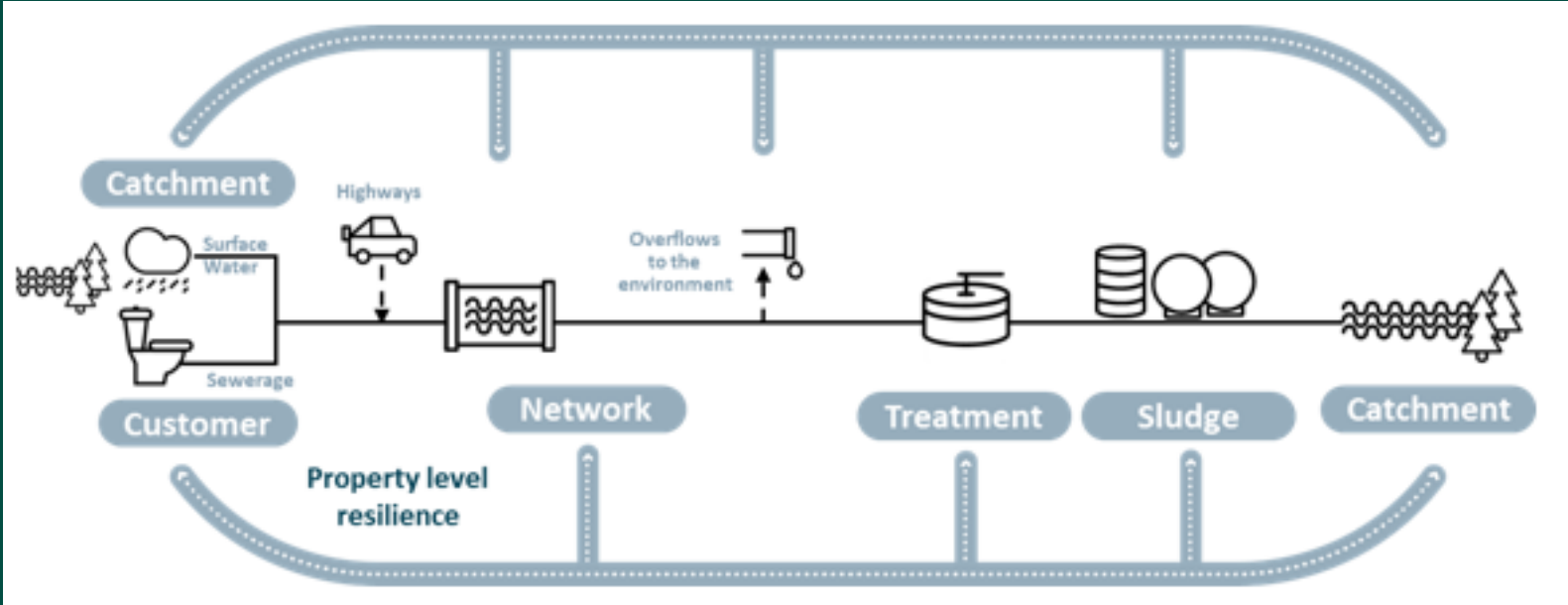


United Utilities have been working on the first Drainage and Wastewater Management Plan (DWMP). The DWMP is a long term plan which aims to understand the risks posed by climate change and growth and the impact of these on our ability to deliver core drainage and wastewater services. It covers the planning period 2025 to 2050.

The wastewater system:



The plan follows a number of stages: setting targets, understanding forecast risk and developing strategies to manage risk. Partners have input and provided feedback via workshops throughout the process which has led to adjustments being made.

Through your input we have:

- Incorporated additional objectives (such as the impact of sewer flooding on highways and open spaces)
- Made our long term targets more ambitious and stretching
- Changed the way we consider the 'benefits' delivered to incorporate wider environmental and social criteria

We'd like your feedback to inform some of the final aspects of the plan:

- Firstly there will be supporting information and some questions on our approach for selecting 'preferred options' across the North West.
- Secondly we'd like your overall feedback on engagement with the DWMP throughout plan development.

You are invited to take part in our online survey.

Please have this open in an internet browser alongside this document as it contains all the information you need to complete the survey.

Survey link:

<https://survey.alchemer.com/s3/6784458/DWMP-Survey>

DWMP@uuplc.co.uk

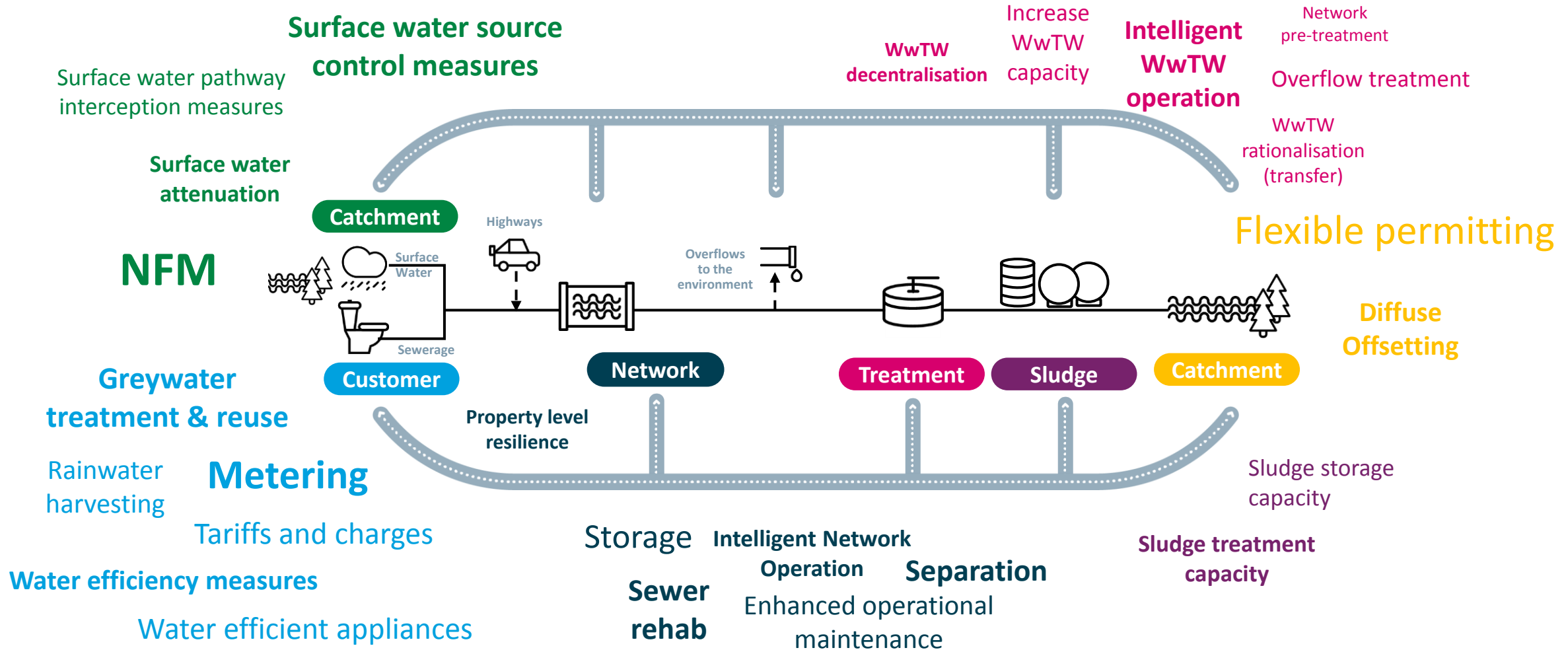
The following slides should be read in conjunction with the options survey, once you've read the slides we'd like your feedback on our approach to inform which we use.

Key points:

- We've followed an iterative approach to developing options: we used models to forecast future exceedances against targets
- We have considered a broad range of options to mitigate these exceedances and have since taken the options through a number of stages of screening to narrow down suitable options.
- Examples of options strategies considered, how we've looked at a range of options and the DWMP screening stages are outlined in the slides below

What strategies could be implemented to manage future uncertainties?

We've explored over 100 different option types across the region covering the end to end wastewater system outlined below

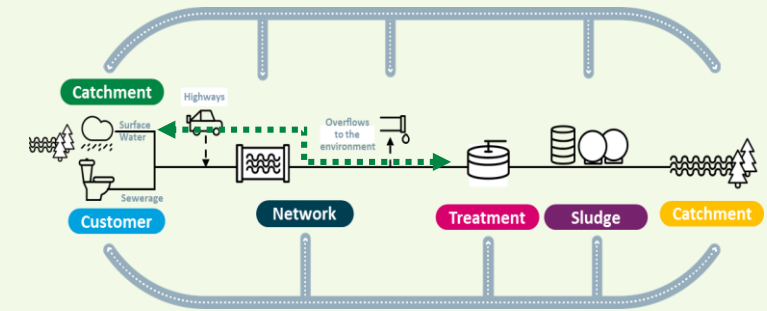


Due to the interconnected nature of drainage and wastewater options need to be considered holistically.

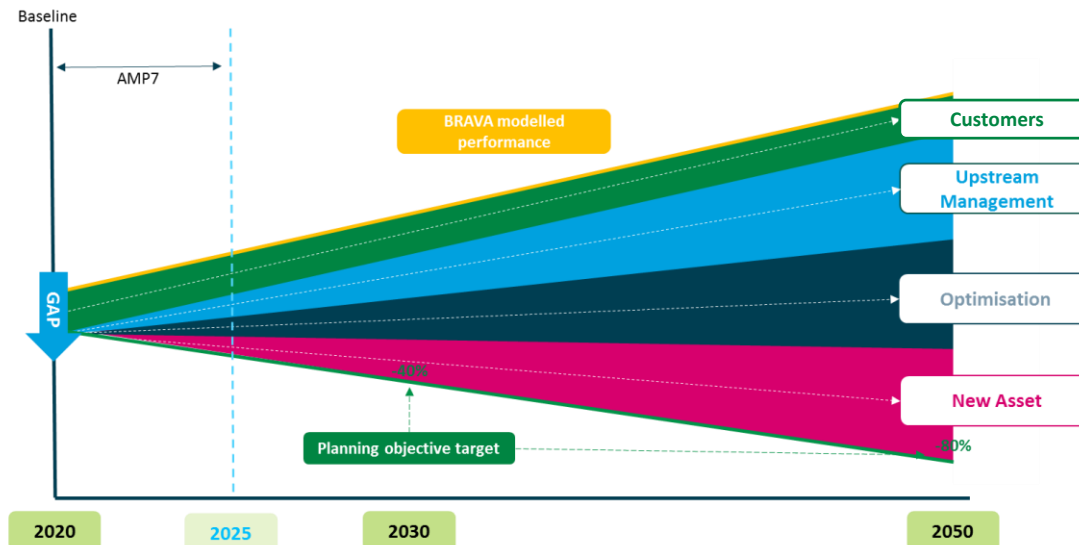
Developing option blends

- There often are multiple forecast risks in a catchment
- Drainage issues are by their nature interconnected but often there is not a fix all solution
- We've developed 'blends' of options in order to implement multiple different strategies over time

Actions in one area can impact on other parts of the system, e.g. surface water could impact the sewer network and flows at wastewater treatment works (WwTW's).



A blend of option strategies should be considered to plan for future uncertainty

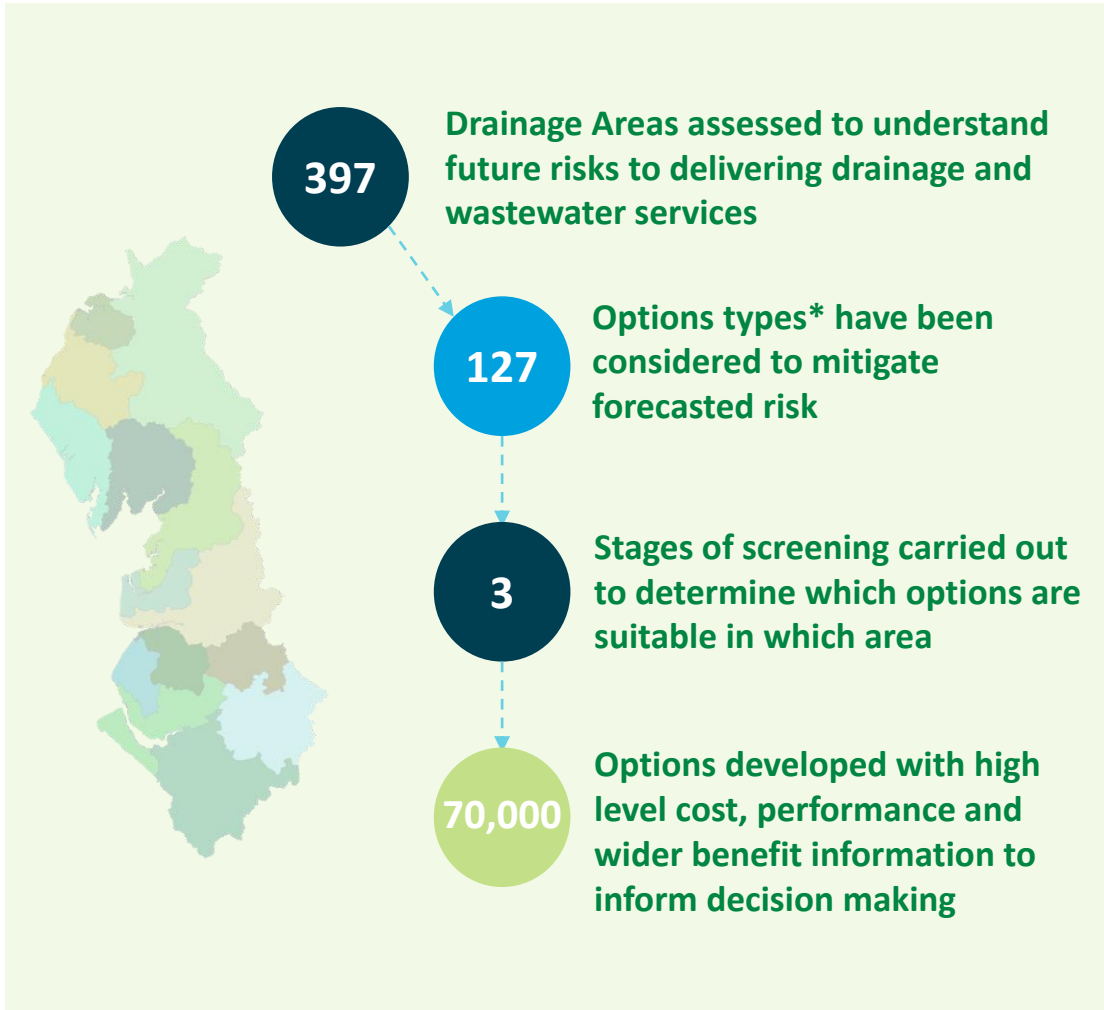


Using option blends

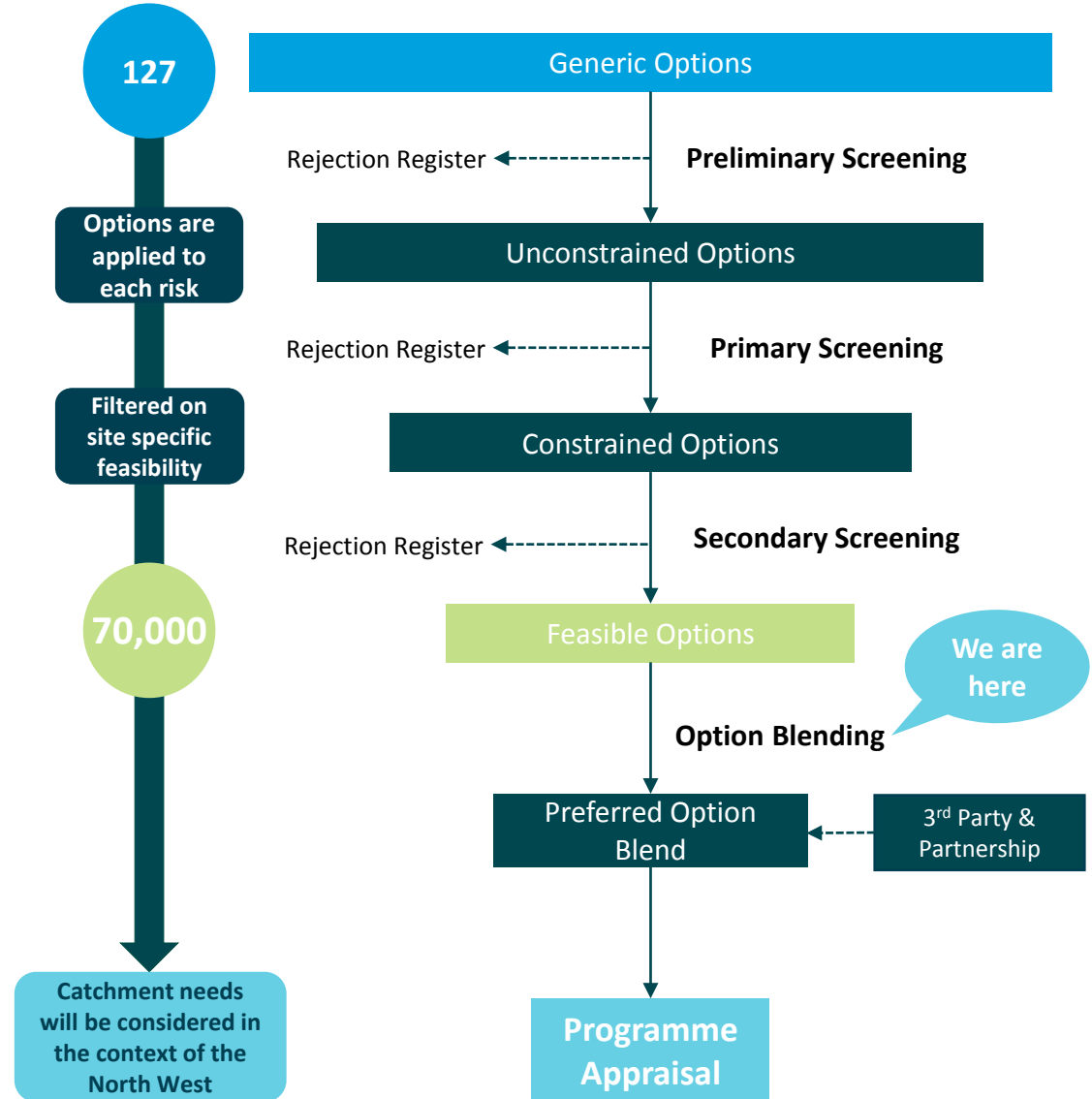
- ✓ Encourages the consideration of a range of options as part of the solution – this doesn't need to be the 'whole' solution to add value
- ✓ This allows us to plan in an adaptive way, implementing 'low regrets' solutions now and adding to solutions as risks become more certain in the future

Options have been developed to give an indication of how we might mitigate risks identified in the future. Over 70,000 options have been generated through this process.

The Options Development Approach



*An option is an **intervention strategy**, it will inform the **type of work** we look to cost in more detail in the future rather than a specific solution



Selecting preferred option for the plan

There are two approaches that we are considering to carry out the selection of preferred option blends:

Approach 1: will prioritise options based on a hierarchy, preferencing those which **reduce demand and better manage the system** over those which increase capacity

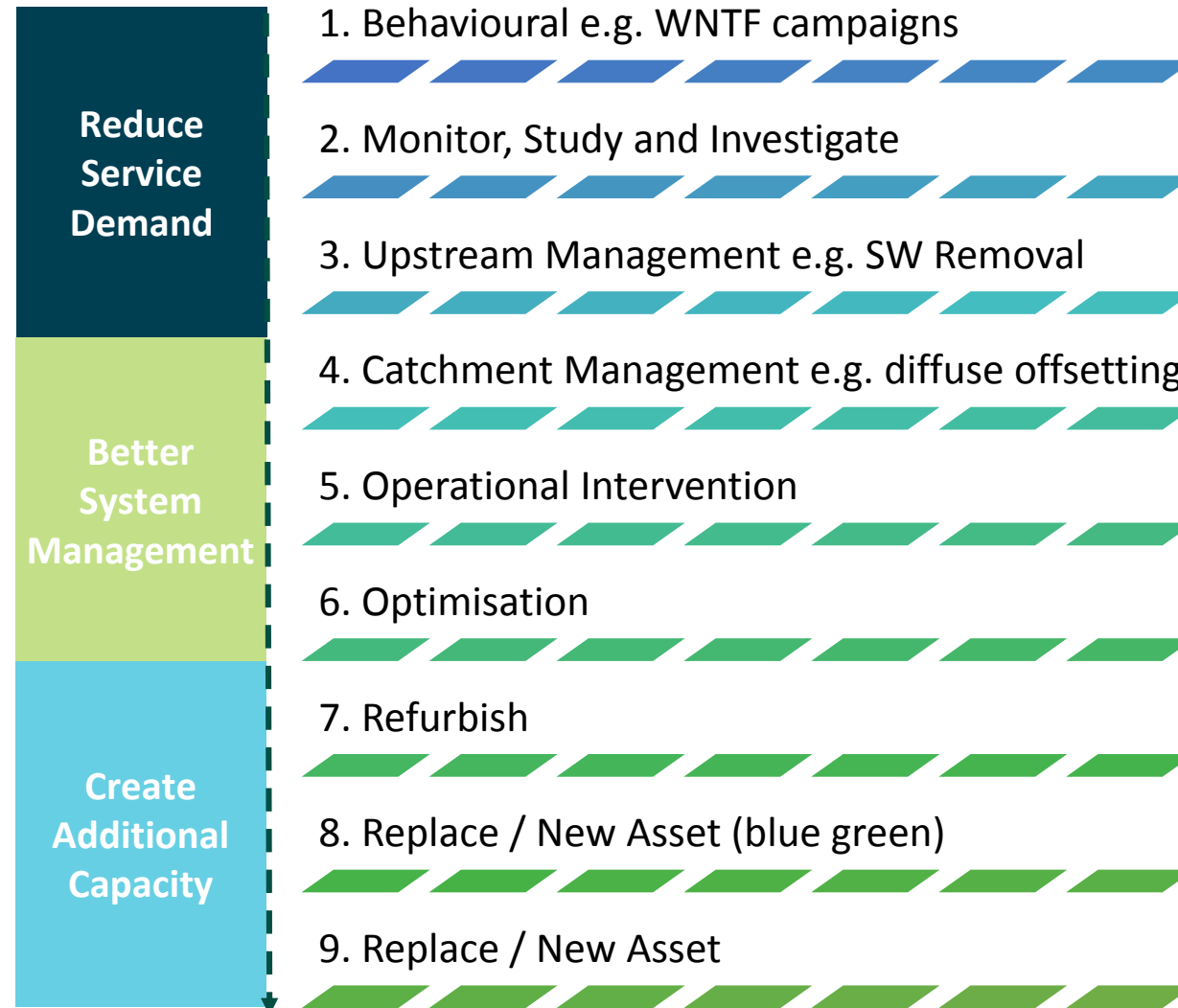
Approach 2: lowest whole life cost – this is a more traditional way of considering cost and benefit of options by weighing up the cost benefit ratio

We will choose one of these two approaches to inform our decision making.

We are asking for your feedback today to help inform this decision.

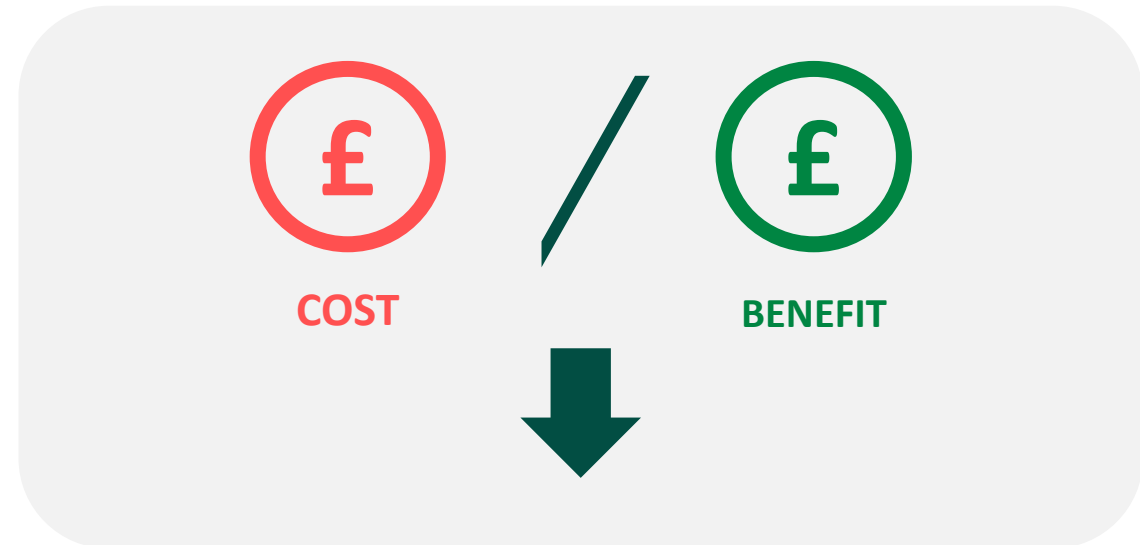
Information on the two approaches can be found on the following slides.

- From our customer research we know that customers have preferences for some types of interventions over others
- The use of a hierarchy allows us to take those preferences into account
- Using the hierarchy means we consider cost beneficial options which **reduce demand** ahead of **system management** and **increasing capacity**
- All options considered still need to meet an agreed **cost benefit threshold**



Partnerships / third party options

- This approach takes into account cost and performance of an option over the duration of the plan (25years)
- This considers benefit against our long term targets (e.g. delivering drainage and wastewater services)
- This assessment considers whether the benefit of an option outweighs the cost of implementing the solution
- This drives a lowest cost plan but may not deliver as many wider benefits



The outcome is a cost benefit ratio which can be used to understand the numerical value of an option, which also takes into account the wider benefits.

Worked example of the two approaches using a fictional catchment.

Options highlighted **green** would be selected to resolve the same problem.

| | |
|-------------------------------|--|
| Drainage area | EXAMPLE CATCHMENT |
| Risks Identified (up to 2050) | Internal, external & open space flooding WwTW compliance – leading to tightening of other parameters, blockage & collapse |

Approach 1: Hierarchy

In this example, using the hierarchy (approach 1), there is a bigger focus on monitoring, catchment management and rainwater management. These options are slightly more expensive overall and may have more uncertainty in the benefit delivered but often deliver wider environmental benefits:

| 1. Behavioural | 2. Monitor, Study and Investigate | 3. Upstream Management | 4. Catchment Management | 5. Operational Intervention | 6. Optimisation | 7. Refurbish | 8. Replace / New Asset (blue green) | 9. Replace / New Asset |
|--|---|---|---|---|--|---|--|--|
| <ul style="list-style-type: none"> Schools programme What not to flush | <ul style="list-style-type: none"> Catchment monitoring Flow monitoring | <ul style="list-style-type: none"> Rain garden box Attenuating rain gardens (with LA) Swales | <ul style="list-style-type: none"> Diffuse offsetting in catchment | <ul style="list-style-type: none"> Property level resilience Enhanced operational targeting and maintenance | <ul style="list-style-type: none"> Filter recirculation | <ul style="list-style-type: none"> Sewer relining Sewer maintenance | <ul style="list-style-type: none"> Reed bed treatment | <ul style="list-style-type: none"> Storage for flooding (4 locations) Increase WwTW capacity |

Approach 2: Lowest Cost

In this example, using the lowest cost (approach 2) options selected are focused on replacement / new assets. These options are expensive but give high confidence in the delivery against targets:

| 1. Behavioural | 2. Monitor, Study and Investigate | 3. Upstream Management | 4. Catchment Management | 5. Operational Intervention | 6. Optimisation | 7. Refurbish | 8. Replace / New Asset (blue green) | 9. Replace / New Asset |
|--|---|---|---|---|--|---|--|--|
| <ul style="list-style-type: none"> Schools programme What not to flush | <ul style="list-style-type: none"> Catchment monitoring Flow monitoring | <ul style="list-style-type: none"> Rain garden box Attenuating rain gardens (with LA) Swales | <ul style="list-style-type: none"> Diffuse offsetting in catchment | <ul style="list-style-type: none"> Property level resilience Enhanced operational targeting and maintenance | <ul style="list-style-type: none"> Filter recirculation | <ul style="list-style-type: none"> Sewer relining Sewer maintenance | <ul style="list-style-type: none"> Reed bed treatment | <ul style="list-style-type: none"> Storage for flooding (4 locations) Increase WwTW capacity |

Please now complete the survey which will ask for your thoughts on the approach to preferred options.

The next part of the survey is looking for feedback on our engagement with partners on DWMP. We'd like to understand what's gone well and what could have been done better, this will help us plan engagement for the next cycle of DMWP.

Thank you for taking the time to support the DWMP.

DWMP@uuplc.co.uk