United Utilities Water

DRAFT Drainage and Wastewater Management Plan 2023

Eden and Esk 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.

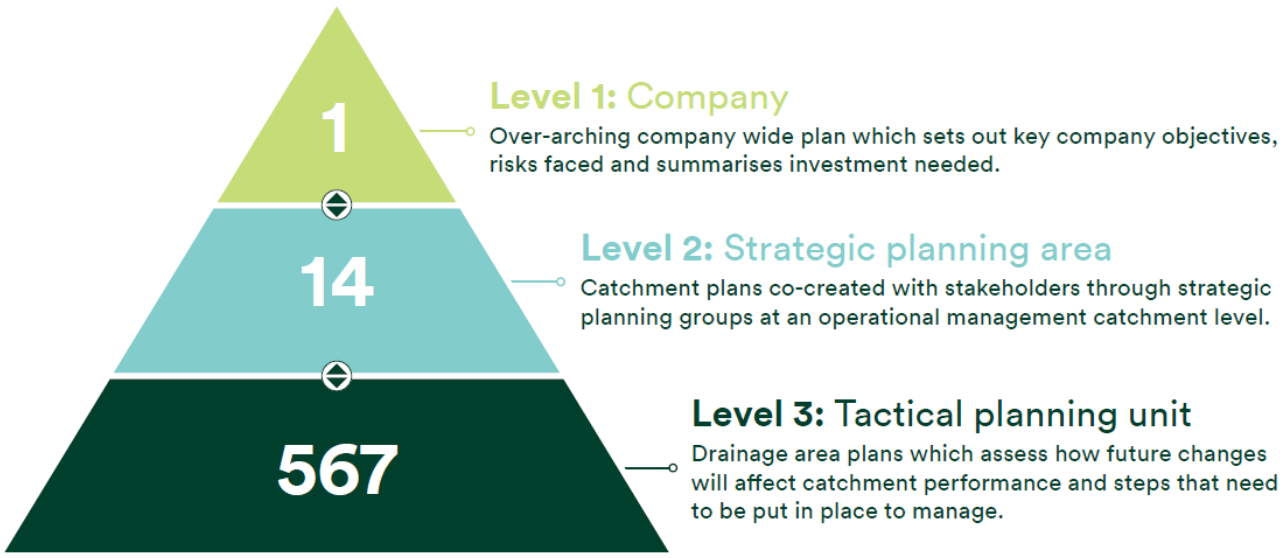
By developing the DWMP, we have an opportunity to:

- 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.

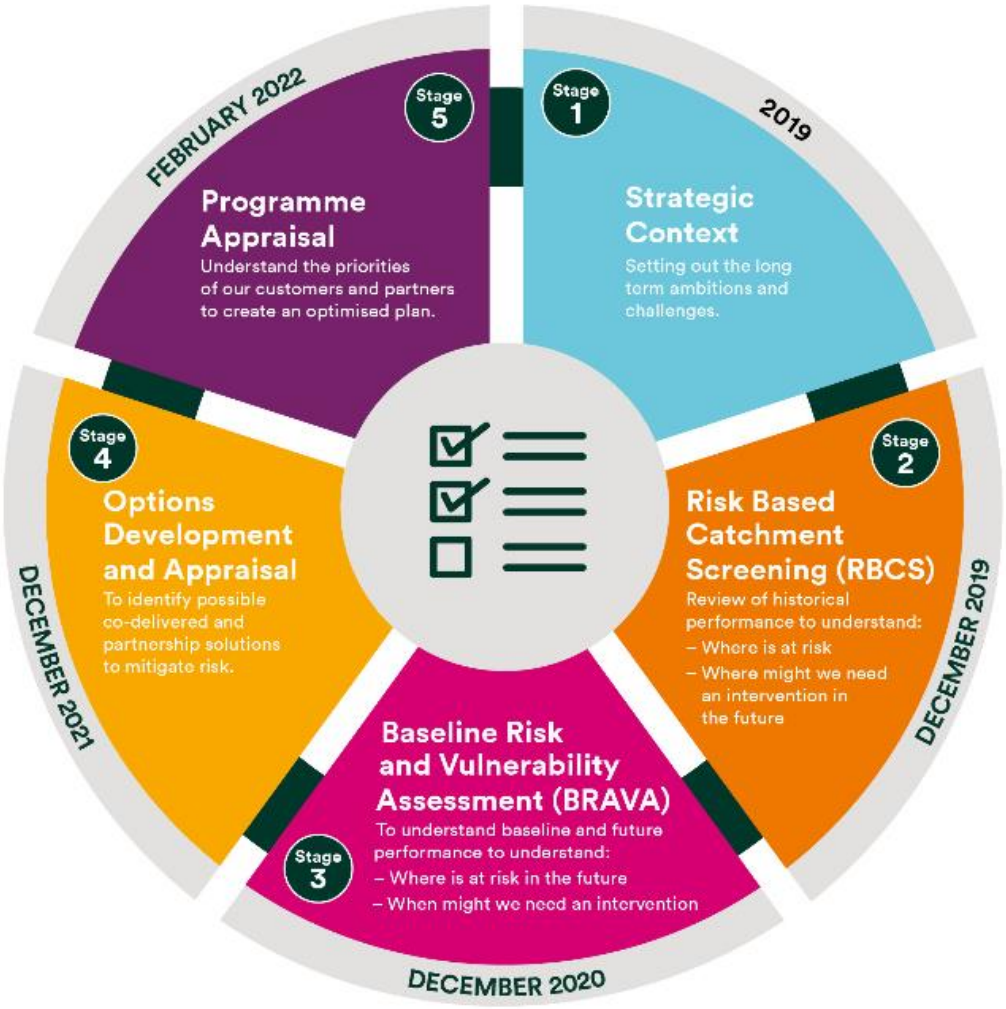
The plan will be set out at three levels (Figure 1) to maximise the potential for partnership working and for effective engagement between regulators and stakeholders at both company-wide level and more locally.

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 Eden and Esk SPA.

2. Background to the Eden and Esk catchment

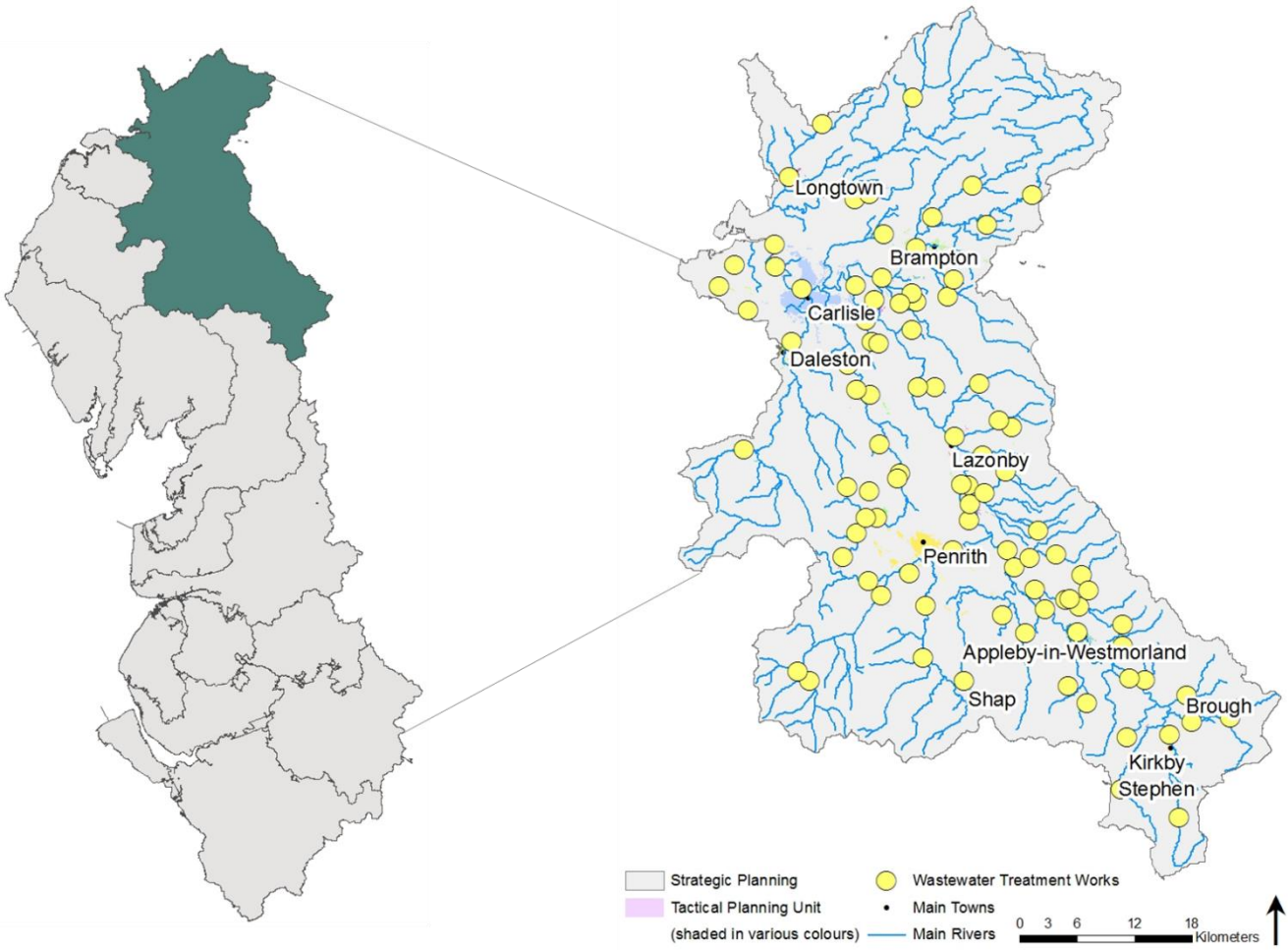
The Eden and Esk catchment area covers 2715.3km^2 between the fells of the Lake District and the Pennines. The land within this catchment is dominated mostly by agriculture, with the Eden Valley providing some of the most productive agricultural land in Cumbria [1].

There are six main sub catchments:

- Caldew – West of the catchment, the Caldew is located within the fells to the north of Keswick [2].
- Eamont – South west of the catchment, Eamont contains two main rivers; Lowther and Eamont. These rivers run through Bampton and Askham [3].
- Eden Lower – Central area of the catchment, found downstream of Penrith. The Eden join the Esk and Irthing, flowing through Carlisle and enters into Solway Firth [4].
- Eden Upper – South East of the catchment, flows through Kirkby Stephen and Appleby [5].
- Esk and Irthing – North east of the catchment, along the border with Scotland [6].
- Petteril – Centre of the catchment, flowing northward from Penrith to Carlisle [7].

There are 95 wastewater tactical planning units (TPU, also known as wastewater treatment work (WwTW) drainage catchments) within the Eden and Esk 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 Carlisle to smaller, rural catchments such as Warcop. The TPUs are highlighted in Figure 3.

Figure 3 Map of the Eden and Esk SPA



There are numerous strategic management plans within the Eden and Esk that are owned by various other organisations. Within the Eden and Esk 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); 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 Eden and Esk catchment
River Basin Management Plan (RBMP) [8] **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 rural areas. Future challenges predicted by the Environment Agency include invasive non-native species, changes to natural flow and levels, physical modification and pollution from a range of sources.
Flood Risk Management Plan (FRMP) [9] **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 Eden and Esk catchment, there are more than 16,500 people at risk of flooding. The majority of flood risk is within Carlisle, Penrith and Appleby. Other areas of the catchment are also susceptible to flooding due to the topography, high rainfall, historic structures and channel constrictions. The December 2015 storms affected numerous towns and villages across the catchment such as Warwick Bridge, Pooley Bridge, Glenridding, Carlisle and Patterdale. 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 Eden and Esk catchment there are 31 measures from earlier plans to manage flood risk.
Surface Water Management Plan (SWMP) [10] **Owner:** Lead Local Flood Authority (LLFA)	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.	

Management plan	Overview	Key aspects for the Eden and Esk catchment
Catchment Based Approach (CaBA) Catchment Plan [8] [11] [12] **Owner:** The Eden 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 Eden Catchment Partnership along with its partners work by the following principles in order to deliver environmental and flooding outcomes: • Collaborative working • Catchment approach • Integrated solutions • Community-focussed decision making • Evolution and learning The catchment partnership has developed the Revitalising Eden: The Eden Catchment Plan which is a local response to water management issues across the Eden and Esk. The plan aims to identify and prioritise the action needed to manage the rivers sustainably whilst improving the natural ecosystem services of the catchment. There is a focus on the climate crisis and flooding. Throughout the catchment, there are opportunities for water quality, water quantity, ecological networks, carbon capture and storage and combining ecosystem services improvements.

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 Eden and Esk catchment we have engaged with stakeholders such as:

- The Environment Agency;
- Cumbria County Council;
- Carlisle Council;
- Eden Borough Council; and
- Eden Rivers Trust (host of the Eden and Esk 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 Eden and Esk SPA 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.

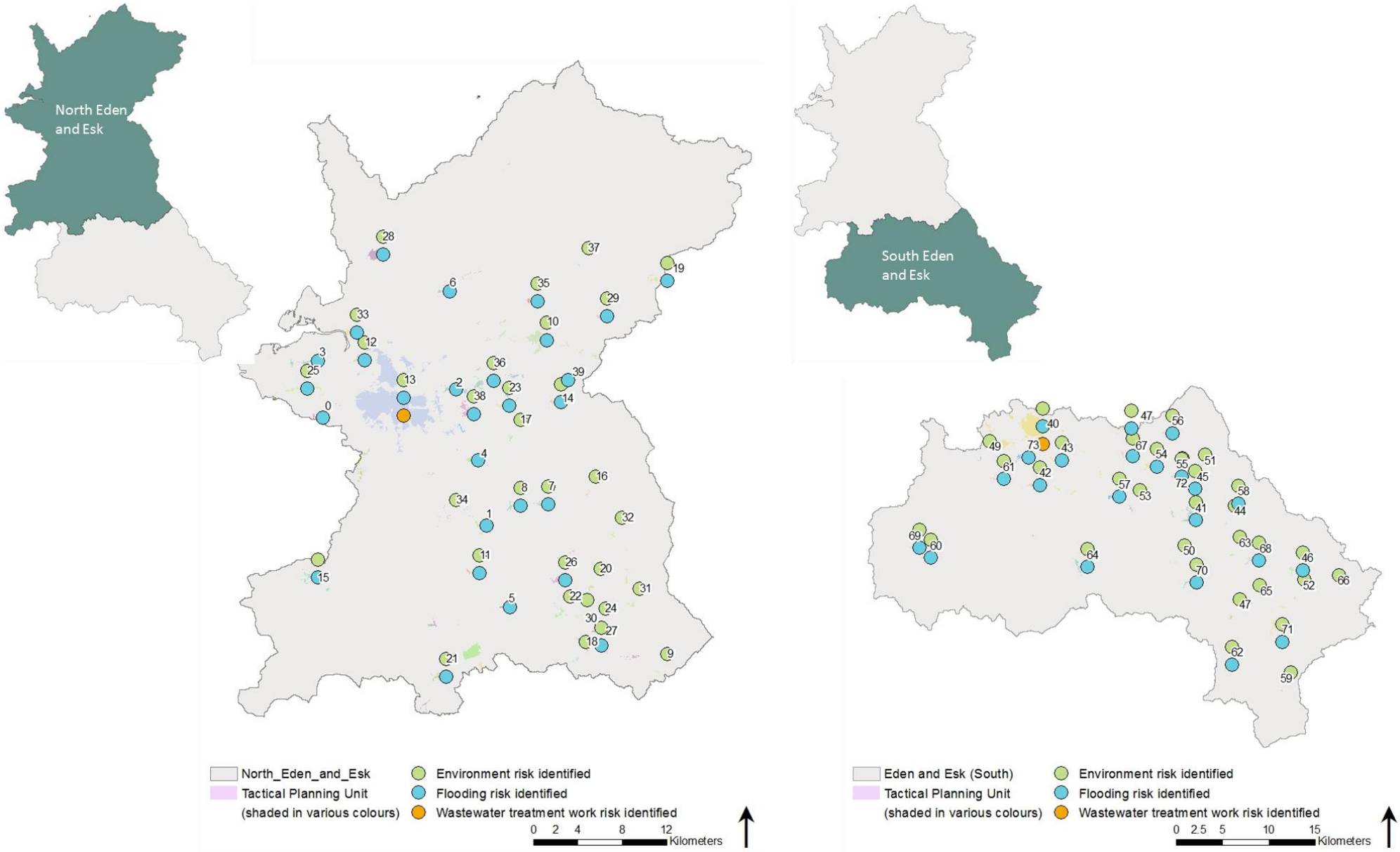
Within the Eden and Esk SPA, the RBCS stage identified 76 out of 95 TPUs that required further investigation and therefore passed onto the BRAVA stage (outlined in Section 3.2).

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 TPUs can be found in Table A.1 and Table A.2 in the Appendix. Environmental and flooding categories are the most common within the Eden and Esk SPA (Figure 5), which is supported by the highest triggered RBCS assessments which are:

- Storm Overflow Assessment Framework - (66/95) – Environment;
- External Sewer Flooding - (51/95) – 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 Eden and Esk catchment. 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



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 Eden and Esk catchment 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
Aglionby						
Ainstable						
Appleby						
Armathwaite						
Askham						
Blencarn						
Bolton Penrith						
Brackenber						
Brampton (Eden)						
Brampton Carlisle						
Brough						
Burgh by Sands						
Caldbeck						
Calthwaite						
Cargo						
Carlisle						
Castle Carrock						
Cote Hill						
Croglin						
Crosby Garret						
Culgaith						
Cumwhitton						
Dacre						

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
Dalston						
Dry Beck						
Dufton						
Edenhall						
Gilsland						
Glassonby Village						
Glenridding						
Great Asby						
Great Orton						
Great Salkeld						
Greystoke						
Heads Nook						
Hunsonby						
Kaber						
Kings Meaburn						
Kirk Bampton						
Kirkby Stephen						
Kirkby Thore						
Kirkoswald						

Tactical Planning Unit	Environmental					
	Pollution Assessment	Storm Overflow Performance		Bathing and Shellfish Spill Assessment		
	2020	2020	2050	2020	2030	2050
Langwathby						
Laversdale						
Little Salkeld						
Long Marton East						
Long Marton West						
Longtown						
Low Hesket						
Low row						
Melmerby						
Milburn						
Morland						
Motherby						
Murton East						
Outhgill						
Patterdale						
Penrith						
Plumpton North						

Tactical Planning Unit	Environmental					
	Pollution Assessment	Storm Overflow Performance		Bathing and Shellfish Spill Assessment		
	2020	2020	2050	2020	2030	2050
Pooley Bridge East						
Ravenstonedale						
Renwick						
Rockcliffe						
Sandford Village						
Shap						
Skelton						
Smithfield						
Sockbridge						
Soulby						
South Stanmore						
Southwaite						
Talkin						
Temple Sowerby						
Walton						
Warcop						
Warwick Bridge						
West Hall						
Wetheral & Great Corby						

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
Aglionby													
Ainstable													
Appleby													
Armathwaite													
Askham													
Blencarn													
Bolton Penrith													
Brackenber													
Brampton (Eden)													
Brampton Carlisle													
Brough													
Burgh by Sands													
Caldbeck													
Calthwaite													
Cargo													
Carlisle													
Castle Carrock													
Cote Hill													
Croglin													

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
Crosby Garret													
Culgaith													
Cumwhitton													
Dacre													
Dalston													
Dry Beck													
Dufton													
Edenhall													
Gilsland													
Glassonby Village													
Glenridding													
Great Asby													
Great Orton													
Great Salkeld													
Greystoke													
Heads Nook													
Hethers Gill													
Hunsonby													
Kaber													
Kings Meaburn													
Kirk Bampton													
Kirkby Stephen													
Kirkby Thore													
Kirkoswald													

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
Langwathby													
Laversdale													
Little Salkeld													
Long Marton East													
Long Marton West													
Longtown													
Low Hesket													
Low row													
Melmerby													
Milburn													
Morland													
Motherby													
Murton East													
Outhgill													
Patterdale													
Penrith													
Plumpton North													
Pooley Bridge East													
Ravenstonedale													
Renwick													
Rockcliffe													

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
Sandford Village													
Shap													
Skelton													
Smithfield													
Sockbridge													
Soulby													
South Stanmore													
Southwaite													
Talkin													
Temple Sowerby													
Walton													
Warcop													
Warwick Bridge													
West Hall													
Wetheral & Great Corby													

Table 4 Wastewater treatment works BRAVA results

Tactical Planning Unit	Wastewater Treatment Works		
	Risk to wastewater treatment works (WwTW) capacity		
	2020	2030	2050
Aglionby			
Ainstable			
Appleby			
Armathwaite			
Askham			
Bolton Penrith			
Brampton (Eden)			
Brampton Carlisle			
Brough			
Burgh by Sands			
Calthwaite			
Cargo			
Carlisle			
Castle Carrock			
Cote Hill			
Culgaith			
Dalston			
Glenridding			
Great Asby			
Great Orton			
Greystoke			
Heads Nook			
Kirk Bampton			
Kirkby Stephen			

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

Tactical Planning Unit	Wastewater Treatment Works		
	Risk to wastewater treatment works (WwTW) capacity		
	2020	2030	2050
Kirkby Thore			
Kirkoswald			
Langwathby			
Long Marton West			
Longtown			
Low Hesket			
Low row			
Milburn			
Morland			
Murton East			
Penrith			
Plumpton North			
Pooley Bridge East			
Ravenstonedale			
Rockcliffe			
Shap			
Smithfield			
Sockbridge			
Talkin			
Temple Sowerby			
Walton			
Warcop			
Warwick Bridge			
Wetheral & Great Corby			

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
Aglionby			
Ainstable			
Appleby			
Armathwaite			
Askham			
Bampton			
Blencarn			
Brampton (Eden)			
Brampton Carlisle			
Brough			
Busk			
Caldbeck			
Calthwaite			
Cargo			
Carlisle			
Castle Carrock			
Cocklakes			
Cote Hill			

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
Croglin			
Crosby Garret			
Culgaith			
Cumwhitton			
Dacre			
Dalston			
Dry Beck			
Dufton			
Edenhall			
Faugh			
Gilsland			
Glassonby Village			
Glenridding			
Great Asby			
Great Orton			
Great Salkeld			
Greystoke			
Heads Nook			
Hunsonby			
Hutton In The Forest			
Kaber			
Kings Meaburn			
Kirkandrews			
Kirkby Stephen			
Kirkby Thore			

	Resilience Assessment		
	Environmental	Flooding	
Tactical Planning Unit	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
Kirkoswald			
Laithes			
Langwathby			
Laversdale			
Little Blencowe			
Little Salkeld			
Long Marton East			
Long Marton West			
Longtown			
Low Hesket			
Low row			
Melmerby			
Milburn			
Morland			
Motherby			
Murton East			
Newbiggin (Eden)			
Outhgill			
Patterdale			
Penrith			

	Resilience Assessment		
	Environmental	Flooding	
Tactical Planning Unit	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**
Plumpton North			
Plumpton South			
Pooley Bridge East			
Ravenstonedale			
Renwick			
Rockcliffe			
Sandford Village			
Shap			
Skelton			
Sleet Beck			
Smithfield			
Sockbridge			
Soulby			
South Stanmore			
Southwaite			
Talkin			
Temple Sowerby			
The How			
Walton			
Warcop			
Warwick Bridge			
West Hall			
Wetheral & Great Corby			
Wreay			

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 Eden and Esk, two TPUs were identified to be 'complex' based on problem characterisation.

- Carlisle; and
- Penrith.

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 Eden and Esk SPA have been identified as having 'strategic growth':

- Carlisle.

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 Carlisle

The Carlisle TPU (Figure 6) is to the West of the Eden and Esk SPA, consisting of just under 1,000km of sewer network serving approximately 39,000 properties and a residential population of approximately 83,000 people. The majority of watercourses in the TPU are classed as 'moderate' under the Water Framework Directive (WFD) 2019, except for the Caldew (downstream of Caldbeck) which is classed as 'poor' and Pow Maughan Beck which is classed as 'bad'.

The Carlisle TPU is considered both a strategic and complex catchment. It is of strategic concern due to significant growth, with an average growth of 500 houses per year in the last four years [13], and a projected 17% increase in residential population by 2050. This could drive a significant amount of further development to meet housing need, and increase pressure on the network and wastewater treatment works.

The St. Cuthbert's garden village development to the south of the TPU (Figure 6) could include over 10,000 residential units and 46,000sqm of commercial space [14], and could drive a high number of new connections and increase the amount of wastewater needing treatment. Carlisle Wastewater Treatment Works is across the city, and connecting the development to the works would require either an enormous infrastructure project laying a new sewer across the city, or to connect an existing sewer that lies in the riverbed of the Caldew and significantly increasing its loading. Another option is to build a new, dedicated wastewater treatment works for the development. Deciding which option would be best is a challenge and all options will require significant investment in both the network and wastewater treatment works to ensure protection of the environment and water quality.

Carlisle is also 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. Alongside this the BRAVA process 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. Areas for further investigation are highlighted in Figure 7. The WINEP and storm overflows guidance are still being developed. This could lead to significant changes and investment to both wastewater treatment works and the drainage network.

Figure 6 Map of the Carlisle TPU, including St Cuthbert's Garden Village

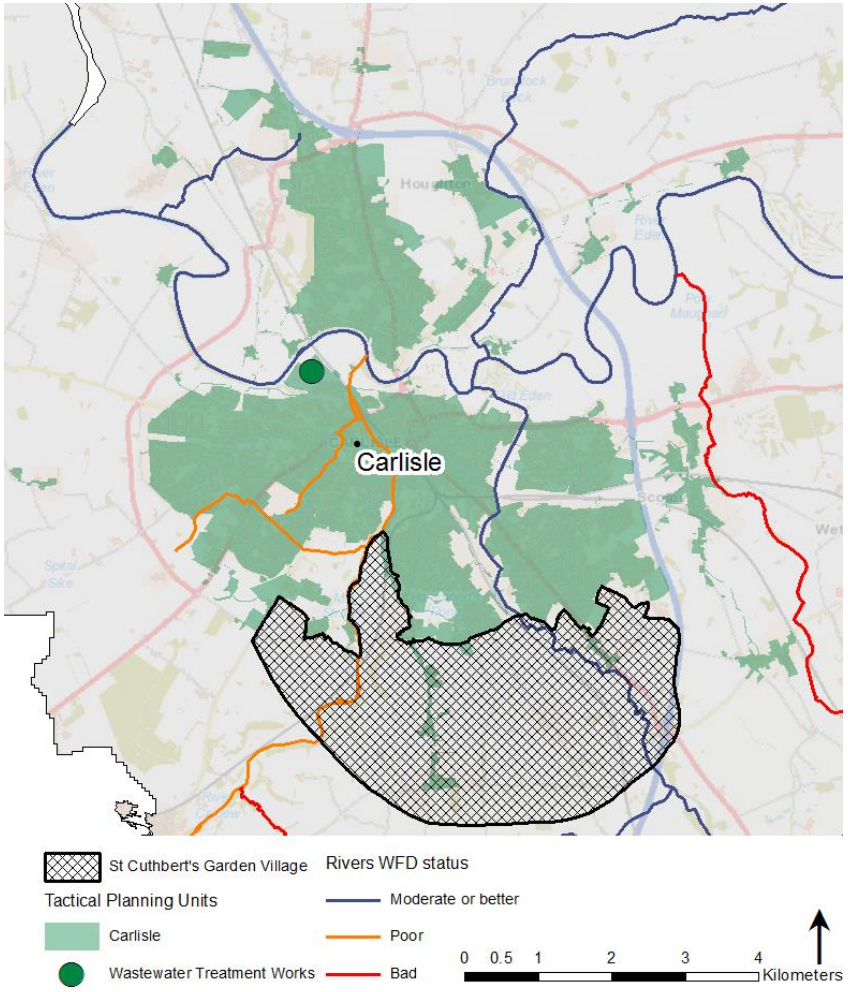
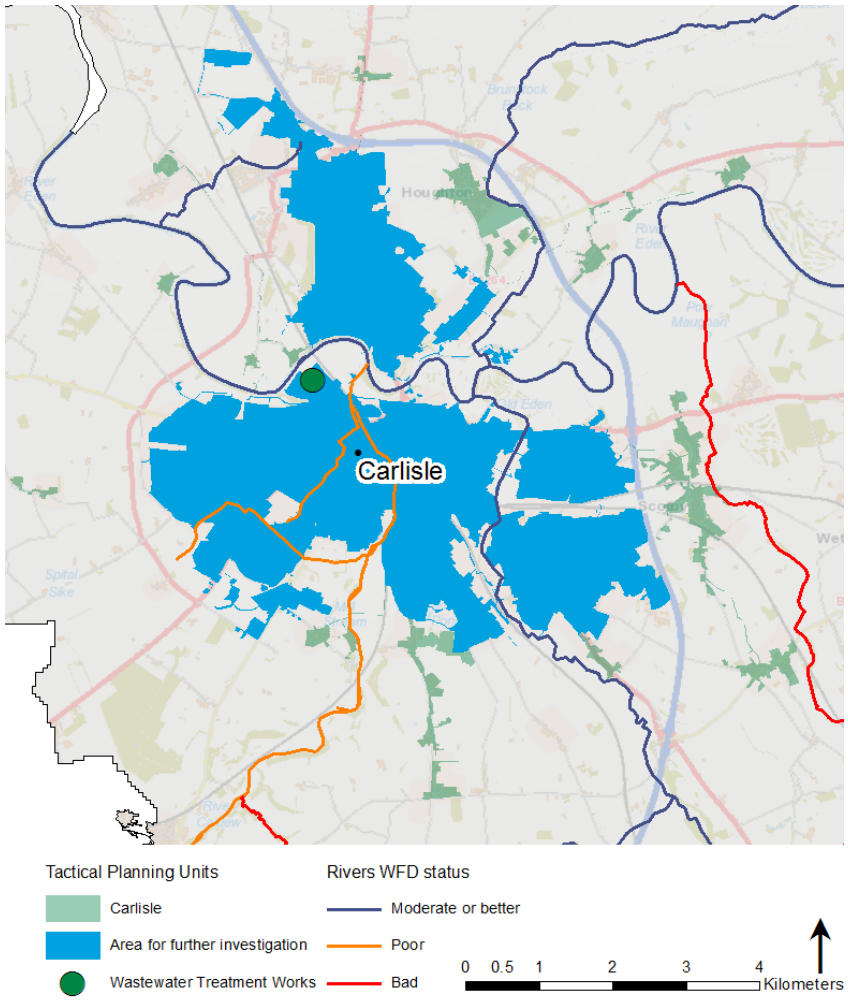


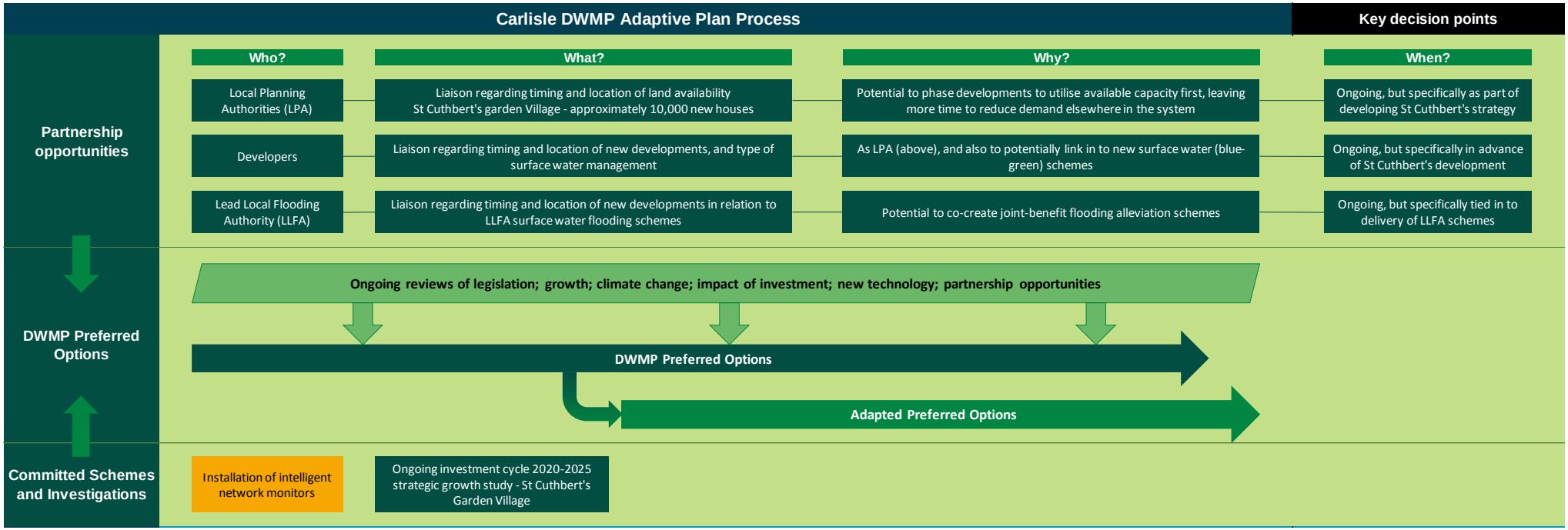
Figure 7 Map of Carlisle TPU with areas for further investigation highlighted in blue



3.3.3.1 Carlisle adaptive plan

The first part of the Carlisle adaptive plan process (Figure 8) highlights the importance of partnership working and regular data reviews.

Figure 8 Carlisle 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 9 shows the second part of the Carlisle adaptive plan, reflecting the different option types identified as being appropriate for Carlisle. 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.

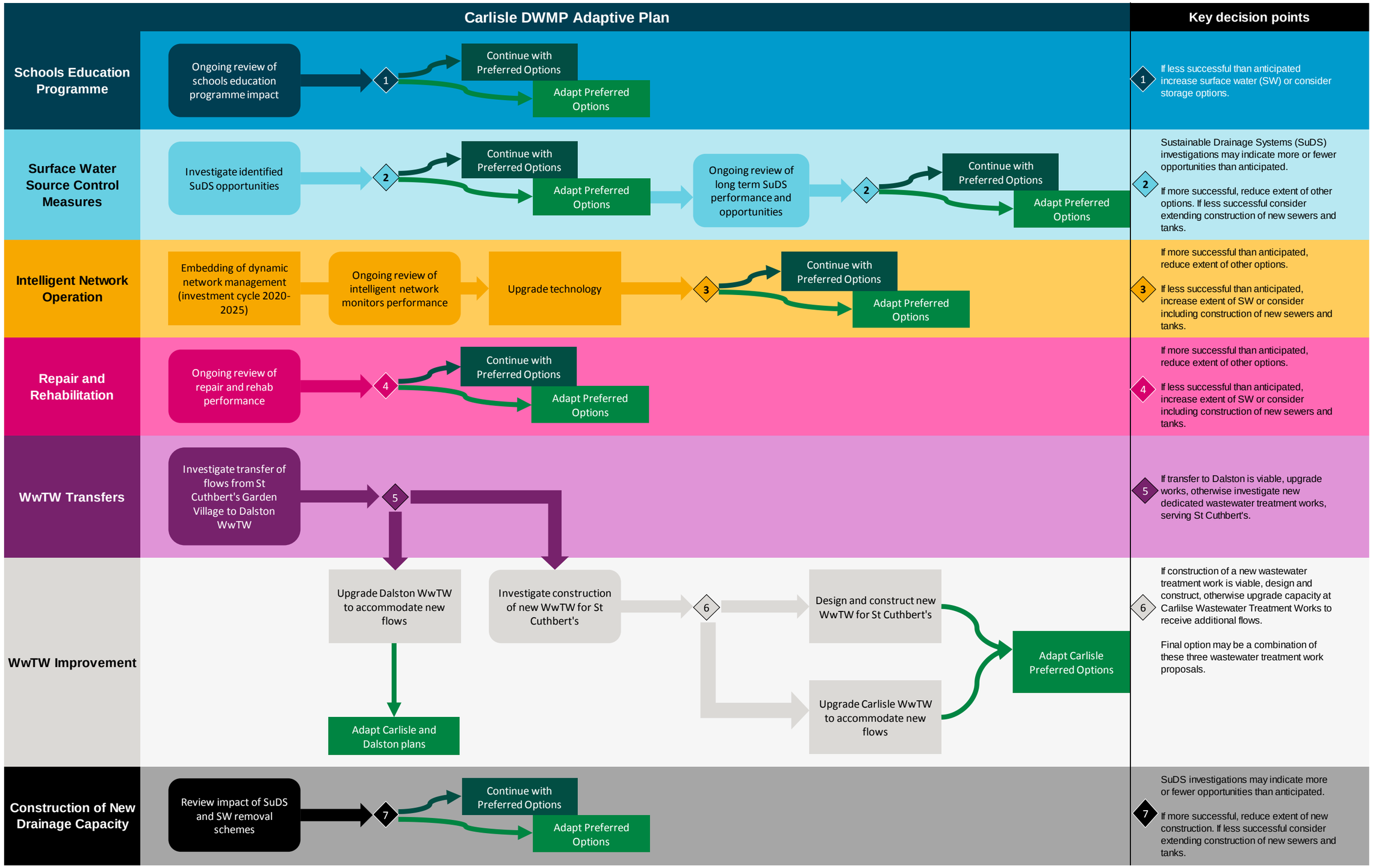
Within Carlisle, there are opportunities to carry out investigations before making final decisions on the final strategy. This means that we can properly evaluate options before committing to significant investment. These investigations will take into account things such as:

- 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 above in Figure 8. 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 9 Carlisle adaptive plan – Possible adaptive pathways as knowledge and opportunities change over time



3.3.4 Penrith

The Penrith TPU (Figure 10) is in the middle of the Eden and Esk SPA. The TPU consists of approximately 280km of sewer network, serving just over 8,500 properties and a residential population of approximately 18,000 people. All of the watercourses in the TPU are classed as 'moderate' under the WFD 2019.

Penrith TPU 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. Alongside this the BRAVA process 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. Areas for further investigation are highlighted in Figure 11. This is against a backdrop of a projected 18% increase in residential population by 2050, which could drive associated development and increase pressure on the drainage network. The WINEP and storm overflows guidance are still being developed. This could lead to significant changes and investment to both wastewater treatment works and the drainage network, to ensure protection of the environment and water quality.

Figure 10 Map of the Penrith TPU

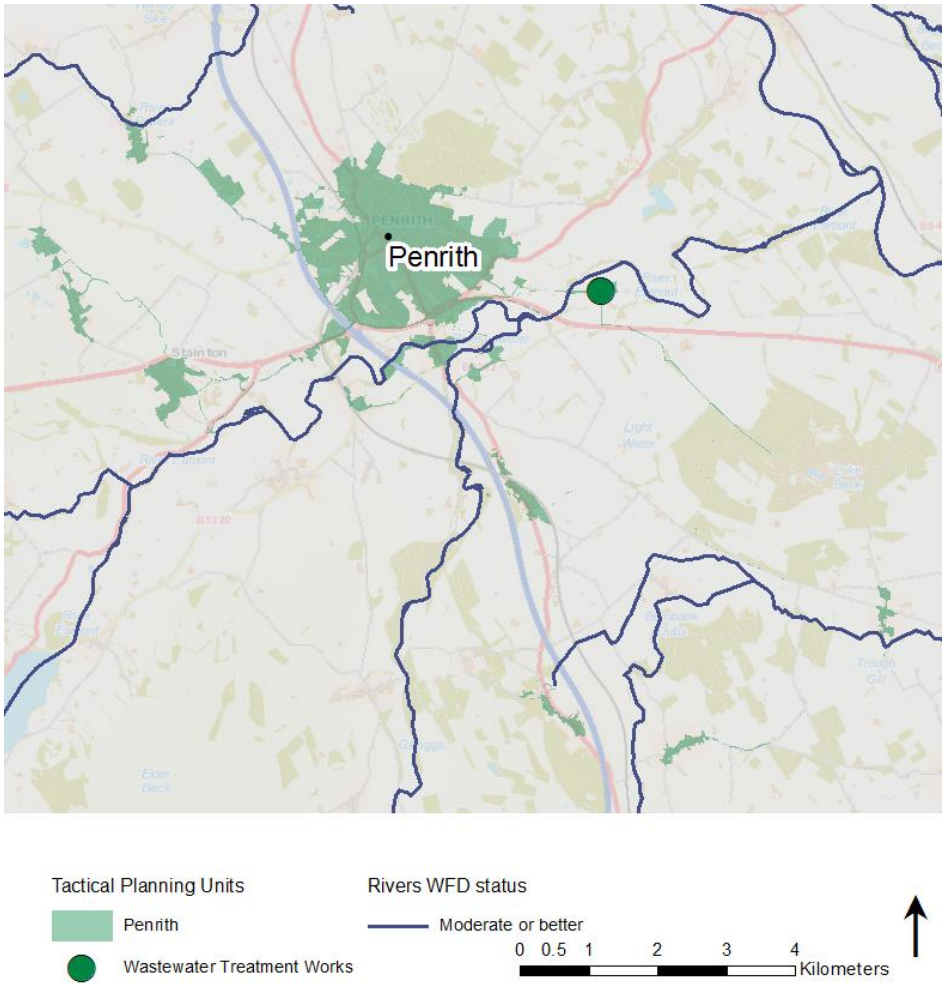
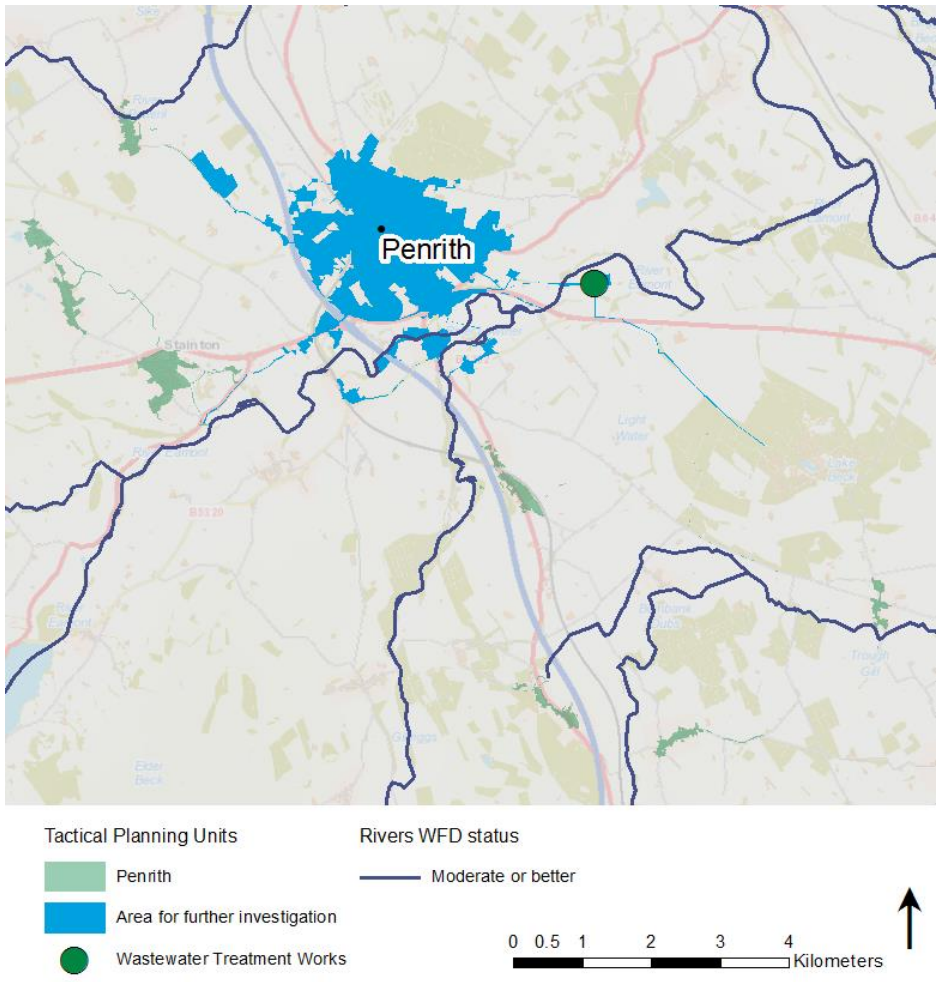


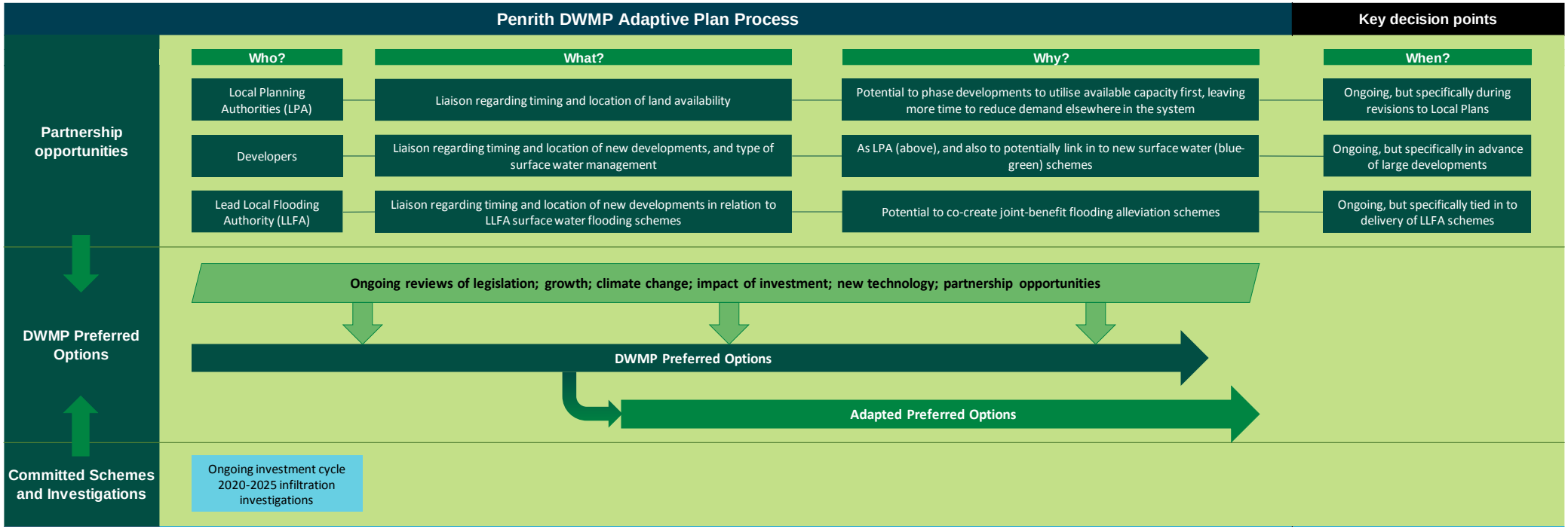
Figure 11 Map of the Penrith TPU with areas for further investigation highlighted in blue



3.3.4.1 Penrith adaptive plan

The first part of the adaptive plan process (Figure 12) highlights the importance of partnership working and regular data reviews.

Figure 12 Penrith 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 7.

Table 7 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 13 shows the second part of the Penrith adaptive plan, reflecting the different option types identified as being appropriate for Penrith. 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.

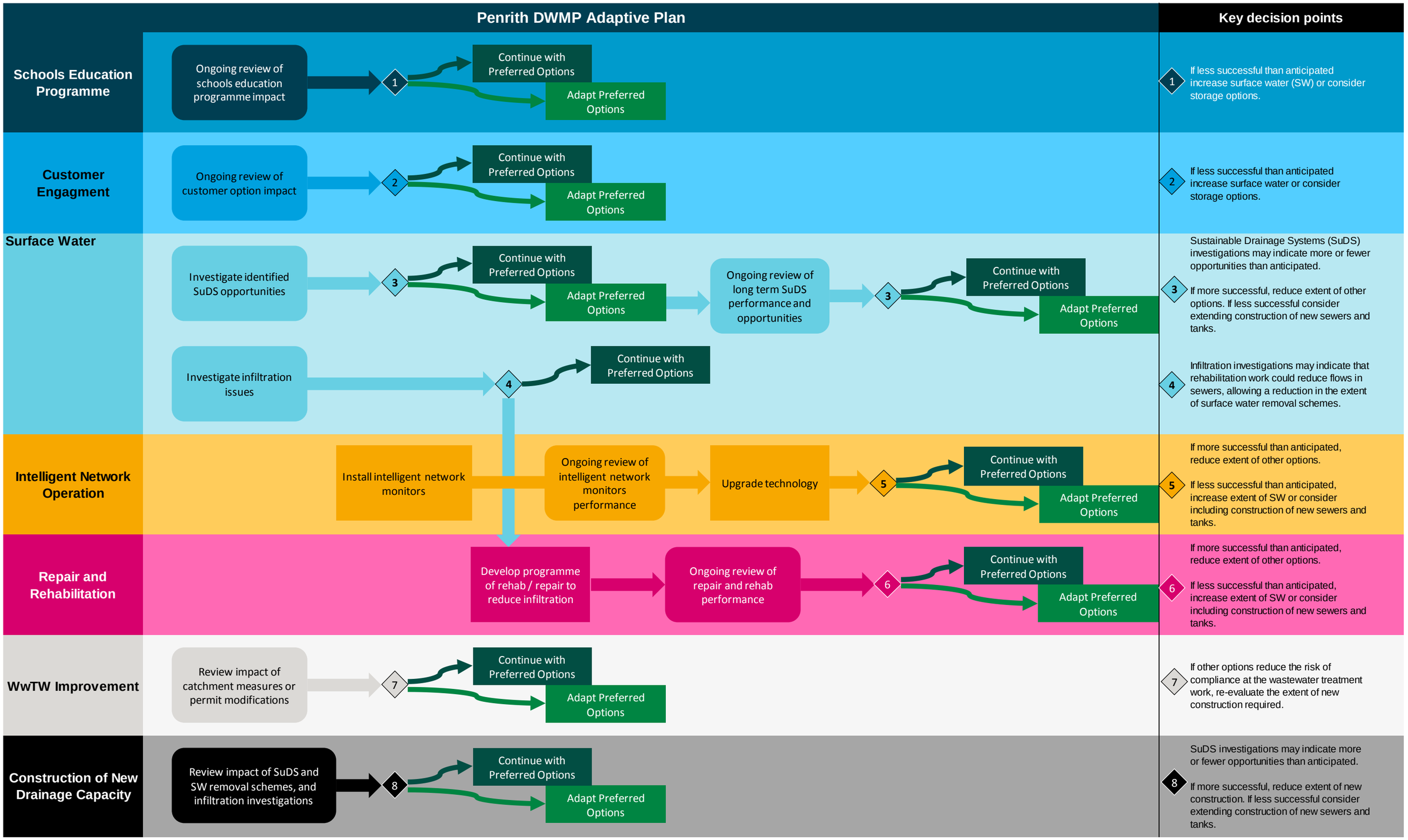
Within Penrith, there are opportunities to carry out investigations before making final decisions on the final strategy. This means that we can properly evaluate options before committing to significant investment. These investigations will take into account things such as:

- 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 above in Figure 12. 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 13 Penrith 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 14).

An options hierarchy was then used which has been endorsed by customers and stakeholders from across the North West to select preferred solutions (Figure 15). 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 14 Options development process

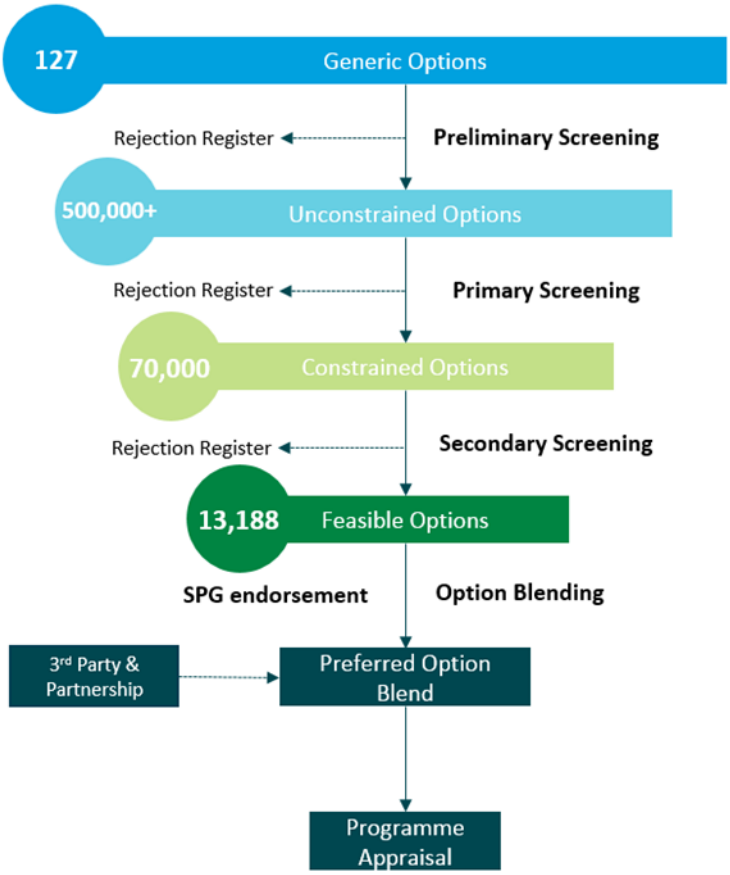
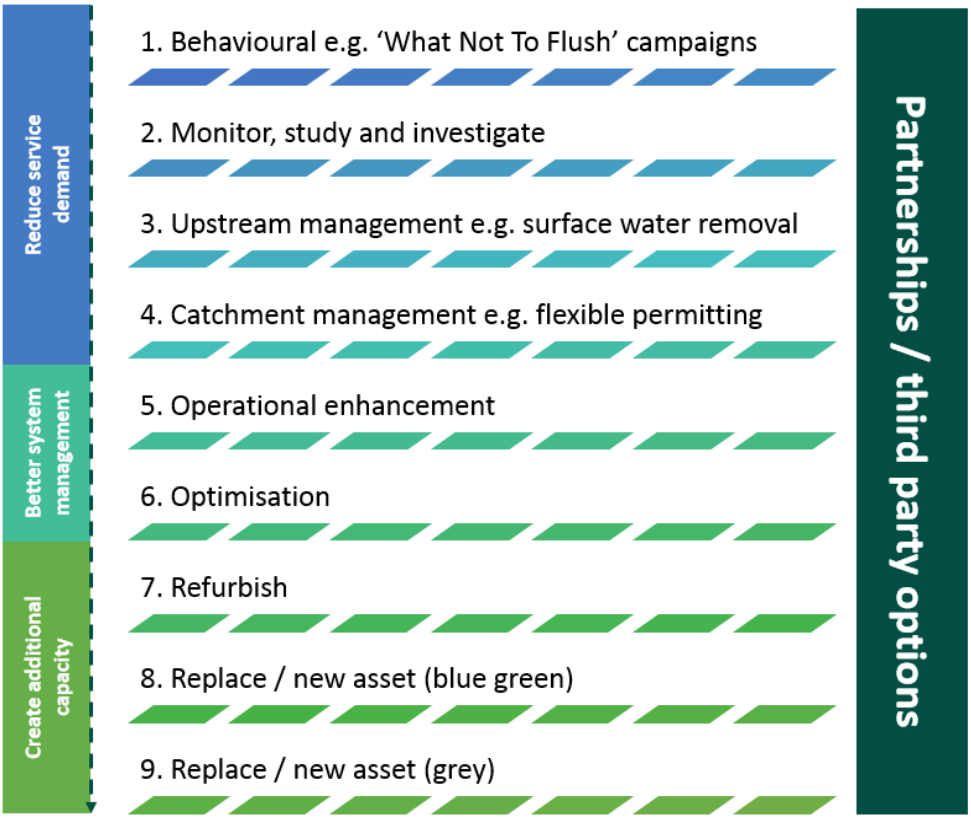


Figure 15 Options hierarchy



4.1 Eden and Esk partnership options

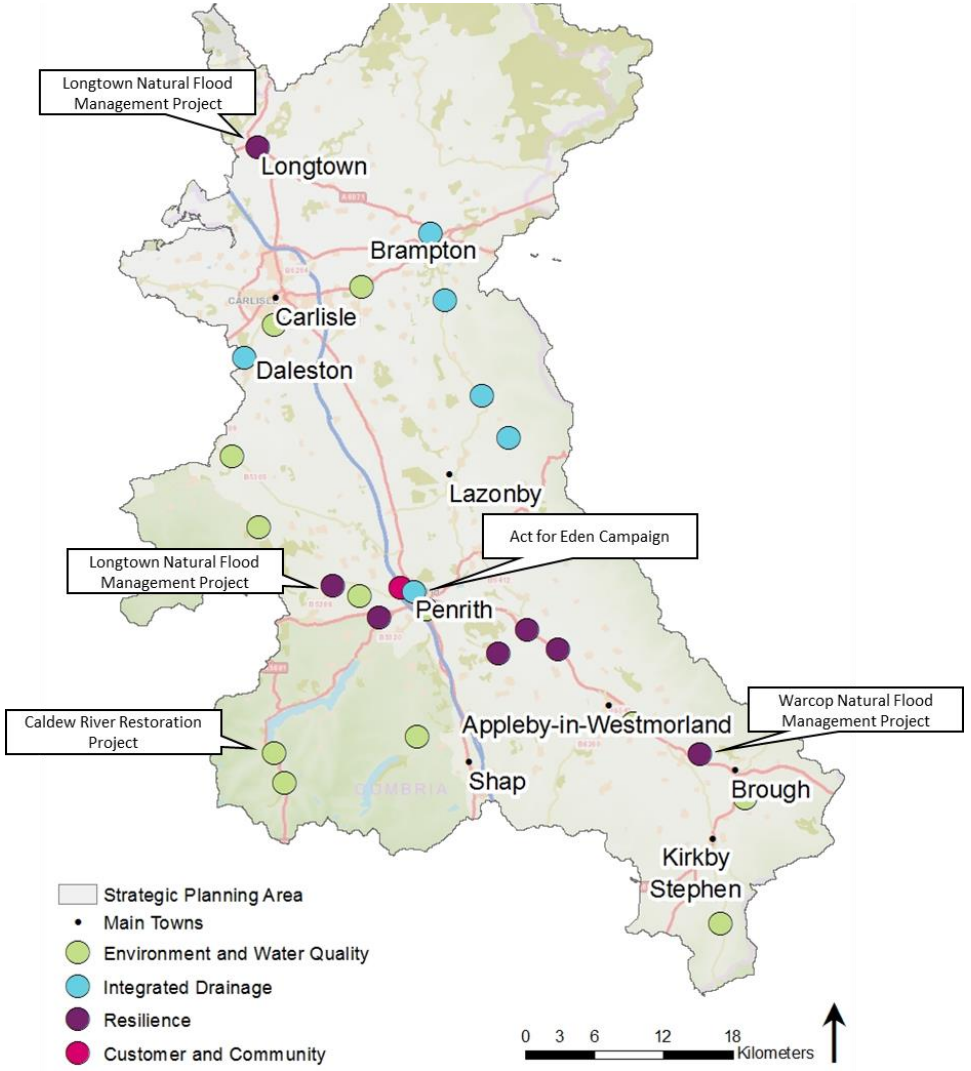
In order to identify and develop potential partnership options in the Eden and Esk SPA, through the SPG we have shared the results from the risk identification stages such as BRAVA. This was done through a series of workshops and the purpose was to identify areas of shared risk and partnership opportunities 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 16.

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 16 Overview of the potential partnership opportunities in the Eden and Esk SPA



5. Options for the Eden and Esk

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 Eden and Esk catchment. Options can be categorised into a number of categories:

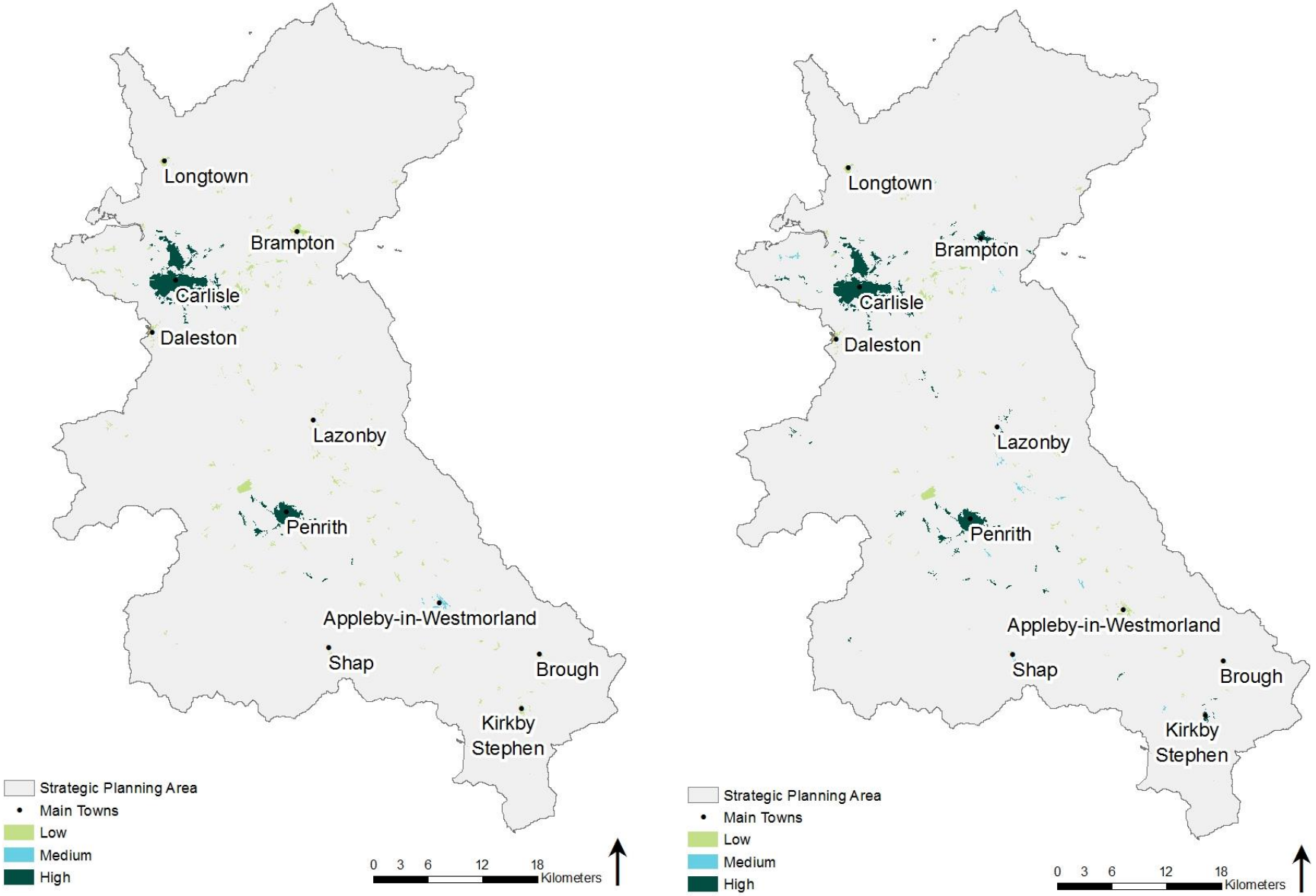
- Customer engagement;
- Monitor and investigate;
- Upstream management;
- Catchment management;
- Operational enhancement;
- Optimisation;
- Refurb/New asset (blue/green); and
- Refurb/New asset (grey).

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 Eden and Esk SPA customer engagement options (Figure 17) 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 Carlisle and Penrith 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 Penrith and Carlisle TPUs (Figure 17).

Figure 17 Maps show the benefit of implementing regional customer engagement (left) and sustainable drainage solutions (right) options across the Eden and Esk 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.

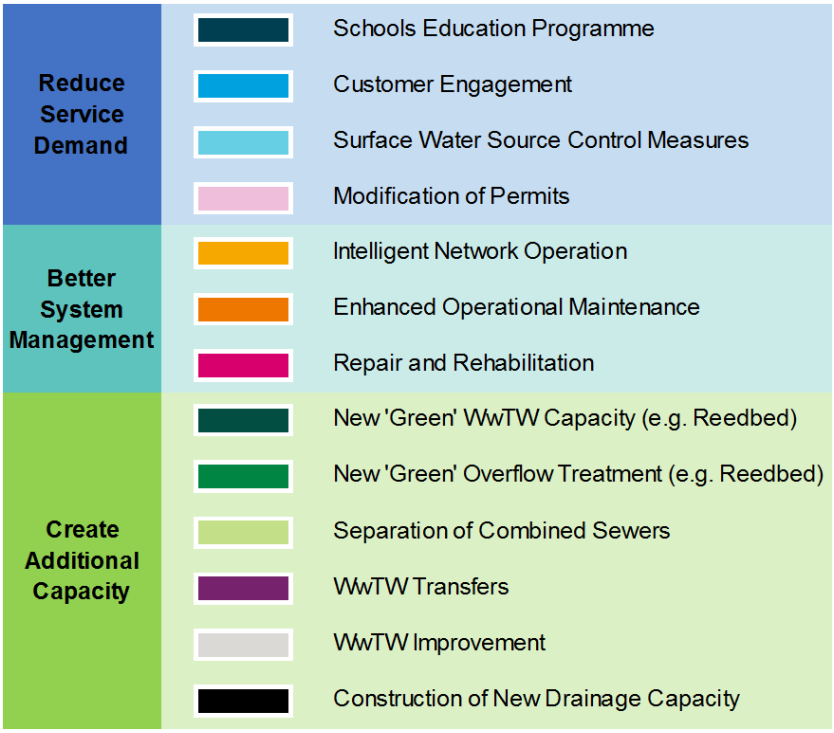
A high-level regional assessment has been carried out to estimate the likely investment requirements to address all overflow risks, but due to the uncertainty described above, this has not been broken down by Strategic Planning Areas. This information can be found in the DWMP main document.

Utilising data collected at the various stages of developing the DWMP (BRAVA, partnership opportunities and the data in Figure 17), 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 18).

Figure 18 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 Eden and Esk SPA, the outcomes seen as a result of investment and benefit in each option type are shown in Figures 19, 20 and 21 respectively.

Figure 19 shows 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 20 shows how the potential options could contribute to addressing the planning objectives – environmental and flooding

Figure 19 shows options addressing environmental planning objectives, which incorporate:

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

Figure 20 shows how the potential options could contribute to addressing flooding planning objectives, which incorporate:

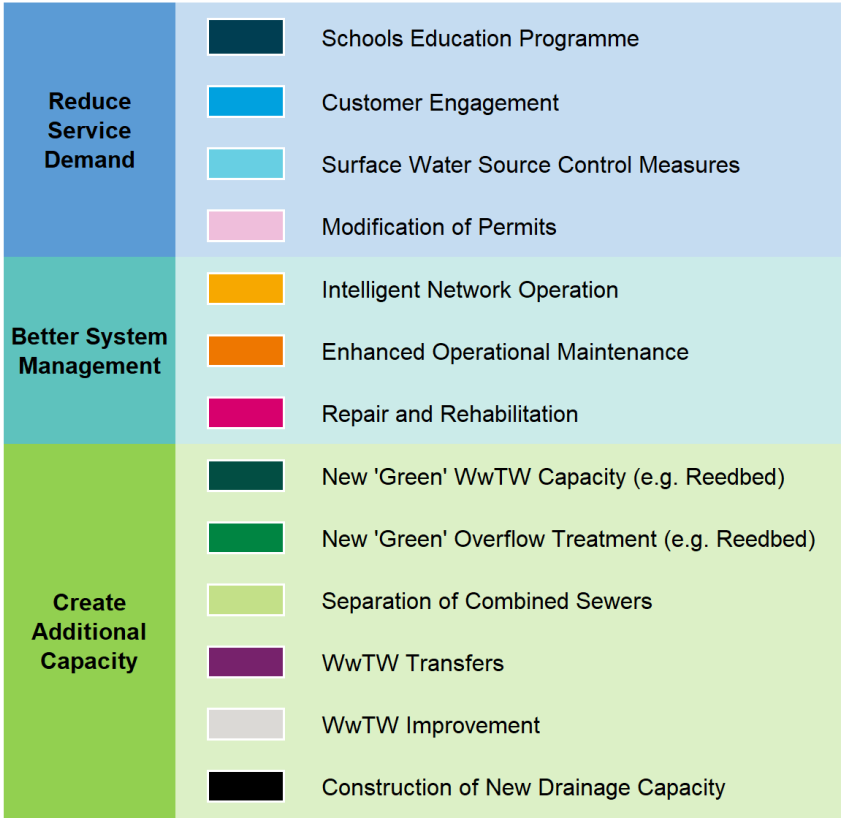
- Internal flooding;
- External flooding;
- Highway and open space flooding; and
- 1 in 50-year flooding.

Note that the percentages shown in Figures 19 and 20 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 21 shows how these options could contribute to addressing the planning objectives – environmental and flooding.

Figure 19 Eden and Esk 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.



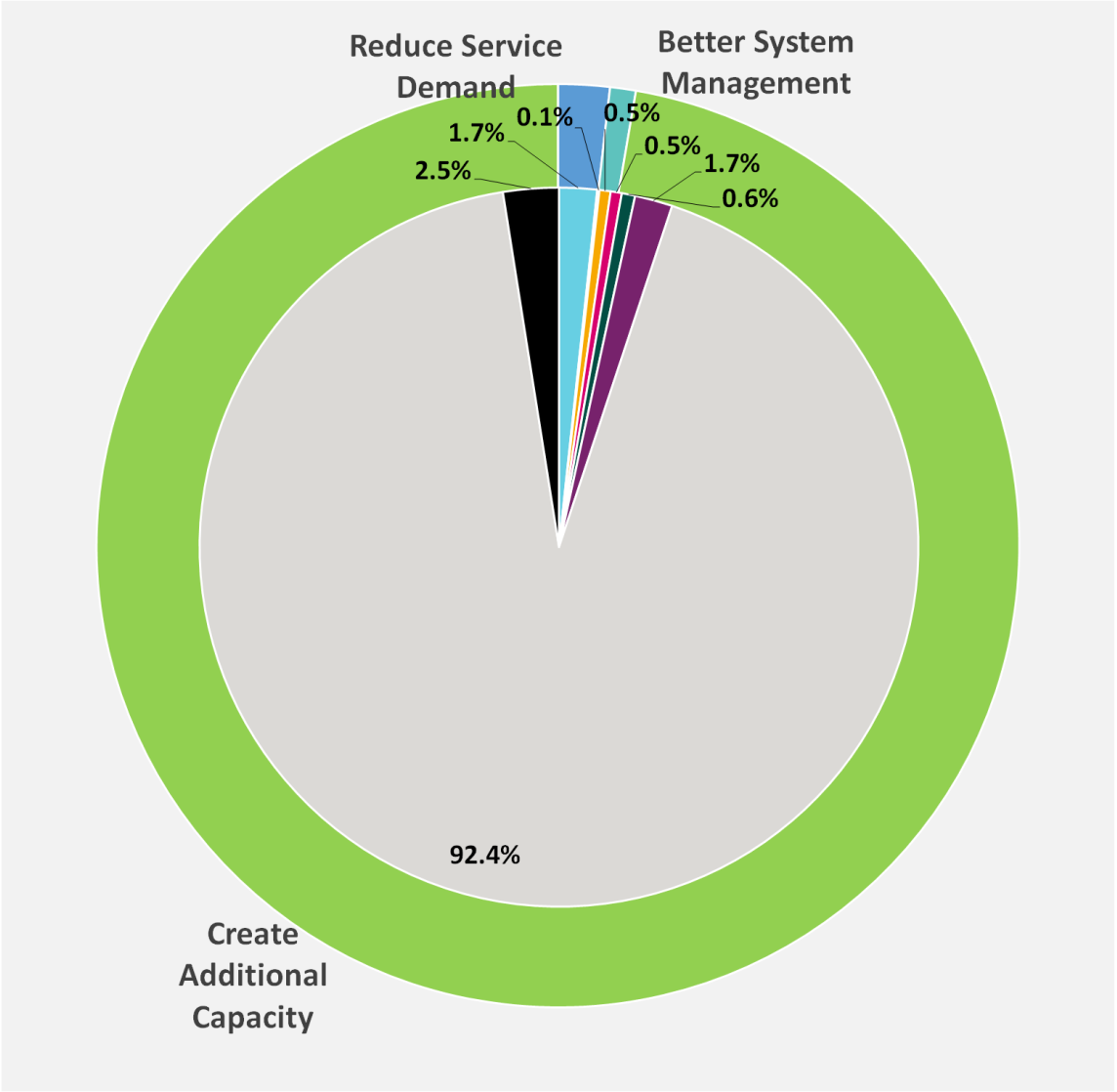


Figure 20 Eden and Esk Strategic Planning Area: Distribution of flooding investment by option type

This is an example of how different options types may be used to address flooding planning objectives. Two thirds of the potential investment could be through a strategy to reduce demand on the sewer system. This potential investment could be through surface water source control measures such as SuDS and schools and engagement programmes.

Around 20% of potential investment could be in the construction of new drainage capacity. Around 11% could be used to improve existing system management with options such as enhanced maintenance and repair and rehabilitation.

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

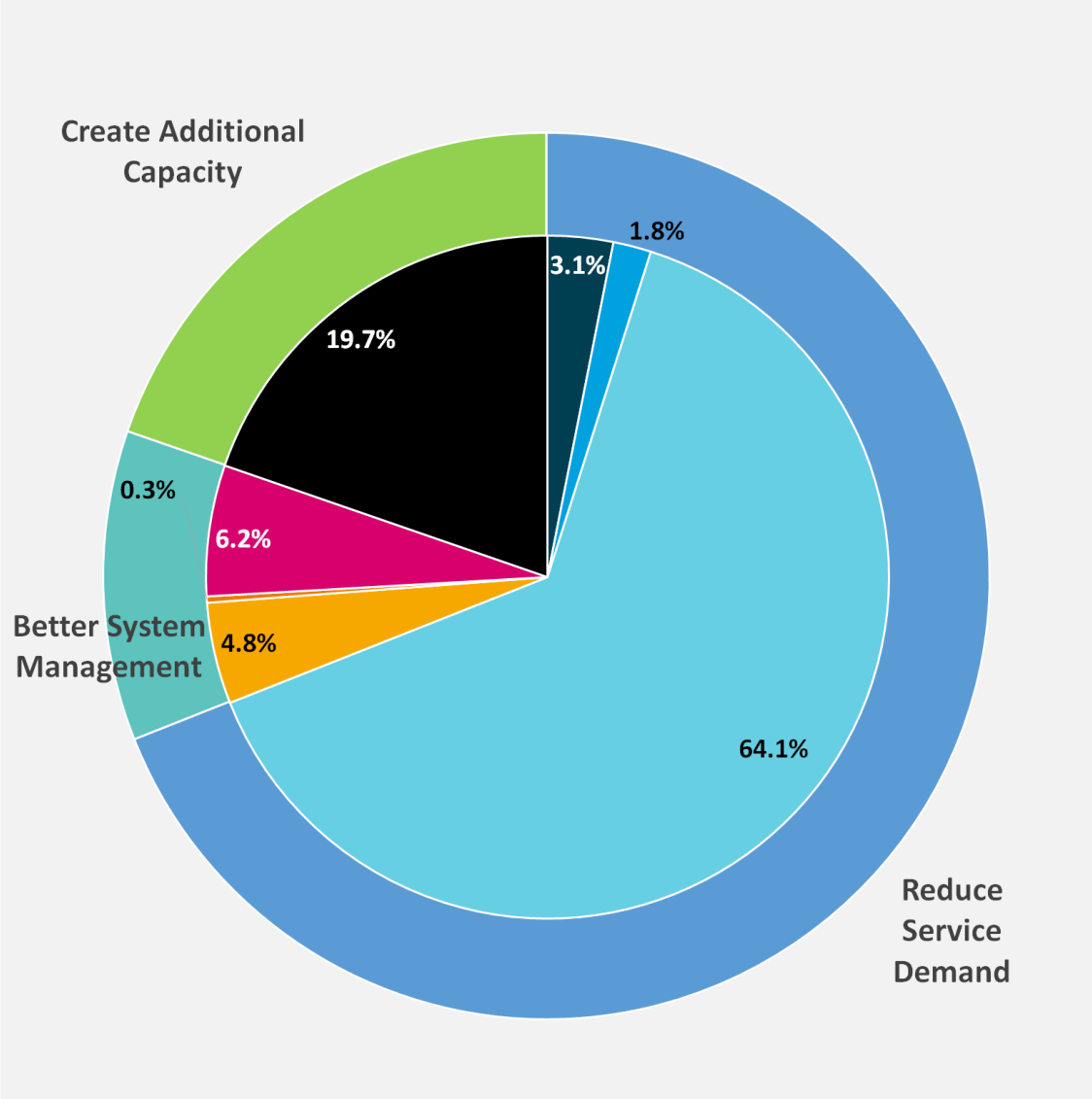
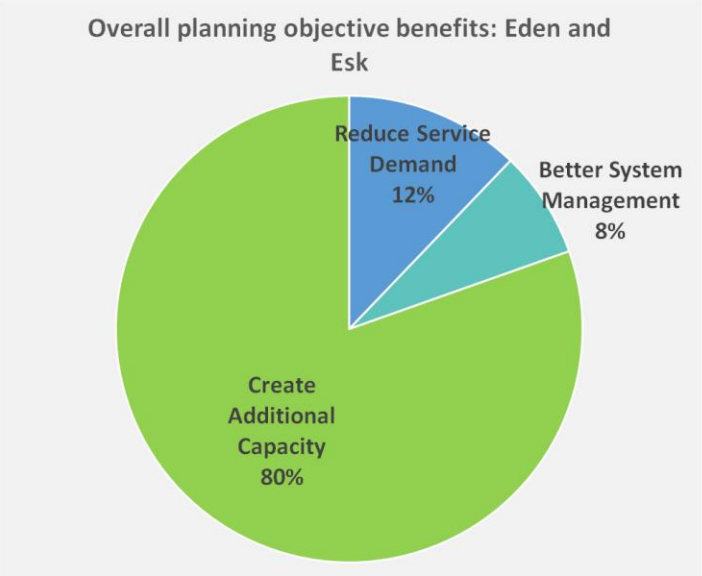


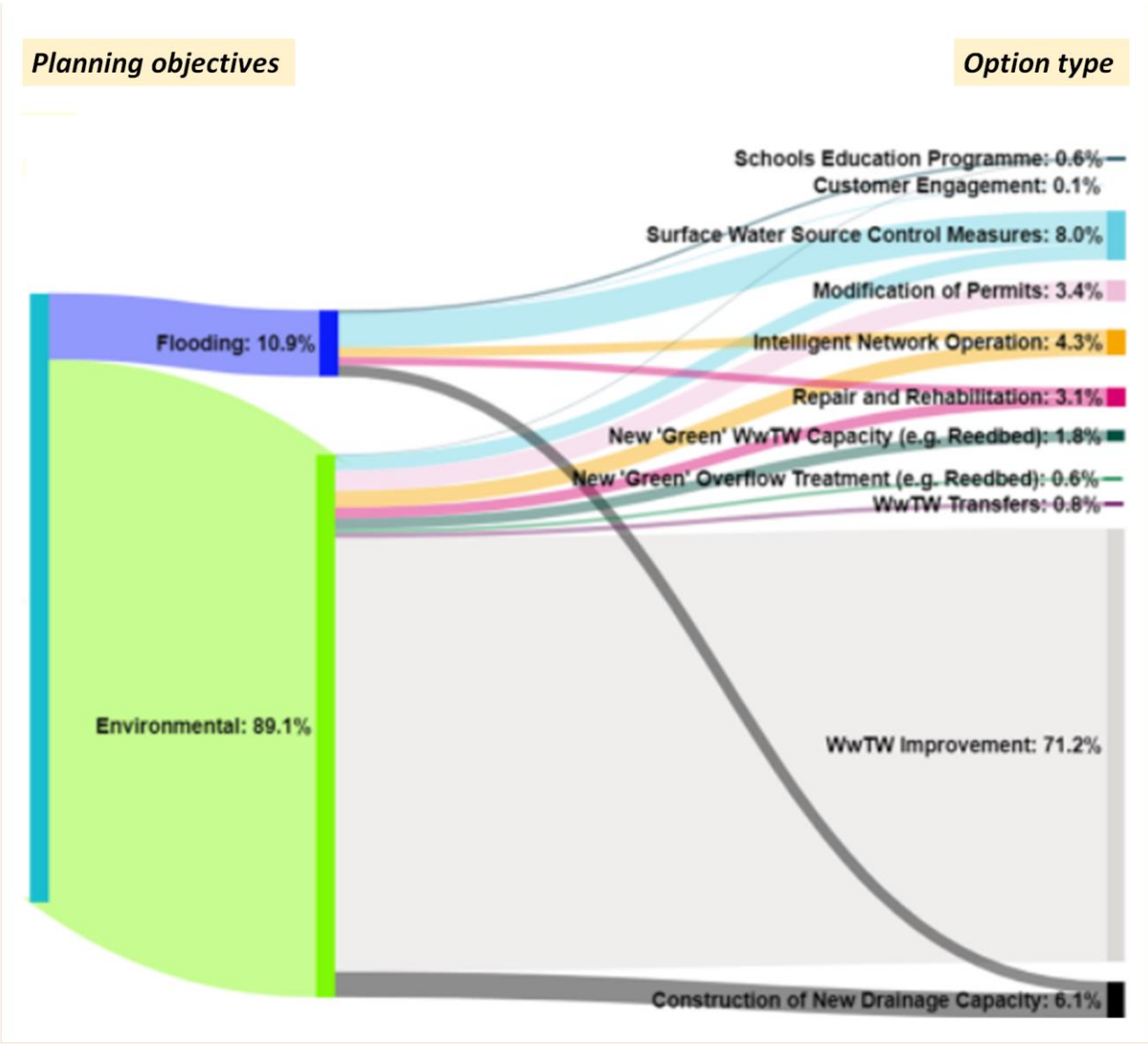
Figure 21 Distribution of benefit by option type within Eden and Esk SPA

This is an example of how different option types may be used to demonstrate potential benefits against different planning objectives within the Eden and Esk SPA.

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

Environmental planning objectives could be met mainly through improvements to wastewater treatment works, repair and rehabilitation of existing network, construction of new drainage capacity, new 'green' overflow treatment, modification of permits and the installation of intelligent network.



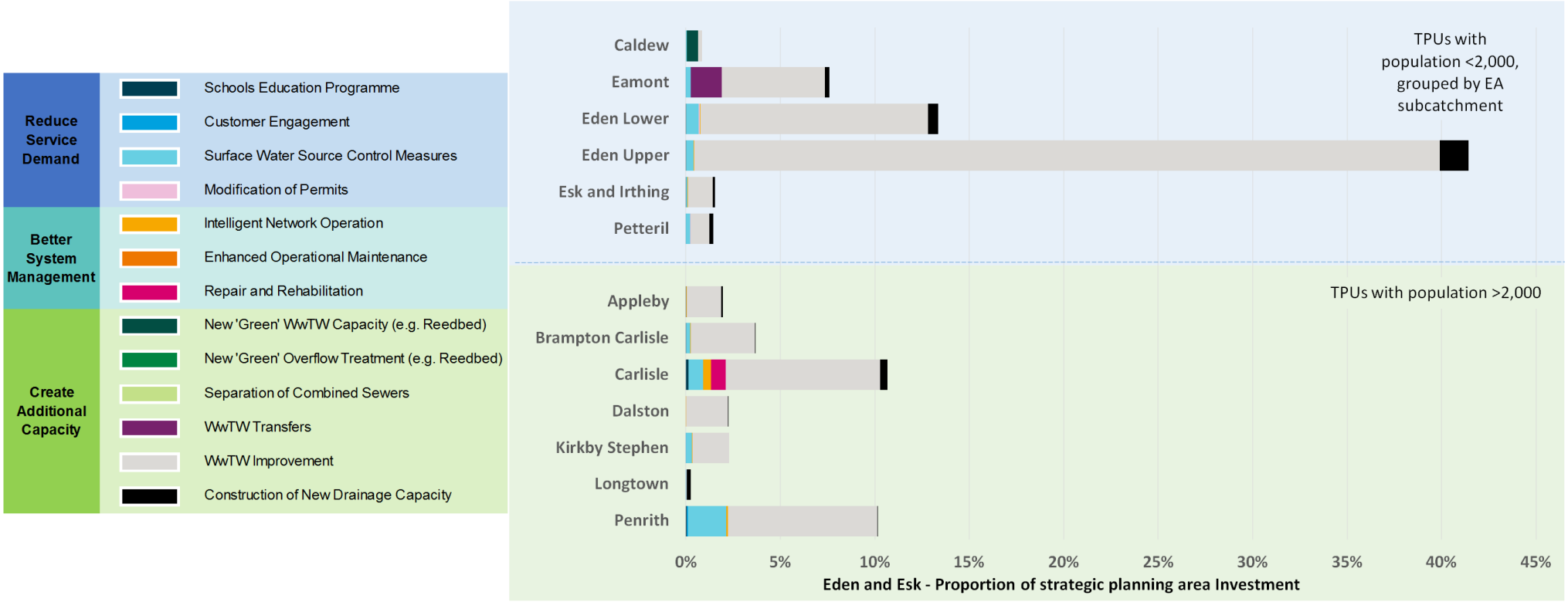


5.3 Overview of preferred options in each TPU

Figure 22 shows the proportion of Eden and Esk SPA 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 Eden and Esk 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 22 Proportion of investment seen in each TPU within the Eden and Esk SPA



The following sub-sections show how potential 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 schools education, are continual programmes that could help to encourage long-term sustainable behaviours, such as reduction in water use.

5.3.1 Appleby

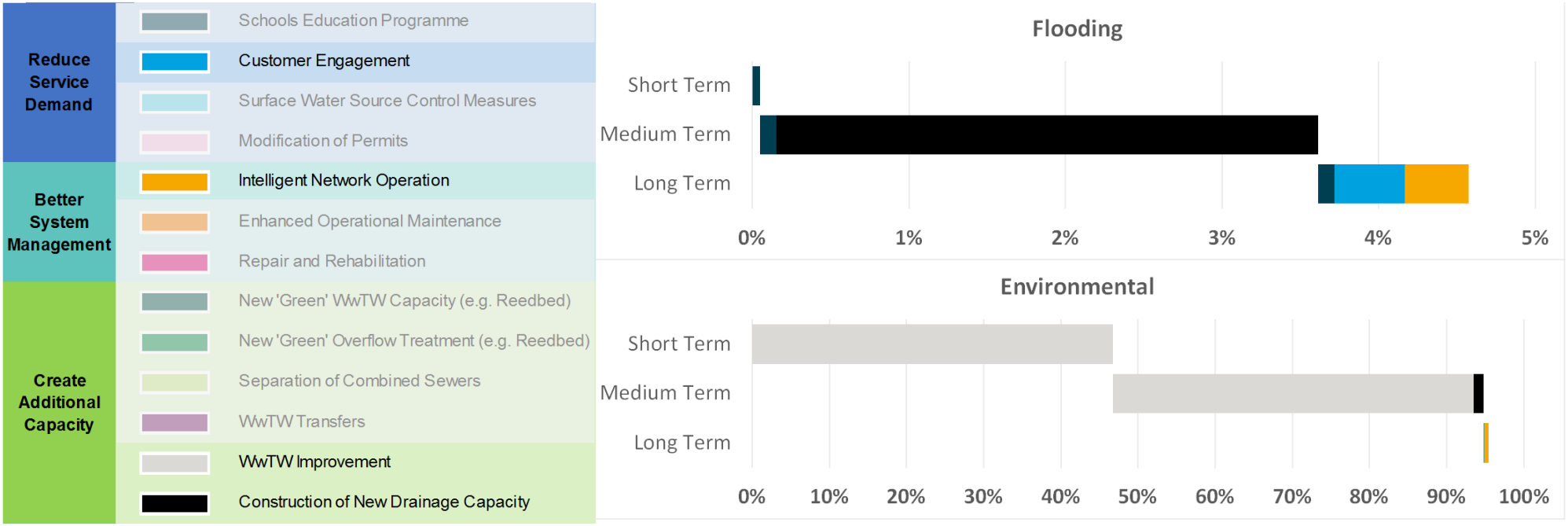
The results from the DWMP show that if we were to invest in Appleby over the next 25 years, around 5% of the investment could be to address flooding risks, and around 95% of investment could be to address environmental risks (Figure 23).

In the short and medium term, potential investment could be through wastewater treatment works improvements to ensure permit compliance.

In the medium term, to address flooding risk, we could invest construction of new drainage capacity and a small amount through schools education programmes.

In the longer term, there could be investment in customer engagement programmes, the installation of intelligent network monitoring systems and in surface water control measures (e.g. SuDS).

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



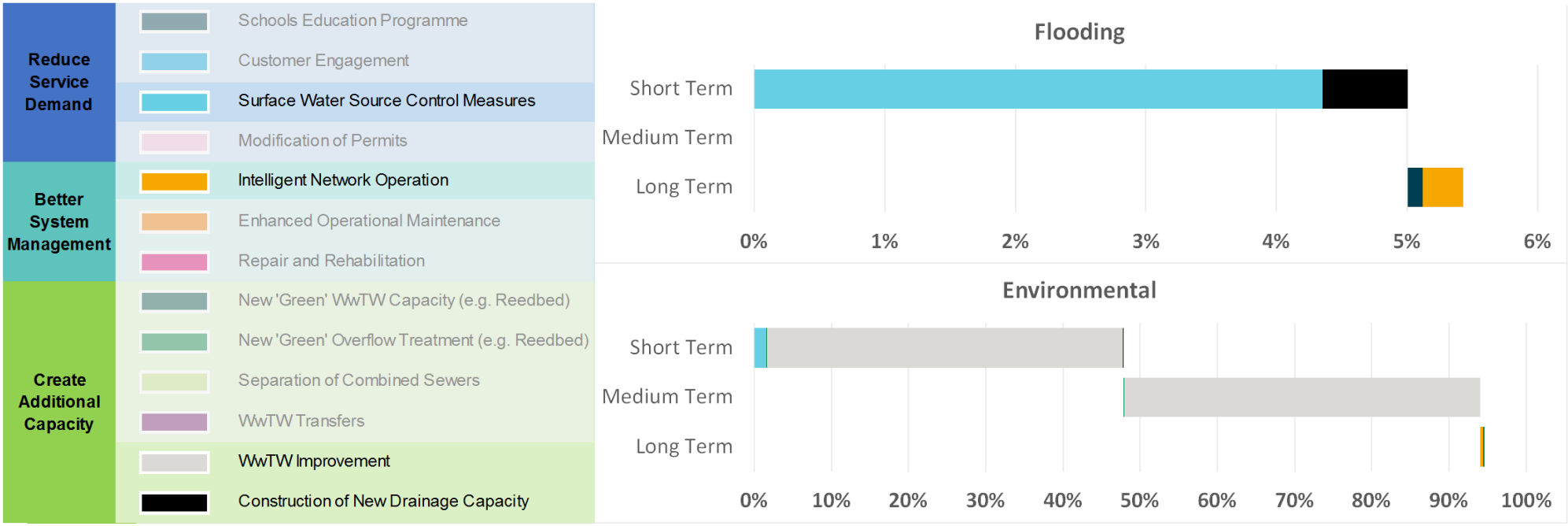
5.3.2 Brampton Carlisle

The results from the DWMP show that if we were to invest in Brampton Carlisle over the next 25 years, around 5% of the investment could be to address flooding risks, and around 95% of investment could be to address environmental risks (Figure 24).

In the short and medium term, potential investment could be through wastewater treatment works improvements to ensure permit compliance, supplemented by new surface water control measures.

In the longer term, there could be investment in customer engagement programmes and the installation of intelligent network monitoring systems.

Figure 24 Short, medium and long-term investment in the Brampton Carlisle TPU, distributed by option type



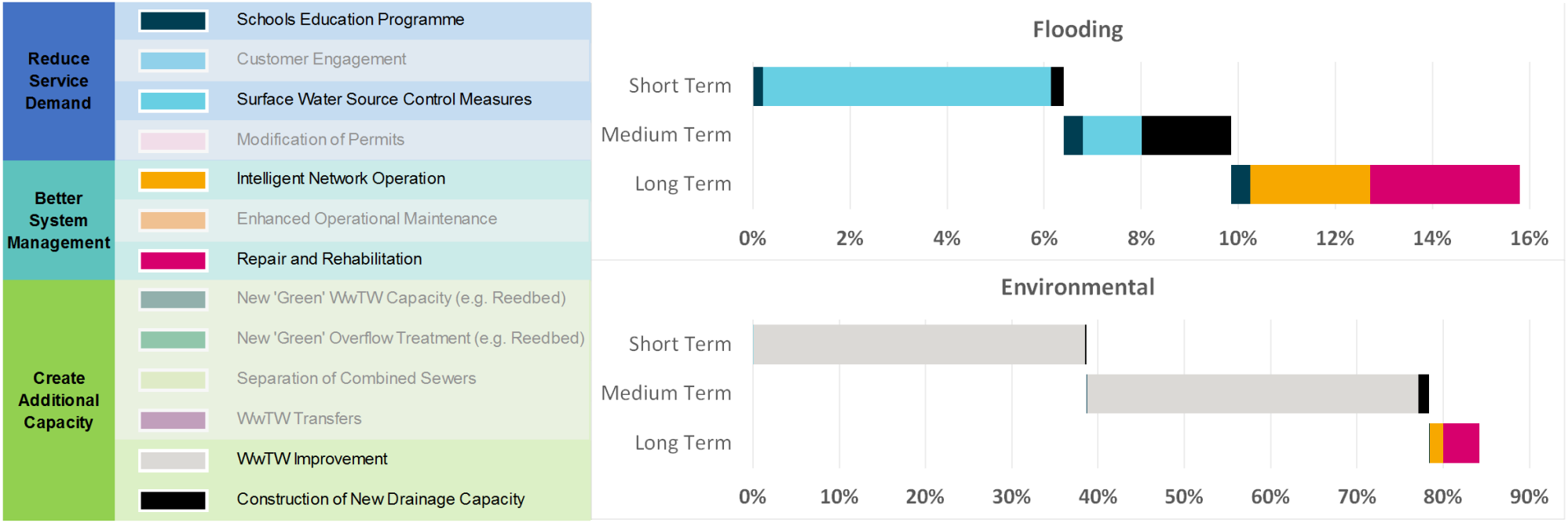
5.3.3 Carlisle

The results from the DWMP show that if we were to invest in Carlisle over the next 25 years, around 16% of the investment could be to address flooding risks, and around 84% of investment could be to address environmental risks (Figure 25).

In the short and medium term, potential investment to address environmental risks could be through wastewater treatment works improvements to ensure permit compliance. To address flooding risk, we could invest in the construction of new storm water drainage capacity, surface water control measures (e.g. SuDS), and through schools education programmes.

In the longer term, there could be investment in customer engagement programmes, the installation of intelligent network monitoring systems, and the repair and rehabilitation of network.

Figure 25 Short, medium and long-term investment in the Carlisle TPU, distributed by option type



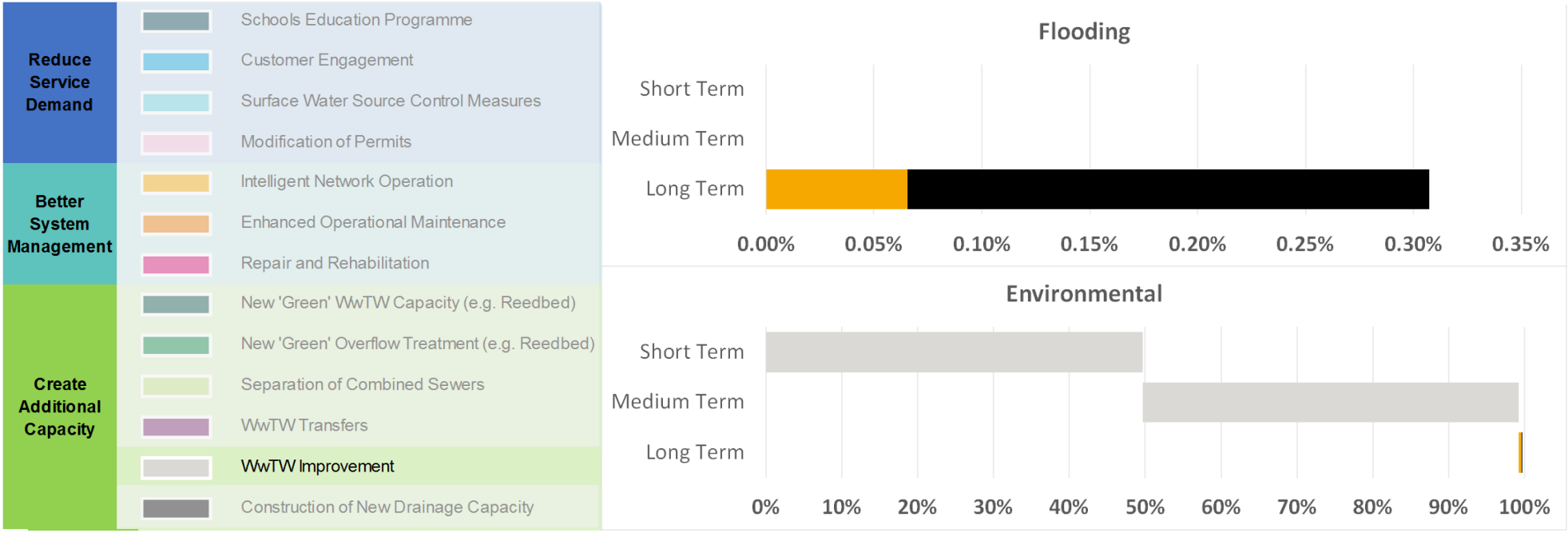
5.3.4 Dalston

The results from the DWMP show that if we were to invest in Dalston over the next 25 years, less than 0.5% of the investment could be to address flooding risks, and around 99.5% of investment could be to address environmental risks (Figure 26).

In the short and medium term, potential investment could be through wastewater treatment works improvements to ensure permit compliance.

In the longer term, there could be investment in installation of intelligent network monitoring systems and construction of new drainage capacity.

Figure 26 Short, medium and long-term investment in the Dalston TPU, distributed by option type



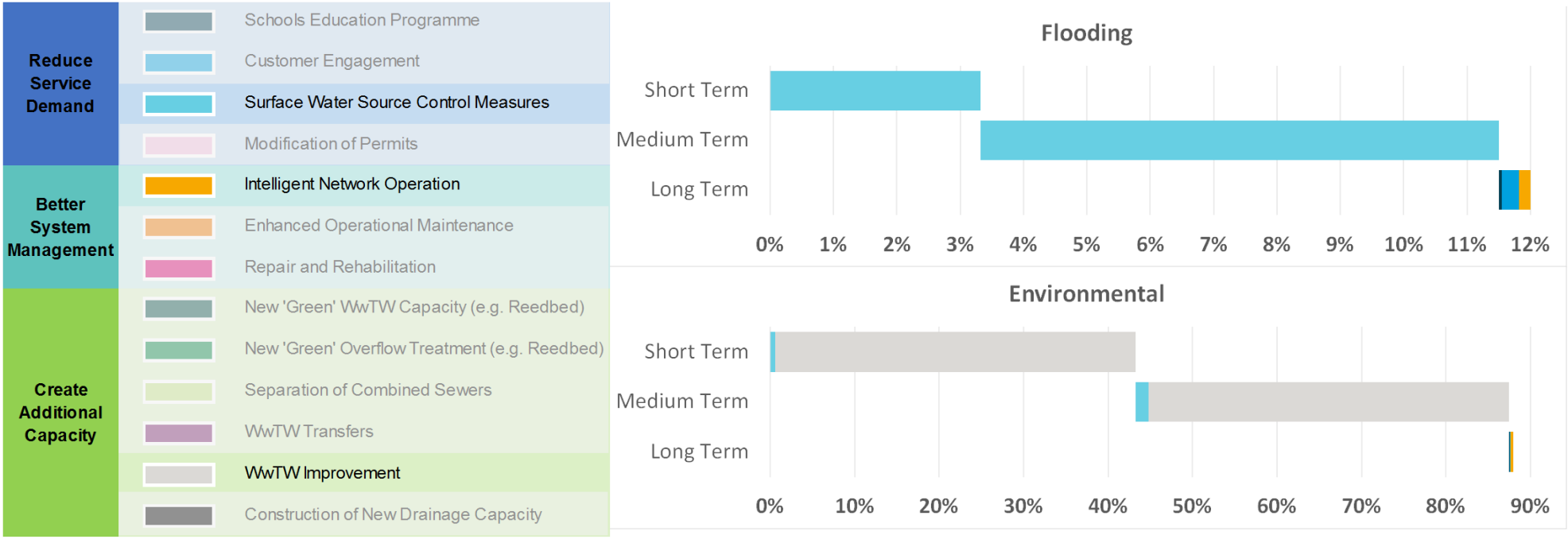
5.3.5 Kirkby Stephen

The results from the DWMP show that if we were to invest in Kirkby Stephen 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 27).

In the short and medium term, potential investment to address environmental risks could be through wastewater treatment works improvements to ensure permit compliance. To address flooding risks, we could invest in surface water control measures (e.g. SuDS).

In the longer term, there could be investment in customer engagement programmes and the installation of intelligent network monitoring systems.

Figure 27 Short, medium and long-term investment in the Kirkby Stephen TPU, distributed by option type



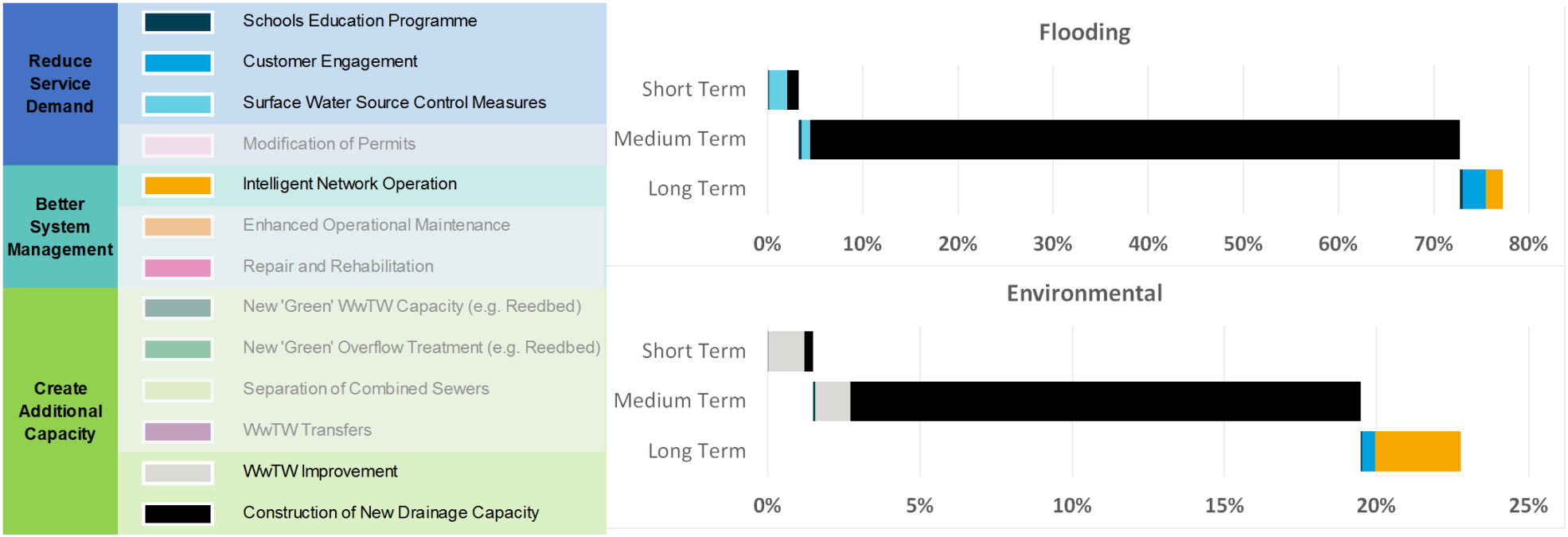
5.3.6 Longtown

The results from the DWMP show that if we were to invest in Longtown over the next 25 years, around 77% of the investment could be to address flooding risks, and around 23% of investment could be to address environmental risks (Figure 28).

In the short and medium term, potential investment could be through the construction of new drainage capacity, with some investment in wastewater treatment works improvements to ensure permit compliance. We could additionally invest in surface water control measures (e.g. SuDS).

In the longer term, there could be investment in customer engagement programmes and the installation of intelligent network monitoring systems.

Figure 28 Short, medium and long-term investment in the Longtown TPU, distributed by option type



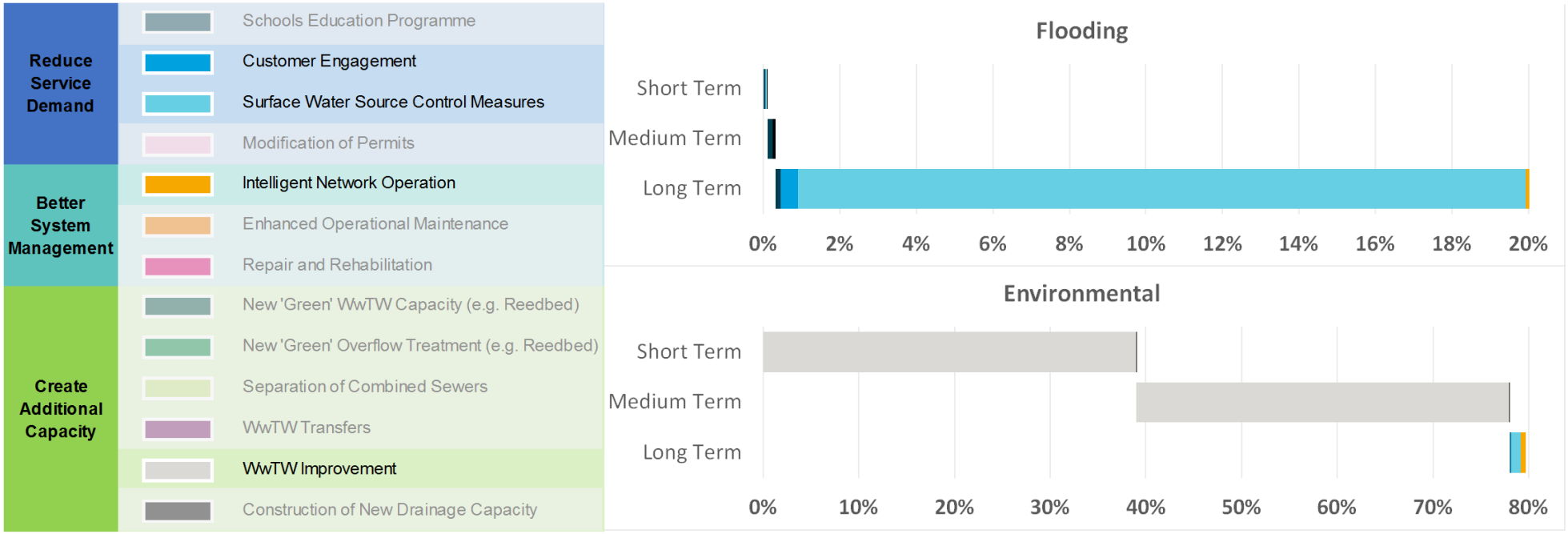
5.3.7 Penrith

The results from the DWMP show that if we were to invest in Penrith over the next 25 years, around 20% of the investment in Penrith could be to address flooding risks, and around 80% of investment could be to address environmental risks (Figure 29).

In the short and medium term, potential investment could be through wastewater treatment works improvements to ensure permit compliance. We could additionally invest in surface water control measures (e.g., SuDS) and the construction of new drainage capacity.

In the longer term, we could additionally invest in surface water control measures (e.g. SuDS), in customer engagement programmes and the installation of intelligent network monitoring systems.

Figure 29 Short, medium and long-term investment in the Penrith TPU, distributed by option type



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

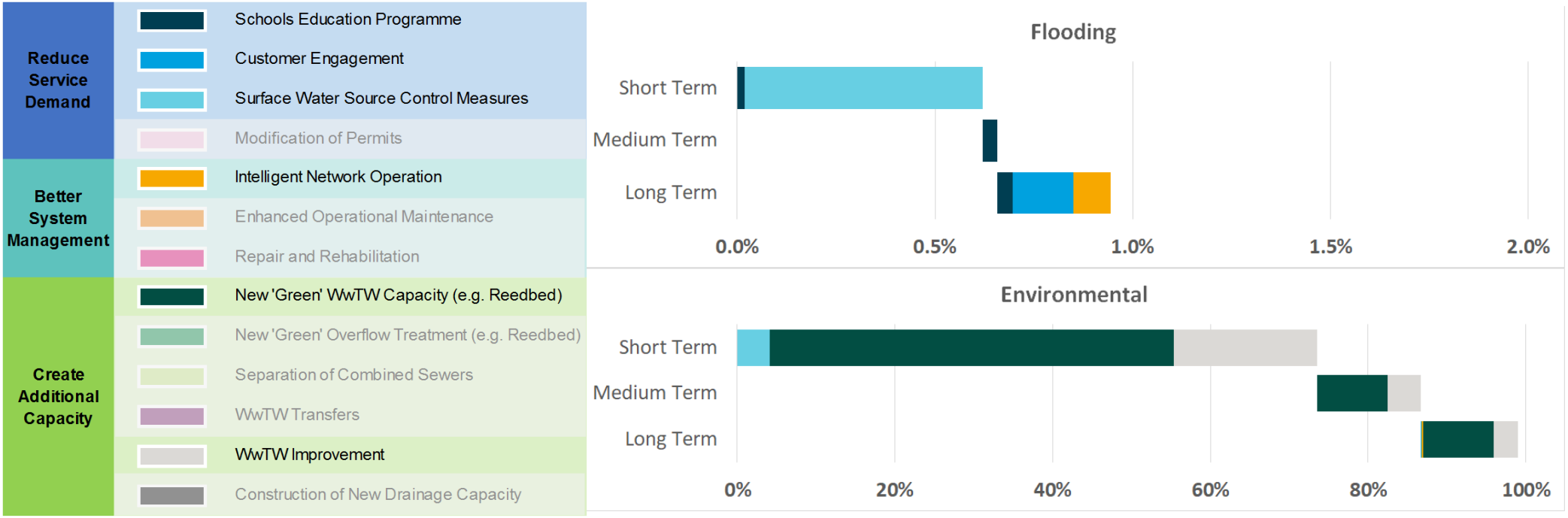
The following TPUs each have a population of less than 2,000, and have therefore been grouped together:

- Caldbeck
- Skelton

In the short and medium term, potential investments could be through new green wastewater treatment capacity (e.g., reed beds), and surface water control measures (e.g., SuDS). We could additionally invest in wastewater treatment works improvements to ensure permit compliance (Figure 30).

In the longer term, investment could continue in the above options, and also in customer engagement programmes and the installation of intelligent network monitoring systems.

Figure 30 Short, medium and long-term investment in TPUs with population less than 2,000 (Caldew), distributed by option type



5.3.9 TPUs with population less than 2,000: *Eamont* sub catchment

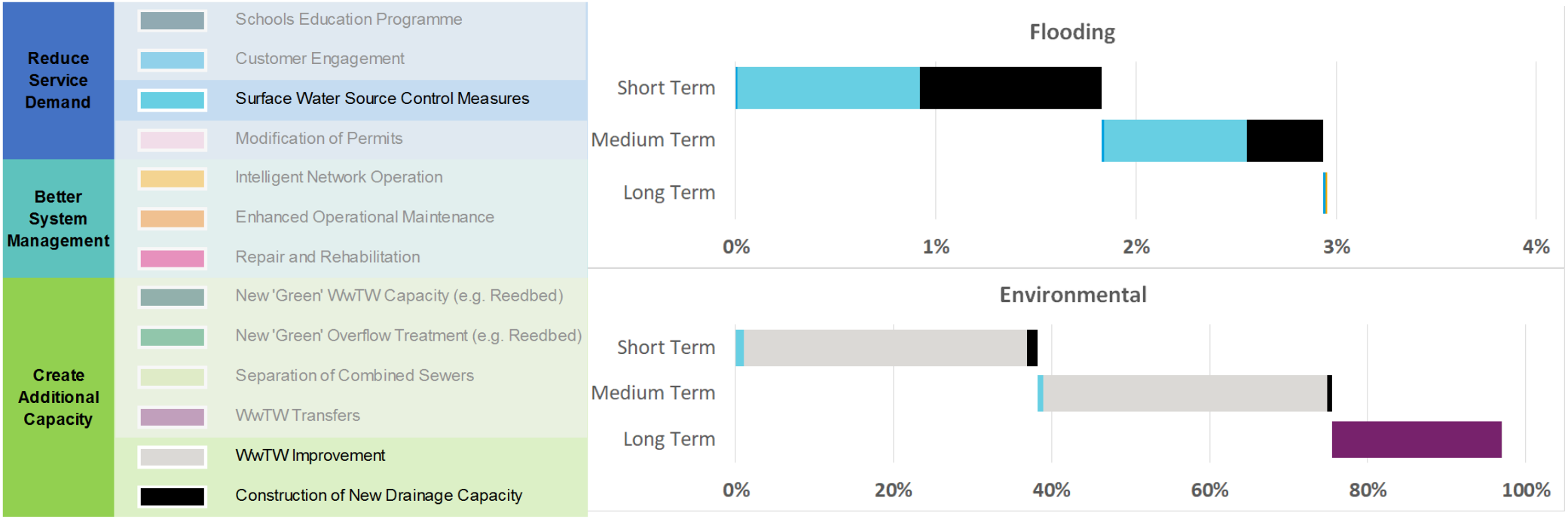
The following TPUs each have a population of less than 2,000, and have therefore been grouped together:

- Askham
- Bampton
- Dacre
- Glenridding
- Patterdale
- Pooley Bridge East
- Sockbridge

In the short and medium term, potential investment could be through surface water control measures (e.g., SuDS), wastewater treatment works improvements to ensure permit compliance, and the construction of new drainage capacity (Figure 31).

In the longer term, investment could continue in wastewater treatment transfers.

Figure 31 Short, medium and long-term investment in TPUs with population less than 2,000 (Eamont) distributed by option type



5.3.10 TPUs with population less than 2,000: *Eden Lower* sub catchment

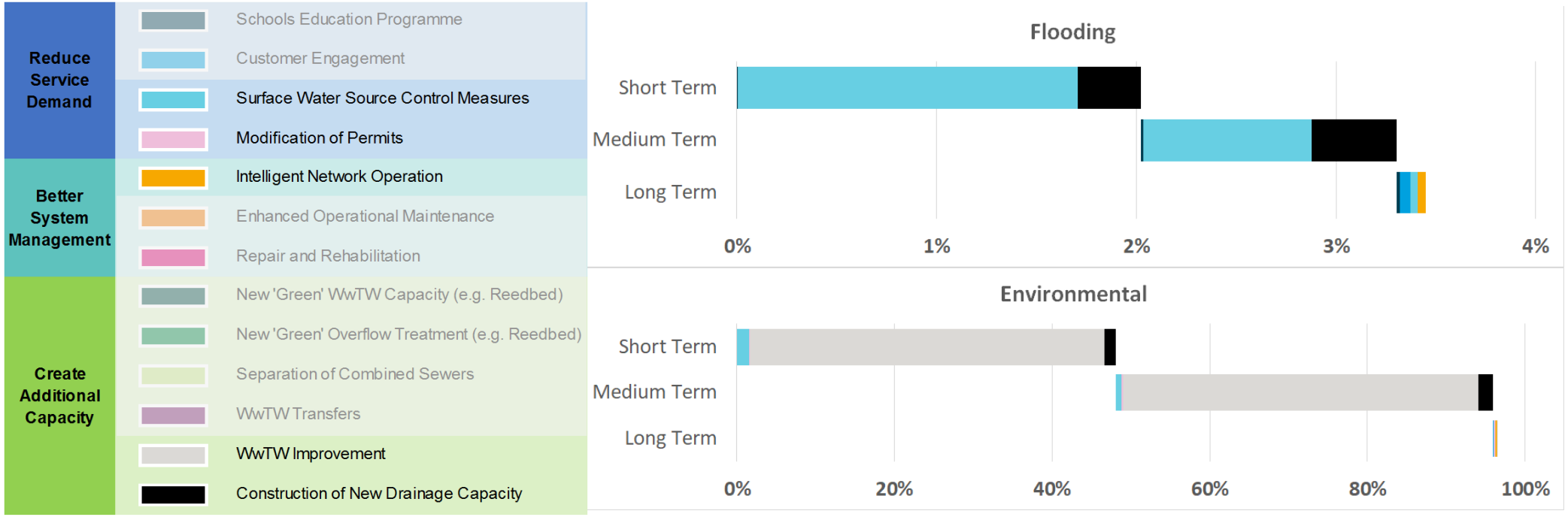
The following TPUs each have a population of less than 2,000, and have therefore been grouped together:

- Aglionby
- Ainstable
- Armathwaite
- Blencarn
- Burgh by Sands
- Busk
- Cargo
- Cocklakes
- Cote Hill
- Croglin
- Cumwhitton
- Edenhall
- Faugh
- Glassonby Village
- Great Orton
- Great Salkeld
- Heads Nook
- Hunsonby
- Kirk Bampton
- Kirkoswald
- Langwathby
- Laversdale
- Little Salkeld
- Melmerby
- Renwick
- Rockcliffe
- The How
- Wetheral & Great Corby
- Wetheral Pasture

In the short and medium term, potential investment could be through surface water control measures (e.g., SuDS), wastewater treatment works improvements to ensure permit compliance and the construction of new storm water drainage capacity (Figure 32).

In the longer term, investment could continue through surface water control measures (e.g., SuDS) and installation of intelligent network monitoring systems.

Figure 32 Short, medium and long-term investment in TPUs with population less than 2,000 (Eden Lower) distributed by option type



5.3.11 TPUs with population less than 2,000: *Eden Upper* sub catchment

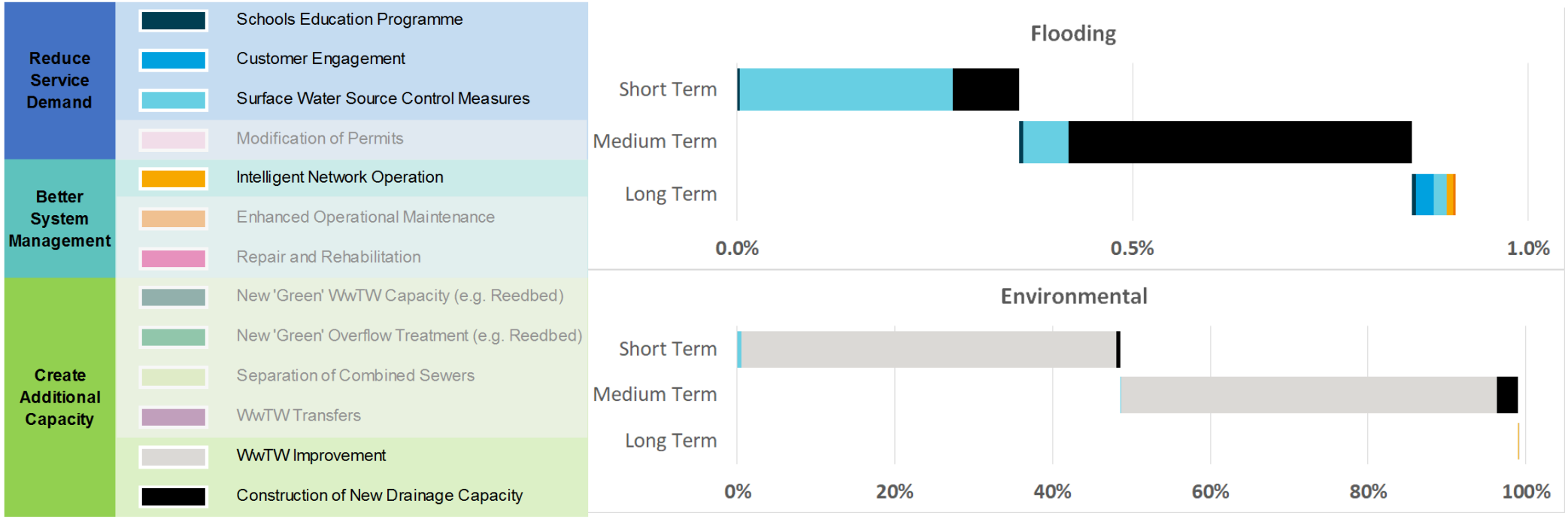
The following TPUs each have a population of less than 2,000, and have therefore been grouped together:

- Bolton Penrith
- Brackenber
- Brampton (Eden)
- Brough
- Crosby Garret
- Culgaith
- Dry Beck
- Dufton
- Great Asby
- Kaber
- Kings Meaburn
- Kirkby Thore
- Knock
- Long Marton East
- Long Marton West
- Milburn
- Morland
- Murton East
- Newbiggin (Eden)
- Outhgill
- Ravenstonedale
- Sandford Village
- Shap
- South Stanmore
- Temple Sowerby
- Warcop

In the short and medium term, potential investment could be through surface water control measures (e.g., SuDS), wastewater treatment works improvements to ensure permit compliance and the construction of new drainage capacity (Figure 33).

In the longer term, investment could continue through surface water control measures (e.g., SuDS) and installation of intelligent network monitoring systems.

Figure 33 Short, medium and long-term investment in TPUs with population less than 2,000 (Eden Upper) distributed by option type



5.3.12 TPUs with population less than 2,000: *Esk and Irthing* sub catchment

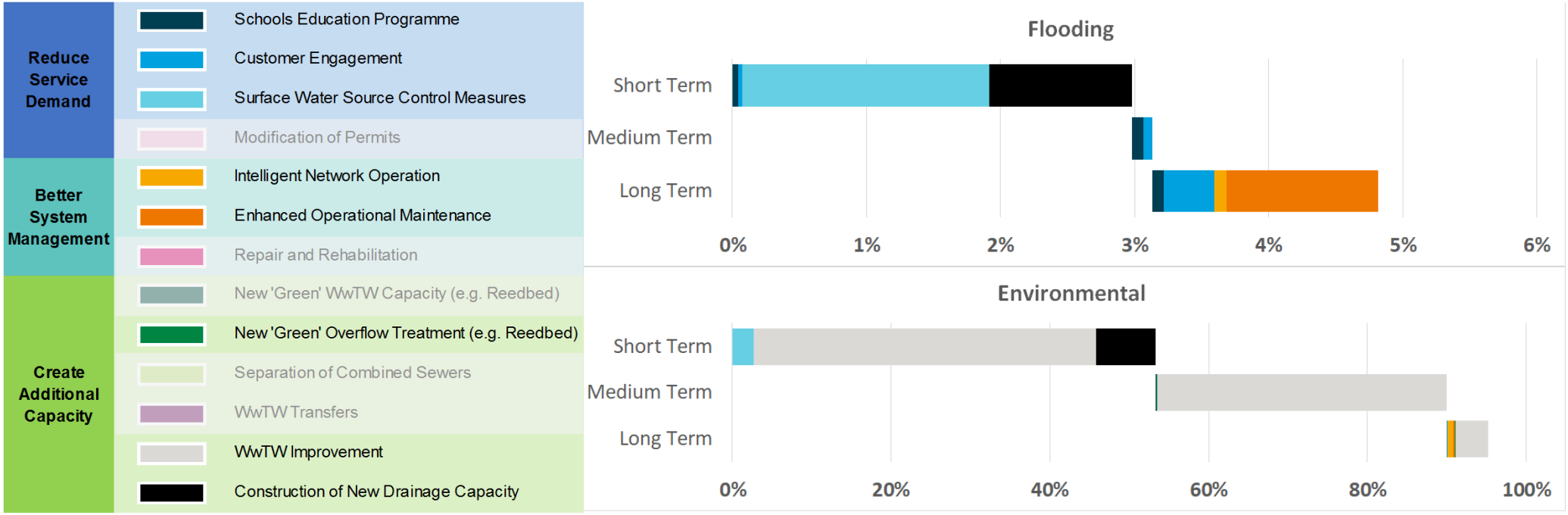
The following TPUs each have a population of less than 2,000, and have therefore been grouped together:

- Castle Carrock
- Gilsland
- Hethers Gill
- Kershopefoot Village
- Kirkandrews
- Low Row
- Sleet Beck
- Smithfield
- Talkin
- Walton
- Warwick Bridge
- West Hall

In the short and medium term, potential investment could be through surface water control measures (e.g., SuDS), wastewater treatment works improvements to ensure permit compliance and the construction of new drainage capacity (Figure 34).

In the longer term, investment could continue through surface water control measures (e.g., SuDS), enhanced operational maintenance and the installation of intelligent network monitoring systems.

Figure 34 Short, medium and long-term investment in TPUs with population less than 2,000 (Esk and Irthing) distributed by option type



5.3.13 TPUs with population less than 2,000: *Petteril* sub catchment

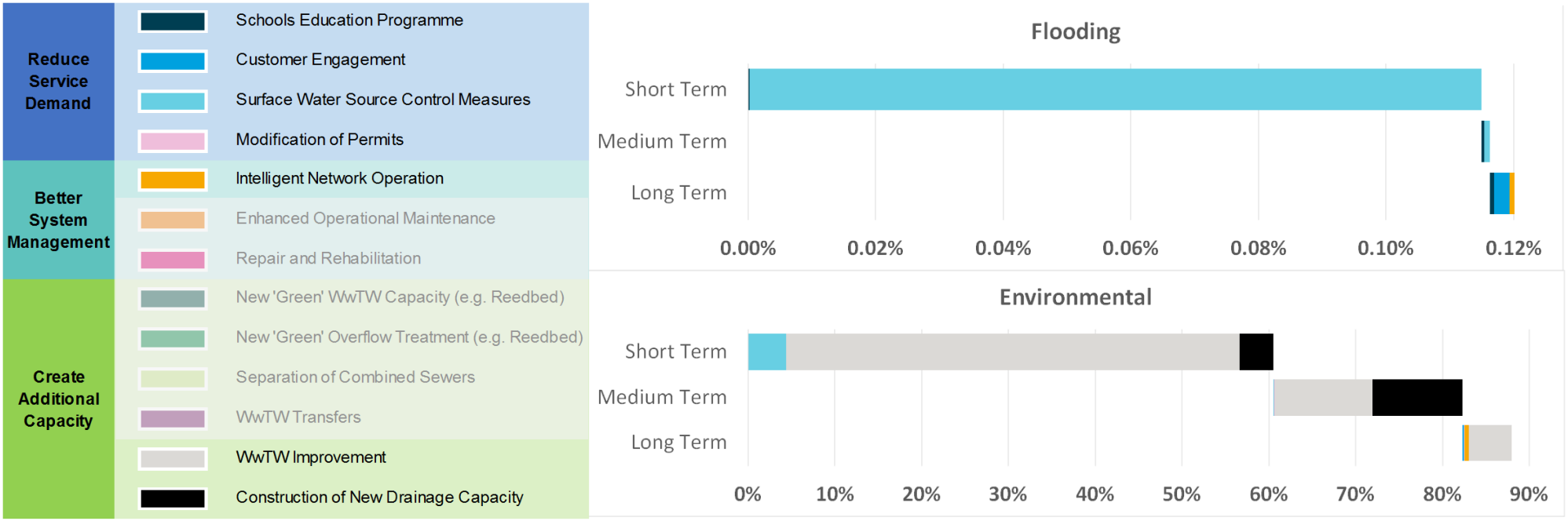
The following TPUs each have a population of less than 2,000, and have therefore been grouped together:

- Calthwaite
- Greystoke
- Hutton In The Forest
- Laithes
- Little Blencowe
- Low Hesket
- Motherby
- Plumpton North
- Plumpton South
- Southwaite
- Wreay

In the short and medium term, potential investment could be through surface water control measures (e.g., SuDS), wastewater treatment works improvements to ensure permit compliance and the construction of new drainage capacity (Figure 35).

In the longer term, investment could continue in the above, with additional investment in customer engagement programmes and intelligent network operation systems.

Figure 35 Short, medium and long-term investment in TPUs with population less than 2,000 (Petteril) 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 Eden and Esk SPA.

We are currently at draft publication (Figure 36) 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 36 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/3036

[2] https://environment.data.gov.uk/catchment-planning/OperationalCatchment/3063

[3] https://environment.data.gov.uk/catchment-planning/OperationalCatchment/3155

[4] https://environment.data.gov.uk/catchment-planning/OperationalCatchment/3165

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[12] https://storymaps.arcgis.com/stories/78d0c091d9f742d7bae1e23396989ef8 (not supported by IE11(2013))

[13] https://www.stcuthbertsgv.co.uk/FAQs

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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 5

0	Great Orton	21	Greystoke	42	Askham	63	Sandford Village
1	Low Hesket	22	Great Salkeld	43	Bolton Penrith	64	Shap
2	Aglionby	23	Heads Nook	44	Brackenber	65	Soulby
3	Burgh by Sands	24	Hunsonby	45	Brampton (Eden)	66	South Stanmore
4	Cote Hill	25	Kirk Bampton	46	Brough	67	Temple Sowerby
5	Plumpton North	26	Kirkoswald	47	Crosby Garret	68	Warcop
6	Smithfield	27	Langwathby	48	Culgaith	69	Glenridding
7	Ainstable	28	Longtown	49	Dacre	70	Great Asby
8	Armathwaite	29	Low row	50	Dry Beck	71	Kirkby Stephen
9	Blencarn	30	Little Salkeld	51	Dufton	72	Long Marton West
10	Brampton Carlisle	31	Melmerby	52	Kaber	73	Sockbridge

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

Tactical Planning Unit	Environment	Flooding	Wastewater Treatment Works
Bampton	Did not progress from RBCS	Did not progress from RBCS	Did not progress from RBCS
Busk	Did not progress from RBCS	Did not progress from RBCS	Did not progress from RBCS
Cocklakes	Did not progress from RBCS	Did not progress from RBCS	Did not progress from RBCS
Faugh	Did not progress from RBCS	Did not progress from RBCS	Did not progress from RBCS
Hethers Gill	Did not progress from RBCS	Did not progress from RBCS	Did not progress from RBCS

Hutton in the Forest	Did not progress from RBCS	Did not progress from RBCS	Did not progress from RBCS
Kershopefoot Village	Did not progress from RBCS	Did not progress from RBCS	Did not progress from RBCS
Kirkandrews	Did not progress from RBCS	Did not progress from RBCS	Did not progress from RBCS
Knock	Did not progress from RBCS	Did not progress from RBCS	Did not progress from RBCS
Laithes	Did not progress from RBCS	Did not progress from RBCS	Did not progress from RBCS
Little Blencowe	Did not progress from RBCS	Did not progress from RBCS	Did not progress from RBCS
Motherby	Did not progress from RBCS	Did not progress from RBCS	Did not progress from RBCS
Newbiggin (Eden)	Did not progress from RBCS	Did not progress from RBCS	Did not progress from RBCS
Plumpton South	Did not progress from RBCS	Did not progress from RBCS	Did not progress from RBCS
Skelton	Did not progress from RBCS	Did not progress from RBCS	Did not progress from RBCS
Sleet Beck	Did not progress from RBCS	Did not progress from RBCS	Did not progress from RBCS
The How	Did not progress from RBCS	Did not progress from RBCS	Did not progress from RBCS
Wetheral Pasture	Did not progress from RBCS	Did not progress from RBCS	Did not progress from RBCS
Wreay	Did not progress from RBCS	Did not progress from RBCS	Did not progress from RBCS

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