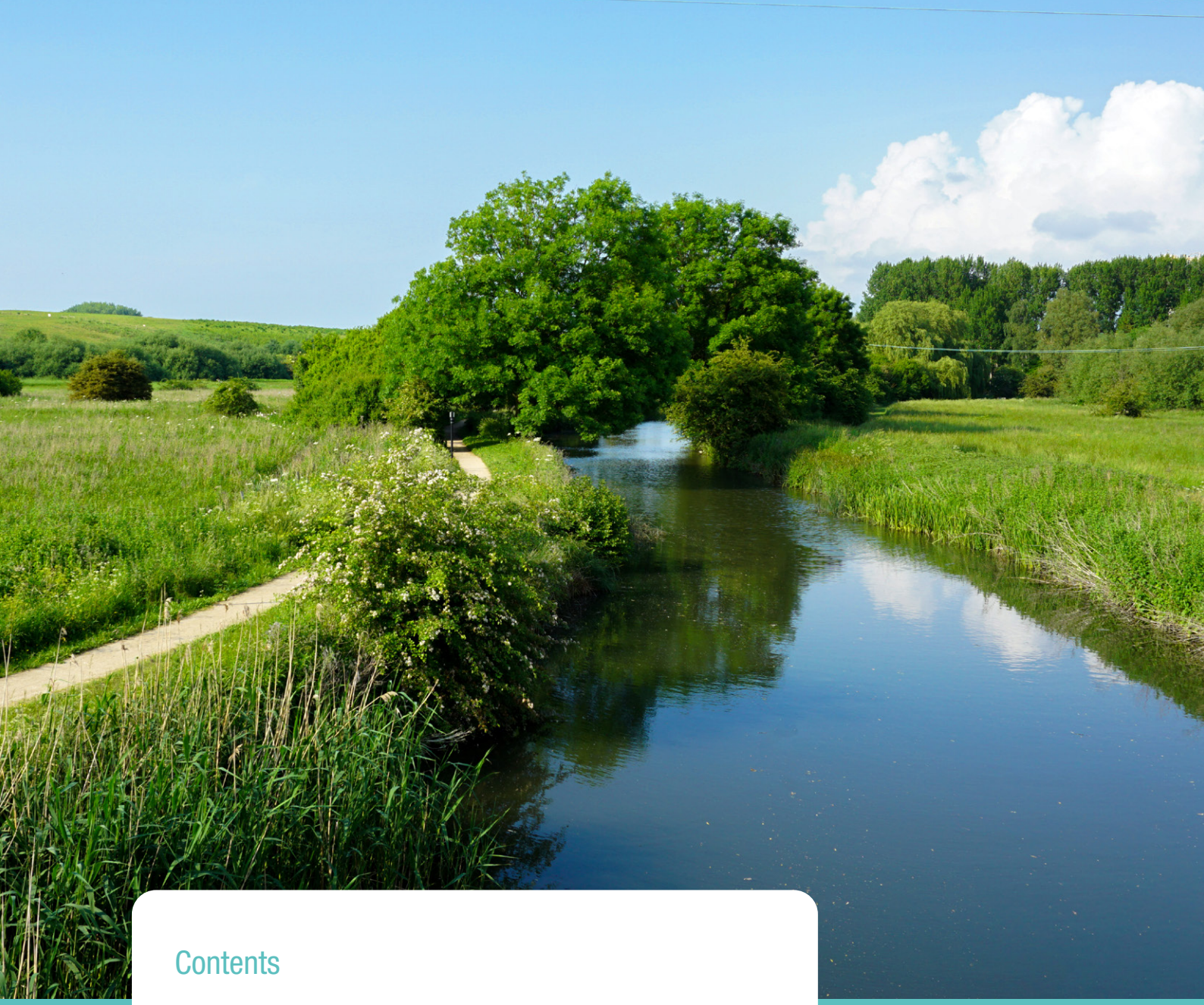
Summary of our Resilience Framework

AUGUST 2021

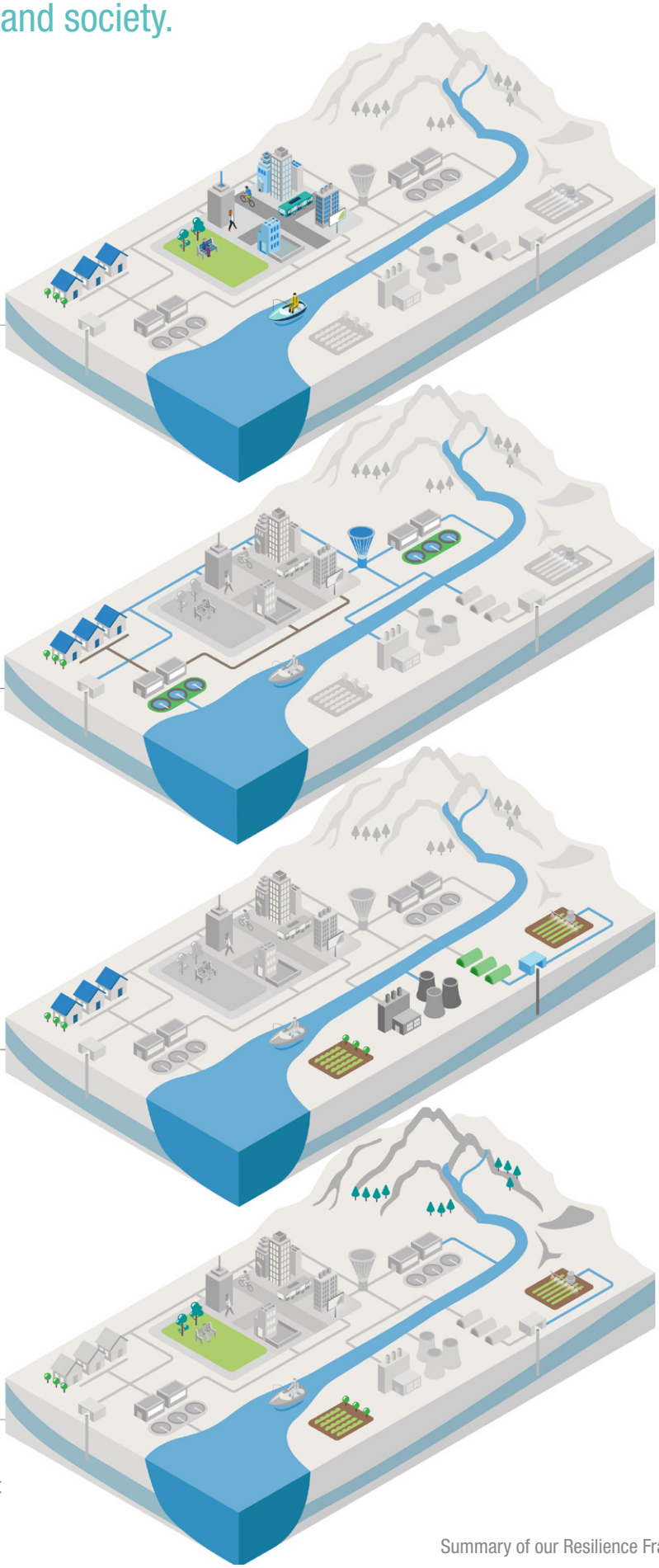
WATER RESOURCES SOUTH EAST



Contents

Our resilience framework:

A systems-based approach that addresses the needs of the environment, customers, industry and society.



Social & Economic

Wider activities that rely upon a secure and sustainable supply of water

Public water supply

Water companies' water sources and networks that supply the drinking water and remove the wastewater used by homes and businesses

Multi-sector water supply

Sectors that have their own water sources that are critical for the production of their product or service

Environment

The natural environment system that provides the water used by society

Summary of our Resilience Framework

1. Introduction

Water resources are coming under increasing pressure as we strive to meet the needs of a growing population, adapt to climate change, reduce abstractions to enhance our environment and increase our resilience to droughts.

To meet these challenges, and others which may arise, Water Resources South East (WRSE) is developing a **multi-sector, regional resilience plan for the South East** – referred to as `the/our plan' throughout the rest of this document.

Our plan will take a long-term view, looking ahead to 2100, and consider the water we need to use at home and at work, as well as that required by agriculture, to generate electricity, for industry, recreation, the environment and to support the well-being of society and economic growth. It will move us from being focussed only on securing public water services and managing the risk of droughts, to securing wider resilience across a series of connected water systems.

To make sure our plan is resilient to future shocks and stresses, both the ones we can forecast and those we can't, our plan will be developed and tested against a **new resilience framework**. This will allow us to appraise choices for our plan in terms of the resilience of both water supplies and the natural environment, where that water comes from.

In essence, our framework offers:

- a systems-based approach that:
  - addresses the needs of the natural environment because it is the foundation of our plan
  - goes beyond the statutory boundary of public water supplies to embrace the water needs of other sectors and society at large
- a regional perspective to balancing the needs of each system but with the all-important local context and relevance – garnered from years of WRSE experience and expertise – still guiding our decisions.

Our resilience framework takes account of the consultation responses we had from organisations and individuals on our original proposals.[1] We now set out our resilience framework and the metrics we will use to measure the resilience of the individual options and our plan as a whole.

1 Securing resilient water resources for South East England - our response to feedback on our resilience summary (August 2020)

2. Our resilience framework

2.1 Defining resilience

We will use three tests – reliability, adaptability and evolvability – to define the resilience of our plan.

We have shown examples of what this means to the Public Water Supply (PWS) system, in Figure 1.

Figure 1 Resilience tests – Public Water Supply example

Reliability

- The ability to withstand short term shocks without actively changing the performance of the system
- **Example:**
  - The Public Water Supply system can **continue or re-start** operations as planned
  - How? Because it is made up of a mix of supply and demand options which, together, provide more resilience to potential impacts than any one option type.

Adaptability

- The ability to make a short term change in performance of the system to accommodate the impact of a shock and recover normal function afterwards
- **Example:**
  - The Public Water Supply system can **flex and adapt** operations to continue services
  - How? Because it is made up of resilient options that deliver greater network connectivity without causing water quality issues.

Evolvability

- The ability to modify the system function to cope with long term trends
- **Example:**
  - The Public Water Supply system is **designed to accommodate** a range of uncertain futures and changing trends
  - How? Because it is made up of resilient options such as pipelines that can work in both directions in case flows need to be reversed.

2.2 Assessing resilience using a systems-based approach

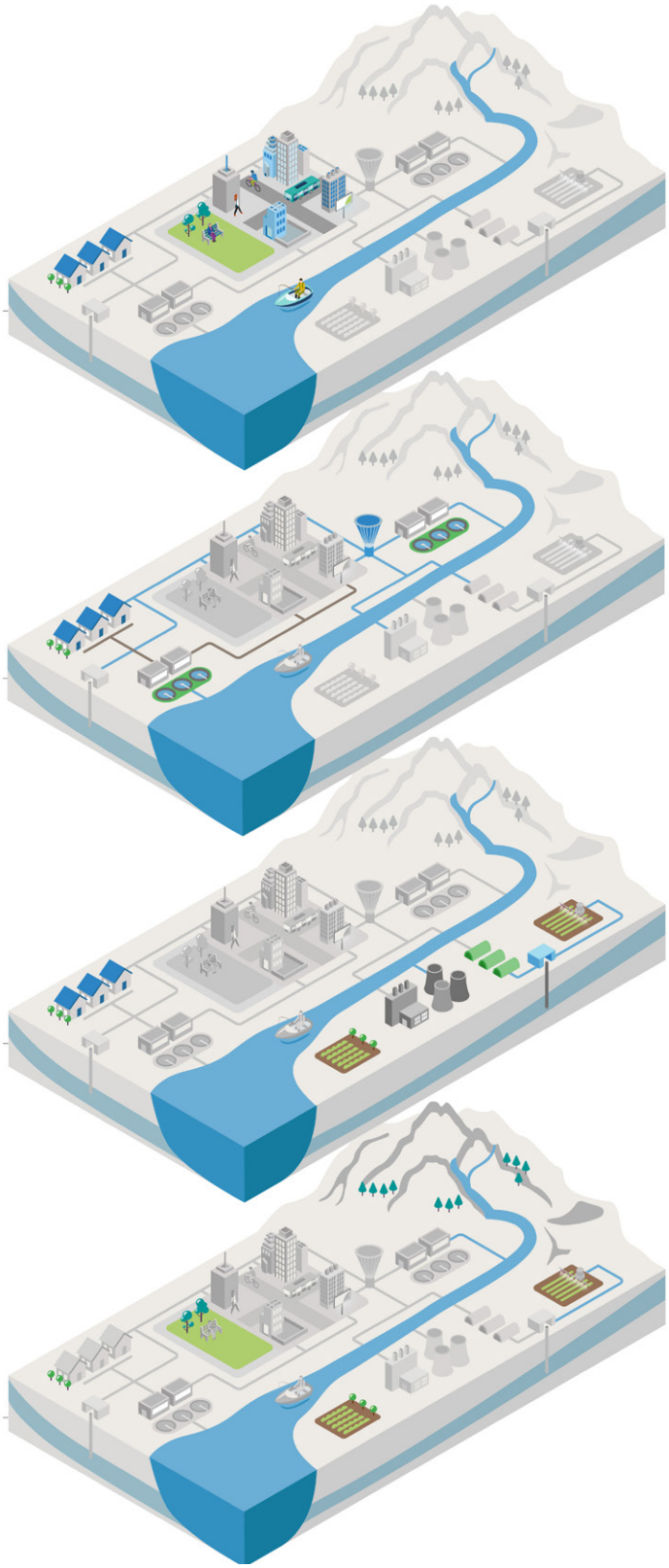
2.2.1 Identifying systems

Our resilience framework assesses the three main systems - environment, multi-sector water supply and public water supply.

We have reviewed how these three systems interact with each other and then looked at how they benefit the fourth wider social and economic system of the South East. In essence, if we improve the overall resilience of these three systems, and can measure that improvement, then the wider South East region benefits too.

We can then make sure our plan delivers what each system needs in the face of short-term shock events and long-term stresses. Figure 2 shows the systems and how all of these are interrelated and interconnected.

Figure 2 Systems identification



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2.2.2 Evaluating the systems

Table 1 summarises what our framework is trying to achieve with these three systems:

Table 1 Systems-based evaluation

What is the system?	What does it typically include?	What does greater resilience for this system look like?
Public water supply	All the operational infrastructure associated with the abstraction, treatment, and distribution of water supplies to the region's households.	Maintaining the balance between supply and demand so that there is enough water to cope with short-term shocks e.g. drought or long-term challenges e.g. climate change.
Multi-sector water supply	The abstraction of water and associated operational infrastructure for other sectors/businesses in the region that also rely on water for their commercial needs e.g., agriculture, paper mills, power, canals, quarries, golf courses.	The ability for these sectors/businesses to predict their future water needs so we can continue to support their economic activities – and which often have added social benefits too.
Environment	Catchments, including water bodies and soils, along with the wildlife and ecology they support.	Catchments and water bodies that can maintain water quality and water quantity to protect wildlife and ecology during and after short-term shocks (drought) and long-term challenges (climate change).

2.3 Measuring resilience using new metrics

We have identified the metrics that would measure the resilience of our plan in terms of its reliability, adaptability and evolvability.

Table 2 shows the 19 metrics across each of the three systems and how we will apply them to these three test areas (reliability, adaptability and evolvability). While not all metrics are relevant to every system, we have, where possible, applied a standardised five-point scoring scale to these metrics. This approach will help us quantify the shift in resilience to each system from the options in our plan (or group of options) so that we can determine the overall strategy and investment that is needed for the region.

Important notes: As a result of our earlier consultation and your feedback we have included new metrics on soil health and collaborative land management to ensure our framework focusses greater attention on the environmental system and the multi-sector system; and a metric on customer relations in recognition that good customer engagement enhances system resilience during droughts.

Our resilience framework sits within the wider 'Best Value' decision making framework that we have developed. Within that framework the resilience metrics are considered and evaluated alongside a range of other value criteria so we can assess the performance of different water resource programmes and make decisions about the preferred regional plan. You can find out more about the Best Value planning process at www.wrse.org.uk/library

Table 2 Resilience metrics

System attribute	RELIABILITY		ADAPTABILITY		EVOLVABILITY	
System indices	**Resilience metric number**	**UNCERTAINTY OF PERFORMANCE**	**Resilience metric number**	**TIMING AND WARNING OF EVENTS**	**Resilience metric number**	**FLEXIBILITY AND DIVERSITY OF OPTIONS**
Metric	R1 Public water supply	Uncertainty of supply/demand benefit	A1 Public water supply	Expected time to failure	E1 Public water supply	Scalability and modularity of interventions
Metric	R2 Multi sector water supply Environment	Breaches of flow and level proxy indicators	A2 Public water supply Multi-sector water supply Environment	Duration of enhanced drought restrictions		
System indices	**Resilience metric number**	**ABILITY TO PERSIST WITH PLANNED FUNCTIONS**	**Resilience metric number**	**ABILITY TO RESPOND TO AND RECOVER FROM UNEXPECTED FAILURES**	**Resilience metric number**	**DELIVERABILITY OF PLANNED CHANGES**
Metric	R3 Public water supply	Risk of failure due to physical hazards	A3 Public water supply	Operational complexity and flexibility	E2 Public water supply	Intervention lead times
Metric	R4 Public water supply	Availability of additional headroom	A7 Public water supply	Customer engagement with demand restrictions	E3 Public water supply	Reliance on external bodies to deliver change
System indices	**Resilience metric number**	**RESILIENCE OF SUPPORTING SERVICES**	**Resilience metric number**	**SYSTEM CONNECTIVITY AND EASE OF SYSTEM RECOVERY**	**Resilience metric number**	**MONITORING AND MANAGEMENT OF CHANGE**
Metric	R5 Environment Public water supply	Catchment / raw water quality risks	A4 Public water Supply	Water Resource Zone connectivity	E4 Public water supply	Flexibility of planning pathways
Metric	R6 Environment	Capacity of catchment services	A5 Public water supply	Public water supply system connectivity	E5 Multi-sector water supply Environment	Collaborative landscape management
Metric	R7 Public water supply	Risk of failure of supporting service due to exceptional events	A6 Multi-sector water supply Environment	Inter-catchment connectivity		
Metric	R8 Environment Multi-sector water supply	Soil health				

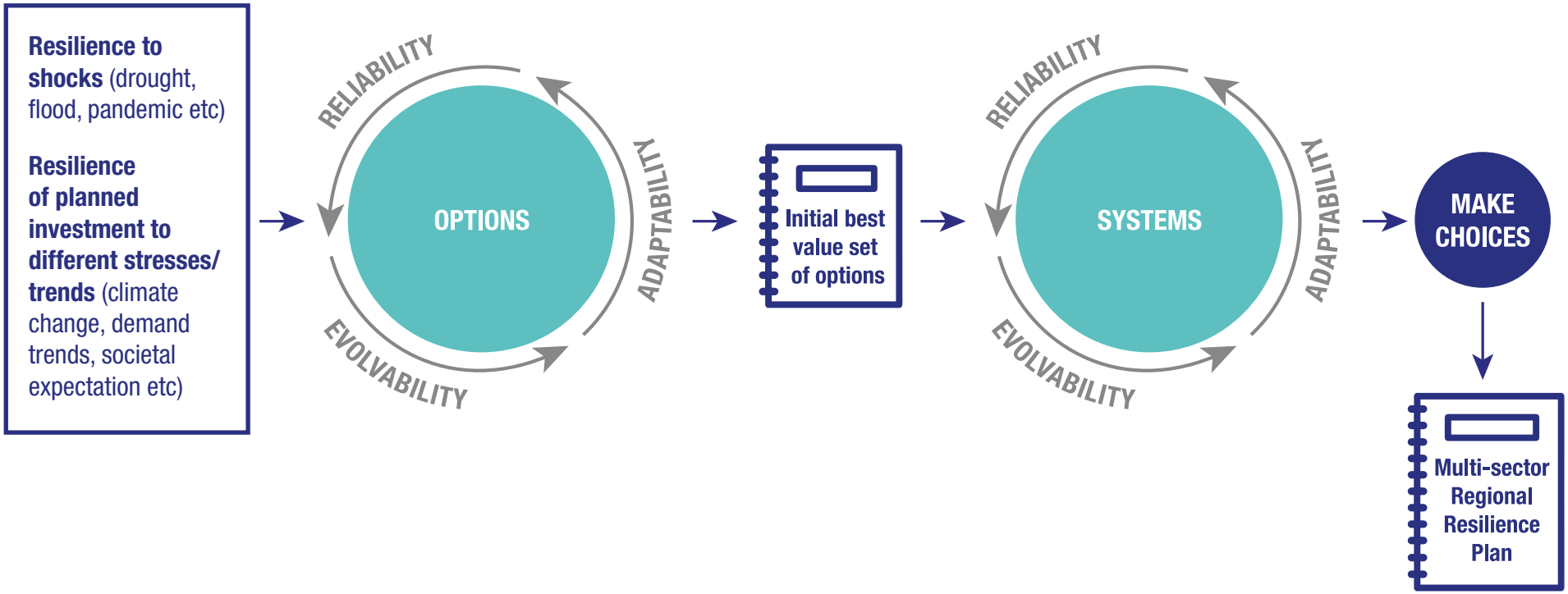
2.4 Using the resilience framework to develop our plan

We have carried out a baseline assessment of the resilience of the public water supply system. We plan to apply the 'resilience framework' at two critical points in the development of our plan.

1. We will use it to both score and identify the benefits of various options that either increase the supply of water or reduce demand for it.
2. We will use it to assess the resilience of alternative water resource programmes as part of our 'Best Value' assessment to identify our preferred regional plan.

Figure 3 graphically represents where these two stages will occur.

Figure 3 Where we will apply the framework



2.5 Where you can find more information

This document summarises our resilience framework, but you can find more detailed information – including our specific resilience framework method statement and resilience report which detail how the resilience metrics are calculated – on our website at **www.wrse.org.uk/library**