United Utilities Water

DRAFT Drainage and Wastewater Management Plan 2023

Mersey Estuary 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.

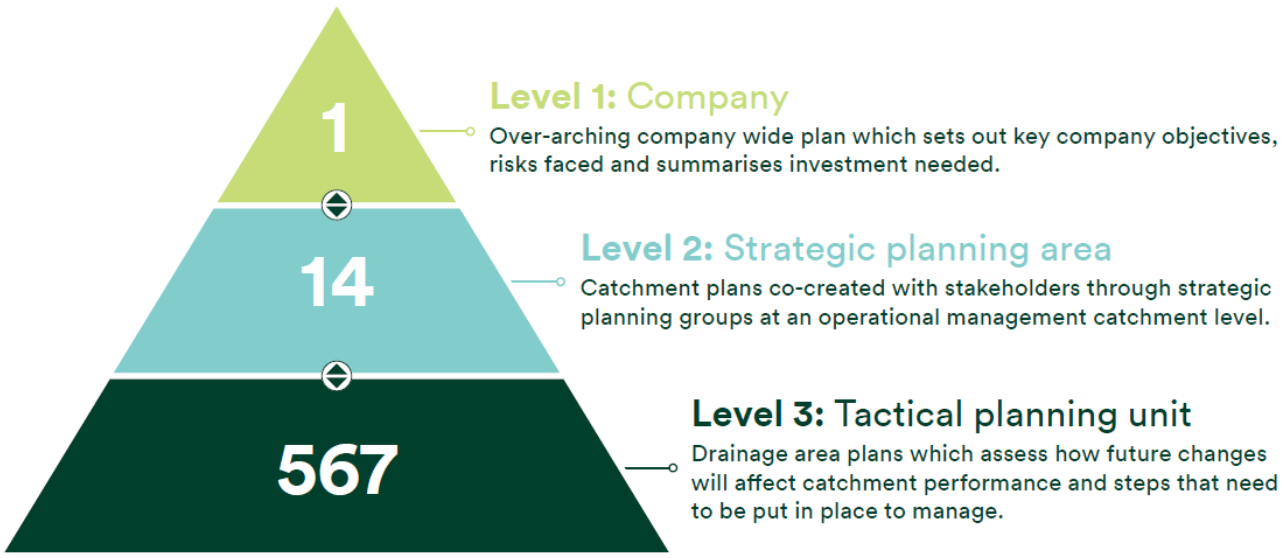
By developing the DWMP, we have an opportunity to:

- 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.

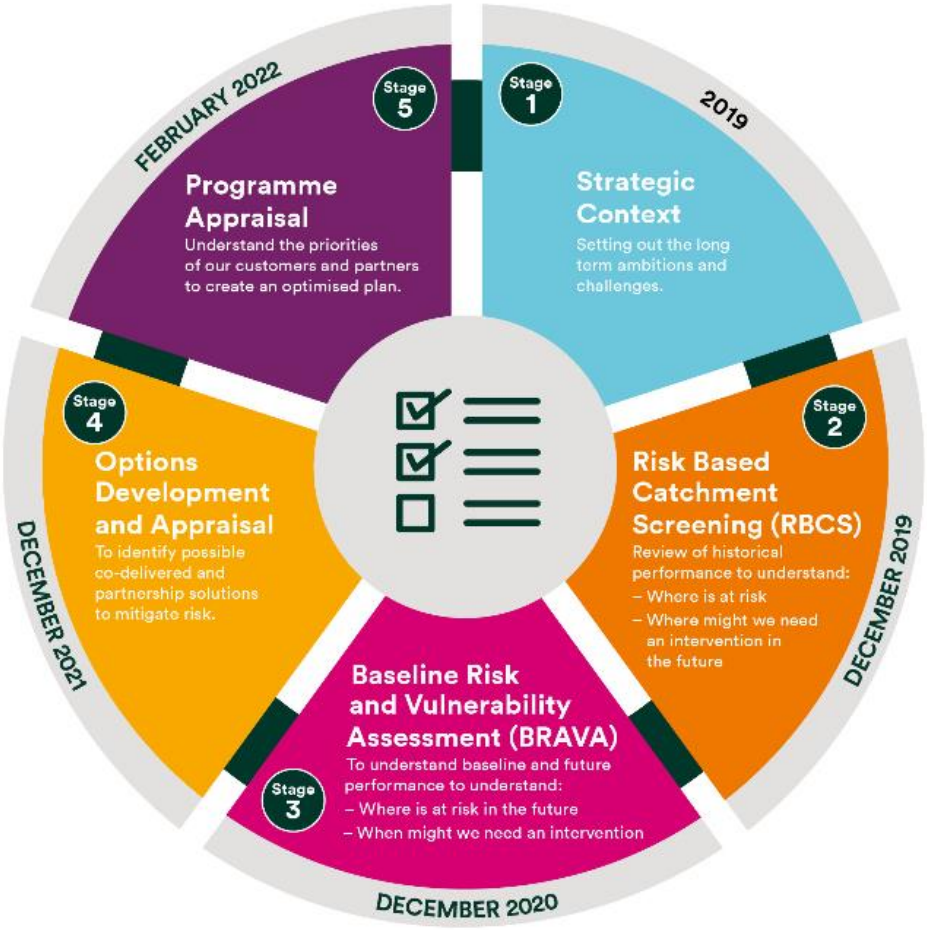
The plan will be set out at three levels (Figure 1) to maximise the potential for partnership working and for effective engagement between regulators and stakeholders at both company-wide level and more locally.

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 Mersey Estuary SPA.

2. Background to the Mersey Estuary catchment

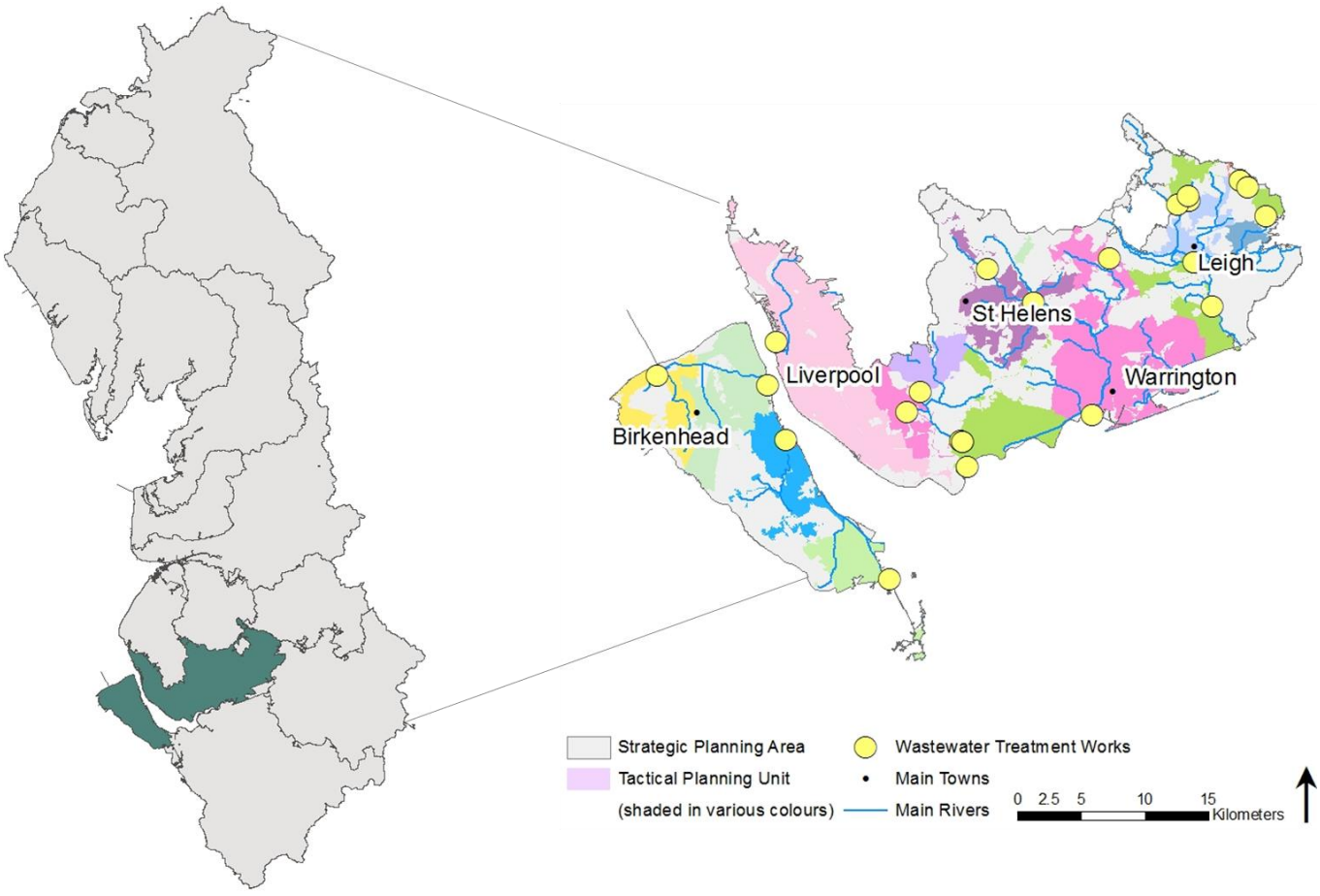
The Mersey Estuary catchment is approximately 783.4km2 and covers the Wirral peninsular to Warrington. This area is estimated to have around 1.4 million people and is a catchment that holds worldwide importance in relation to both heritage and the environment due to the Liverpool Waterfront holding a World Heritage site status [1].

There are four main sub catchments:

- Ditton – This area covers Crosby through to Prescot and south to Widnes. It is a predominately industrial area, there are an abundance of parks, golf courses and agriculture throughout this area [2].
- The River Glaze – Located from Pennington Flash to the River Mersey near Cadishead, this area is mainly covered by agriculture. There is a presence of urban areas such as the towns of Leigh, Tyldesley and Woolston [3].
- Sankey – Located in the central area of the Mersey Estuary catchment, this sub catchment mainly covers urban areas such as St Helens and Warrington [4].
- Wirral – Located to the far west of the catchment area, the Wirral is a mixture of both agricultural and urban land that has five rivers which all flow into the Mersey Estuary [5].

There are 21 wastewater tactical planning units (TPU, also known as wastewater treatment work (WwTW) drainage catchments) within the Mersey Estuary 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 Liverpool (Sandon), Warrington and Birkenhead to smaller, rural catchments such as Daisy Hill, Over Hulton and Golborne. The TPUs are highlighted in Figure 3.

Figure 3 Map of the Mersey Estuary SPA



There are numerous strategic management plans within the Mersey Estuary that are owned by various other organisations. Within the Mersey Estuary 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 Mersey Estuary catchment
River Basin Management Plan (RBMP) [6] **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, rural areas, towns, cities, transport and wastewater. Future challenges predicted by the Environment Agency include physical modifications, invasive non-native species and pollution from a range of sources.
Flood Risk Management Plan (FRMP) [7] **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.	In the Mersey Estuary catchment, 47,000 people (3%) and 4,000 non-residential properties are at risk of fluvial and coastal flooding. Approximately 7% of agricultural land, 26% of SSSI sites and 67% Ramsar sites are also at risk of flooding. The December 2015 floods affected numerous areas of the catchment. Since the floods, a programme of recovery is in place which includes asset inspection and repair, community engagement and investigations to understand flood mechanisms. Groundwater levels in the Mersey basin are known to be rising due to a decline in abstraction by industry. This could pose future flood risk of basements and low lying areas, and increase pumping to keep tunnels dry. Economic growth and development in Liverpool could present funding opportunities if complimentary options can be identified to reduce flood risk and allow development. Across the Mersey Estuary catchment there are 30 measures from earlier plans to manage flood risk.

Shoreline Management Plan (SMP) [8] **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-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).	The long term plan is to continue to provide flood and erosion protection to the residential areas, infrastructure and low lying land along the Wirral frontage. The long term plan in the Narrows and Inner Mersey estuary is to maintain the status quo by continuing to provide the same extent of protection currently offered to property and infrastructure, while allowing natural evolution of the shoreline where there are currently no defences present. A number of areas have been identified in the Upper estuary where the long term plan is to look at opportunities to potentially reduce flood risks upstream and create additional habitat. Allowing the natural evolution of this area is the long term plan, and as such, a managed realignment policy will allow the dune system to behave as naturally as possible with only limited intervention if local problems occur and adapt to coastal change.
Surface Water Management Plan (SWMP) [9] **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.	

Catchment Based Approach (CaBA) Catchment Plan [10] **Owner:** Lower Mersey 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 catchment partnership's mission is to: • Promote and encourage the preservation, restoration, and development of urban and rural waterways and environment for the benefit of the public. • To promote the use and access of waterways for social interests and recreation. The catchment is approximately 50% urban which poses numerous urban diffuse pollution challenges from wrong connections, road run-off and leachate from industrial/contaminated land. Many of the catchment's streams and rivers flow through farmland, towns and industrial areas, which has resulted in the combination of agricultural and urban pollution affecting the water quality across the catchment. All 32 water-bodies in the Lower Mersey Catchment are failing to reach good classification or 'healthy water rating'.

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 Mersey Estuary SPA we have engaged with stakeholders such as:

- The Environment Agency;
- Liverpool City Council;
- Knowsley Council;
- Warrington Borough Council;
- Wirral Council; and
- Mersey Rivers Trust (host of the Lower Mersey 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 Mersey Estuary 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.

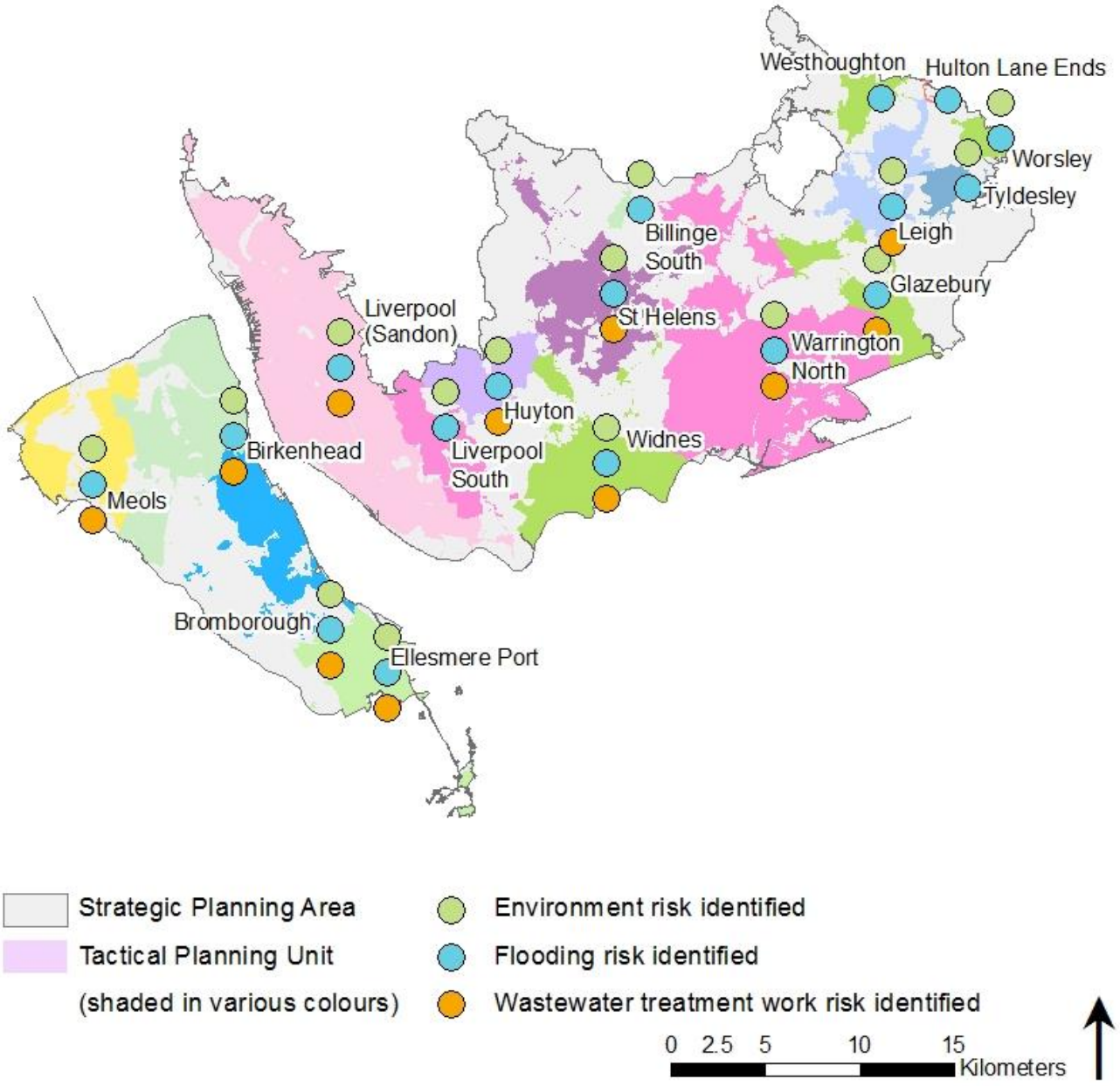
Within the Mersey Estuary SPA, the RBCS stage identified 17 out of 21 TPUs that required further investigation and therefore passed onto the BRAVA stage (outlined in Section 3.2).

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.1 in the Appendix. Environmental and flooding categories are the most common within the Mersey Estuary SPA, which is supported by the highest triggered RBCS assessments which are:

- Storm Overflow Assessment Framework - (15/21) – Environment; and
- External Sewer Flooding - (17/21) – Flooding.

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

Figure 5 Map of the RBCS results for the Mersey Estuary SPA. Risk categories indicate areas triggering further investigation following RBCS



3.2 Baseline Risk and Vulnerability Assessment (BRAVA) and Resilience

The TPU's 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 Mersey Estuary 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
Barton						
Billinge South						
Birkenhead						
Bromborough						
Dolphinholme						
Ellesmere Port						
Elswick						
Fleetwood						
Garstang						
Glazebury						
Hulton Lane Ends						
Huyton						
Inskip						
Leigh						
Liverpool (Sandon)						
Liverpool South						
Meols						
Preesall						
St Helens						
Tyldesley						
Warrington North						
Weeton						
Westhoughton						
Widnes						
Worsley						

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

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
Billinge South													
Birkenhead													
Bromborough													
Ellesmere Port													
Glazebury													
Hulton Lane Ends													
Huyton													
Leigh													
Liverpool (Sandon)													
Liverpool South													
Meols													
St Helens													
Tyldesley													
Warrington North													
Westhoughton													
Widnes													
Worsley													

Table 4 Wastewater treatment works BRAVA results

Tactical Planning Unit	Wastewater treatment works		
	Risk to wastewater treatment works (WwTW) capacity		
	2020	2030	2050
Billinge South			
Birkenhead			
Bromborough			
Ellesmere Port			
Glazebury			
Hulton Lane Ends			
Huyton			
Leigh			
Liverpool (Sandon)			
Liverpool South			
Meols			
St Helens			
Tyldesley			
Warrington North			
Westhoughton			
Widnes			
Worsley			

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
Billinge South			
Birkenhead			
Bromborough			
Ellesmere Port			
Glazebury			
Hulton Lane Ends			
Huyton			
Leigh			
Liverpool (Sandon)			
Liverpool South			
Meols			
St Helens			
Tyldesley			
Warrington North			
Westhoughton			
Widnes			
Worsley			

Resilience	
	More resilient
	Less resilient
	Not assessed

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 Mersey Estuary SPA, Bromborough TPU was 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 Ellesmere Port TPU has been identified as having strategic interests due to the high proportion of trade effluent in the loading of the wastewater treatment works.

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 Bromborough

The Bromborough TPU is to the south west of the Mersey Estuary SPA (Figure 6). The sewer network is over 850km long, and serves over 34,000 properties and a residential population of approximately 81,000 people. The watercourses in the area are all classed as 'moderate' under the Water Framework Directive (WFD) 2019, except for 'Dibbinsdale Brook and Clatter Brook' which is classed as 'poor'.

The Bromborough 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 from 1-in-50-year storm events, pollution, sewer collapse and blockages by 2050, with areas for further investigation highlighted in Figure 7. This is against a backdrop of a projected increase in residential population of 8% by 2050, which could also drive further development to meet housing need, and increase pressure on the network and wastewater treatment works. 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 Bromborough TPU

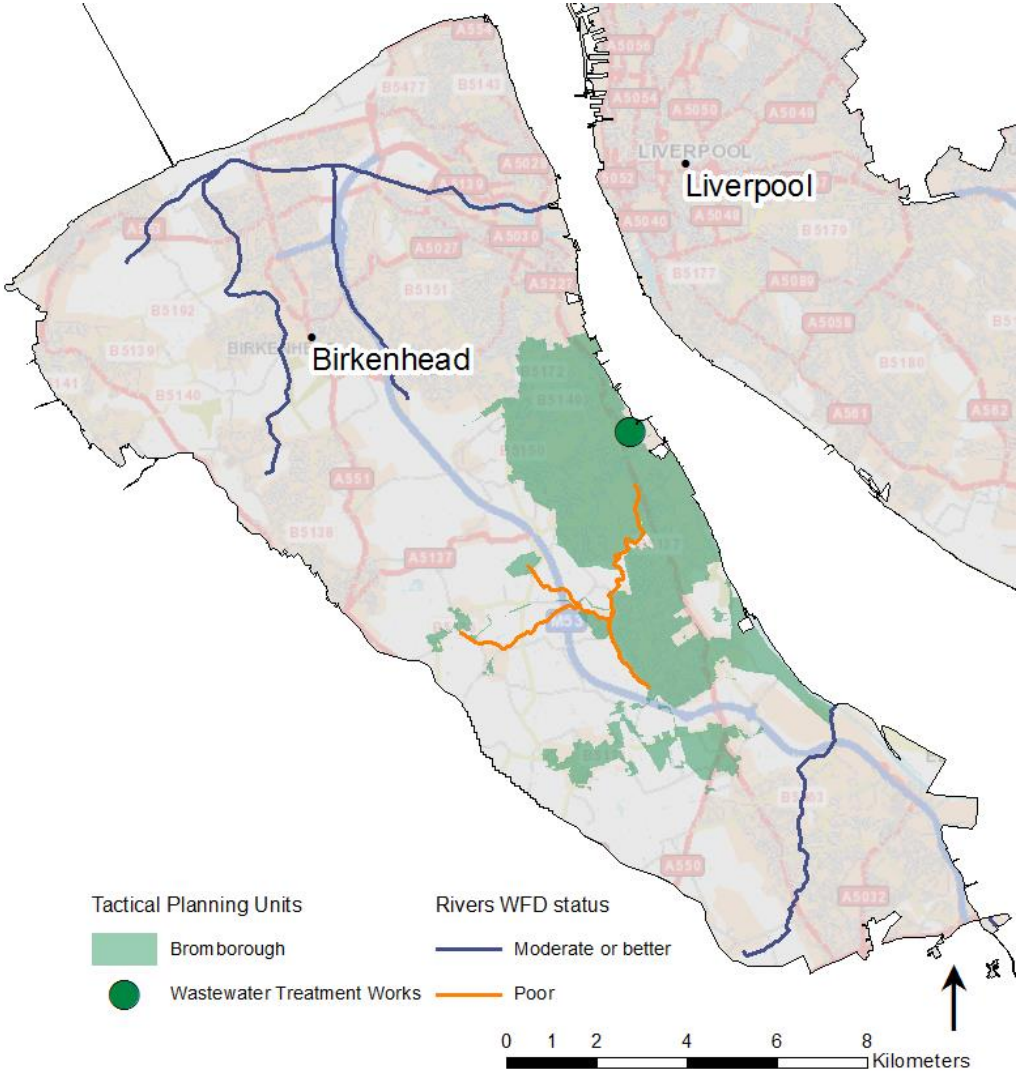
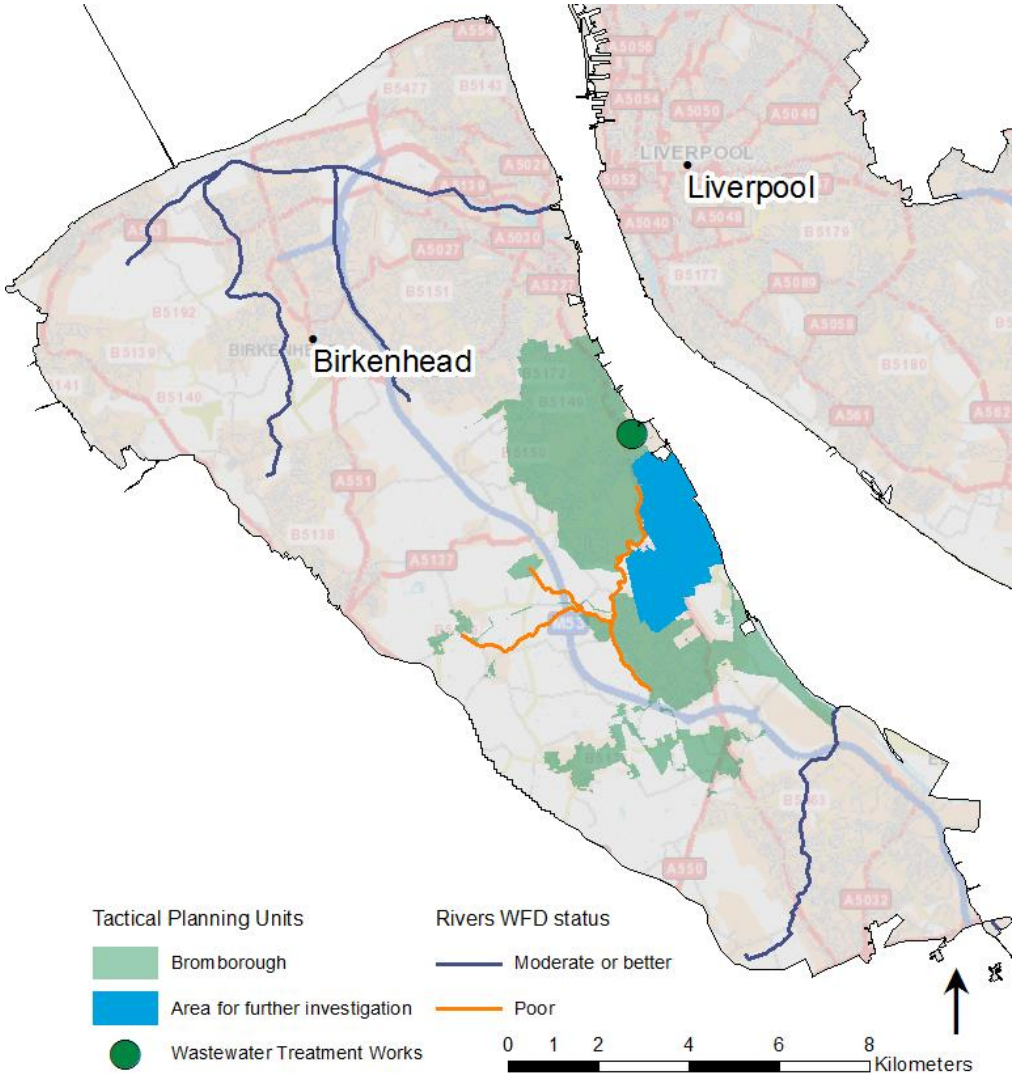


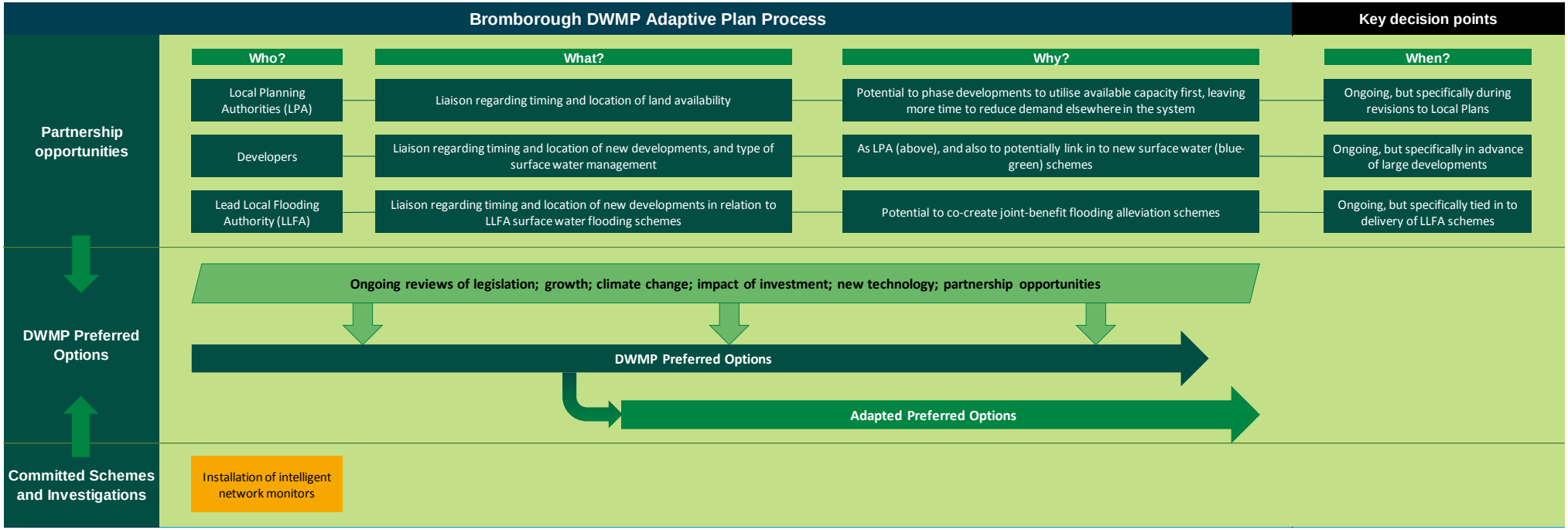
Figure 7 Map of the Bromborough TPU, with areas for further investigation highlighted in blue



3.3.3.1 Bromborough adaptive plan

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

Figure 8 Bromborough 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 Bromborough adaptive plan, reflecting the different option types identified as being appropriate for Bromborough. 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.

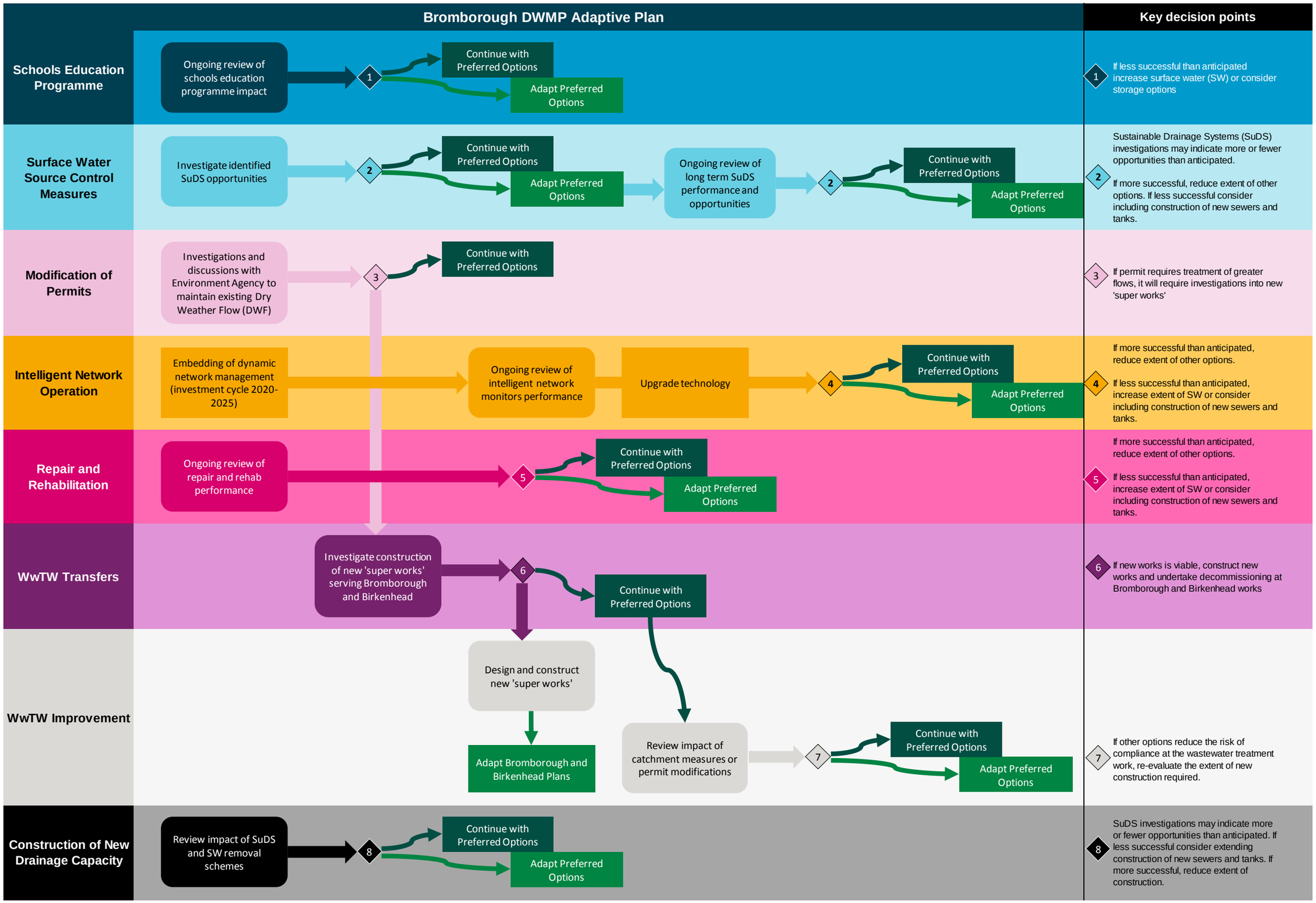
Within Bromborough, there are opportunities to carry out investigations before making final decisions on the final strategy. This means that we can properly evaluate options before committing to significant investment. These investigations will take into account things such as:

- 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 Bromborough adaptive plan – Possible adaptive pathways as knowledge and opportunities change over time



3.3.4 Ellesmere Port

The Ellesmere Port TPU is to the south of the Mersey Estuary SPA (Figure 10). The sewer network is over 900km long, and serves just under 30,000 properties and a residential population of approximately 66,000 people. The Rivacre Brook is classed as 'moderate' under the WFD 2019.

The TPU is of strategic interest due to the high proportion of trade effluent that makes up the loading at the wastewater treatment works. This is due to the trade effluent being largely supplied by a single user, an oil refinery, and should the refinery cease production this could cause significant under-loading and operational challenges, as the wastewater treatment works are designed to treat the type and characteristics of the wastewater they typically receive.

Alongside these strategic concerns, the BRAVA process identified risks for internal flooding, external flooding, flooding of open spaces, flooding from 1-in-50-year storm events, pollution, sewer collapse and blockages by 2050, with areas for further investigation highlighted in Figure 11.

Figure 10 Map of the Ellesmere Port TPU

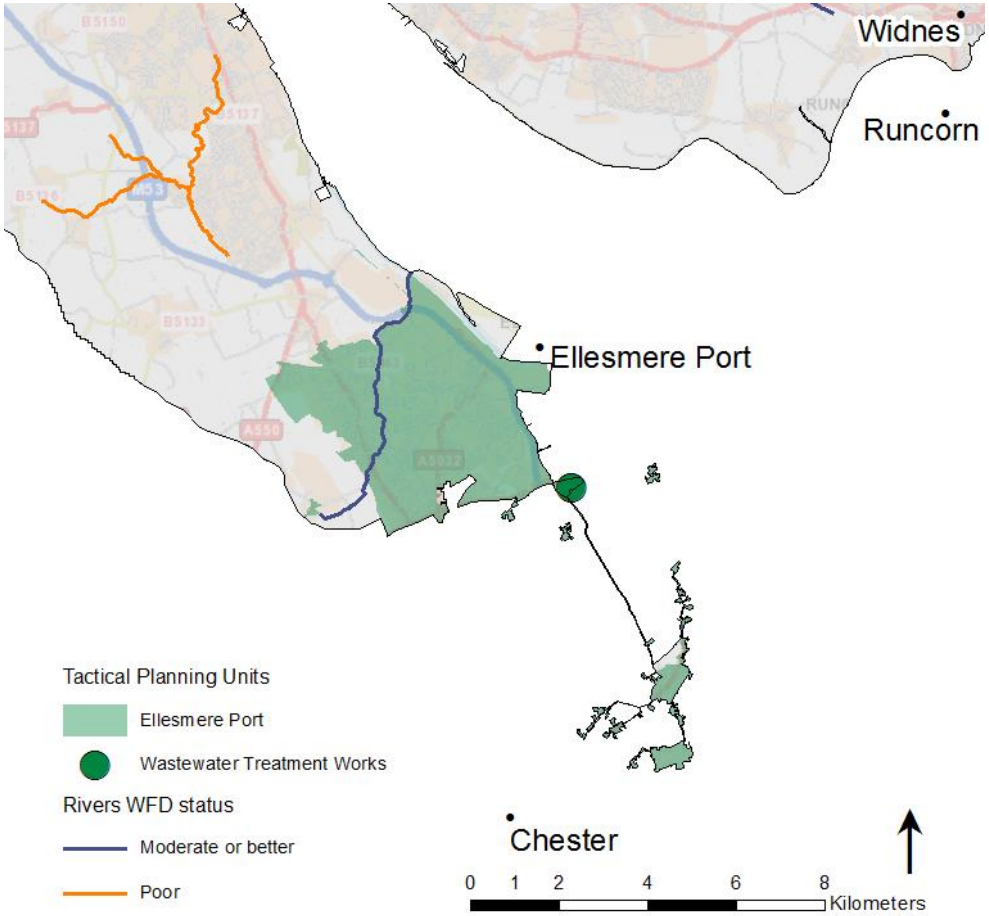
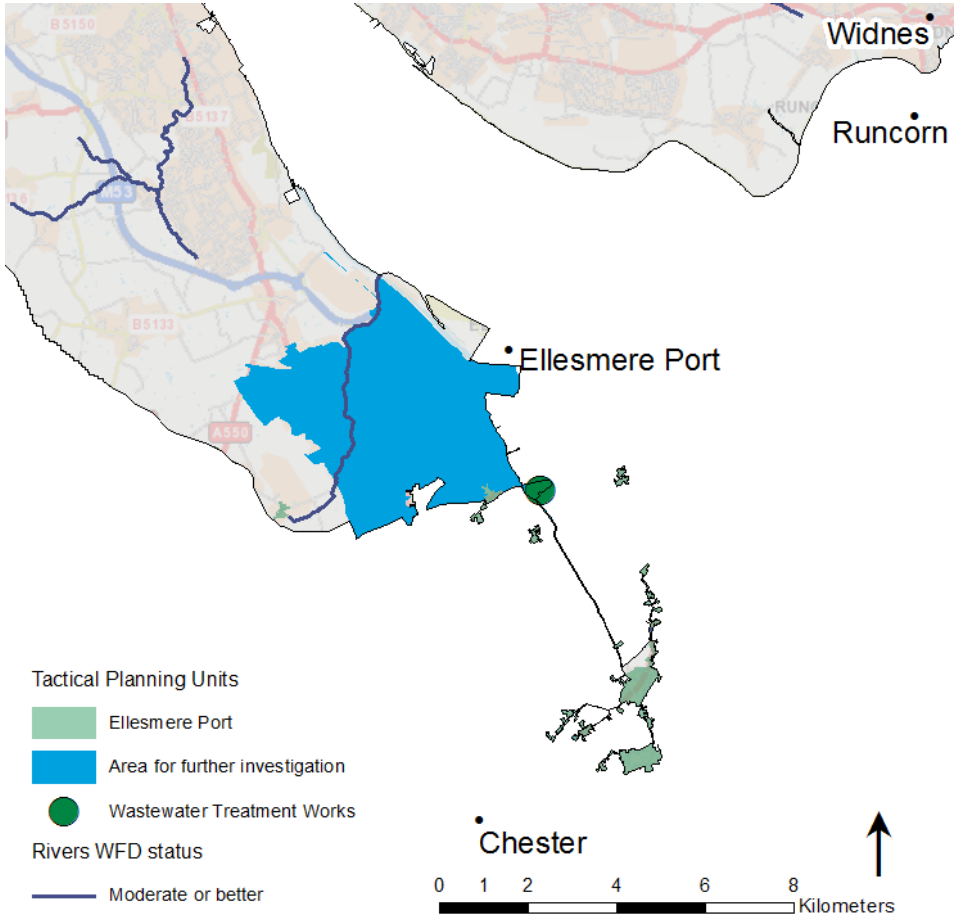


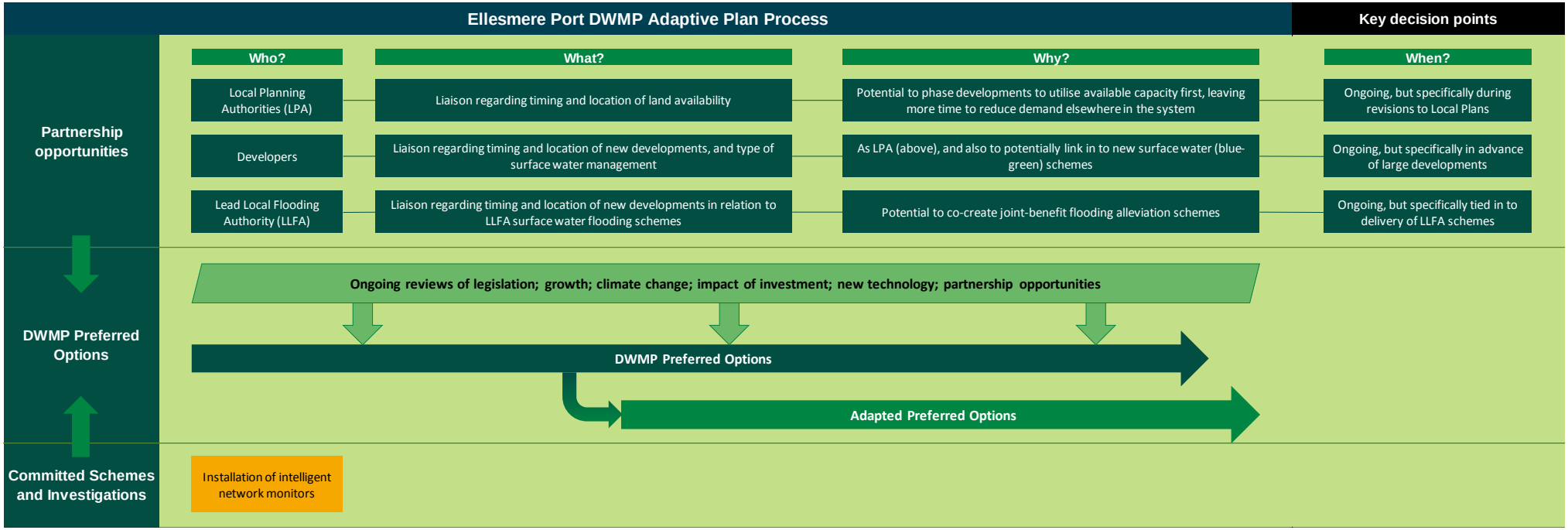
Figure 11 Map of the Ellesmere Port TPU with areas for further investigation highlighted in blue



3.3.4.1 Ellesmere Port adaptive plan

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

Figure 12 Ellesmere Port 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 Ellesmere Port adaptive plan, reflecting the different option types identified as being appropriate for Ellesmere Port. 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.

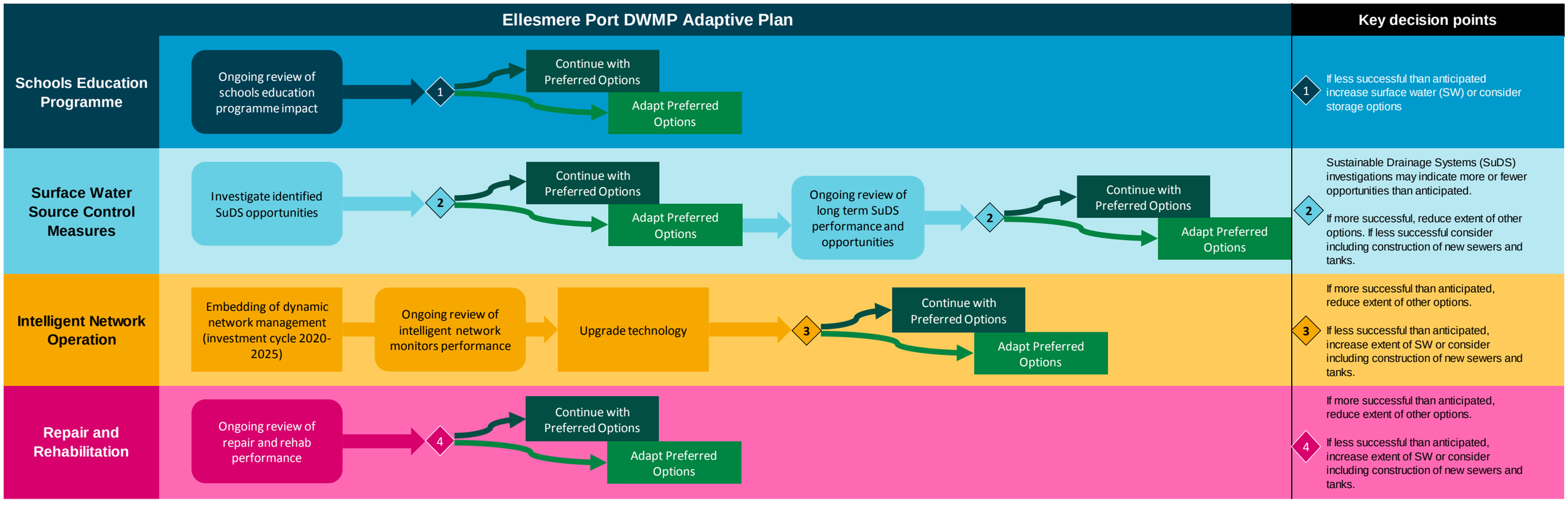
Within Ellesmere Port, there are opportunities to carry out investigations before making final decisions on the final strategy. This means that we can properly evaluate options before committing to significant investment. These investigations will take into account things such as:

- 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 Ellesmere Port 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

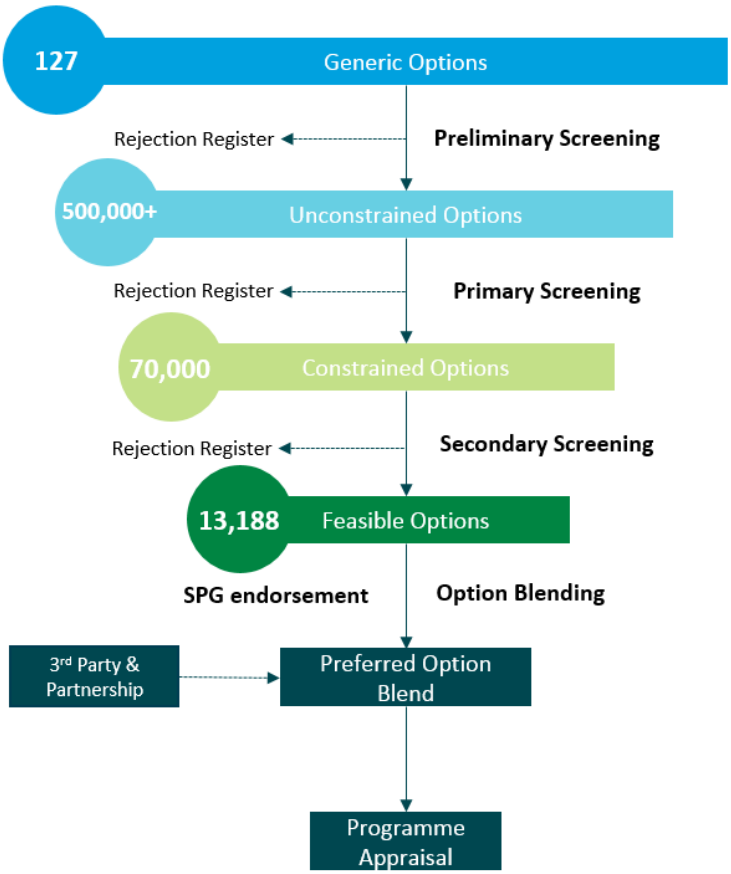
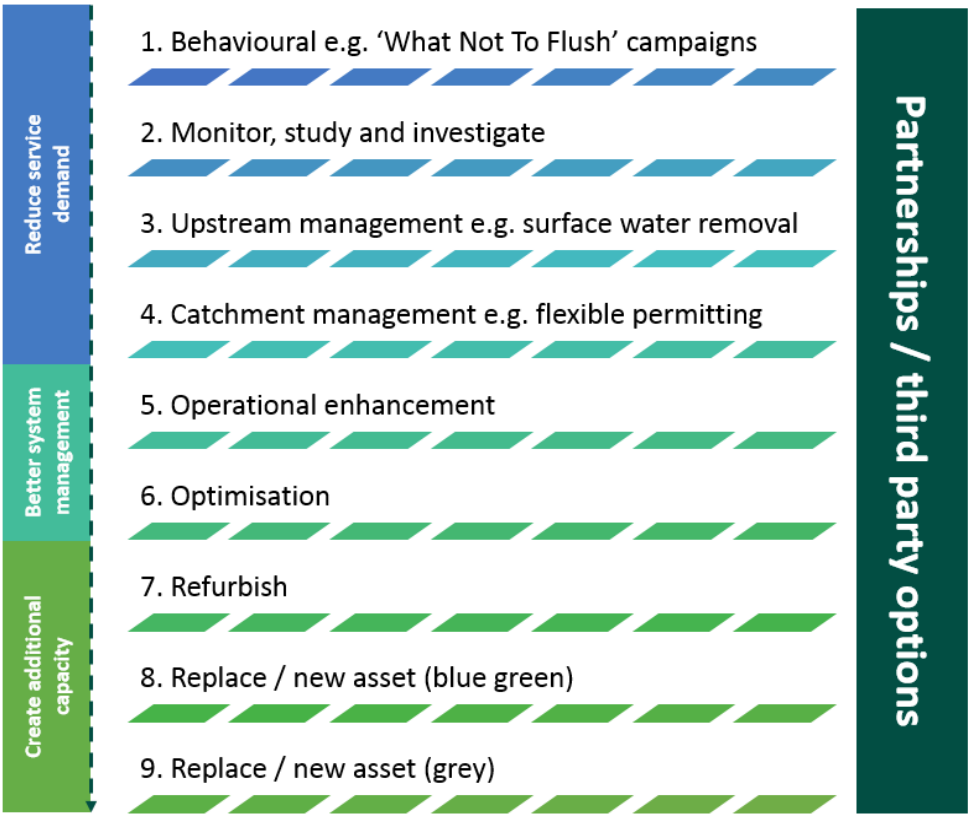


Figure 15 Options hierarchy



4.1 Mersey Estuary partnership options

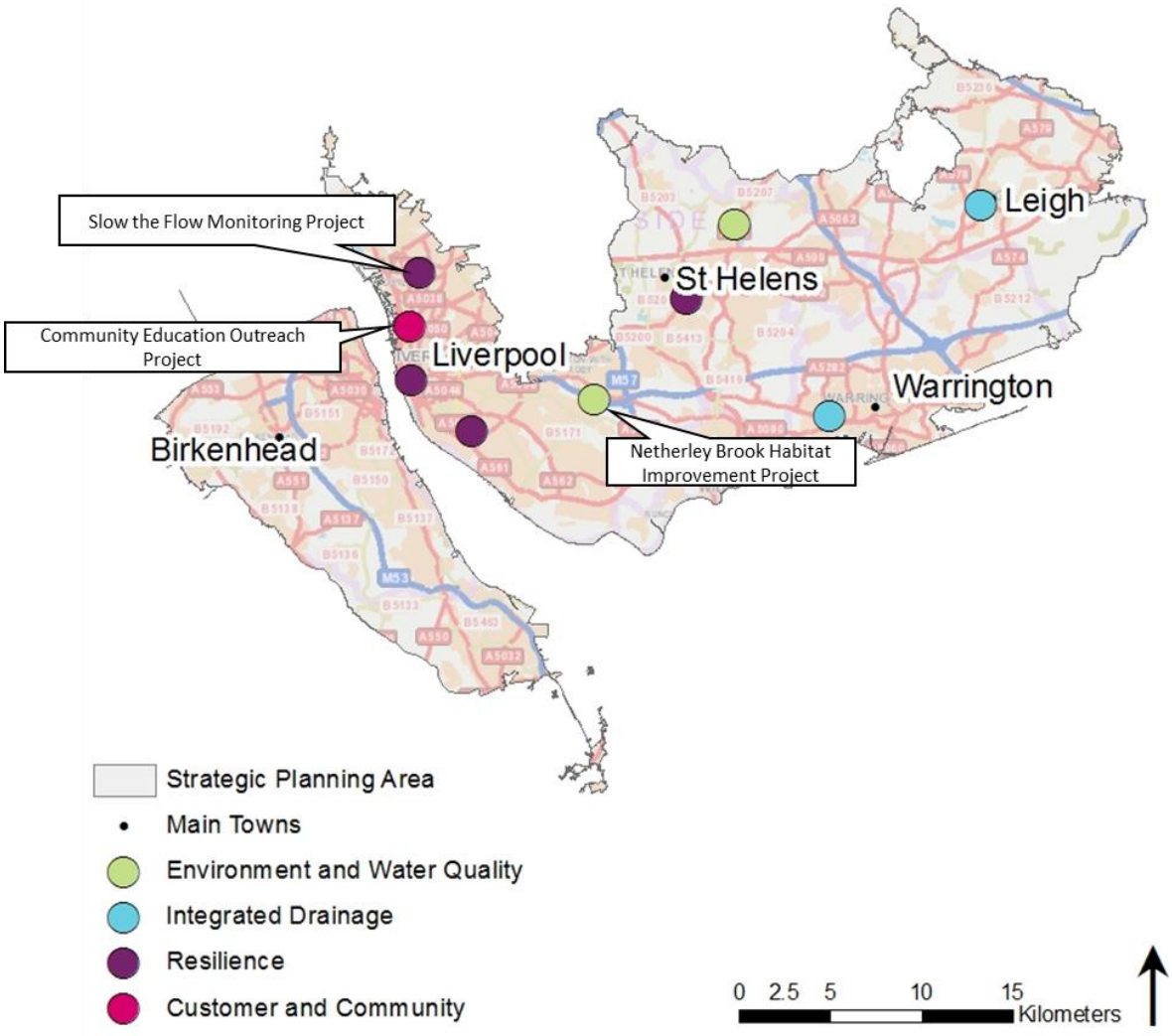
In order to identify and develop potential partnership options in the Mersey Estuary catchment, through the SPG we have shared the results from the risk identification stages such as BRAVA. This was done through a series of workshops and the purpose was to identify areas of shared risk and partnership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



5. Options for the Mersey Estuary

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 Mersey Estuary catchment. Options can be categorised into a number of categories:

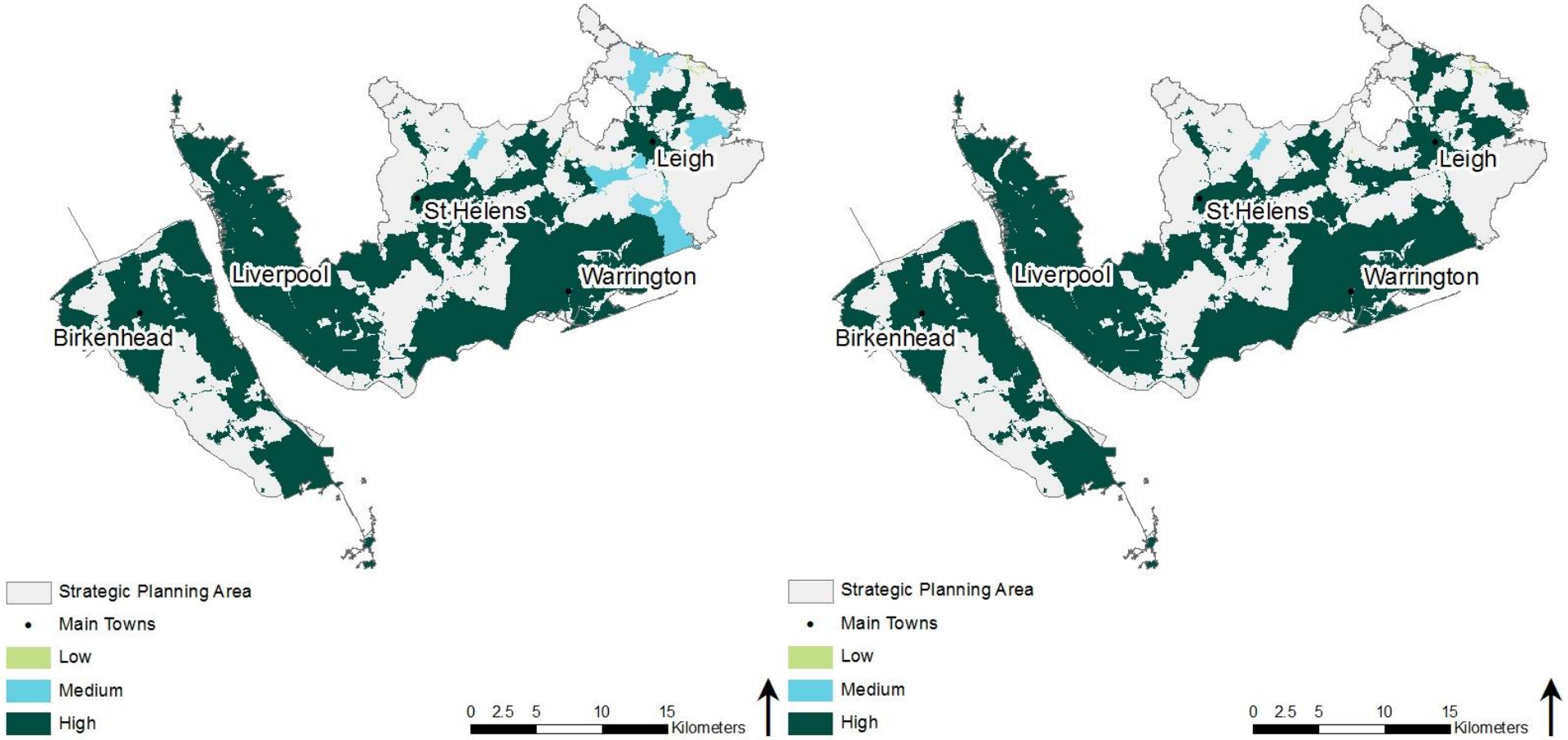
- Customer engagement;
- Monitor and investigate;
- Upstream management;
- Catchment management;
- Operational enhancement;
- Optimisation;
- Refurb/New asset (blue/green); and
- Refurb/New asset (grey).

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 Mersey Estuary 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 St Helens, Liverpool (Sandon) and Leigh 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 Liverpool (Sandon) and Birkenhead TPUs (Figure 17).

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

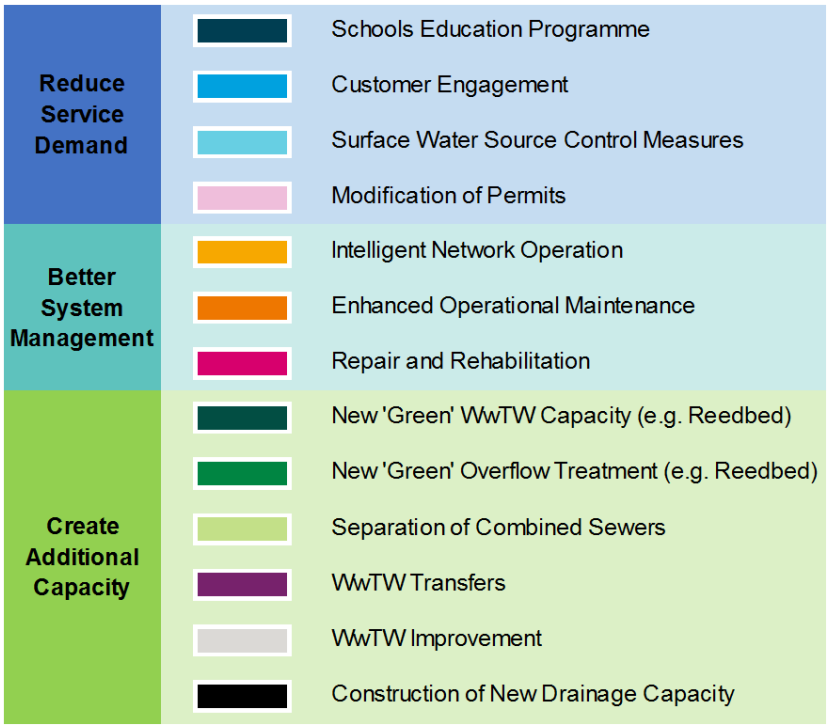
A high-level regional assessment has been carried out to estimate the likely investment requirements to address all overflow risks, but due to the uncertainty described above, this has not been broken down by Strategic Planning Areas. This information can be found in the DWMP main document.

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 Options 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 19, 20 and 21.

Figures 19 and 20 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 19 shows potential options that could address environmental planning objectives, which incorporate:

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

Figure 20 shows potential options that could 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 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 Mersey Estuary 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.

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

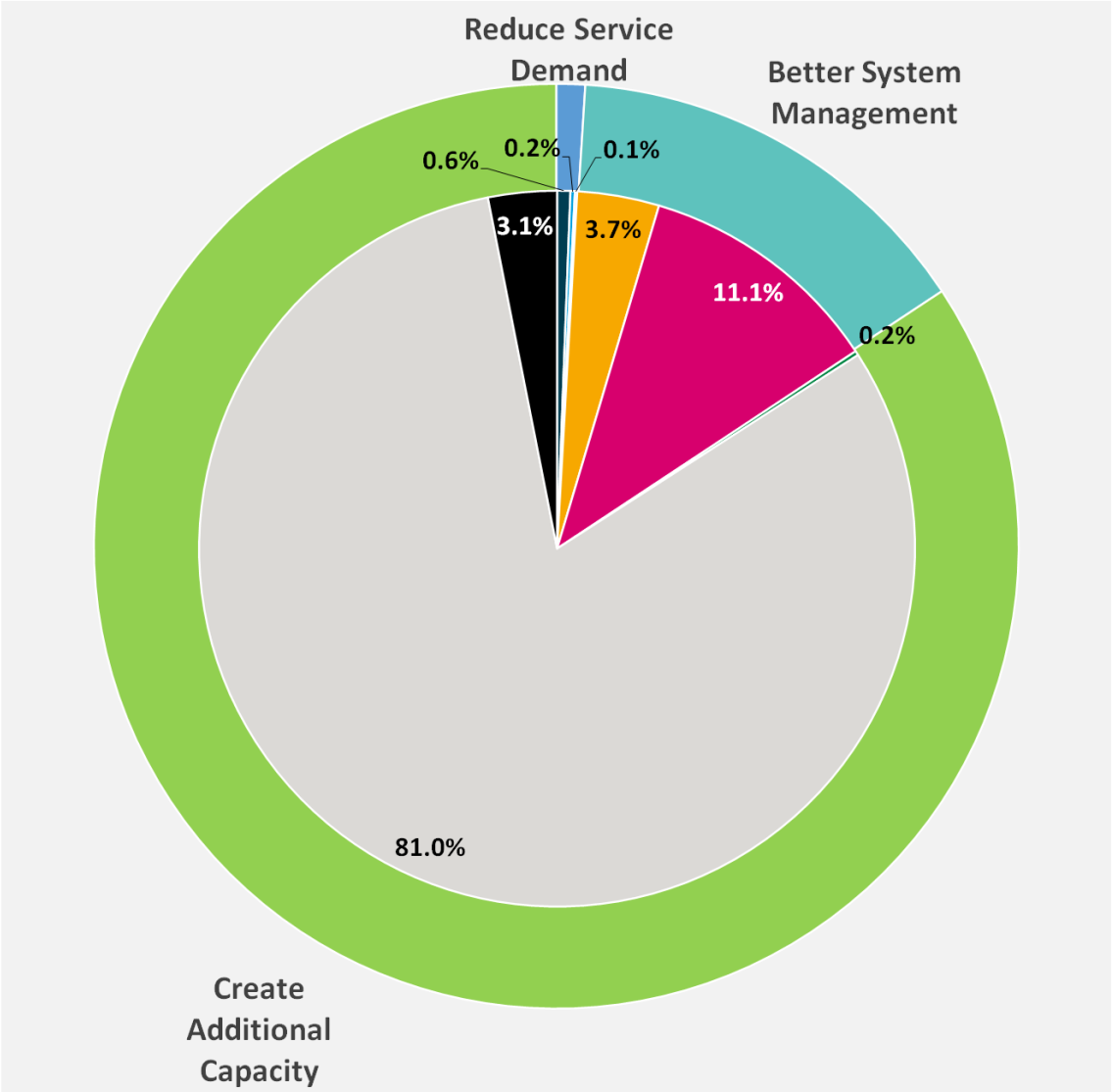


Figure 20 Mersey Estuary Strategic Planning Area: Distribution of flooding investment by option type

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

Around 15% of potential investment could be in the construction of new drainage capacity and around 40% could be used to improve existing system management with options such as intelligent network operation 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

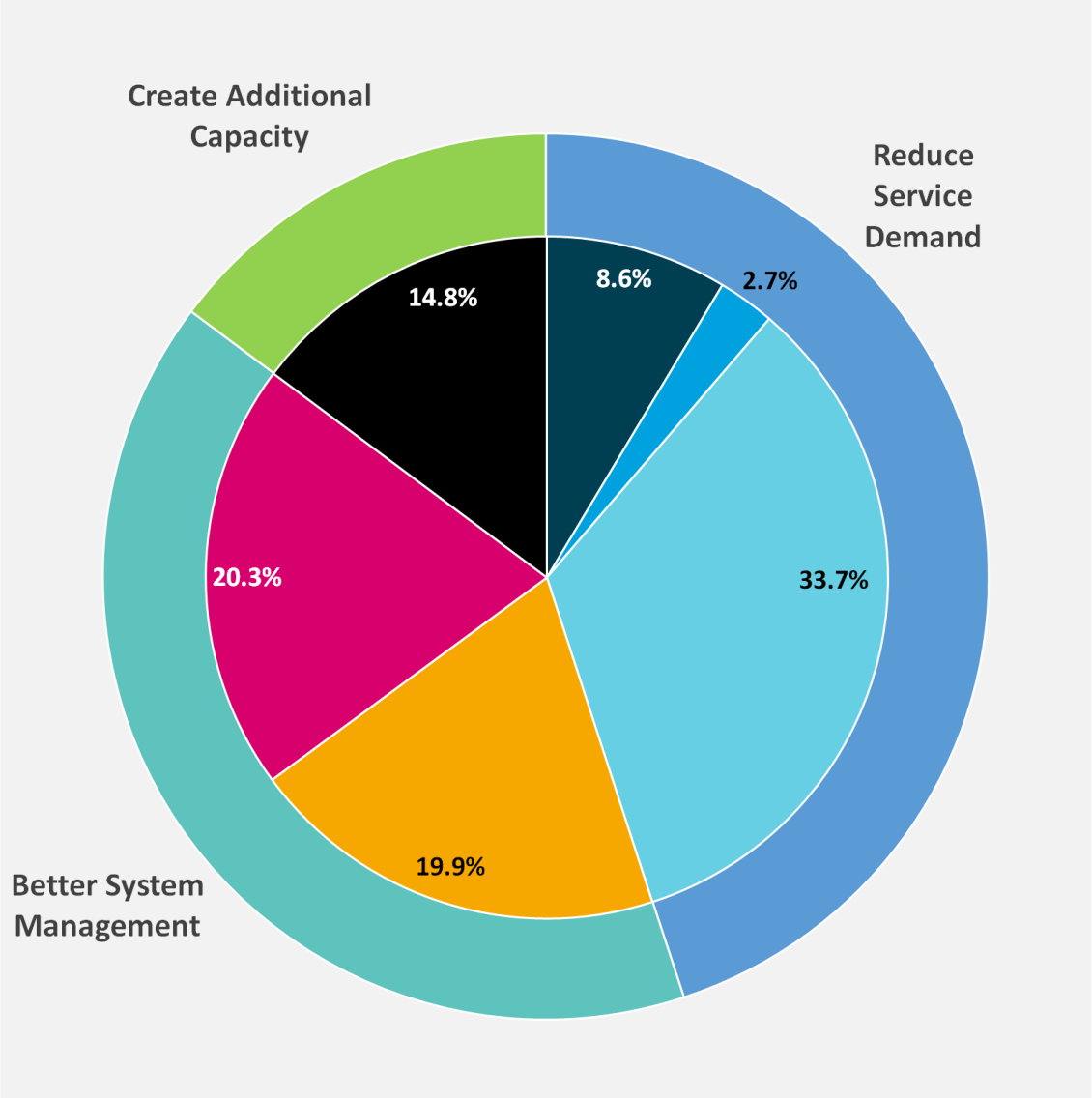
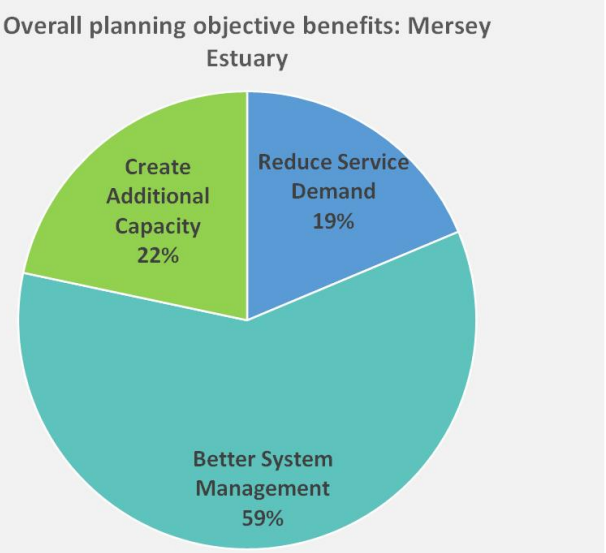


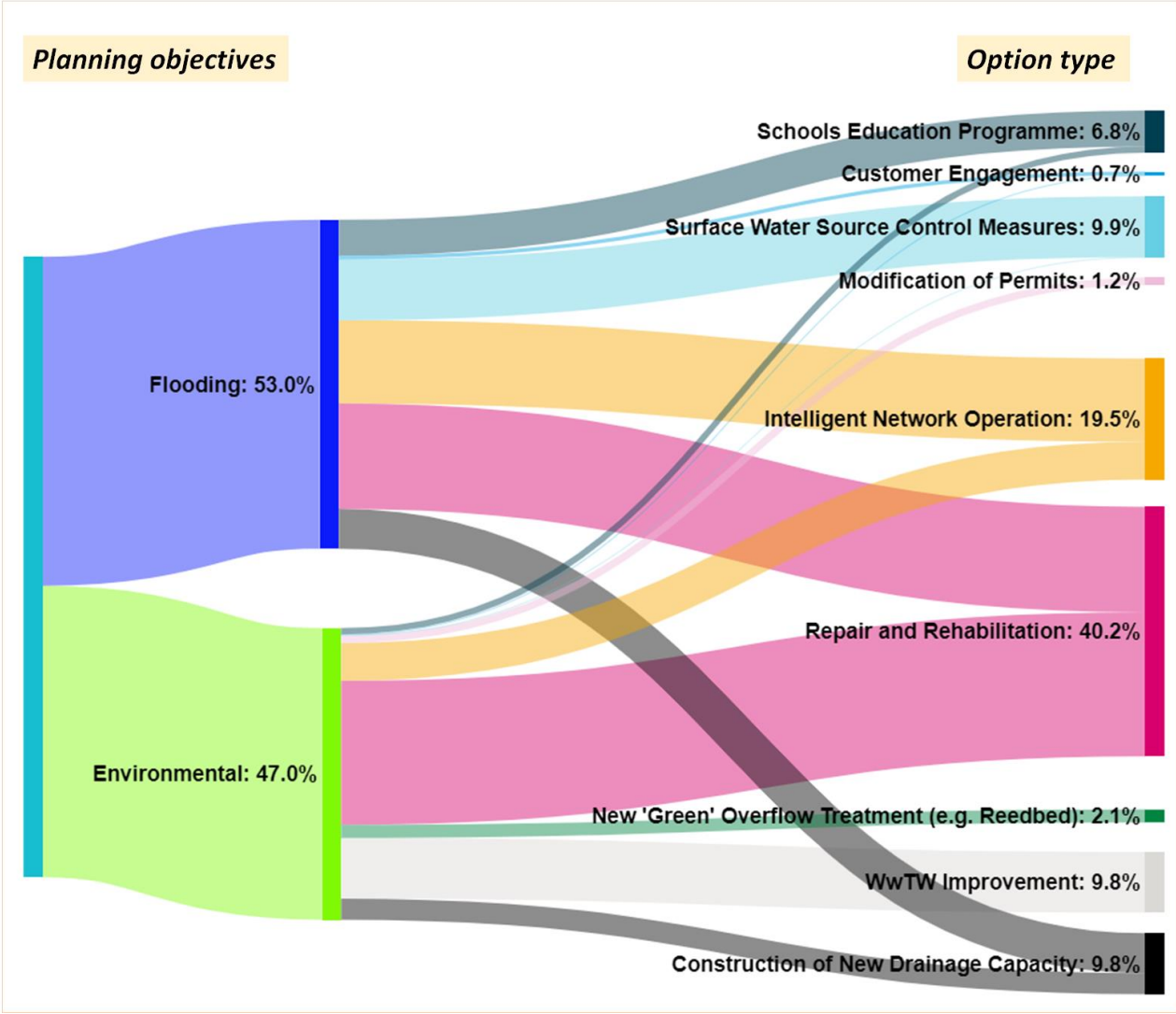
Figure 21 Distribution of benefit by option type within Mersey Estuary SPA

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

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

Environmental planning objectives could be met mainly through repair and rehabilitation programmes, improvements to wastewater treatment works and provision of stormwater storage capacity.



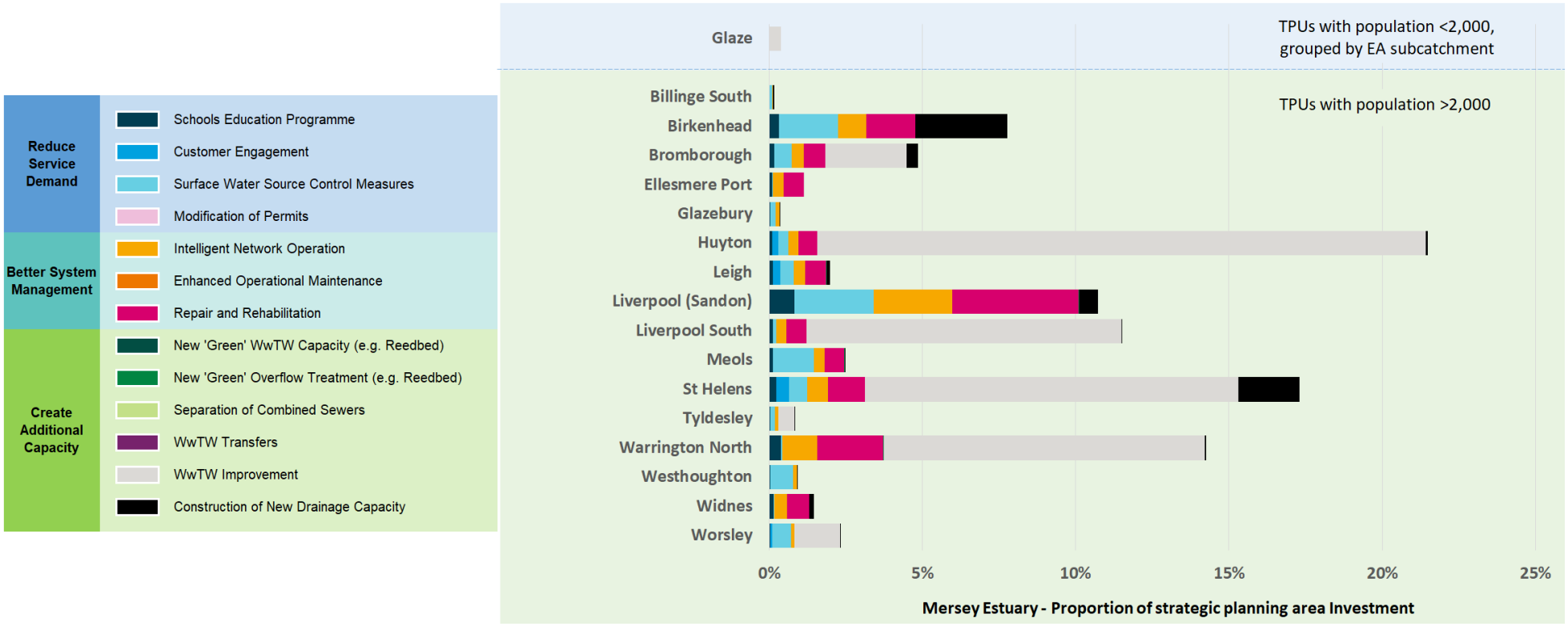


5.3 Overview of preferred options in each TPU

Figure 22 shows the proportion of Mersey Estuary 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 Mersey Estuary catchment, the largest TPUs see the largest potential investment, which is split predominantly between surface water control, improved system management, construction of new storm water storage tanks and wastewater treatment works improvements.

Figure 22 Proportion of investment seen in each TPU within the Mersey Estuary 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 will be seen long into the future. Other options such as schools education, are continual programmes that will help to encourage long-term sustainable behaviours, such as reduction in water use.

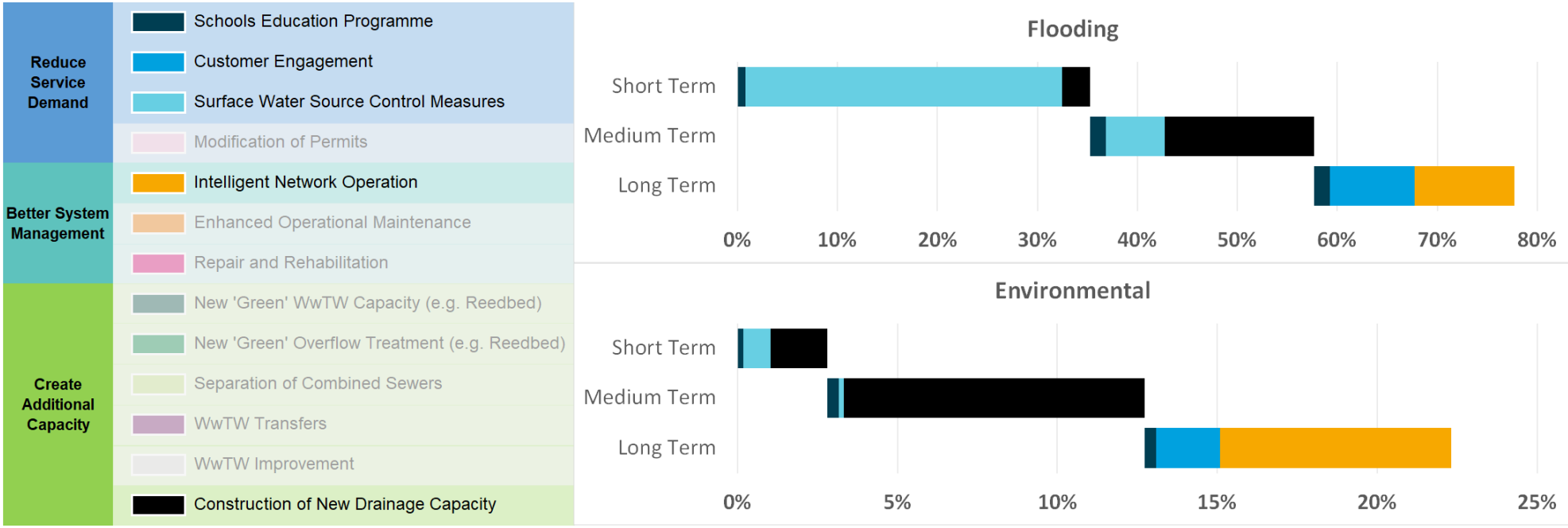
5.3.1 Billinge South

The results from the DWMP show that if we were to invest in Billinge South over the next 25 years, around 78% of the investment could be to address flooding risks, and around 22% of investment could be to address environmental risks (Figure 23).

In the short and medium term, potential investments could be through construction of new drainage capacity and surface water control measures (e, g. SuDS).

In the longer term, investments could be through the installation of intelligent network monitoring systems, schools education programmes and customer engagement as well as continuing with all previous options.

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



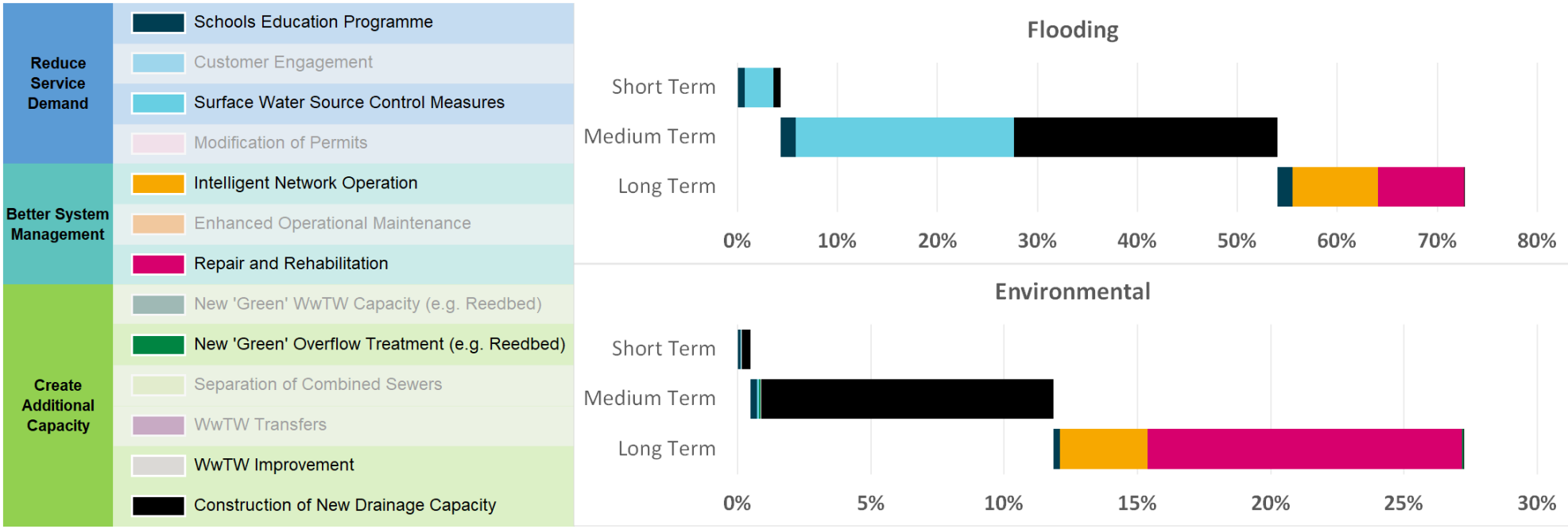
5.3.2 Birkenhead

The results from the DWMP show that if we were to invest in Birkenhead over the next 25 years, around 73% of the investment could be to address flooding risks, and around 27% of investment could be to address environmental risks (Figure 24).

In the short and medium term, we could invest in the construction of new drainage capacity, surface water control measures (e.g. SuDS), and through schools education programmes.

In the longer term, existing intelligent network monitoring systems that are already in place could be replaced or updated, and there could be investment in the repair and rehabilitation of the existing network.

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



5.3.3 Bromborough

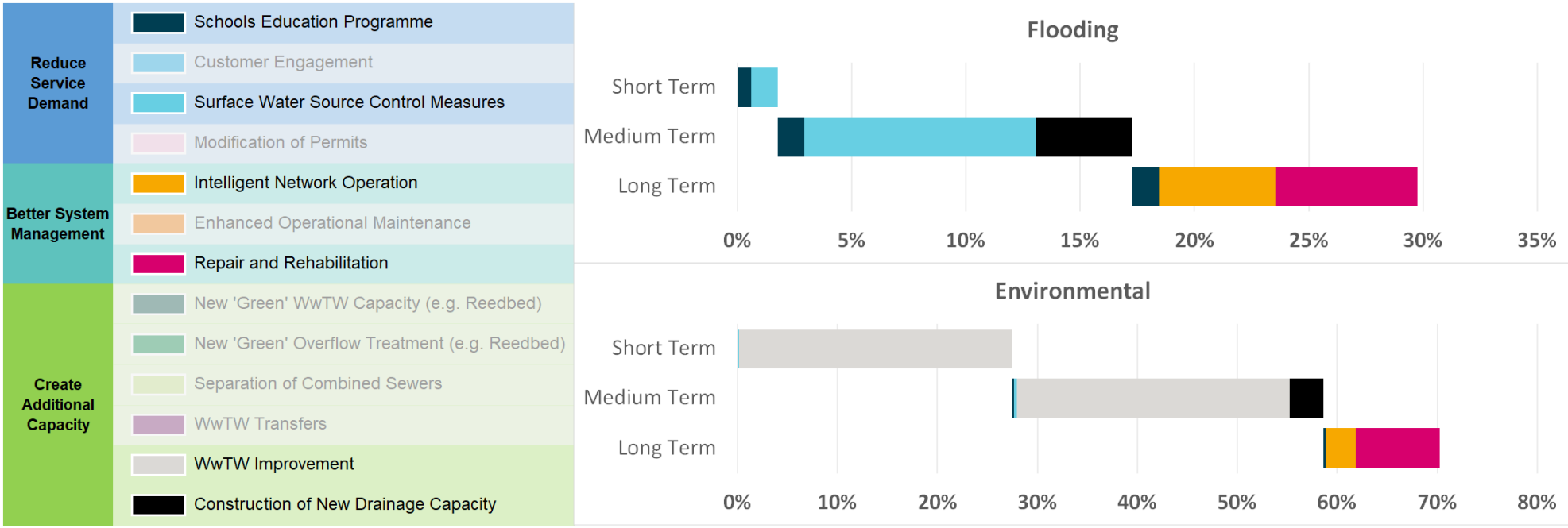
The results from the DWMP show that if we were to invest in Bromborough over the next 25 years, around 30% of the investment could be to address flooding risks, and around 70% of investment could be to address environmental risks (Figure 25).

In the short and medium term, to address flooding risk, we could invest in the construction of new drainage capacity, in surface water control measures (e.g. SuDS), and through school's education programmes.

In the short and medium term to address environmental risks potential investments could be through wastewater treatment works improvements.

In the longer term, there could be investment in schools education programmes, repair and rehabilitation of existing network, and existing intelligent network monitoring systems that are already in place could be replaced or updated.

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



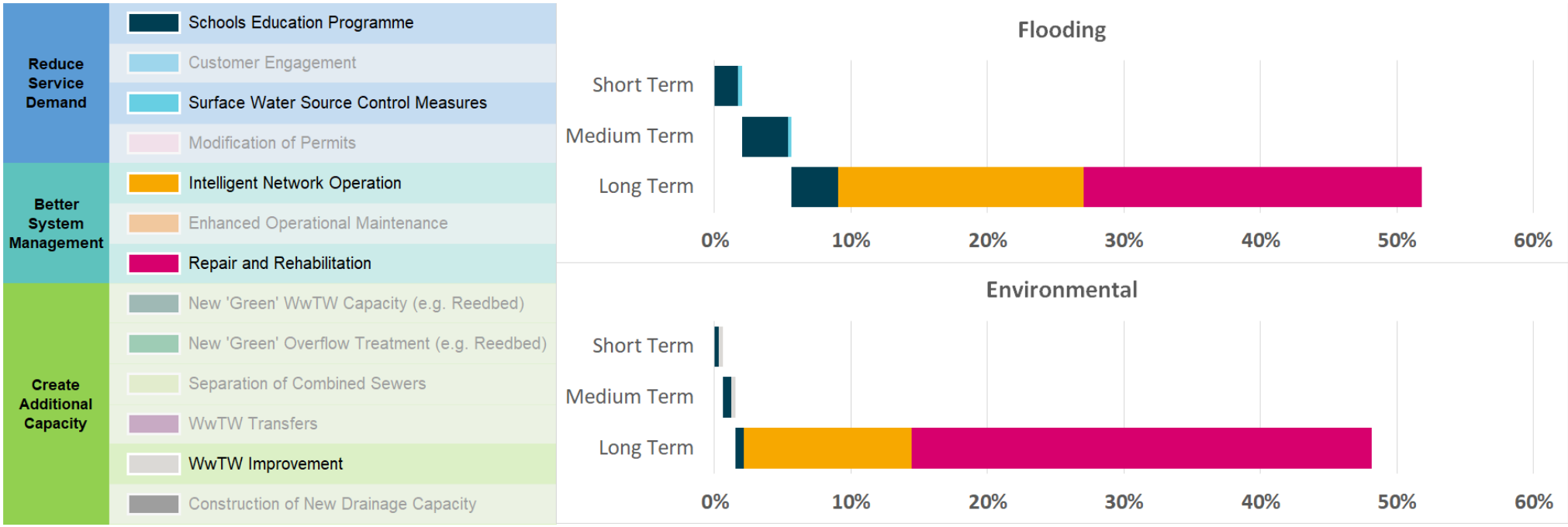
5.3.4 Ellesmere Port

The results from the DWMP show that if we were to invest in Ellesmere Port over the next 25 years, around 52% of the investment could be to address flooding risks, and around 48% of investment could be to address environmental risks (Figure 26).

In the short and medium term, there could be some investment in wastewater treatment works improvements, surface water control measures (e.g. SuDS) and schools education programmes.

In the longer term, there could be investment in the repair and rehabilitation of existing network, and existing intelligent network monitoring systems that are already in place could be replaced or updated.

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



5.3.5 Glazebury

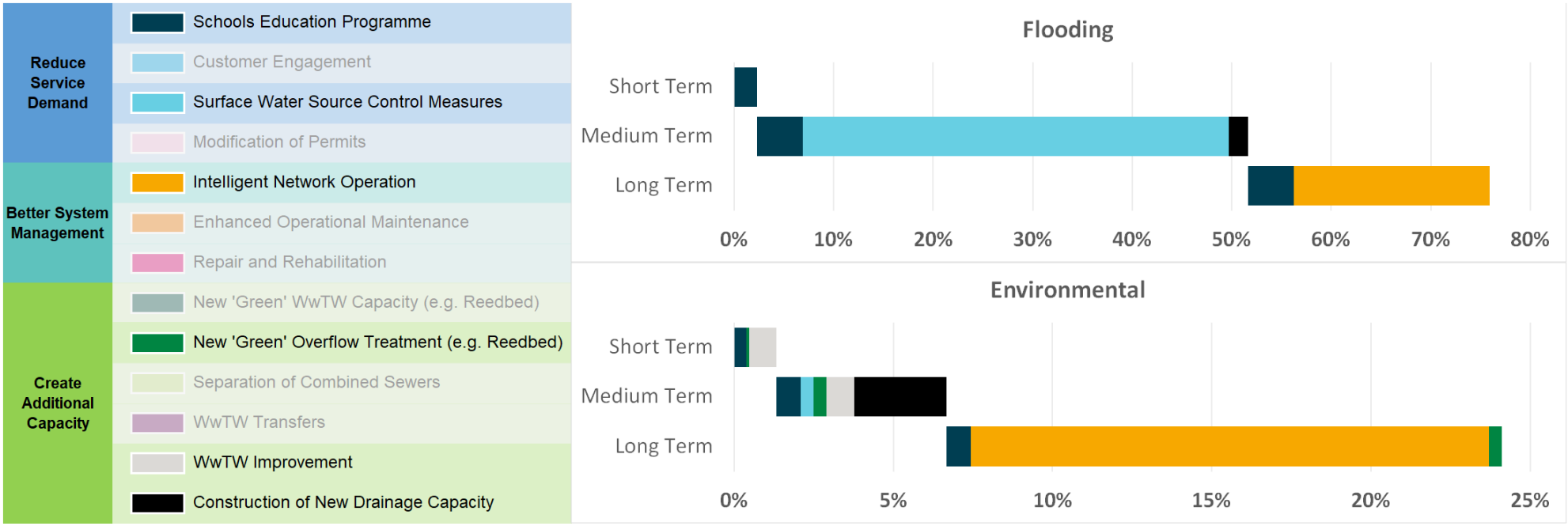
The results from the DWMP show that if we were to invest in Glazebury over the next 25 years, around 76% of the investment could be to address flooding risks, and around 24% of investment could be to address environmental risks (Figure 27).

In the short and medium term, to address flooding risk, there could be investment in surface water control measures (e.g. SuDS) and schools education programmes.

In the short and medium term to address environmental risk, there could be investment in wastewater treatment works improvements, construction of new drainage capacity, surface water control measures (e.g. SuDS) and new green overflow treatment (e.g. reed beds).

In the longer term, existing intelligent network monitoring systems that are already in place could be replaced, as well as continuing with previous options.

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



5.3.6 Huyton

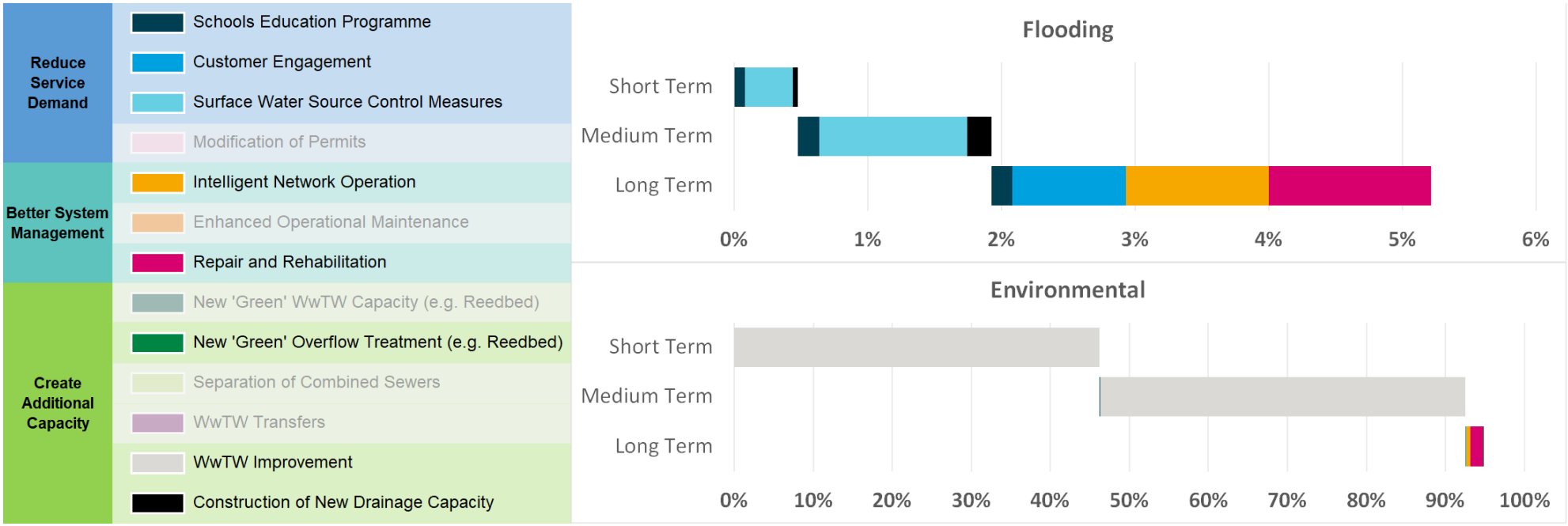
The results from the DWMP show that if we were to invest in Huyton over the next 25 years, around 5% of the investment could be to address flooding risks, and around 95% of investment could be to address environmental risks (Figure 28).

In the short and medium term, to address flooding risk, there could be investment in surface water control measures (e.g. SuDS), schools education programmes and the construction of new drainage capacity.

In the short and medium term to address environmental risk, there could be investment in wastewater treatment works improvements.

In the longer term, there could be investment in schools and customer engagement programmes, repair and rehabilitation of existing network, and existing intelligent network monitoring systems that are already in place could be replaced.

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



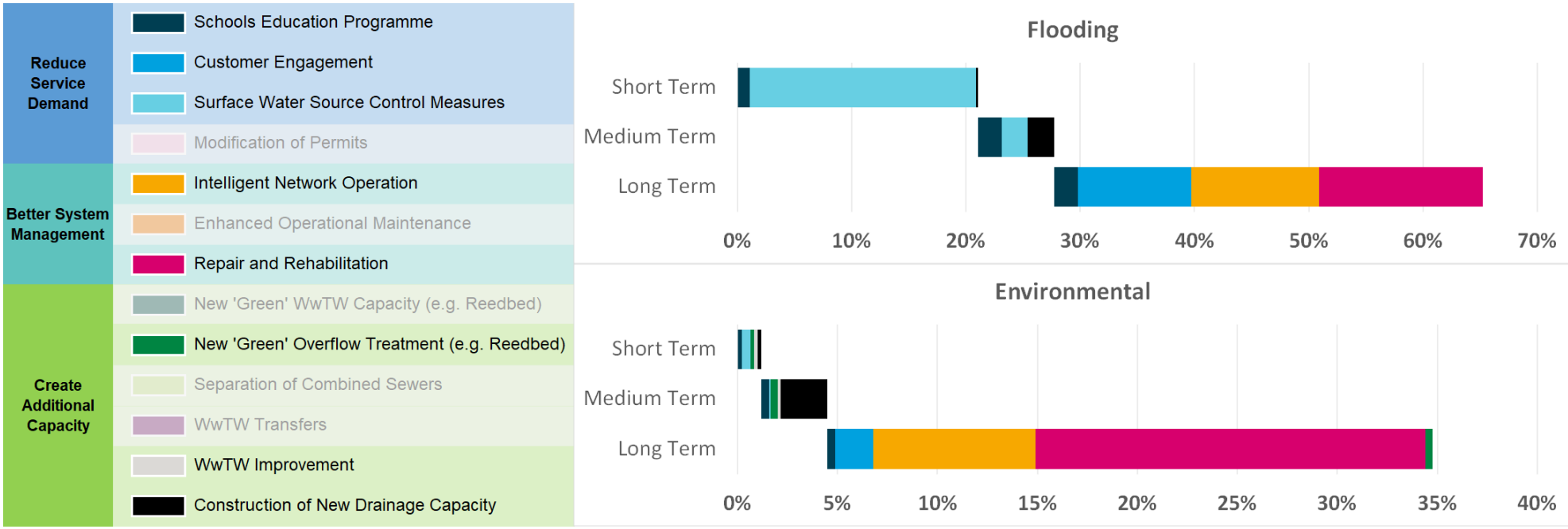
5.3.7 Leigh

The results from the DWMP show that if we were to invest in Leigh over the next 25 years, around 65% of the investment could be to address flooding risks, and around 35% of investment could be to address environmental risks (Figure 29).

In the short and medium term, to address flooding risk, there could be investment in surface water control measures (e.g. SuDS), new green overflow treatment (e.g. reed beds), schools education programmes and the construction of new drainage capacity.

In the longer term, there could be investment in customer engagement programmes, existing intelligent network monitoring systems that are already in place could be replaced, and we could invest in the repair and rehabilitation of existing network.

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



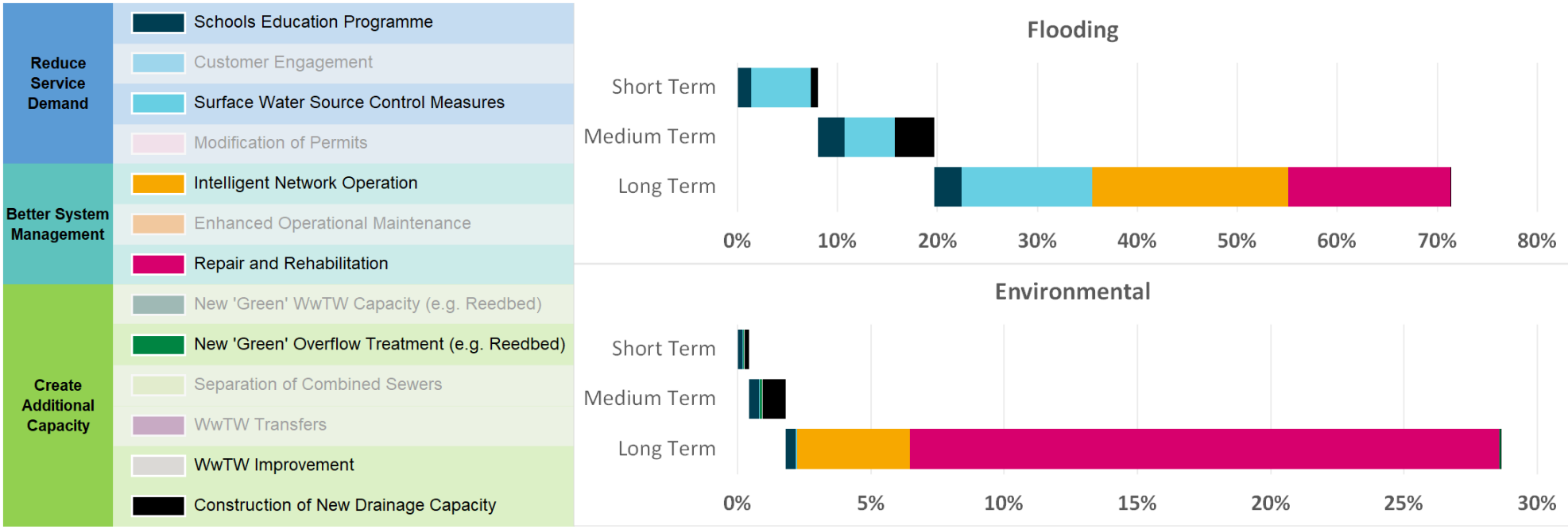
5.3.8 Liverpool (Sandon)

The results from the DWMP show that if we were to invest in Liverpool (Sandon) 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 30).

In the short and medium term, there could be investment in surface water control measures (e.g. SuDS), schools education programmes and the construction of new drainage capacity.

In the longer term we could replace or update the existing intelligent network monitoring systems that are already in place, and we could continue to invest in surface water control measures. We could also maintain existing sewers through repair and rehabilitation programmes.

Figure 30 Short, medium and long-term investment in the Liverpool (Sandon) TPU, distributed by option type



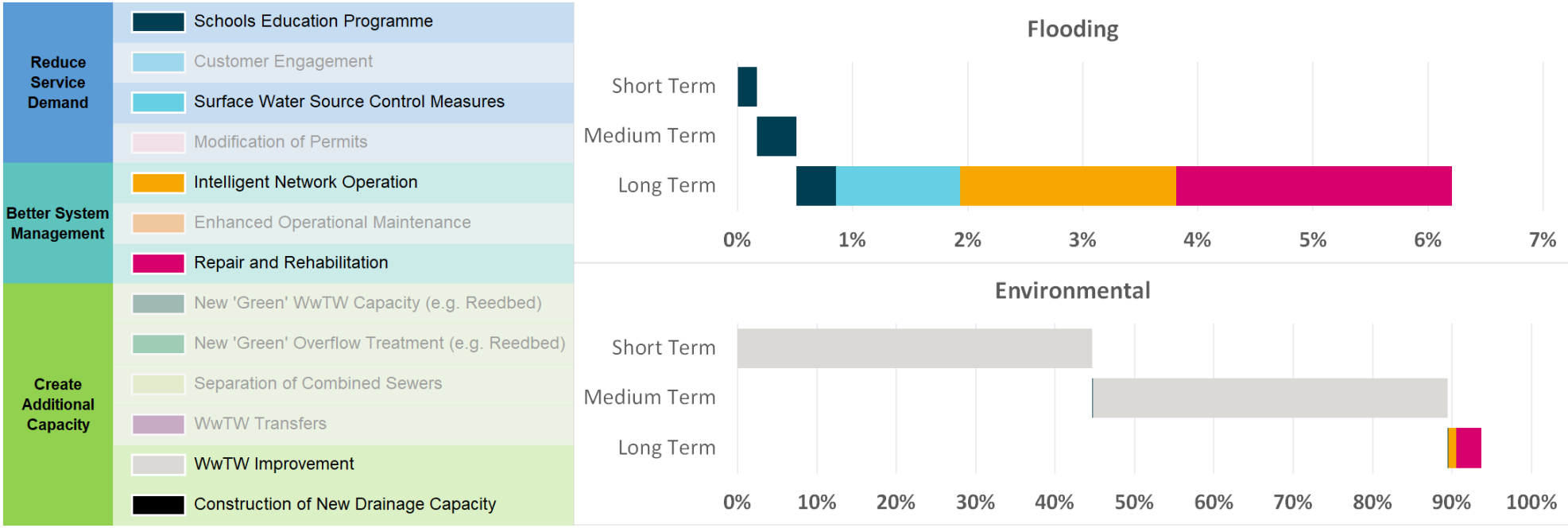
5.3.9 Liverpool South

The results from the DWMP show that if we were to invest in Liverpool South over the next 25 years, around 6% of the investment could be to address flooding risks, and around 94% of investment could be to address environmental risks (Figure 31).

In the short and medium term, there could be investment in wastewater treatment works improvements and schools education programmes.

In the longer term, we could also invest in surface water control measures (e.g. SuDS), the installation of intelligent network monitoring systems, the repair and rehabilitation of existing network.

Figure 31 Short, medium and long-term investment in the Liverpool South TPU, distributed by option type



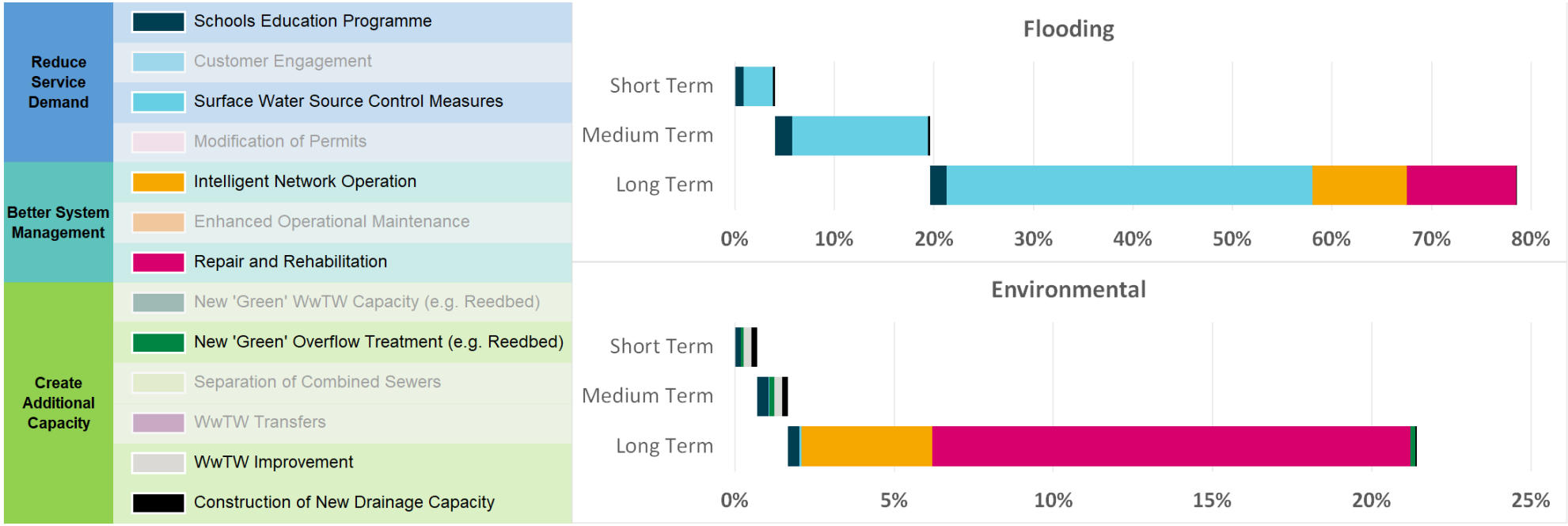
5.3.10 Meols

The results from the DWMP show that if we were to invest in Meols over the next 25 years, around 79% of the investment could be to address flooding risks, and around 21% of investment could be to address environmental risks (Figure 32).

In the short and medium term, there could be investment in surface water control measures (e.g. SuDS), in school's education programmes, and the construction of new drainage capacity.

In the longer term, we could replace or update the existing intelligent network monitoring systems that are already in place, and we could maintain the existing network through repair and rehabilitation programmes.

Figure 32 Short, medium and long-term investment in the Meols TPU, distributed by option type



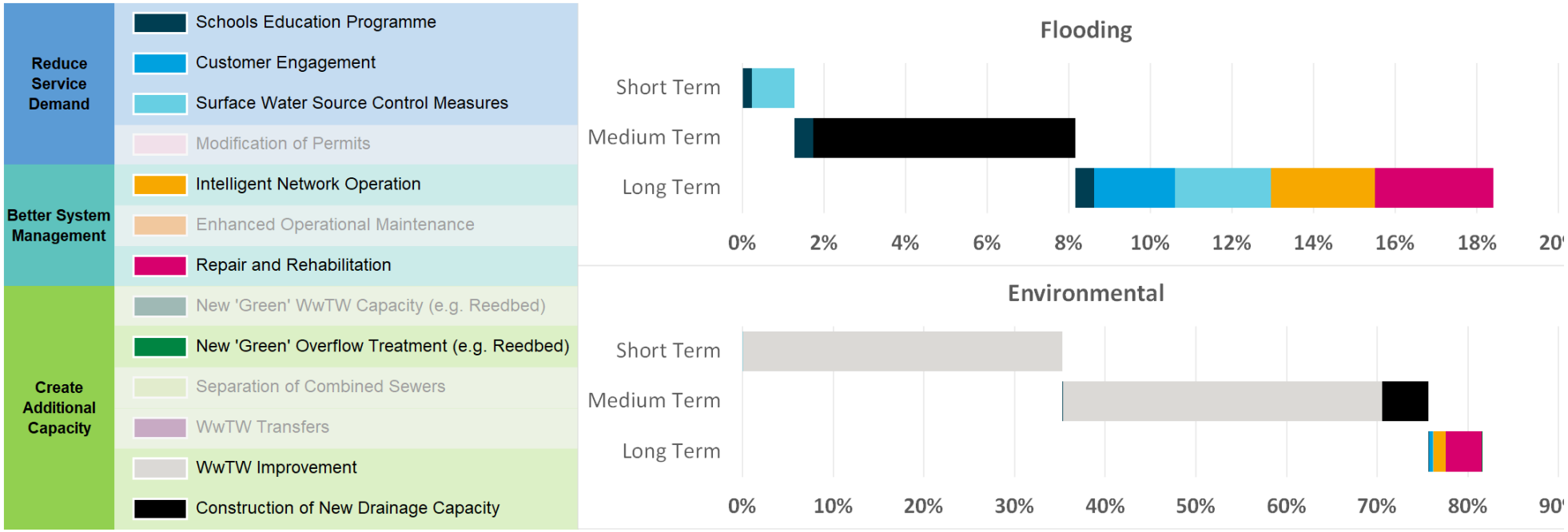
5.3.11 St Helens

The results from the DWMP show that if we were to invest in St Helens 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 33).

In the short and medium term, there could be investment in wastewater treatment works improvements, construction of new storm water drainage capacity, schools education programmes, and surface water control measures (e.g. SuDS).

In the longer term, we could invest in the installation of intelligent network monitoring systems, the repair and rehabilitation of existing network as well as continuing with surface water control measures.

Figure 33 Short, medium and long-term investment in the St Helens TPU, distributed by option type



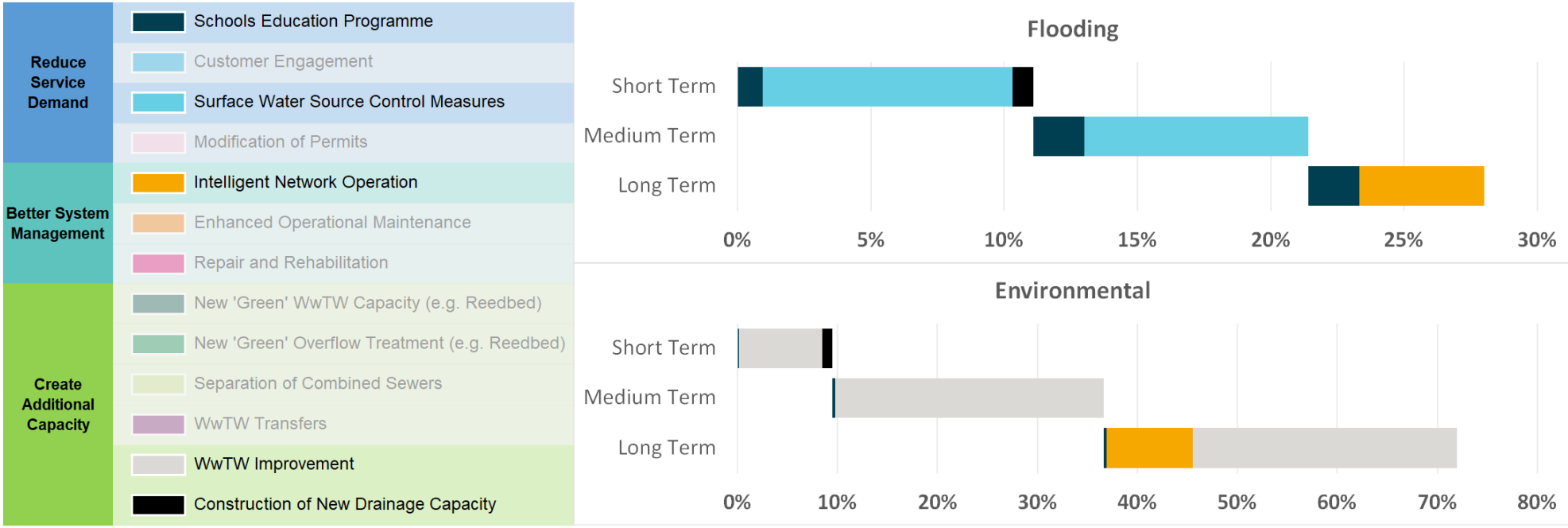
5.3.12 Tyldesley

The results from the DWMP show that if we were to invest in Tyldesley over the next 25 years, around 28% of the investment could be to address flooding risks, and around 72% of investment could be to address environmental risks (Figure 34).

In the short and medium term, there could be investment in schools education programmes, surface water control measures (e.g. SuDS), wastewater treatment works improvements and construction of new drainage capacity.

In the longer term, we could invest in the installation of intelligent network monitoring systems, as well as continuing with all previous options.

Figure 34 Short, medium and long-term investment in the Tyldesley TPU, distributed by option type



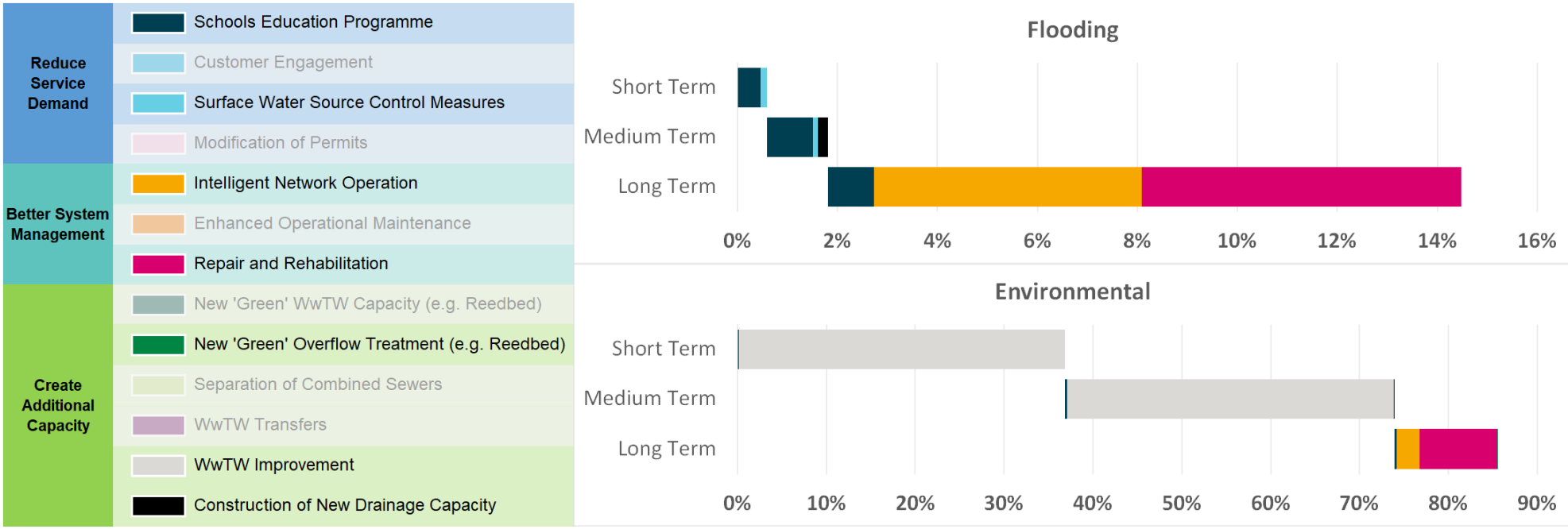
5.3.13 Warrington North

The results from the DWMP show that if we were to invest in Warrington North over the next 25 years, around 14% of the investment could be to address flooding risks, and around 86% of investment could be to address environmental risks (Figure 35).

In the short and medium term, there could be investment in wastewater treatment works improvements, schools education programmes, surface water control measures (e.g. SuDS), and construction of new drainage capacity.

In the longer term, we could replace or update the existing intelligent network monitoring systems that are already in place, and we could maintain the existing network through repair and rehabilitation programmes.

Figure 35 Short, medium and long-term investment in the Warrington North TPU, distributed by option type



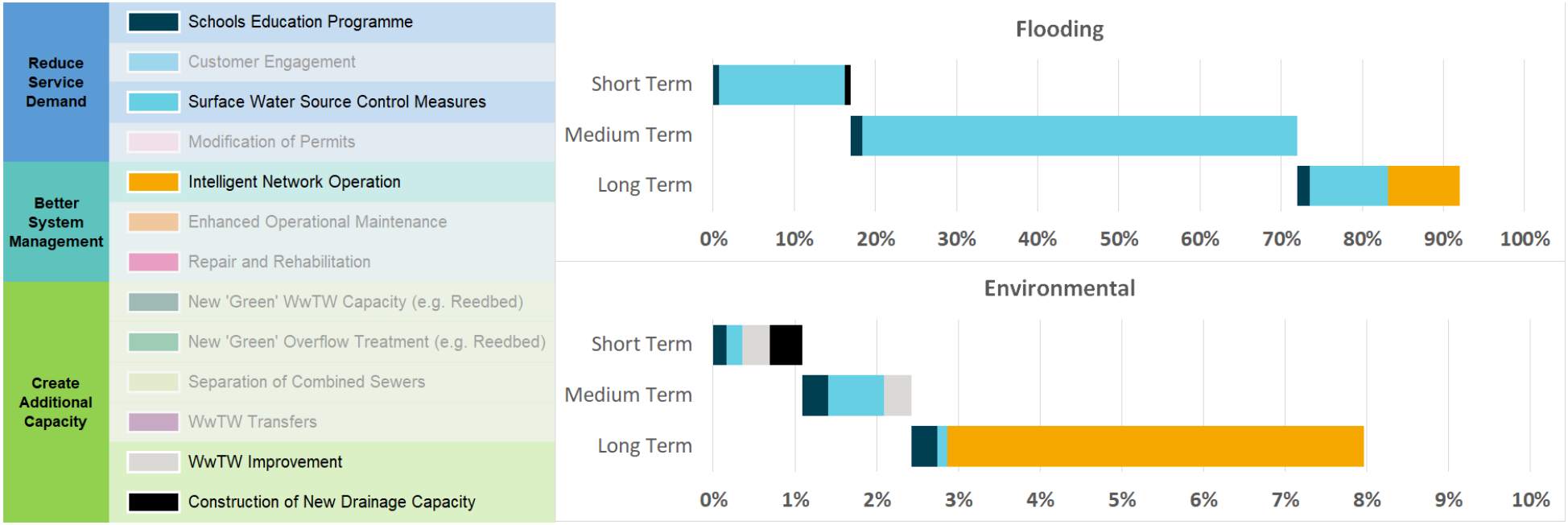
5.3.14 Westhoughton

The results from the DWMP show that if we were to invest in Westhoughton over the next 25 years, around 92% of the investment could be to address flooding risks, and around 8% of investment could be to address environmental risks (Figure 36).

In the short and medium term, there could be investment in schools education programmes, surface water control measures (e.g. SuDS), wastewater treatment works improvements and construction of new drainage capacity.

In the longer term, we could invest in the installation of intelligent network monitoring systems, as well as continuing with previous options.

Figure 36 Short, medium and long-term investment in the Westhoughton TPU, distributed by option type



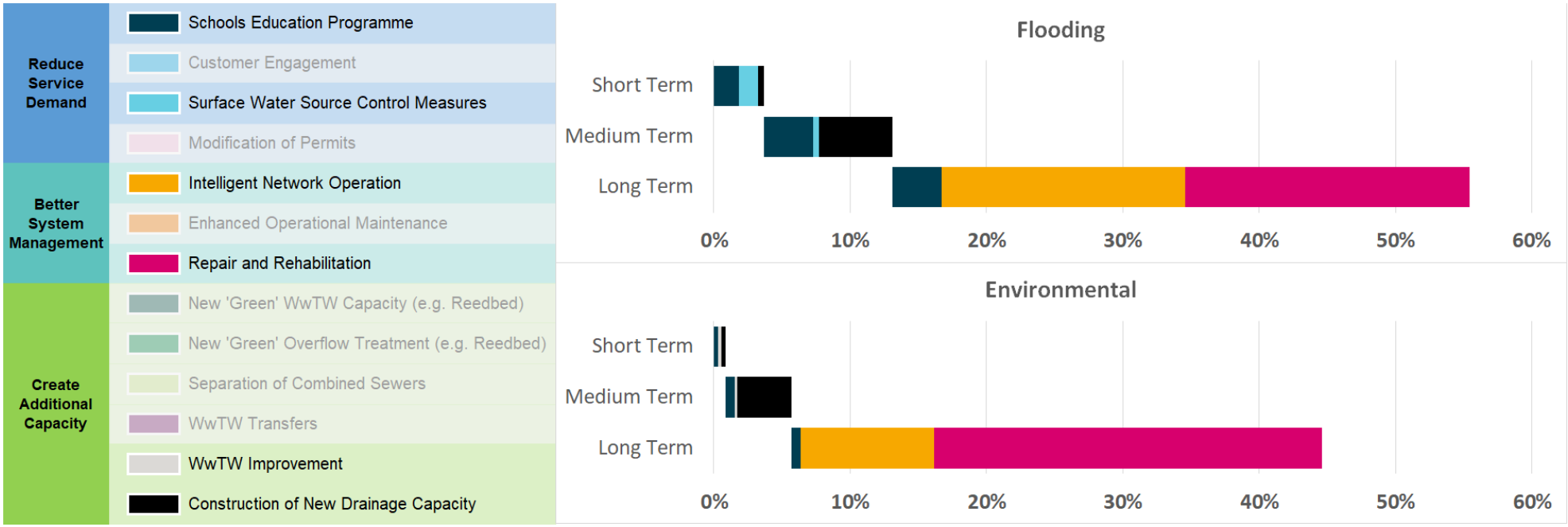
5.3.15 Widnes

The results from the DWMP show that if we were to invest in Widnes over the next 25 years, around 55% of the investment could to address flooding risks, and around 45% of investment will be to address environmental risks (Figure 37).

In the short and medium term, there could be investment in schools education programmes, surface water control measures (e.g. SuDS), wastewater treatment works improvements and construction of new drainage capacity.

In the longer term, we could replace or update the existing intelligent network monitoring systems that are already in place, and we could maintain the existing network through repair and rehabilitation programmes.

Figure 37 Short, medium and long-term investment in the Widnes TPU, distributed by option type



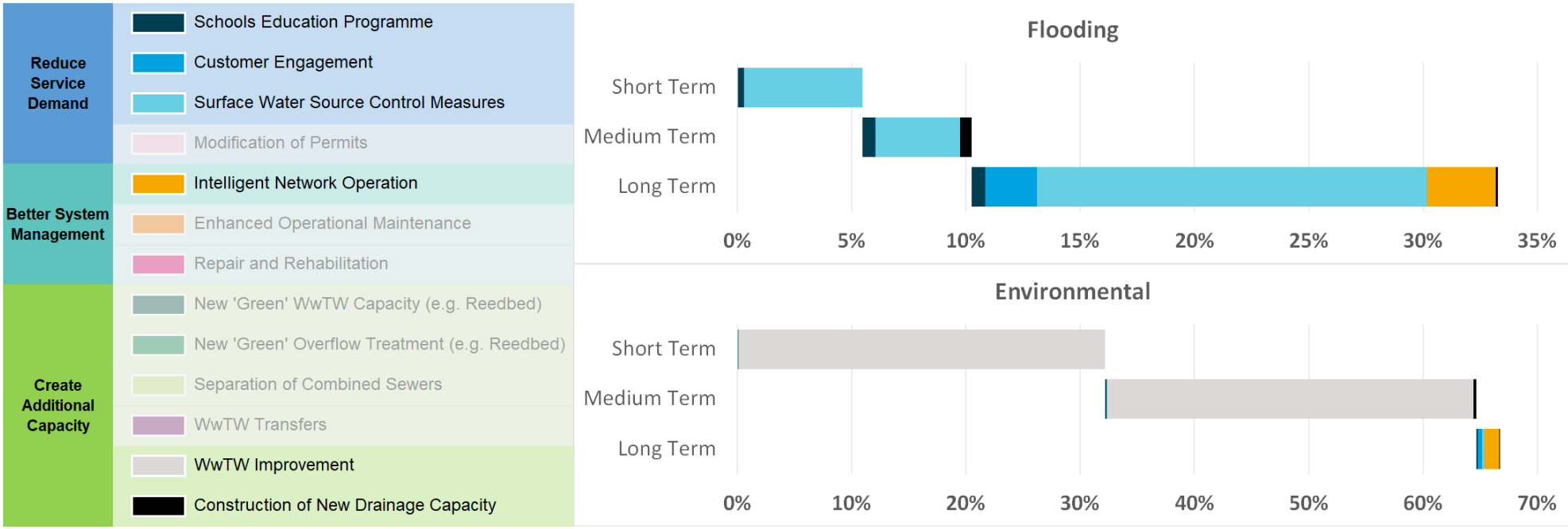
5.3.16 Worsley

The results from the DWMP show that if we were to invest in Worsley over the next 25 years, around 33% of the investment could be to address flooding risks, and around 67% of investment could be to address environmental risks (Figure 38).

In the short and medium term, there could be investment in schools education programmes, surface water control measures (e.g. SuDS), wastewater treatment works improvements and construction of new drainage capacity.

In the longer term, we could invest in the installation of intelligent network monitoring systems, and customer engagement programmes, as well as continuing with all previous options.

Figure 38 Short, medium and long-term investment in the Worsley TPU, distributed by option type



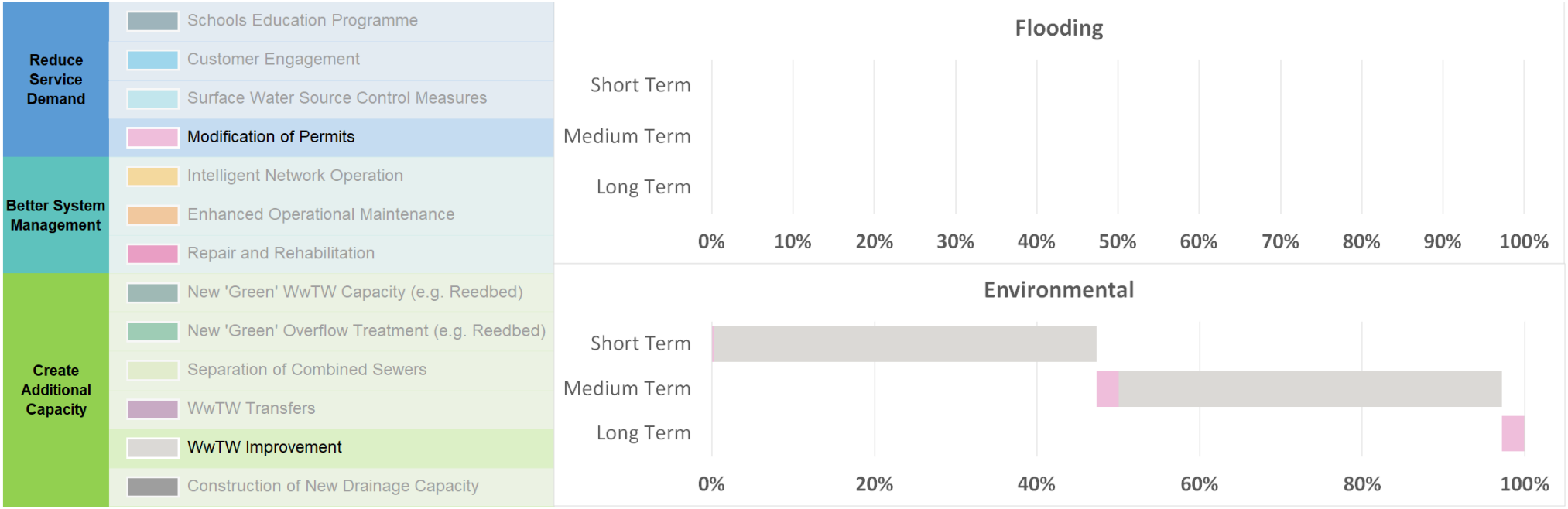
5.3.17 TPUs with population less than 2,000: *Glaze* sub catchment

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

- Daisy Hill
- Golborne
- Hulton Lane Ends
- Over Hulton

In the short, medium and longer term, to address environmental risk, potential investments could be through improvements at wastewater treatment works and modification of permits (Figure 39).

Figure 39 Short, medium and long-term investment in TPUs with population less than 2,000 (Glaze) 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 Mersey Estuary SPA.

We are currently at draft publication (Figure 40) 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 40 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/3051

[2] https://environment.data.gov.uk/catchment-planning/OperationalCatchment/3139

[3] https://environment.data.gov.uk/catchment-planning/OperationalCatchment/3202

[4] https://environment.data.gov.uk/catchment-planning/OperationalCatchment/3391

[5] https://environment.data.gov.uk/catchment-planning/OperationalCatchment/3540

[6] https://environment.data.gov.uk/catchment-planning/v/c3-draft-plan/CatchmentPartnership/WEIF4201

[7] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/507122/LIT_10210_NORTH_WEST_FRMP_PART_B.pdf

[8] https://www.mycoastline.org.uk/shoreline-management-plans/

[9] https://www.gov.uk/government/publications/surface-water-management-plan-technical-guidance

[10] https://www.merseyriverstrust.org/index.php/projects/caba

8. Appendix

Table A.1 List of TPUs which did not trigger for RBCS across environment, flooding or wastewater treatment works categories

TPU	Environment	Flooding	Wastewater Treatment Works
Daisy Hill	Not triggered in RBCS	Not triggered in RBCS	Not triggered in RBCS
Golborne	Not triggered in RBCS	Not triggered in RBCS	Not triggered in RBCS
Over Hulton	Not triggered in RBCS	Not triggered in RBCS	Not triggered in RBCS
Crank Road	Not triggered in RBCS	Not triggered in RBCS	Not triggered in RBCS

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