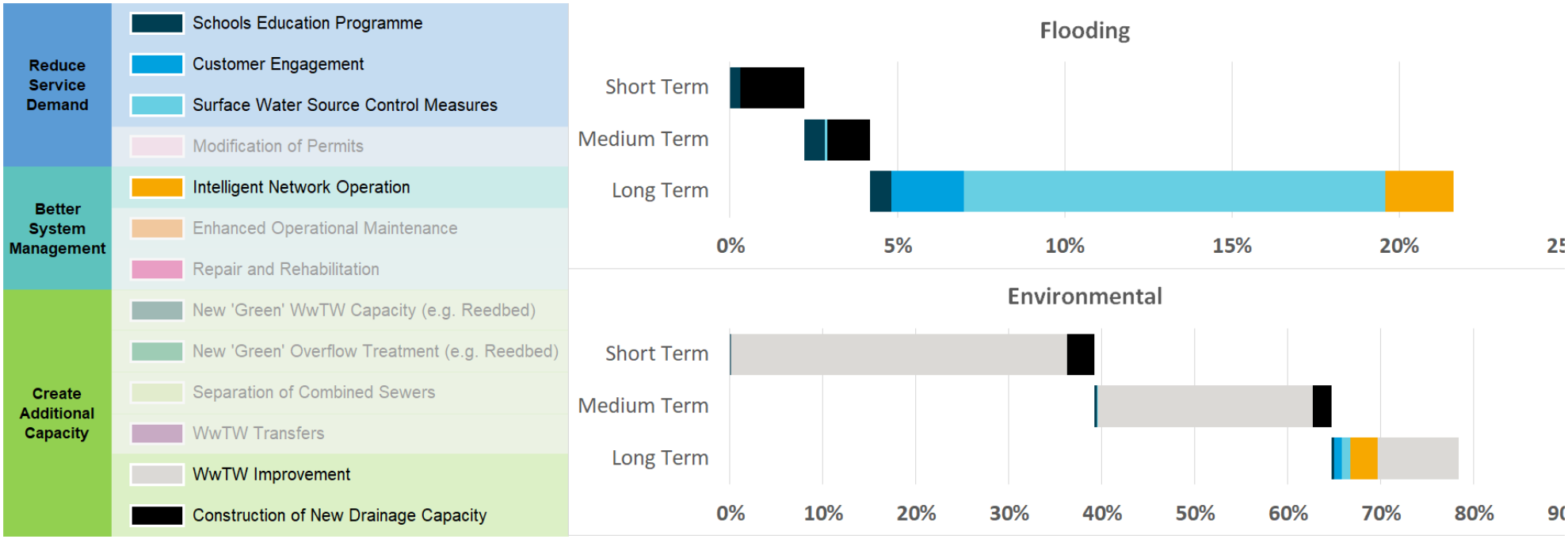
5.3.2 Cockermouth

The results from the DWMP show that if we were to invest in Cockermouth over the next 25 years, around 22% of the investment could be to address flooding risks, and around 78% of investment could be to address environmental risks (Figure 19).

In the short and medium term, potential investment could be through improvements at wastewater treatment works, and construction of new storm water drainage capacity, with additional investment in school education programmes.

In the longer term, investments could be in surface water source control measures, such as SuDS, new intelligent network monitoring systems, and customer engagement programmes.

Figure 19 Short, medium and long-term investment in the Cockermouth TPU, distributed by option type



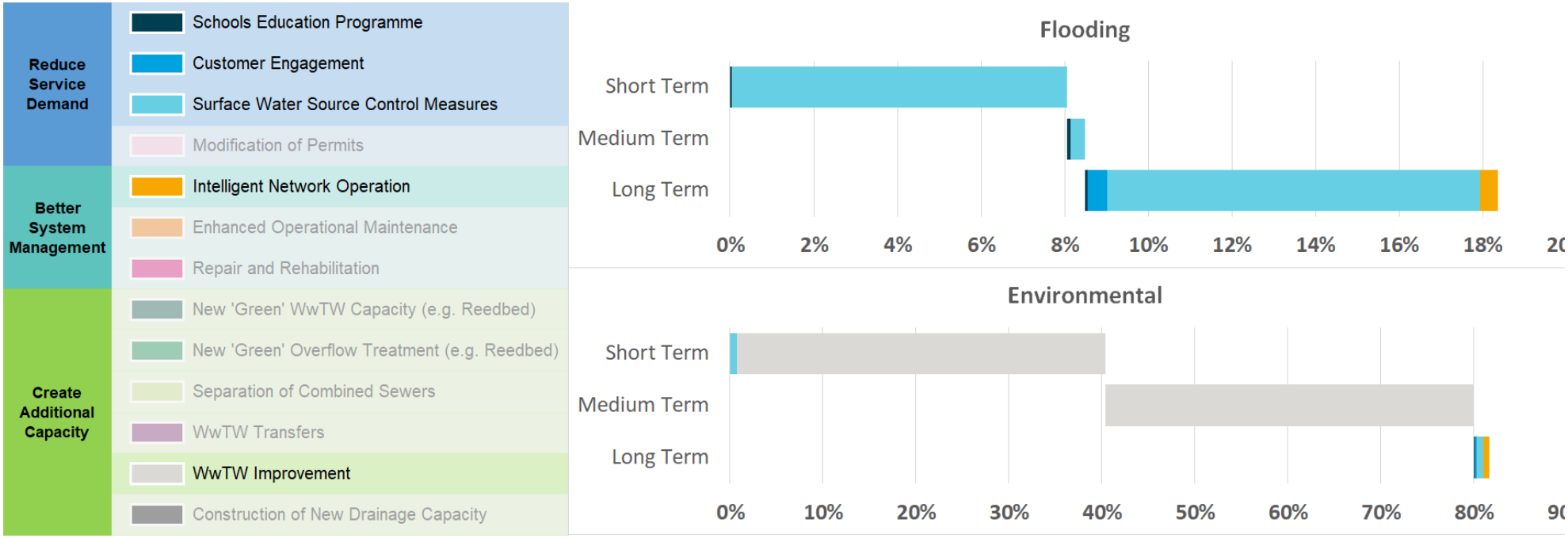
5.3.3 Dearham

The results from the DWMP show that if we were to invest in Dearham over the next 25 years, around 18% of the investment could be to address flooding risks, and around 82% of investment could be to address environmental risks (Figure 20).

In the short, medium and long term, potential investment could be through improvements at wastewater treatment works and surface water source control measures, such as SuDS.

Additionally, in the longer term, intelligent network monitoring systems could be installed and invest in customer engagement programmes.

Figure 20 Short, medium and long-term investment in the Dearham TPU, distributed by option type



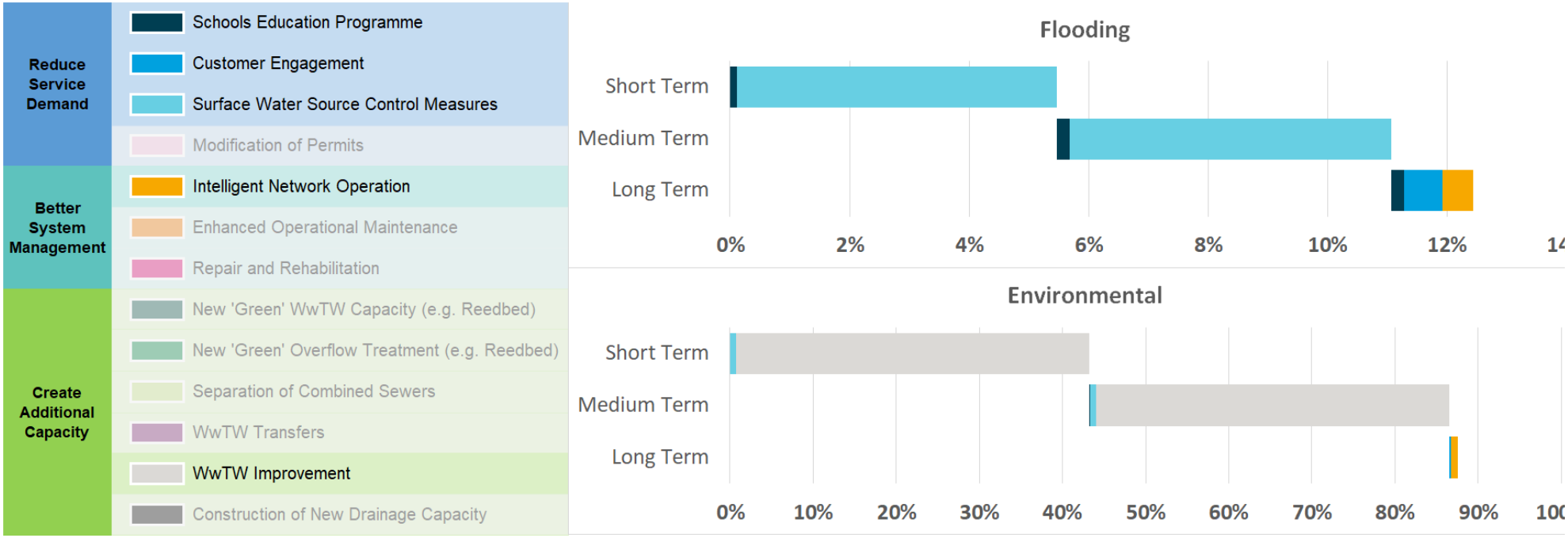
5.3.4 Keswick

The results from the DWMP show that if we were to invest in Keswick over the next 25 years, around 12% of the investment could be to address flooding risks, and around 88% of investment could be to address environmental risks (Figure 21).

In the short, medium and long term, potential investment could be through improvements at wastewater treatment works, surface water source control measures, such as SuDS, and schools education programmes.

Additionally, in the longer term, we intelligent network monitoring systems could be installed and invest in customer engagement programmes.

Figure 21 Short, medium and long-term investment in the Keswick TPU, distributed by option type



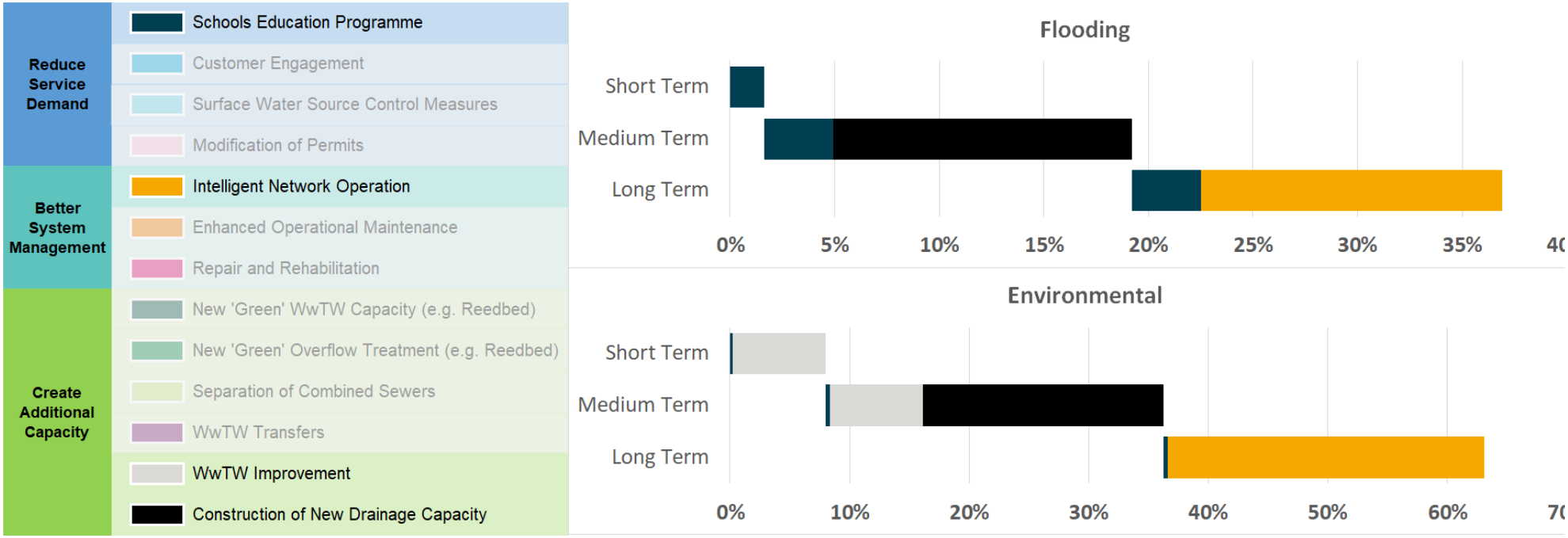
5.3.5 Silloth

The results from the DWMP show that if we were to invest in Silloth over the next 25 years, around 37% of the investment could be to address flooding risks, and around 63% of investment could be to address environmental risks (Figure 22).

In the short and medium term, potential investment could be through improvements at wastewater treatment works, construction of new storm water drainage capacity, and schools education programmes

In the longer term, intelligent network monitoring systems could be installed.

Figure 22 Short, medium and long-term investment in the Silloth TPU, distributed by option type



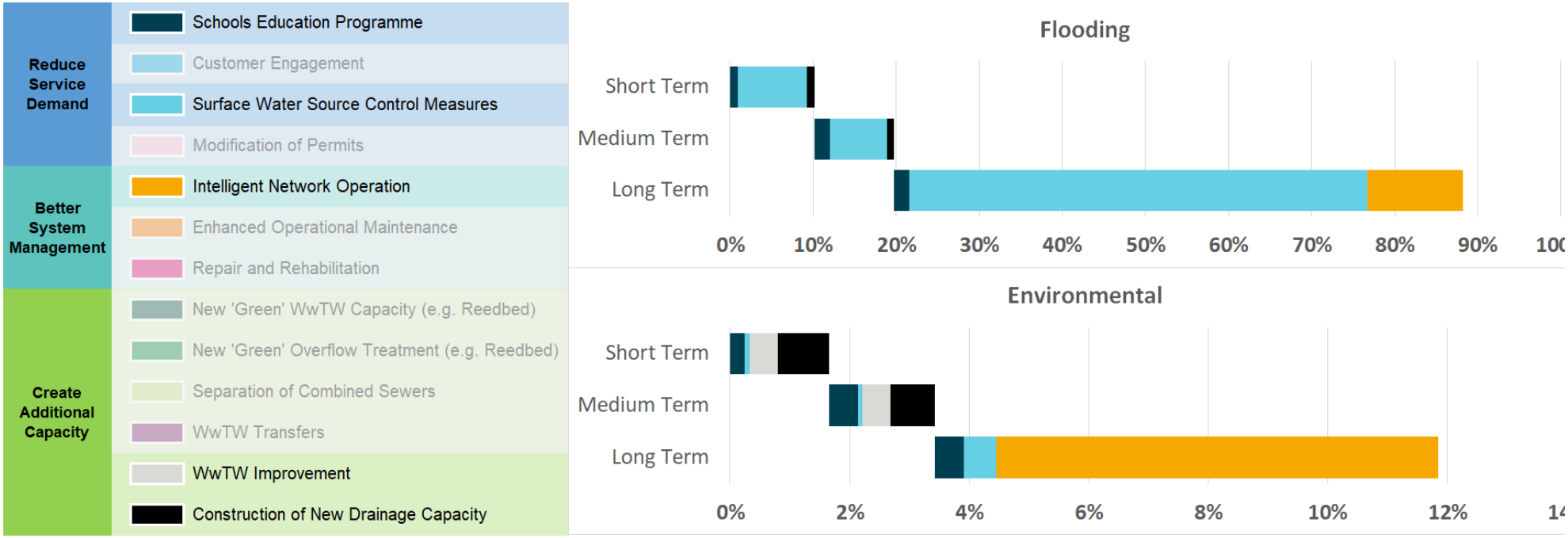
5.3.6 Workington

The results from the DWMP show that if we were to invest in Workington over the next 25 years, around 71% of the investment could be to address flooding risks, and around 29% of investment could be to address environmental risks (Figure 23).

In the short and medium term, potential investment could be through surface water source control measures, such as SuDS, with additional investment in improvements at wastewater treatment works, construction of new storm water drainage capacity, and school education programmes.

In the longer term, investments could be additionally in new intelligent network monitoring systems.

Figure 23 Short, medium and long-term investment in the Workington TPU, distributed by option type



5.3.7 TPUs with population less than 2,000: *Cocker* sub catchment

The following TPUs each have a population of less than 2,000, and have therefore been grouped together:

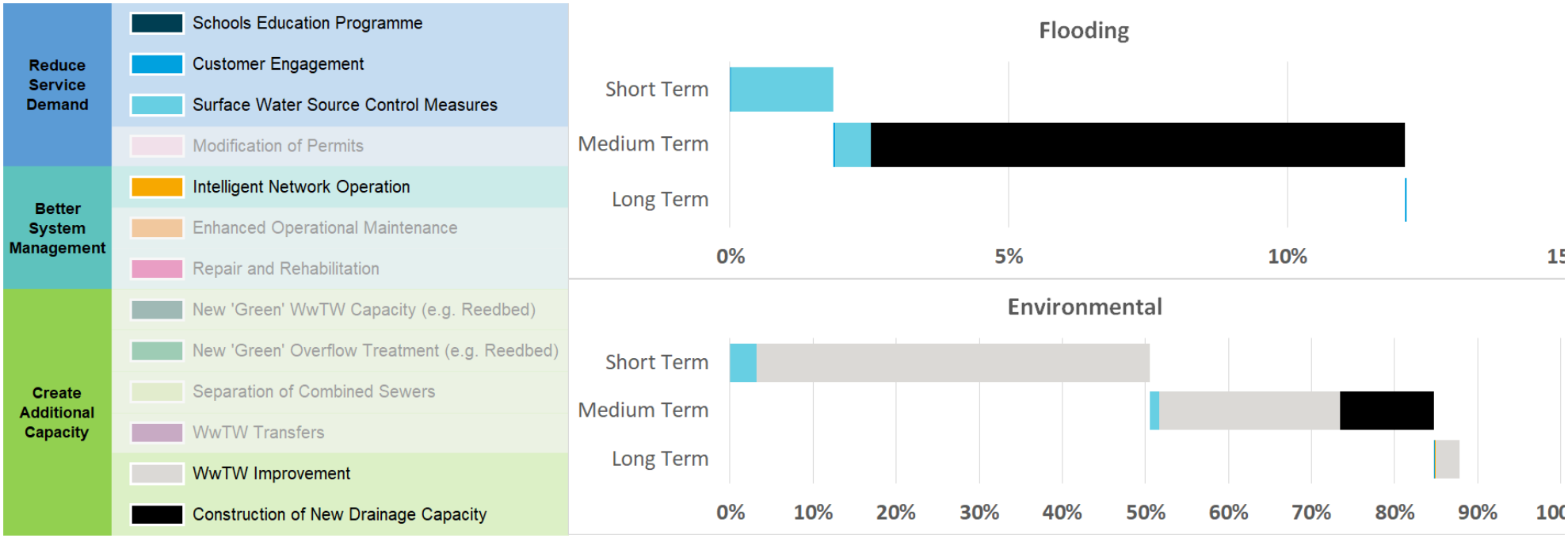
- Buttermere
- Cornhow
- Eaglesfield
- Lorton

In the short and medium term, potential investment could be through improvements at wastewater treatment works and surface water source control measures, such as SuDS (Figure 24).

In the medium term, there could be additional investment in the construction of new storm water drainage capacity.

In the longer term, further investments could be in school and customer engagement programmes and the installation of new intelligent network monitoring systems.

Figure 24 Short, medium and long-term investment in TPUs with population less than 2,000 (Cocker sub catchment) distributed by option type



5.3.8 TPUs with population less than 2,000: *Derwent* sub catchment

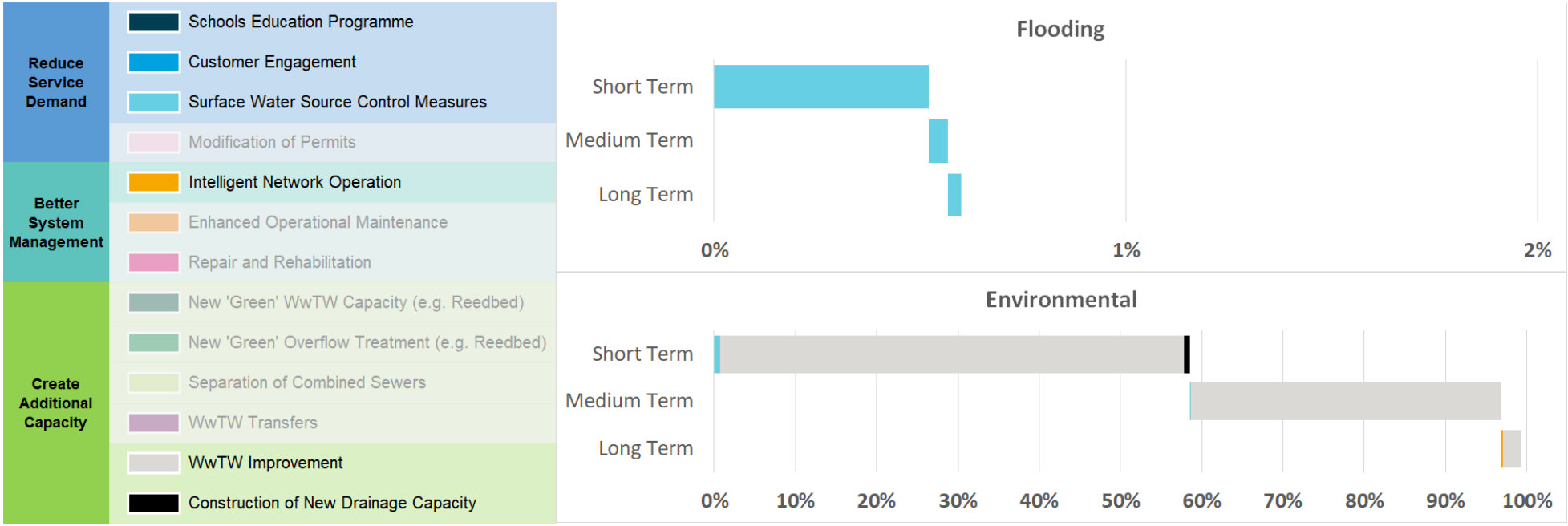
The following TPUs each have a population of less than 2,000, and have therefore been grouped together:

- Asby
- Broughton Cross
- Fell Dyke
- Little Clifton
- Stannah
- Ullock
- Bassenfell
- Camerton
- Fisher Place
- Mockerkin
- Stonethwaite
- Bassenthwaite
- Crossgate
- Grange In Borrowdale
- Pardshaw
- Sunderland
- Blind Crake
- Dovenby
- Great Broughton
- Redmain
- Swirls
- Branthwaite
- Dub Wath
- Great Clifton
- Rosthwaite
- Thornthwaite
- Bridekirk
- Embleton
- Grey Southern
- Seatoller
- Threlkeld

Environmental risks could be addressed through improvements at wastewater treatment works, with additional investment in surface water source control measures, such as SuDS, and the installation of new intelligent network monitoring systems (Figure 25).

Flooding risks could be addressed through surface water source control measures, such as SuDS.

Figure 25 Short, medium and long-term investment in TPUs with population less than 2,000 (Derwent sub catchment) distributed by option type



5.3.9 TPUs with population less than 2,000: *Ellen and West Coast* sub catchment

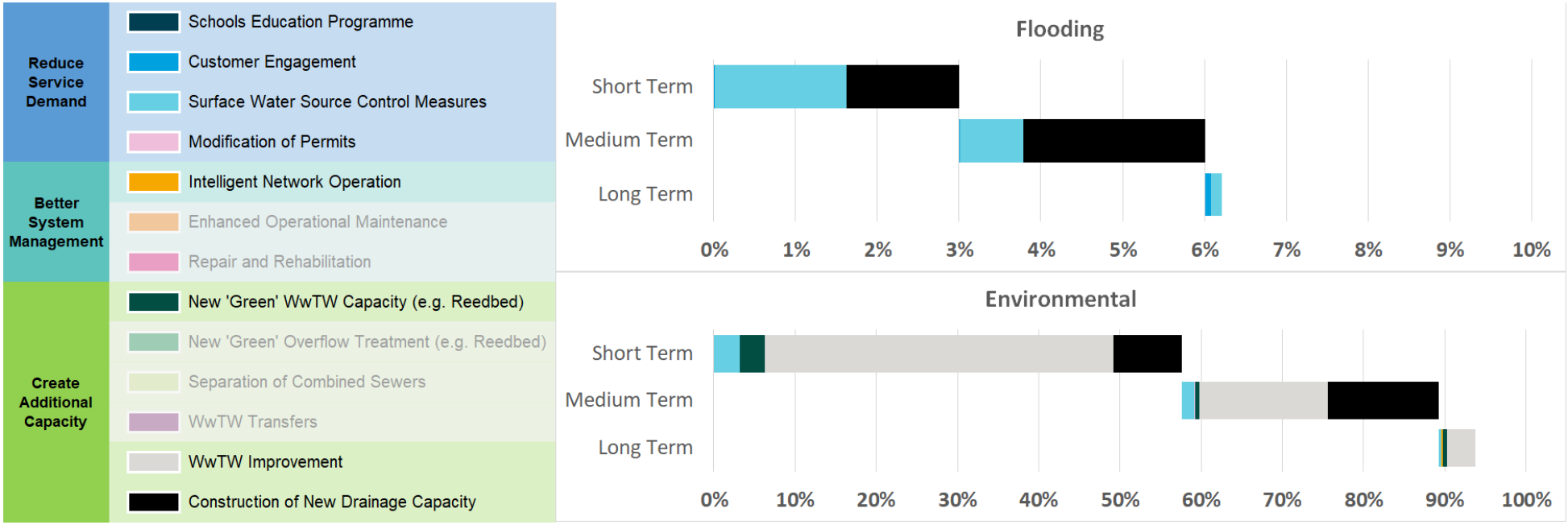
The following TPUs each have a population of less than 2,000, and have therefore been grouped together:

- Allerby
- Crosscanonby
- Plumbland
- Watch Hill
- Allonby
- Edderside
- Prospect & Oughterside
- Watchhill West
- Birkby
- Gilcrux
- Threapland
- West Newton
- Blennerhasset
- Greengill
- Torpenhow
- Westmoor End
- Bothel
- Hayton
- Uldale
- Bullgill
- Ireby
- Wardhall Guards

Environmental risks could be addressed through improvements at wastewater treatment works, with additional investment in surface water source control measures, such as SuDS, new 'green' treatment processes, and the installation of new intelligent network monitoring systems (Figure 26).

Flooding risks could be addressed through surface water source control measures, such as SuDS, construction of new storm water drainage capacity, and schools and customer engagement programmes.

Figure 26 Short, medium and long-term investment in TPUs with population less than 2,000 (Ellen and West Coast sub catchment) distributed by option type



6. Next steps

The DWMP is inherently not a static plan so we will continue to work with stakeholders to develop partnership options and strategies which will make a difference within the Derwent SPA.

We are currently at draft publication (Figure 27) and between now and final publication in March 2023, we will reflect on updated guidance such as WINEP and storm overflows, and incorporate the feedback that we receive to ensure that the DWMP can build the best foundation to allow the North West to thrive in years to come.

Figure 27 Timeline between draft and final publication

We welcome your feedback on our draft publication of our first DWMP. Please get in touch using our mailbox:

DWMPConsultation@uuplc.co.uk

7. References

[1] https://environment.data.gov.uk/catchment-planning/ManagementCatchment/3028
[2] https://environment.data.gov.uk/catchment-planning/OperationalCatchment/3095
[3] https://environment.data.gov.uk/catchment-planning/OperationalCatchment/3132
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[8] https://www.gov.uk/government/publications/surface-water-management-plan-technical-guidance

[9] https://westcumbriacatchmentpartnership.co.uk/

[10] https://westcumbriariverstrust.org/areas/derwent

8. Appendix

Table A.1 List of TPUs which triggered for RBCS across environment, flooding or wastewater treatment works categories which are numbered on the map in figure 7

1	Aspatria	11	Cockermouth	21	Fell Dyke	31	Little Clifton	41	Threlkeld
2	Bassenthwaite	12	Cornhow	22	Fisher Place	32	Plumbland	42	Thornthwaite
3	Blennerhasset	13	Crosscanonby	23	Gilcrux	33	Prospect & Oughterside	43	Westmoor End
4	Bothel	14	Crossgate	24	Grange In Borrowdale	34	Rosthwaite	44	West Newton
5	Bridekirk	15	Dearham	25	Great Broughton	35	Seatoller	45	Workington
6	Broughton Cross	16	Dovenby	26	Great Clifton	36	Silloth	46	Allerby
7	Branthwaite	17	Dub Wath	27	Grey Southern	37	Stannah	47	Allonby
8	Bullgill	18	Eaglesfield	28	Hayton	38	Stonethwaite	48	Asby
9	Buttermere	19	Edderside	29	Keswick	39	Sunderland		
10	Camerton	20	Embleton	30	Lorton	40	Threapland		

Table A.2 List of TPUs which did not trigger for RBCS across environment, flooding or wastewater treatment works categories

TPU Name	Environment	Flooding	Wastewater Treatment Works
Bassenfell	Not triggered in RBCS	Not triggered in RBCS	Not triggered in RBCS
Blind Crake	Not triggered in RBCS	Not triggered in RBCS	Not triggered in RBCS
Greengill	Not triggered in RBCS	Not triggered in RBCS	Not triggered in RBCS
Ireby	Not triggered in RBCS	Not triggered in RBCS	Not triggered in RBCS
Legburthwaite	Not triggered in RBCS	Not triggered in RBCS	Not triggered in RBCS
Mockerkin	Not triggered in RBCS	Not triggered in RBCS	Not triggered in RBCS
Pardshaw	Not triggered in RBCS	Not triggered in RBCS	Not triggered in RBCS
Redmain	Not triggered in RBCS	Not triggered in RBCS	Not triggered in RBCS
Swirls	Not triggered in RBCS	Not triggered in RBCS	Not triggered in RBCS
Torpenhow	Not triggered in RBCS	Not triggered in RBCS	Not triggered in RBCS

Uldale	Not triggered in RBCS	Not triggered in RBCS	Not triggered in RBCS
Ullock	Not triggered in RBCS	Not triggered in RBCS	Not triggered in RBCS
Wardhall Guards	Not triggered in RBCS	Not triggered in RBCS	Not triggered in RBCS
Watch Hill	Not triggered in RBCS	Not triggered in RBCS	Not triggered in RBCS
Watchhill West	Not triggered in RBCS	Not triggered in RBCS	Not triggered in RBCS

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