Mainstreaming Nature-based Solutions

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Mainstreaming Nature-based Solutions

Common Value Framework V2.1

User Guidance

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The CVF has been developed through substantial engagement with companies and regulators in the UK Water Sector. This work has been funded by the Ofwat Innovation Fund through the Mainstreaming Nature-based Solutions to Deliver Greater Value programme.

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List of abbreviations

AD	Anaerobic Digestion	NEA	National Ecosystem Assessment
AAD	Advanced Anaerobic Digestion	NEP	National Environment Programme
AHDB	Agriculture and Horticulture Development Board	NIC	National Infrastructure Commission
CHP	Combined Heat and Power	ODI	Outcome Delivery Incentives
CIO	Charitable Incorporated Organisation	ONS	Office for National Statistics
CIRIA	Construction Industry Research and Information Association	ORVal	Outdoor Recreation Valuation Tool
CPIH	Consumer Prices Index including owner occupiers' housing costs	PI	Performance Indicator
CRI	Compliance Risk Index	PC	Performance Commitment
CVF	Common Value Framework	PCV	Prescribed Concentration Value
DCMS	Department for Culture, Media & Sport	PR24	2024 Price Review
DCS	Decision Support Tool	PTSD	Post-traumatic Stress Disorder
DEFRA	Department for Environment, Food & Rural Affairs	QALYs	Quality-Adjusted Life Years
DESNZ	Department for Energy Security and Net Zero	RBMP	River Basin Management Plan
DfT	Department for Transport	RICS	Royal Institution of Chartered Surveyors
DWI	Drinking Water Inspectorate	SAV	Submerged Aquatic Vegetation
DWMP	Drainage and Wastewater Management Plan	SM	Service Measure
EA	Environment Agency	SRE	Service Reservoir
ENCA	Enabling a Natural Capital Approach	SSSI	Site of Special Scientific Interest
		SuDS	Sustainable Drainage Systems
GHG	Greenhouse Gas	SROI	Social Return on Investment
GLA	Greater London Authority	TDS	Tonnes Dry Solids
GSS	Guaranteed Standards Scheme	UK	United Kingdom
GVA	Gross Value Added	WAFU	Water Available for Use
HEAT	Health Economic Assessment Tool	WEO	Wider Environmental Outcomes
HSE	Health & Safety Executive	WFD	Water Framework Directive
INNS	Invasive Non-Native Species	WINEP	Water Industry National Environment Programme
IT	Information Technology	WISER	Water Industry Strategic Environmental Requirements
IUCN	International Union for Conservation of Nature	WRAP	Waste and Resources Action Programme
LTDS	Long-Term Delivery Strategy	WRMP	Water Resources Management Plan
MMO	Marine Management Organisation	WTW	Water Treatment Works
MNBS	Mainstreaming Nature-based Solutions	WTP	Willingness to Pay
NAEI	National Atmospheric Emissions Inventory	WTA	Willingness to Accept
NbS	Nature-based Solutions	WwTW	Waste Water Treatment Works
NCEM	Natural Capital Evidence and Metrics		

1. Introduction

1.1 Purpose of the Common Value Framework

The UK Water Sector (the Sector) faces complex challenges in balancing financial, environmental, and societal priorities across multiple stakeholders. A Common Value Framework (CVF) enables a consistent, comparative and transparent way to assess investment outcomes. It offers a shared foundation for the Sector to carry out planning that reflects the true range of benefits delivered to customers, wider society, and the environment.

The CVF is designed to be used for plan and programme level investment planning, including Drainage and Wastewater Management Plans (DWMP), Water Resource Management Plans (WRMP), Water Industry National Environment Programme (WINEP), National Environment Programme (NEP), Long-Term Delivery Strategy (LTDS) and Price Reviews.

The CVF has been developed in close collaboration with the Environment Agency (EA) team that produced the Natural Capital Evidence and Metrics (NCEM) published in June 2025. The CVF can be used to bring environmental considerations into the outset of option development where limited information about the location and details of investment options are known. As options progress through to the latter stages of development or delivery, localised assessment of impact using the NCEM directly may be more appropriate. For more details on the CVF and NCEM, see **Section 1.4**.

There are three main products associated with the CVF:

- The CVF workbook (excel)
- User Guidance (this document)
- Worked examples (excel)

In this User Guidance, when we refer to the CVF, we are referring to the CVF workbook.

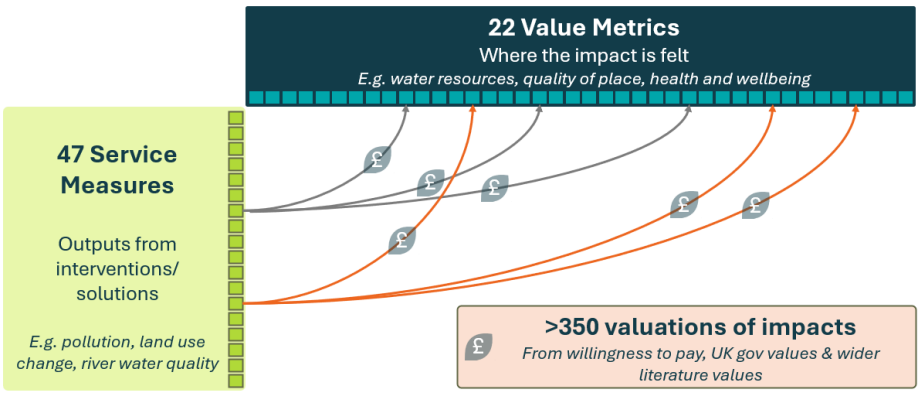
1.2 What is the CVF

The CVF is a repository of monetary values for investment outcomes common to the UK Water Sector. Its purpose is to ensure that all investment outcomes, financial and non-financial, including those delivered to water companies, their customers, and wider society, are incorporated into decision-making to enable best value investment planning. The key components of the CVF are:

- Service Measures: a list of common outcomes from water sector investments
- Impact Categories: sub-categories of a Service Measure i.e. severity
- Unit of measure: the measuring unit of the Impact Category
- Value metrics: the grouping of values impacted by water sector investments categorised using a multi-capitals approach
- Impact pathways: a matrix that shows which value metric(s) is impacted by each one of the Impact Categories

Figure 1 shows the structure of the CVF. Each one of the Service Measures map across to one or more Value Metrics depending on the impact pathways. Valuations are then sought to monetise each pathway.

Figure 1: The structure of the CVF



The CVF takes a multi-capitals approach to defining value, which is already commonly used by the Sector in the context of investment planning. The capitals represented in the CVF are set out in Figure 2.

Figure 2: Multi-capitals framework used by the CVF

Manufactured capital is an important part of business operation in the Sector and its representation in the CVF has been considered in depth. The way that a change in the 'stock' of manufactured capital is represented in the CVF is by capturing the impact of that 'stock' change via other forms of capitals. For example, an asset improvement of a wastewater treatment work may result in less spills, and subsequently improved river health and recreational use. The river health improvement and change in recreational use are valued by the CVF, instead of the change in asset condition.

The full list of Value Metrics included under each of the capitals and their definitions are provided in Table 1. These Value Metrics are selected to represent the breadth of values created from water company investments.

Table 1 Value metrics used in the CVF

Capitals	Value metrics	Definition
Financial capital	Private costs	Costs incurred as a result of service failure.
	Private benefits	Cost savings or income as a result of service improvement (e.g. renewable energy generation, customer billing).
Natural capital	Food provision	Agricultural production of crops, fodder, timber and other resources for human consumption.
	Soil	Healthy soil is a complex finite living resource which performs multiple functions including storage of carbon and regulation of greenhouse gases, infiltration and transport of water, controlling flood risk, nutrient and waste cycling and provision of food, timber and other materials.
	Water resources	The availability of water to support sustainable ecosystems and human use.
	Water quality	Good ecological and chemical status of waterbodies in order to support sustainable ecosystems and human use.
	Water regulation	The management of water flows and levels to reduce flood risk, prevent water shortages, and maintain adequate hydrological conditions.
	Air quality	Good quality of air to support the healthy existence of all living organisms.
	Greenhouse Gases (GHG)	Adequate concentration of greenhouse gases in the atmosphere to support normal temperature regulation function of the global atmosphere.

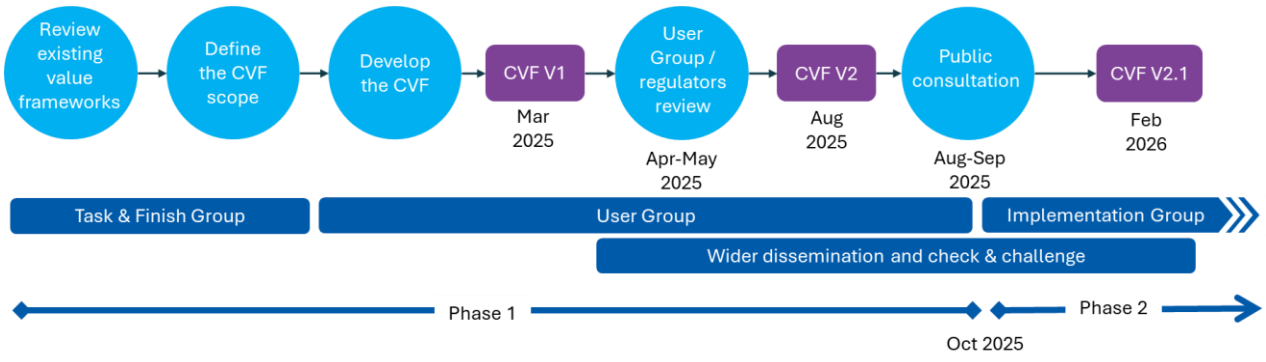
Capitals	Value metrics	Definition
	Temperature regulation	Moderation of air temperature to reduce heat stress and create more stable local climates.
	Recreation	Opportunity for people to engage in leisure activities that support wellbeing and enjoyment, such as walking, cycling, wildlife watching, or outdoor play.
	Biodiversity	The variety of life on Earth, including all species and the natural systems and habitats that support them. Biodiversity underpins many other ecosystem services and their benefits.
Social capital	Trust	The level of confidence people have in an organisation, built through consistent actions, transparency, and positive experience.
	Stakeholder relationship	Ongoing interaction and collaboration between organisations and the individuals or groups affected by their decisions, built on communication, trust, and mutual understanding to support shared goals.
	Quality of place	The perceived quality of the build and nature environment to support good quality of life. This value metric also covers amenity.
	Local economy	The system of businesses, jobs, and services within a community that generates income, supports livelihoods, and contributes to the overall prosperity and resilience of the local area.
Human capital	Skills and knowledge	The abilities, expertise, and understanding that people develop through learning and experience, enabling them to perform tasks effectively and make informed decisions.
	Health and wellbeing	Overall physical, mental, and social condition of individuals, supported by environments and activities that promote safety, reduce stress, and enhance quality of life.
	Safety and security	Protection of people, property, and environments from harm or risk, achieved through measures that reduce hazards, increase resilience, and create a sense of stability and confidence.
Intellectual capital	Routine and practices	The regular processes, know-how and ways of working that individuals or organisations consistently follow, helping create reliability, efficiency, and continuity in business operation.
	Structural resources	The internal systems, tools, and organisational infrastructure that support how a company operates and retains knowledge, enabling consistent performance and long-term value creation.

Section 5 provides detailed guidance on each one of the Service Measures included in the CVF, covering definition, Impact Categories, units of measure, and guidance for use.

1.3 How is the CVF developed

The CVF has been developed through substantial engagement with companies and regulators in the UK Water Sector. This work has been funded through the Mainstreaming Nature-based Solutions to Deliver Greater Value programme, funded by the Ofwat Innovation Fund. Figure 3 summarises the overall development timeline of the CVF. The main phase of the development work was carried out over 26 months from November 2023 to February 2026.

Figure 3: CVF development process



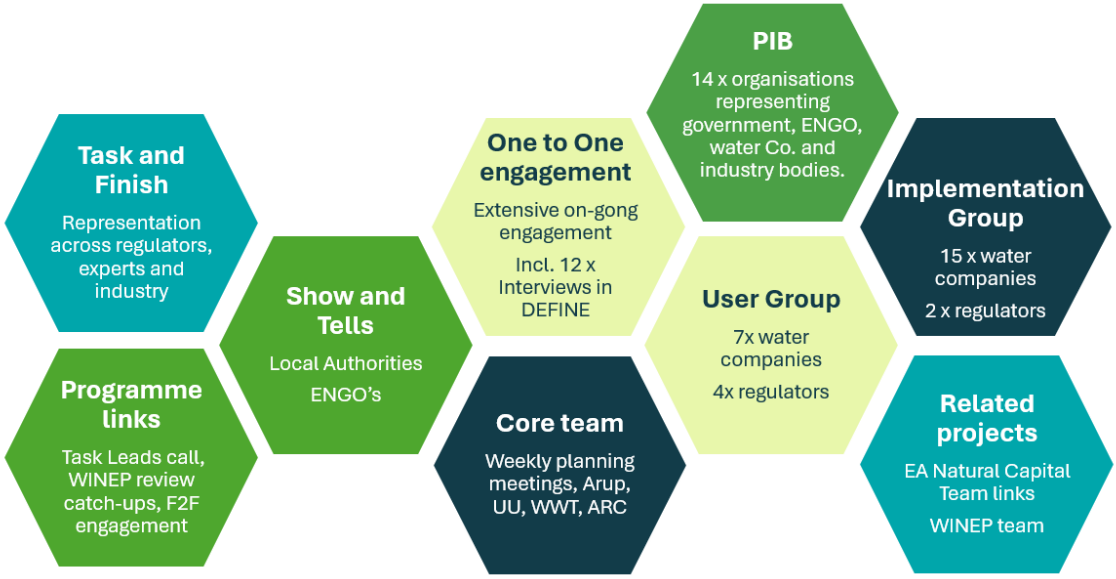
Throughout the development of the CVF, the core team[1] has worked closely with various stakeholder groups to co-create a product that is robust and fit-for-purpose. The engagement undertaken are shown in Figure 4. Key stakeholder groups that served the co-creation of the CVF include:

- Task & Finish Group: with representatives from across regulators, experts and industry. This group supported the CVF mainly through the Review and Define phases, identifying user needs for the CVF and co-defining the scope for the CVF.
- User Group: with representatives from across industry and regulators who are involved in water sector investment planning as their main role. This group supported the development phase of the CVF, acting as a sounding board and collective decision-making body resolving issues that arise during the development of the CVF e.g. agreeing on the Service Measures to be included, approaches to valuation.
- Implementation Group: with representatives from across regulators, experts and industry who are best placed to drive the adoption and implementation of the CVF. This group has been supporting the core team in their response to the feedback received through the August 2025 public consultation and conversations on the adoption and regulatory integration of the CVF into PR29 and beyond.

- Programme Implementation Board (PIB): with senior representatives from across government bodies, eNGO, water companies and industry bodies. This group has been steering the general direction of the CVF and providing support and endorsement from senior representatives.

For a full list of members of the various engagement groups, please refer to Appendix B.

Figure 4: Summary of engagement through the development of the CVF



1.4 The CVF and NCEM

Both the CVF and NCEM provide valuable lenses for water company decision making. While they share common principles, their combined use ensures a more holistic and aligned approach. This section outlines how NCEM and the CVF should be used in conjunction with one another, with the aim of creating an efficient value assessment approach. For a detailed comparison of the values used in the CVF and NCEM, please refer to Appendix A.

Overview of approaches

[1] The CVF has been developed by a core team with colleagues from United Utilities, Arup, Wildfowl and Wetland Trust and Adrian Rees Consulting.

Both approaches aim to widen the scope of company optioneering to incorporate a broader range of values. In the development of the CVF, underlying values from the NCEM work were incorporated into the natural capital-related Service Measures and impacts.

Table 2 Overview of CVF and NCEM

	CVF	NCEM
Purpose	Designed to be used as the default multi-capitals value framework for water companies across all optioneering.	To drive consistency in natural capital approaches for optioneering.
Structure	Provides valuations of a broad range of impacts and dependencies of water sector interventions on multi-capitals.	Provides guidance, evidence and values for natural capital.
Required inputs	Allows for different levels of granularity of input data to suit short- and long-term planning. Input data requirements aim to align with companies' existing data where possible.	Local/place-based data focussed on natural capital.
Outputs	NPVs and Cost benefit ratios for use in intervention ('solution') optioneering, building best value programmes and portfolio optimisation.	Natural capital values of schemes & programmes.

Further guidance will follow on using the CVF and NCEM together.

2. How to use the CVF

2.1 Setting up the workbook

Before taking values from the CVF, the user should first go to the **COMPANY INPUT tab** and select the company and appraisal start and end years. This allows the valuations that rely on company data and appraisal start and end years to be updated. Table 3 shows all the Service Measures that use company data for value calculations.

The appraisal start year is used to for inflation purposes and is applied to all Service Measures. The appraisal end year is used to calculate the appraisal duration, which is used in the CVF workbook to calculate an average value for carbon over the appraisal period.

Table 3 Services Measures that use company data as an input for its value calculations

Ref	Service Measure
1	Drinking water quality (biological and chemical)
2	Drinking water quality (appearance, taste and odour)
5	Unplanned interruptions
7	Leakage
9	Water use restrictions
10	Water use
11	Rainwater management
26	Pollution incidents
28	Bathing water quality

2.2 Positive and negative values in the CVF

The values included on the **VALUATION tab** are annual values if not stated otherwise. Benefits are displayed as negative values and costs displayed as positive values.

To represent an inversed outcome to what the Service Measure is describing, simply enter the quantity as a negative number. For example, a residential property benefitting from an improved natural environment may have a valuation of -£7000 per property, but a home that experiences a loss of natural environment nearby would be counted as -1 quantity in the appraisal calculation, resulting in a calculation of -1 * -£7000 = £7000 disbenefit.

2.3 Frequency vs quantity

Each Service Measure and Impact Category has specific guidance on how to input frequency and quantity for that impact when using the CVF in investment decision-making processes. Please see **Section 5**. Where an impact is expected less than once per year, the quantity of the impact should be less than 1, e.g. a pollution event occurring once every 5 years would have a frequency of 1 and a quantity of 0.2. For Service Measures where the units require both the number of properties/people affected and the number of incidents per year, the quantity should be used to capture the number of properties/people affected per incident and the frequency should be used to capture how often the incident occurs.

2.4 The numbered tabs

For each Service Measure where values are provided, there is a numbered tab that provides the detailed workings of the valuation, including value sources, assumptions, calculations and references.

The numbered tabs are structured as illustrated in Table 4. The rows on each worksheet are grouped. under grouping 1, the detailed workings for each Value Option are collapsed, showing only the summary tables for each Value Metric. It is recommended that users start with this view and only going into grouping 2 when interrogating the detailed workings for the valuations. This is especially beneficial for Service Measure with values across many Value Metrics.

Table 4 Structure of the numbered tabs

Numbered tab structure	Grouping	Commentary
Name of the Service Measure (e.g. leakage)	1	/
Final values table	1	Final values inflated to the appraisal base year, presented by Impact Categories and split under respective Value Metrics
Value Metric 1 (e.g. water resources) • Outcomes • Value summary	1	This is the summary section for each Value Metric. The workbook states the outcomes being valued, how many Value Options were found, and which one was used in the final values.
Value Option 1 • Source information • Confidence • Input data • Calculation • Valuation and source information	2	This is the detailed working sections and is set out by Value Options. Each Value Option provides a different way of valuing the outcome e.g. the negative impact of leakage on water resources. Sometimes, only one Value Option is found, other times, none. At the start of each Value Metric, it is made clear how many Value Options were found and which one was used.
Value Option 2 …	2	
Value Metric 2 …	1	/
Value Option 3 …	2	/

There are a small number of Service Measures that do not have a numbered tab. The majority of these are reporting only Service Measures, meaning that they don't have a direct consequence that can be felt by customers or another stakeholder. As such, their impact will be measured using other Service Measures. For example, a burst does not have a direct impact, but it may cause surface water flooding and loss of pressure, which should be represented using the Internal/External surface water flooding (16/17) Service Measures and the Water pressure (6) Service Measure respectively. The Service Measures that do not have a numbered tab are stated in Table 5.

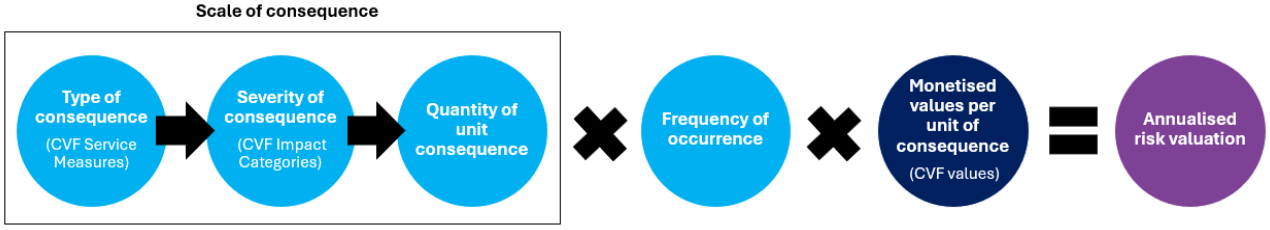
Table 5 Service Measures without a numbered tab

Ref	Service Measure	Reason
8	Bursts	Reporting only
21	Blockages	Reporting only
22	Collapse	Reporting only
37	Compliance Risk Index (CRI)	Reporting only
47	Other benefits and avoided costs	Monetary value to be inputted by user

2.5 Representing investment options

The current version of the CVF is designed with the UK Water Sector as the primary user. The investment decision making process in the Sector is driven by the understanding and management of risk and value. Figure 5 illustrates how the CVF is designed to be applied in this context. The CVF provides a list of pre-defined consequences (i.e. Service Measures) and severities (i.e. Impact Categories), and values against each of them. The CVF has been designed to be configured within decision support tools (DSTs), although this is not a prerequisite for application.

Figure 5 Application of CVF in investment decision making



To use the CVF, users will need to select the relevant Service Measures and then provide input on the pre and post intervention quantity and frequency against each Service Measure. Please refer to the worked examples (a separate excel workbook) for a step-by-step guide on how this can be done.

The CVF products (workbook, User Guidance, worked examples) focuses on the benefit valuation element of investment decision making (the dark blue circle in Figure 5). It does not provide guidance on how quantify and frequency should be calculated, which are typically covered by companies' own risk management processes and capabilities.

2.6 Representing Nature-based Solutions

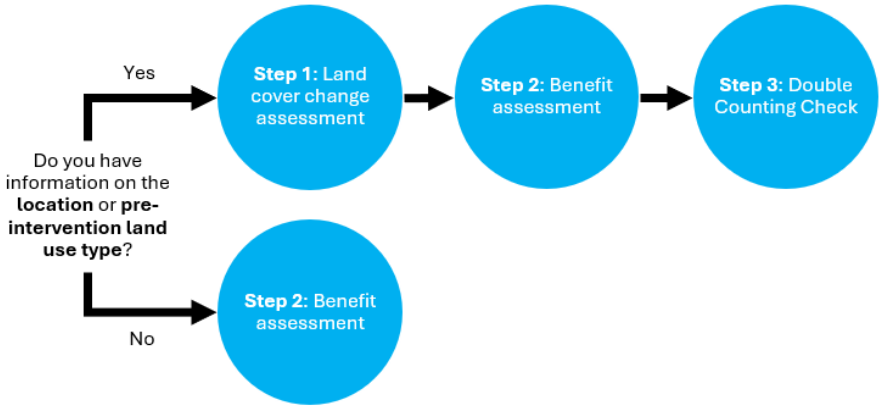
The CVF is designed to represent any water sector investment, not just nature-based investment. However, we recognise that nature-based Solutions (NbS) can often bring benefits in addition to the primary purpose of their investment, and the inclusions of these wider benefits is important for their comprehensive consideration through the investment planning process. As such, the guidance given in this section explains in more detail how the CVF should be used to represent NbS. Same to representing any investment options, the benefits from a NbS are calculated by comparing the difference between the pre and post intervention positions.

By NbS, we refer to the following information as provided by the IUCN Global Standard on Nature-based Solutions and Principles[2]:

Nature-based Solutions are actions to protect, sustainably manage, and restore natural or modified ecosystems, that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits.

There are two routes to represent NbS using the CVF, depending on if the user has information on the location or pre-intervention land use (Figure 6).

Figure 6 How to represent NbS using the CVF



Step 1: Will the NbS result in any land use or land quality change?

Consider if the NbS will result in a change in land cover type or land quality. If the answer is yes, the Habitat impact (incl. biodiversity) (30) Service Measure should be used to represent this change. Use Table 6 to identify the most appropriate Impact Category to represent the NbS. The list of NbS groups included in the table was developed by the MNBS programme from a comprehensive literature review.

For guidance to select the most appropriate land quality (good / moderate /poor) please refer to **Section 5.30** of this guidance.

Table 6 Representing land use/quality change from NbS using Habitat impact (30) Service Measure

NbS Group	Example of interventions	What Impact Category under SM 30 to use
Treatment wetlands	Constructed wetlands, treatment lagoons	Wetland (urban/rural)
SuDS	Swales, bioretention systems, detention basins, retention ponds/wetlands, rainwater harvesting, soakaways, green roofs	SuDS (high/medium/low)

[2] The decision to adopt this definition of NbS was made by the Mainstreaming Nature-based Solutions Programme for the purpose of the programme delivery. The definition can be found here: https://iucnacademy.org/wp-content/uploads/2025/02/NbS7_Live_session_2.pdf [accessed 26/01/2026]

NbS Group	Example of interventions	What Impact Category under SM 30 to use
NFM	Upland peatland management, soil and land management, assisted natural regeneration	Select the most appropriate Impact Category based on the **land cover impacted**.
	Runoff management and storage, flood plain reconnection, woodland management, leaky barriers, species reintroduction	Select the most appropriate Impact Category based on **post-intervention land cover**. Only use wetland (urban/rural) if wet for more than half of the year. If intervention is in a watercourse, skip this step and move to Step 2
Coastal NbS	Saltmarsh / mudflat / sand dune management and restoration, submerged aquatic vegetation (SAV) and kelp, species reintroduction, regenerative marine farming	Coastal margins if there is creation of coastal margin habitats. Otherwise, move to Step 2.
River restoration	Restore channel shape / connectivity / river movement, riprap removal, in-stream substrate addition	Skip this step, move to Step 2.
Agriculture	Farm infrastructure and practice	Select the most appropriate Impact Category based on **post-intervention land cover**.

Step 2: What benefits will the NbS give?

Consider all the material benefits that will be delivered by the NbS. Table 7 provides guidance on the most appropriate Service Measure to use to represent these benefits. The table includes explanation of what value is captured by each Service Measure or Impact Category, to help the user understand the build-up of the values. If the user identifies any benefits that are not captured in Table 7, the Other benefits and avoided cost (47) Service Measure should be used to capture the monetary value of these benefits.

Table 7 Representing benefits from NbS

Typical benefits from NbS		Service Measure to use		What does the value represent
Water resource	Provides the ability to **separate surface water from combined** sewerage systems	11 Rainwater management: Surface water separated from combined		This Impact Category values the greenhouse gas emissions avoided due to not having to process the surface water that have been separated.
	Provides the ability to **intercept and harvest surface water** for reuse	11 Rainwater management: Surface water intercepted/harvested		This Impact Category values benefit from the avoided water abstraction from harvesting the surface water, and the avoided emissions for not having to treat other clean water for use.
Water quality	Impacts the amount of **polluting nutrients** entering water bodies	33 Nutrient removal		This Service Measure values the benefit of reduced nutrient removal cost from water bodies.
	Impacts the **quality** of a river, lake or other **water body**	27 Quality of the water environment	These Service Measures shouldn't be used together	This Service Measure values the bundled benefits from the water environment (recreation, biodiversity and quality of place), based on WTP values.
	Impacts the **quality** of a designated **bathing water**	28 Bathing water quality		This Service Measure values the bundled benefits from bathing water (recreation, health & wellbeing, quality of place, local economy), based on WTA values.
Recreation	Impacts on the no. of **recreational visitors or fishing visits**	38 Recreation		This Service Measure values the benefits of recreation to the local economy (trip expenditure, avoided public health costs) and individuals (wellbeing valuation).
Water regulation	Impacts the occurrence of **internal or external surface water flooding** of properties	16/17 Interna/External surface water flooding		These Service Measures value the carbon cost from flood damages, bundled disbenefits from flooding on society based on WTA values, and impact on individuals (mental health).

Typical benefits from NbS		Service Measure to use	What does the value represent
Community engagement	Provides benefits to **educational engagement with young people or adults**	39 Community engagement: Educational visits, Engaging with adults	These Impact Categories value the benefit of educational visits, based on travel cost method.
	Provides benefits through **external investment leveraged**	39 Community engagement: Investment leveraged	This Impact Category values the direct financial input leveraged.
	Provides benefits through **external time leveraged** through in-kind contribution	39 Community engagement: Time leveraged (through in-kind contribution)	This Impact Category values the productivity generated to the local economy from the in-kind contribution of time.
	Provides benefits through **volunteering opportunity** (employee or non-employee)	39 Community engagement: Company and non-company employees participating in volunteering	These Impact Categories value the productivity generated to the local economy from the in-kind contribution of time, and the positive impact on people's wellbeing through volunteering.
Biodiversity unit	Provides a benefit to **biodiversity** that is captured through the number of **biodiversity units**	30 Habitat impact: Biodiversity unit (high/central/low value)	These Impact Categories value the benefits delivered by enhanced biodiversity through the market value of one biodiversity unit, based on habitat size, condition, strategic significance, and type.
	Provides a benefit to **in-watercourse biodiversity** that is captured through the number of **biodiversity units (watercourse only)**	30 Habitat impact: Biodiversity unit --- watercourses only	These Impact Categories value the benefits delivered by enhanced biodiversity of watercourses through the market value of one biodiversity unit (watercourse specific), based on habitat size, condition, strategic significance, and type.

Step 3: Checking for double counting of values

If the user has used Service Measures from Step 2 in addition of the Habitat impact (incl. biodiversity) (30) Service Measure to represent a given NbS, they should check for double counting risk using Table 8. This table identifies where the recommended Service Measures and Impact Categories from Step 2 should not be used in combination with the Habitat impact (incl. biodiversity) (30) Service Measure from Step 1. This is identified using dark grey cells – do not use this Service Measure/Impact Category with that habitat type.

Table 8 Double counting check between Habitat impact (30) and other Service Measures which may be used to capture benefits from NbS

		Typical NbS benefits									
		Water resource		Water quality			Recreation	Water regulation	Community engagement	Biodiversity unit	
		Separate surface water from combined	Harvest surface water for re-use	Reduce polluting nutrients	Impact on waterbody quality (non-designated)	Impact on bathing water quality	Impact on recreational visits	Impact on surface water flooding	Deliver educational engagement, or volunteering benefits	Provide quantified biodiversity unit benefit	Provide quantified biodiversity unit benefit (watercourse only)
		SM 11	SM 11	SM 33	SM 27	SM 28	SM 38	SM 16/17	SM 39	SM 30	SM 30
Land use type used to represent the NbS	SuDS						4	5	6	7	7
	Woodland (urban)										
	Woodland (rural)										
	Wetland (urban)										
	Wetland (rural)										
	Grassland (urban)										
	Grassland (rural)										
	Farmland			2							
	Mountain, moor & heath										
	Peatland										
	Costal margins		1	2	3	3		5			
	Designated area										

Explanation of double counting risks identified in Table 8:

1) The water resource valuation for coastal margins includes a benefit to surface water resources, which may double count with the benefit to water resources included the Impact Category surface water intercepted/harvested.

2) The benefit to water quality included in the farmland, mountain moor & heath, and coastal margins may double count with the benefit to water quality captured by the Nutrient removal (33) Service Measure, as they both capture the benefits/disbenefits to water quality through the impact of polluting nutrients. The choice of which Service Measure to use in this case, Habitat impact (incl. biodiversity) (30) or Nutrient removal (33), may depend on the input data available and whether the data is in the form area (ha) of habitat changed or in mass (kg) of nutrients removed.

3) The quality of the Water environment (27) and Bathing water quality (28) Service Measures should not be used with the coastal margins or designated area Impact Categories to value the same waterbody or area of water body. Quality of the water environment (27) and Bathing water quality (28) can be used alongside Habitat impact (incl. biodiversity) (30) to value the downstream impacts to water bodies or bathing waters, where the area of habitat change is distinct from the downstream water body or bathing water.

4) The quality of place benefits of SuDS includes the value of visitors attracted to the green space, which may double count with the value of recreational visits captured in the Recreation (38) Service Measure.

5) The water regulation benefits of SuDS, woodland (urban and rural) and coastal margins may double count with the Internal/External surface water flooding (16/17) Service Measures as they both capture the impacts to surface water flooding.

6) The skills and knowledge benefits of SuDS may double count with the Community engagement (39) Service Measure, as the SuDS habitat type captures the benefits to education from the SuDS.

7) The biodiversity unit (high/central/low value and watercourses only) Impact Categories should not be used with any other habitat type to capture impacts to the same area of habitat.

2.7 Avoiding double counting

Double counting is when a monetised impact is included twice or more in a decision-making process. This means that benefits or disbenefits are not accurately represented. The CVF has accounted for the risk of double counting in its development. This covers instances where there is a risk of overlapping values within a single Impact Category, as well as instances where there is a risk of overlapping values across two Service Measures/Impact Categories.

For the former, the risk of double counting has been avoided in all cases by only including one value where overlapping is suspected with the omitted impact denoted by the sign '</>'.

For the latter, where a risk of double counting across two Service Measures/Impact Categories is anticipated, decisions have been made case by case on how to treat the risk:

- In some cases, advice has been explicitly given that two Service Measures should not be used together. This is set out in Table 9.
- In other cases, the overlapping value metric has only been valued in one of the two related Service Measures, allowing them to be used together. This is set out in Table 10.

For the Service Measures included in Table 9 and Table 10, prompts have also been given in the **Section 5** under the respective Service Measures.

Table 9 Service Measures that should not be used together

Ref	Service Measure	Shouldn't be used with	Rationale
1	Drinking water quality (biological & chemical)	**2** Drinking water quality (appearance, taste and odour)	For parameters that have an aesthetic impact noticed by customers and could be captured under the Drinking water quality (appearance, taste and odour) (2) Service Measure, use the Drinking water quality (biological &

Ref	Service Measure	Shouldn't be used with	Rationale
			chemical) (1) Service Measure if there is any health impact from those same parameters. If the parameter only has an aesthetic impact noticed by customer, use the Drinking water quality (appearance, taste and odour) (2) Service Measure instead. Do not use Service Measures 1 and 2 together to capture the impacts from the same parameter.
		3 Water quality (lead risk)	Do not use these Service Measures to capture the same impacts from lead risk, which may be picked up in parameter sampling. To capture impacts from lead, use the Water quality (lead risk) (3) SM. If any other non-lead parameter impacts occur from the same lead contamination, these can be captured through the Drinking water quality (biological & chemical) (1) SM.
14	Internal sewer flooding	**30** Habitat impact	These SMs should not be used with some of the Impact Categories under 30, as they both cover water regulation and mental health values. See Table 8 for which Impact Categories.
15	External sewer flooding		
16	Internal surface water flooding		
17	External surface water flooding		
18	Final effluent quality	**38** Recreation	If using the Quality of the water environment (27) SM to represent an impact on water quality resulting from final effluent / spills, do not use the Recreation (38) SM at the same time as both SMs cover recreation and quality of place.
19	Final effluent compliance		
20	Intermittent discharge consent compliance		
27	Quality of the water environment	**28** Bathing water quality	Do not use this SM alongside the Bathing water quality (28) SM unless assessing impacts to separate and distinct waters. This SM is for impacts to non-designated waters.
		38 Recreation	We do not recommend using this SM alongside Recreation (38), unless you can identify specific and distinct impact pathways that are captured by both SMs. If there is not a clear and distinct impact pathway, use either this SM or Recreation (38)
28	Bathing water quality	**27** Quality of the water environment	Do not use this SM alongside Quality of the water environment (27) unless assessing impacts to separate and distinct waters. This SM is for impacts to designated waters. Any impacts to non-designated waters should be captured using Quality of the water environment (27)
		38 Recreation	Do not use this SM alongside Recreation (38) to capture impacts to visitor numbers to bathing waters, unless assessing impacts to separate and distinct waters. Impacts to recreation related to bathing waters are included in the valuations for quality of place and local economy.
29	Shellfish water quality	**27** Quality of the water environment	Do not use this SM alongside Quality of the water environment (27), Bathing water quality (28) or Habitat impact (30) to capture impacts for the same area of shellfish water, as all four SMs cover biodiversity value. To capture impacts to areas of water designated as shellfish waters, use this SM. To capture impacts to a non-designated water body use SM 27, impacts to a bathing water use SM 28, or impacts to coastal margins use SM 30.
		28 Bathing water quality	
		30 Habitat impact	
30	Habitat impact	**14** Internal sewer flooding	The SuDS Impact Categories should not be used with the sewer/clean water flooding (14-17) Service Measures as both capture water regulation and mental health values.
		15 External sewer flooding	
		16 Internal surface water flooding	

Ref	Service Measure	Shouldn't be used with	Rationale
		17 External surface water flooding	
		34 Amenity	The SuDS and urban Impact Categories should not be used with the Amenity (34) Service Measure as both capture quality of place benefits.
34	Amenity	**30** Habitat impact	This SM should not be used with the SuDS and urban Impact Categories under the Habitat impact (30) SM as both capture quality of place benefits.
38	Recreation	**27** Quality of the water environment	If capturing recreation benefits as a result of river or other water body water quality improvements, use the Quality of the water environment (27) SM and not this one. If an intervention is expected to impact on recreational visits but has no impact on river or other water body water quality, use this Service Measure and not Service Measure 27.
44	Health and safety	**45** Security	Do not use this SM alongside the Security (physical and cyber) (45) SM for the physical security breach Impact Category, as they both value the impacts to individuals' physical health.
45	Security	**44** Health and safety	Do not use the physical security breach Impact Category under this SM alongside the Health and safety (public and employees) (44) SM, as they both value the impacts to individuals physical health.

Table 10 Service Measures that should be used together

Ref	Service Measure	Should be used with	Rationale
1	Drinking water quality (biological and chemical)	**44** Health and safety	If there is any anticipated health and safety or safety and security impact of reservoir act non-compliance, please use the Health and safety (44) SM to capture it. *This only applies while the health and wellbeing value metric for SM 1 is a literature gap. When the literature gap is filled with a valuation, do not use SM 1 and SM 44 together to capture health impacts from water quality sample failures.*
9	Water use restriction	**47** Other benefits and avoided costs	The impact of drought on water resources should be valued through the Other benefits and avoidable costs (47) Service Measure on a company-specific basis.
10	Water use	**47** Other benefits and avoided costs	If there are any private financial benefit to the water company e.g. through energy saving, this should be entered using the Other benefits and avoidable costs (47) SM on a case-specific basis.
11	Rainwater management	**47** Other benefits and avoided costs	If there are any private financial benefit from surface water separation or interception to the water company, this should be entered using the Other benefits and avoidable costs (47) SM on a case-specific basis.
13	Reservoir act compliance failure	**44** Health and safety	If there is any anticipated health and safety or safety and security impact of reservoir act non-compliance, please use the Health and safety (44) SM to capture it.
18	Final effluent quality	**27** Quality of the water environment	If impact on river's or other water bodies' water quality is expected, please use the Quality of the water environment (27) SM.
19	Final effluent compliance		
20	Intermittent discharge consent compliance		
23	Sludge treatment	24 Sludge disposal	Valuations for the soil value metric are not provided to avoid double counting with Sludge disposal (e.g. landfill, incineration, land) (24) SM. So, if impact on soil is expected from sludge treatment interventions, consider using SM 24 to capture these.

Ref	Service Measure	Should be used with	Rationale
26	Pollution incidents	38 Recreation	A valuation for the recreation value metric is not provided to avoid double counting with the Recreation (38) Service Measure. If impact on recreation is expected, SM 38 should be used in tandem.
30	Habitat impact	33 Nutrient removal	Water quality impacts on habitats: SuDS, urban wetland, rural wetland, urban woodland, and rural woodland, should be valued through the Nutrient removal (33) SM.
33	Nutrient removal	39 Community engagement	The valuations for stakeholder relationships value metric are not included to avoid double counting with the Community engagement (39) SM. If impact on community engagement is expected, SM 39 should be used in tandem.
		47 Other benefits and avoided costs	If there are any private financial benefit from the removal of nutrients to the water company, this should be entered using the Other benefits and avoidable costs (47) SM on a case-specific basis.
35	External contacts	1 Drinking water quality (biological and chemical)	This Service Measure only captures the impact of customer complaints on local economy from a lost productivity perspective of the caller. Any local economy impact from disruption to businesses due to water supply issues should be represented using the Drinking water quality SM 1 and 2.
		2 Drinking water quality (appearance, taste and odour)	
39	Community engagement	47 Other benefits and avoided costs	The impact of investment leveraged on local economy should be value through the Other benefits and avoidable costs (47) SM on a case-specific basis.
43	Active travel opportunities	38 Recreation	Valuations are not provided for the recreation value metric to avoid double counting with the Recreation (38) SM. If impact on recreation is expected, SM 38 should be used in tandem.

2.8 Confidence score

For every valuation, the CVF has assigned a confidence in the quality of that valuation. This is to provide the user with as much information about the provenance and calculation of valuations as possible and reflect the reliability and accuracy of the inputs into any investment decisions.

The overall confidence score used is based on 6 different criteria. The source, robustness, age, location, and transparency criteria are related to the weakest source used in the calculation if more than one source was used. The manipulation criteria are related to the complexity and limitations in the calculation used to apply the benefit transfer. The overall confidence score is calculated as follows:

1. For each criterion, the value option source/s are given a score of high (3), medium (2) or low (1), relating to the descriptors provided in Table 11.
2. An average score is taken to create an overall score.
3. There are a discrete number of overall scores, which range from 1.71 to 3.00 at the time of the derivation of this method. This range of scores is divided equally to give three confidence bands: an average score of ≤ 2.14 is awarded red, an average score >2.14 and ≤ 2.57 is awarded amber, and an average score >2.57 and ≤ 3 is awarded green.
4. A cap is imposed using the manipulation score, as the degree of calculation from the original source value introduces a significant level of uncertainty to the valuations. Therefore, the average score cannot exceed 2.14 if the manipulation score is low or 2.57 if the manipulation score is medium.

The CVF has not been prescriptive on the use of the confidence scores provided to inform investment decisions. Users can determine their approach depending on the context of use. Here are some suggestions on how confidence score can be used to improve decision making:

- Use confidence to filter inputs: for example, restrict analysis to benefits with high or medium confidence ratings, excluding low confidence values from calculations to avoid overstating impact.
    - Apply confidence as weighting factors: giving greater influence to benefits assessed with stronger evidence or clearer assumptions and reducing the weight of more uncertain valuations.
    - Use confidence to structure sensitivity analysis: helping users understand how results shift when emphasizing only the most certain benefits.
    - Present results alongside confidence: to increase transparency and help users understand which benefits are robust and which rely on more uncertain assumptions.

Table 11 Criteria for confidence scoring

Criteria	High (3)	Medium (2)	Low (1)
Source	Monetary values have been peer reviewed or are recommended / referenced in other, well recognised and accepted guidance / tools relevant to the water sector.	The monetary values are recommended / referenced in other, well recognised and accepted guidance / tools relevant to another sector.	Data or assumption based on poor evidence.
Robustness	Study has few limitations and is considered robust.	Study has some limitations which may impact on the robustness of the value.	Study has significant limitations and the use of the value comes with significant caveat.
Age	0 – 5 years	6-10 years	>10 years
Location	Geographically relevant to UK	Less geographically relevant e.g. Europe or relevant to a specific UK region	Limited geographical relevance e.g. Asia
Transparency	Clear understanding of the valuation method and how the value should be applied.	Meta-analysis or limited understanding of what the value represents.	Unclear on what the value represents.
Manipulation	The original valuation can be used with no or very simple modification e.g. change units from ha to km2, applying inflation.	The original valuation can be used with some modification e.g. applying household numbers. The calculation is simple or introduces low levels of uncertainty.	The original valuation can be used with significant modification e.g. several additional data inputs are required to use the original source. The calculation is complex or introduces significant uncertainty.

2.9 Private costs and benefits

Private costs are costs to the water company, incurred as a result of service failure. Private benefits are cost savings or income as a result of service improvement (e.g. renewable energy generation, customer billing). The CVF has not attempted to provide values for private costs and benefits, with a small number of exceptions. This is because private costs and benefits tend to be company specific. As this CVF has not been developed for any one company, private costs and benefits have not been calculated, except where there is a sector wide valuation for an impact on a water company.

It is expected that water companies will use their own calculated private costs and benefits alongside the CVF. Below is a very high-level summary of the types of costs that may feature in the calculation of private costs and benefits.

- Legal fees and public liability excess
- Staff rates and required hours for response to incident
- Logistical cost of response to incident
- Supplies, e.g. bottled water
- Sending communications, e.g. leafletting
- Reporting or monitoring costs

- Organisational overheads
- Income from energy generation
- Avoided fees e.g. landfill gate fee

2.10 Literature gaps & company's own values

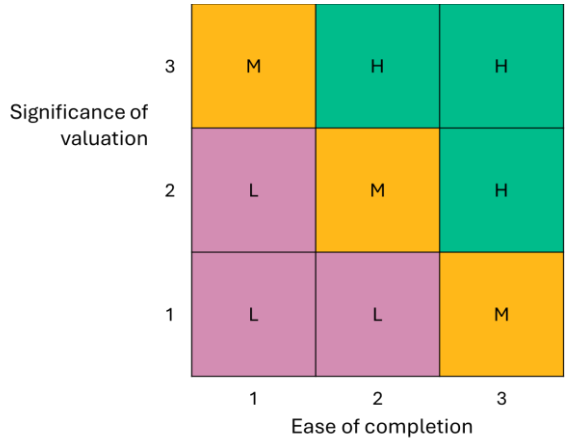
The CVF has a number of literature gaps despite the best effort to find suitable valuations for every impact pathway. However, it does represent the best information available at the time of development (Nov 2024-Jan 2026). These literature gaps have been categorised into High (H), Medium (M), and Low (L) priorities. This value represents the priority with which owners and users of the CVF should seek to find new sources or conduct new research to fill those gaps.

The assignment of the gap priority was done using the following principles:

- Significance of value: how useful having that valuation available to use, or how much it will impact investment decision-making. A more significant valuation might be one that fills an important or commonly identified investment area or is likely to significantly impact the results of an optioneering process.
- Ease of completion: how quick or easy it is to find or calculate that valuation. An easy to complete valuation might be one where all the required calculation input data is available and someone only needs to calculate the final valuation, or where the process to generate the valuation, such as additional research or surveys, is quick and simple to undertake.

These principles are combined in a 3x3 matrix as shown in Figure 7, with cells assigned low, medium or high priority. This matrix is applied to all the existing literature gaps in the CVF.

Figure 7 Matrix for assigning literature gap priority



Notably, customer trust is an area with very limited research for the water sector, meaning nearly all valuations for this value metric are literature gaps. This, along with other value metrics relating to social capital impacts, is a growing field of research and so monetised valuations may be developed in future.

Updating evidence and filling literature gaps

Knowledge and evidence for the water and environment sector is constantly evolving. Evidence banks including the CVF will require periodic updates to capture the most up to date evidence. Users are also encouraged to fill these literature gaps with new research or private data where possible. When a literature gap is filled, a review of double counting tables and considerations is required as the new valuation may change how Service Measures can be used in combination.

Table 12 provides a summary of literature gaps currently present in the CVF.

Table 12 Current literature gaps in the CVF

Value Metric	Service Measure and Impact Categories with literature gaps	Significance	Ease	Priority
Private costs/benefits	All relevant Service Measures	3	3	H

Value Metric	Service Measure and Impact Categories with literature gaps	Significance	Ease	Priority
Trust	All relevant Service Measures	3	2	H
Water quality	Water quality (lead risk) (3)	3	2	H
	Pollution incidents (26)	3	1	M
Water regulation	Habitat impact (30) *Mountain moor & heath / Peatland*	2	1	L
Air quality	Transport disruption (42) *Rail*	2	2	M
	Sludge treatment (23) *Loss of generation (e.g. CHP, gas to grid failure)*	1	1	L
Greenhouse gases	Internal/external sewer flooding (14/15), Internal/external surface water flooding (16/17) Sludge treatment (23) *Re-treatment through thickening and de-watering / Re-treatment through liming*	2	2	M
	Transport disruption (42) *Rail*	3	1	M
	Circular economy (46) *Subpotable water supply / Heat recovery from sludge*	1	1	L
Temperature regulation	Habitat impact (incl. biodiversity) (30) *SuDS / Urban woodland / Urban wetland*	1	1	L
Biodiversity	Bathing water quality (28) Habitat impact (incl. biodiversity) (30) *Urban/rural grassland / Urban/rural wetland / Mountain moor & heath / Peatland / Coastal margin*	3	1	M
Stakeholder relationships	Community engagement (39)	2	1	L
Quality of place	Planned/unplanned interruptions (4/5) *0 to 3 hour interruption to supply*	3	3	H
	Abstraction consent compliance (12) *Abstraction consent compliance failure*	3	2	H
	Water pressure (6) *High pressure noticed by customer*	1	3	M
	Sludge disposal (24) *Sludge to landfill (instead of to land) / Sludge to incineration (instead of to land)*	2	1	L
Local economy	Drinking water quality (biological and chemical) (1) *WQ parameter sample exceedance, higher estimate* Planned/unplanned interruptions (4/5) *0 to 3 hour interruption to supply*	3	2	H
	Water pressure (6) *High pressure noticed by customer*	1	3	M
	External sewer flooding (15) *Hydraulic/FOC – External flooding of open social infrastructure*	1	2	L
	Transport disruption (42) *Rail*	2	1	L
Health & wellbeing	Drinking water quality (biological and chemical) (1) *WQ parameter sample exceedance, health impacts* Quality of the water environment (27)	3	2	H
	Internal/external sewer flooding (14/15) Internal/external surface water flooding (16/17) *Non-residential Impact Categories*	3	1	M
	Amenity (34)	2	1	L

Value Metric	Service Measure and Impact Categories with literature gaps	Significance	Ease	Priority
	No. businesses benefited from improved natural environment			

Using company's own values

Many companies conduct their own WTP or WTA studies. These studies often represent a more locally relevant valuation that is considered more accurate for the geography that the company operates in but is less applicable to the wider sector due to the bias towards that specific location and customer base. Furthermore, studies are often not directly comparable as they are dependent on the language used in the stated preference studies (e.g. one customer base may be asked to judge their willingness to accept "poor river water quality near their property" and another set may be asked to just their willingness to accept "polluted river waters within 5 miles of their property"), and the other options presented to the customers, as customers are asked to rank their preferences of all options available.

As this is a common value framework, the workbook has not included company specific valuations unless there is a gap in sector-wide studies. When considering substituting or supplementing the values provided by the CVF with company's own values, users should only do so if the following conditions are met:

- Need to be able to demonstrate that a change in the value used will make a material difference.
- Need to be able to satisfy the same level of robustness in the value used.

Any substitution or supplement should be documented for auditability, including the sources of the valuations, rationale which explains how they meet the conditions for deviating from the CVF and produce a clear audit trail which explains how their values now differentiate from the CVF. Users should be able to identify specific drivers for what has driven the differentiation. This evidence would need to be able to be queried and challenged by regulators and learning shared back to the wider sector.

2.11 Reporting from the CVF

The CVF has been designed to align closely with key regulatory requirements and sector planning frameworks. This alignment provides a clear link between value-based planning and regulatory expectations, enabling water companies to use the CVF alongside existing regulatory guidance to support best value investment decisions. We have mapped the CVF Service Measures to the following to help with water company planning and reporting needs:

- Drainage and Wastewater Management Plan (DWMP) Performance Indicators (PIs).
- Water Resources Management Plan (WRMP) supplementary guidance wider outcomes topics that should be considered as part of water resource planning.
- Water Industry National Environmental Programme (WINEP) and National Environment Programme (NEP): mapping action categories (e.g. bathing waters, climate change, INNS etc) that fall under Water Industry Strategic Environmental Requirements (WISER) and other environmental regulation objectives.
- PR24 Common Performance Commitments (PCs).
- Natural Capital Evidence and Metrics (NCEM).

Table 13: Service Measures aligned to DWMP categories

Ref	Service Measure	Flooding	Water environment	Economy & community
14	Internal sewer flooding	X		
15	External sewer flooding	X		
16	Internal surface water flooding	X		
17	External surface water flooding	X		
18	Final effluent quality		X	
19	Final effluent compliance		X	
20	Intermittent discharge consent compliance		X	
26	Pollution incidents		X	

Ref	Service Measure	Flooding	Water environment	Economy & community
27	Quality of the water environment		X	
28	Bathing water quality			X
29	Shellfish water quality			X

Table 14: Service Measures aligned to WRMP supplementary guidance

Re	Service Measure	1 in 500	Outage	Env & society in decision-making	Leakage	Climate change
4	Planned interruptions	X	X			X
5	Unplanned interruptions	X	X			X
7	Leakage				X	
9	Water use restrictions	X				X
10	Water use			X		
11	Rainwater management			X		X
12	Abstraction consent compliance					
13	Reservoir act compliance failure	X				X
14	Internal sewer flooding			X		X
15	External sewer flooding			X		X
16	Internal surface water flooding			X		X
17	External surface water flooding			X		X
18	Final effluent quality			X		
19	Final effluent compliance			X		
20	Intermittent discharge consent compliance (spills)			X		
26	Pollution incidents			X		
27	Quality of the water environment			X		X
28	Bathing water quality			X		X
29	Shellfish water quality			X		X
30	Habitat impact (incl. biodiversity)			X		X
31	Greenhouse gas emissions			X		X
32	Air pollution			X		
33	Nutrient removal			X		X
34	Amenity			X		X
36	Nuisance			X		
37	Compliance Risk Index (CRI)					X
38	Recreation			X		
39	Community engagement			X		
40	Employment			X		
42	Traffic disruption			X		X
43	Active travel opportunities			X		
44	Health and safety (public & employees)			X		X
46	Circular economy			X		X

Table 15: Service Measures aligned to WINEP WISER objectives

Ref	Service Measure	A thriving natural environment	Expected performance / compliance	Resilience
1	Drinking water quality (biological and chemical)	X	X	X
2	Drinking water quality (appearance, taste and odour)	X	X	X

Ref	Service Measure	A thriving natural environment	Expected performance / compliance	Resilience
3	Water quality (lead risk)	X	X	X
7	Leakage	X		X
9	Water use restrictions			X
10	Water use	X		X
11	Rainwater management			X
12	Abstraction consent compliance		X	X
13	Reservoir act compliance failure		X	X
14	Internal sewer flooding	X		X
15	External sewer flooding	X		X
16	Internal surface water flooding			X
17	External surface water flooding			X
18	Final effluent quality	X	X	X
19	Final effluent compliance	X	X	X
20	Intermittent discharge consent compliance (spills)	X	X	X
21	Blockages			X
22	Collapse			X
23	Sludge treatment (including methods and final quality)		X	
24	Sludge disposal (e.g. landfill, incineration, land)		X	
25	Sludge compliance		X	
26	Pollution incidents	X	X	
27	Quality of the water environment	X	X	X
28	Bathing water quality	X		X
29	Shellfish water quality	X		X
30	Habitat impact (incl. biodiversity)	X		X
31	Greenhouse gas emissions			X
34	Amenity	X		
37	Compliance Risk Index (CRI)		X	
38	Recreation	X		
39	Community engagement	X		X
41	Enabling growth			X
44	Health and safety (public & employees)		X	
45	Security (physical / cyber)		X	

Table 16: Service Measures aligned to PR24 common PCs and where NCEM values are used

Ref	Service Measure	PR24 PCs	NCEM values used
1	Drinking water quality (biological and chemical)	X	
2	Drinking water quality (appearance, taste and odour)	X	
4	Planned interruptions	X	
5	Unplanned interruptions	X	
7	Leakage	X	X
8	Bursts	X	
10	Water use	X	X
11	Rainwater management		X
12	Abstraction consent compliance		X
14	Internal sewer flooding	X	
15	External sewer flooding	X	
18	Final effluent quality	X	
19	Final effluent compliance	X	

Ref	Service Measure	PR24 PCs	NCEM values used
20	Intermittent discharge consent compliance (spills)	X	
22	Collapse	X	
23	Sludge treatment (including methods and final quality)		X
26	Pollution incidents	X	
27	Quality of the water environment	X	X
28	Bathing water quality	X	
29	Shellfish water quality		X
30	Habitat impact (incl. biodiversity)		X
31	Greenhouse gas emissions	X	
32	Air pollution		X
33	Nutrient removal		X
35	External contacts	X	
37	Compliance Risk Index (CRI)	X	
38	Recreation		X
39	Community engagement		X
43	Active travel opportunities		X

Table 17: Service Measures aligned to NEP categories

Ref	Service Measure	Physical modifications	Storm overflows & improved wastewater treatment	Biodiversity, INNS, SSSI	Water Quality	Eels and fisheries	Bioresources and Net Zero	Water Resources	NbS and Flood	Bathing Waters, Marine and Shellfish Waters	Chemicals and micro-plastics
1	Drinking water quality (biological and chemical)										X
2	Drinking water quality (appearance, taste and odour)										X
3	Water quality (lead risk)				X						X
9	Water use restrictions							X			
10	Water use							X			
11	Rainwater management							X	X		
12	Abstraction consent compliance							X			
14	Internal sewer flooding								X		
15	External sewer flooding								X		
16	Internal surface water flooding								X		
17	External surface water flooding								X		
18	Final effluent quality		X		X				X		
19	Final effluent compliance		X		X				X		
20	Intermittent discharge consent compliance (spills)		X		X				X		
23	Sludge treatment						X				
24	Sludge disposal (e.g. landfill, incineration, land)						X				
25	Sludge compliance						X				
26	Pollution incidents		X		X				X		
27	Quality of the water environment	X	X	X	X					X	
28	Bathing water quality	X	X	X	X					X	
29	Shellfish water quality	X	X	X	X	X				X	
30	Habitat impact (incl. biodiversity)	X		X	X	X		X	X	X	
31	Greenhouse gas emissions						X				
33	Nutrient removal				X						X
46	Circular economy						X	X			

3. Methodology notes

3.1 Sources of valuation

For each Service Measure in the CVF, monetised values reflecting the impacts of benefits (positive outcomes) or disbenefits (negative outcomes) across the capitals (financial, natural, social, human, and intellectual capitals) have been provided. These monetised values are calculated using a range of different sources. Table 18 describes the main types of sources of values included in the CVF. A full list of sources used is available in the **REVIEWED SOURCES tab** in the CVF.

Table 18: Types and sources of value in the CVF

Valuation type	Definition	Approach
Willingness to pay (WTP) studies	Economic studies done using customer stated preference values, which are derived by surveying water company customers on what change in bills, i.e. what they would be willing to pay, for a positive change in service level. This can also be captured as 'willingness to accept' (WTA) a specific service issue if their bills were reduced, i.e. what value would a customer willingly receive in exchange for a negative outcome.	Many utility companies commission WTP studies on their own customer base to determine monetised valuations for specific service issues. In this case, the CVF has the Ofwat Collaborative Customer Research as an England and Wales-wide WTP/WTA study ('PR24: Using collaborative customer research to set outcome delivery incentive rates', Ofwat, August 2023). The use of the Ofwat Collaborative Customer Research intends to create an England and Wales-wide baseline where a sector wide valuation is available for all Service Measures, but this may reduce some location specific detail. If a company has a valuation more relevant to their location, this can be used when inputting valuations into DSTs. More detail is provided on this below. Where the Ofwat Collaborative Customer Research does not provide an appropriate valuation or data, the CVF has used company-specific studies or other sources. See below for Ofwat's Collaborative Customer Research WTA valuation summaries (household and non-household) Other company-specific studies are available and used where needed, but have inherent bias towards the area of the country and customer base that the study took place in. It is also difficult to compare WTP study values on a like-for-like basis as they are dependent on the language used in the stated preference studies (e.g. one customer base may be asked to judge their willingness to accept "poor river water quality near their property" and another set may be asked to just their willingness to accept "polluted river waters within 5 miles of their property"), and the other options presented to the customers, as customers are asked to rank their preferences of all options available.
UK government referenced valuations	Economic valuations of impacts on utility companies, society and the environment, which are developed by UK government departments or recommended in official government documents.	UK government valuations are used in preference to wider literature values as they align to UK policy or ambition, and support use of universal valuations for consistent economic appraisal. They are well-researched and considered most relevant to economic appraisal in the UK, e.g. reflecting impacts to the UK's natural environment from carbon emissions as opposed to the calculated impact to the environment of a country with a different economy and ecosystem.
Wider literature values	Economic valuations of impacts on utility companies, society and the environment, which are published in external studies.	Economic valuation is a growing area of study and currently evolving, with valuation of social, human and intellectual capitals being less mature. This means that valuations may not align to the desired outcome directly or may need converting. Calculations may require assumptions, which are stated where necessary.

3.2 Ofwat Collaborative Customer Research for PR24

Ofwat's Collaborative Customer Research for PR24, undertaken jointly with Consumer Council for Water (CCW), was designed to build a consistent, sector-wide understanding of what matters most to water customers and to inform common performance commitments, ODI rates, and affordability and acceptability testing. The work explored customer priorities across England and Wales and confirmed broad alignment

between these priorities and the performance commitments proposed for PR24, while also highlighting important themes such as affordability, resilience, and fairness.

The Ofwat Collaborative Customer Research has been used across the CVF V2.1 where it is applicable, as it is the most recent England and Wales-wide customer study. Customer studies provide important information on willingness-to-pay (WTP) or willingness-to-accept (WTA), which cannot be calculated from other sources or valuation methods. We give preference to the Ofwat Collaborative Customer Research because it provides England and Wales-wide valuations, where other WTP/WTA studies previously only looked at specific regions of the UK. The Ofwat Collaborative Customer Research also assesses a large set of service impacts on customers which makes these valuations more internally consistent when used together.

However, there are noted limitations to the Ofwat Collaborative Customer Research. Ofwat was also ultimately unable to use the study to set bottom-up outcome delivery incentive (ODI) rates, which was the original intention of the study, as they could not robustly map the service impacts to the relevant performance commitments (PCs) for half of all PCs. For the PCs where the mapping exercise was complete, some ODI rates were far higher or far lower than expected. We have still included the study in order to benefit from the comparability of valuations but acknowledge the limitations to the study.

Below are the two main figures (figures 4.1 and 4.2) from 'PR24: Using collaborative customer research to set outcome delivery incentive rates', which show the resulting WTA valuations from the study. Table 19 provides a summary of the Service Measures where the Ofwat valuations have been used and highlights any unit conversions.

Figure 4.2: Non-household valuation results, England and Wales

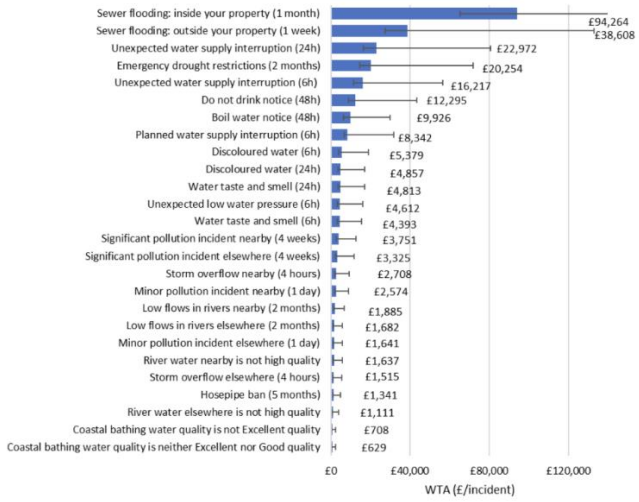


Figure 4.1: Household valuation results, England and Wales

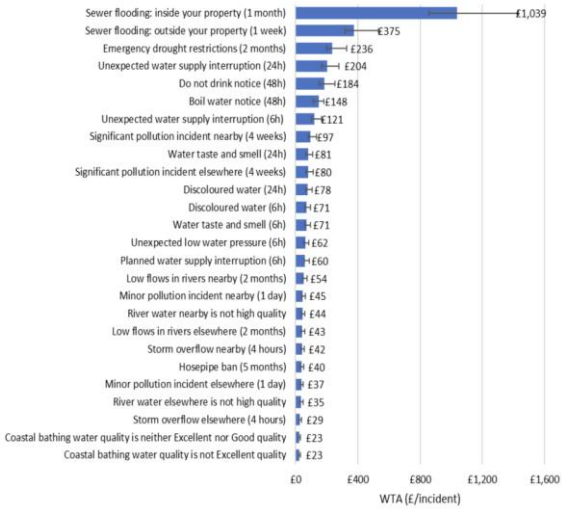


Table 19: The use of the PR24 Ofwat Collaborative Research in the CVF

Service Measures and Impact Categories that used the Ofwat research outputs	Unit conversion	Impact Categories
Drinking water quality (appearance, taste & odour) (2)		
Taste & Odour Complaints - chlorine	No conversion required, unit matches SM units (contacts per incident) as Ofwat's valuation is assumed to be an incident that prompts a contact.	Quality of place, Local economy
Taste & Odour Complaints - earthy/musty		
Taste & Odour Complaints - petrol/diesel		
Taste & Odour Complaints - other causes		
Appearance Complaints - discoloured water (brown/black/orange)		
Appearance Complaints - discoloured water (blue/green)		
Appearance Complaints - particles		
Appearance Complaints - white (air)		
Appearance Complaints - white (chalk)		
Appearance Complaints - animalcules		
Appearance Complaints - general conditions		
Planned interruptions (4)		

Service Measures and Impact Categories that used the Ofwat research outputs	Unit conversion	Impact Categories
3 to 6 hour interruption to Supply	No conversion required, unit matches SM units (properties per interruption).	Quality of place, Local economy
6 to 12 hour interruption to Supply		
Unplanned interruptions (5)		
>3 to 6 Hour Interruption to Supply	No conversion required, unit matches SM units (properties per interruption).	Quality of place, Local economy
>6 to 12 Hour Interruption to Supply		
>12 to 24 Hour Interruption to Supply		
24+ Hour Interruption to Supply		
Water use restrictions (9)		
Drought trigger level 2: Implementation of hosepipe ban	No conversion required, unit matches SM units (properties per impacted event). Interpolation required to identify service issues in between those covered in the study.	Quality of place, Local economy
Drought trigger level 3: Implementation of drought permit / drought order		
Drought trigger level 4: Emergency conditions		
Internal sewer flooding (14)		
Hydraulic - Internal flooding of residential living space	No conversion required, unit matches SM units (properties per incident). Lower bound of valuation used to distinguish between hydraulic and FOC flooding.	Quality of place, Local economy
Hydraulic - Internal flooding of social infrastructure (e.g. schools, hospitals)		
Hydraulic - Internal flooding of commercial and industrial properties		
FOC - Internal flooding of residential living space		
FOC - Internal flooding of social infrastructure (e.g. schools, hospitals)		
FOC - Internal flooding of commercial and industrial properties		
External sewer flooding (15)		
Hydraulic - External flooding of residential properties	No conversion required, unit matches SM units (properties per incident). Lower bound of valuation used to distinguish between hydraulic and FOC flooding.	Quality of place, Local economy
Hydraulic - External flooding of social infrastructure (e.g. schools, hospitals)		
Hydraulic - External flooding of commercial and industrial properties		
FOC - External flooding of residential properties		
FOC - External flooding of social infrastructure (e.g. schools, hospitals)		
FOC - External flooding of commercial and industrial properties		
Pollution incidents (26)		
Category 1 pollution incident (wastewater) - Major incident	Conversion from £ per incident per household, to £ per incident. Multiply by number of houses affected by pollution incident "nearby" which is given as a 5 mile radius in WTA study, using England & Wales housing density.	Quality of place
Category 2 pollution incident (wastewater) - Significant impact		
Category 3 pollution incident (wastewater) - Minor impact		
Bathing water quality (28)		
In class benefit on bathing water quality	Conversion from £ per incident (bathing water) per household, to £ per bathing water. Multiply by number of houses affected, which is calculated by finding average number of houses per bathing waters across England & Wales.	Quality of place, Local economy
Bathing water quality (poor to sufficient)		
Bathing water quality (sufficient to good)		
Bathing water quality (good to excellent)		

3.3 Weighting residential and business WTP/WTA values

For Service Measures where the Ofwat Collaborative Research Study WTA values are used, where the impact is felt across both residential and business properties, but it is unknown which or exactly how many residential vs. business properties will be impacted, we have applied a weighting to account for this unknown. For example, unplanned interruptions to water supply impact, by definition, an unknown proportion of residential and business properties. For planned interruptions to water supply, as the interruption is planned, the appraiser would know or be able to estimate the number and type of property impacted.

This situation applies to the following Service Measures:

- Drinking water quality (appearance, taste and odour) (2)
- Unplanned interruptions (5)
- Water use restrictions (9)

The valuations available are in the form of WTA value per incident, which given the incidents considered are also implicitly per property. There are a residential valuation and a business valuation. To use these valuations as given would overemphasise the proportion or likelihood of impacting a business property, where the valuation is significantly higher, given that the unit of Impact Categories in the CVF is 'number of properties per incident'.

Therefore, we have applied a weighting based on the proportion of residential and business properties using the following method. Using total number of properties across England and Wales, we calculate the proportion of residential and business properties. This is approximately 0.95 and 0.5 respectively. These values are then multiplied by the per property valuations, to scale the total sum value to be proportional to one property representative of residential and business property proportions.

The following other Service Measures also use Ofwat Collaborative Research valuations to obtain a residential and business valuation that is scaled proportionally, but the method of scaling is different depending on the unit:

- Bathing water quality (28): valuations scaled as above using proportions of residential and business properties, then the values are multiplied by the total population and divided by number of bathing waters, to obtain a value per bathing water. This is because the WTA valuations are per incident (household), and the CVF unit is per bathing water.
- Pollution incidents (26): valuations are scaled by respective residential and business property density per sq. mile, to calculate number of properties in 5 sq. miles, to align to the wording of the WTA questionnaire. Values are divided by total number of pollution incidents (category 1, 2 and 3 as appropriate) reported in the year the study was done, as the CVF unit is per pollution incident.

4. Upkeep of the CVF

The CVF is built on latest available valuation evidence and reflects the regulatory landscape and requirements at the time of development (up until Jan 2026). As such, to keep the CVF current and relevant, there is an ongoing need for maintenance. This section summarises the maintenance requirements of the CVF.

4.1 Standard data

The **STANDARD DATA tabs** are found at the back of the CVF workbook. These tabs are referenced across the workbook.

The CPIH index is used for inflating price years and is updated monthly. This data may not need to be updated in the CVF monthly, as the new values only extend the time series to the present month. Up to date values are needed when valuations need to be inflated to present day or new sources are added to the CVF that use the most recent price year.

Carbon values for greenhouse gas emission appraisals are extracted from 2021 DESNZ guidance. These values will need updating if/when this guidance is updated. The latest version is from 2021.

Company specific data is sourced from Ofwat PR24 data. Companies can update this data with more up to date outturn values, or the values can be updated at the next price review.

4.2 New sources and filling literature gaps

New research is constantly being developed. New sources may become relevant to the CVF and fill existing literature gaps or may update and improve existing valuation calculations. These sources should be incorporated where possible, and added to the **Reviewed sources tab**. When a new source is added, either to an existing valuation or to fill a literature gap, the owner of the CVF must review the double counting relationships and update the relationships tables (see **Section 2.7**) and Service Measure-specific guidance (see **Section 5**), so that new sources do not introduce new cases of double counting. New combinations of Service Measures may be identified, as well as complimentary Service Measures that would now double count due to the new source or values.

See **Section 2.10** for more details on literature gaps.

4.3 England and Wales-wide WTP/WTA research

As noted in **Section 3.2**, the CVF V2.1 uses the Ofwat Collaborative Customer Research for PR24, thanks to the comparability of values across a range of service impacts and the England and Wales-wide survey area. However, there are limitations to this study, as noted in the opening sections of the study itself, and so it is recommended that as more England and Wales-wide research is developed this is incorporated into the CVF, either filling literature gaps, or replacing existing valuations to ensure the most applicable valuations and sources are used. To update the Collaborative Customer Research, we expect that a similar research exercise will be undertaken for PR29 to set incentive rates across a number of service areas. We recommend that this research should be designed in a way so as to update the valuations within the CVF.

4.4 Regulatory guidance and frameworks

The CVF V2.1 reflects the regulatory landscape and frameworks at the time of development. This landscape is likely to change over time, therefore the CVF should reflect these changes. In the V2.1 workbook, this is seen in the inclusion of ODI rates, which are updated at every water sector price review, and in the forms of standard data, e.g. location-based GHG emission reporting. In the V2.1 guidance, this is seen in the alignment to current regulatory frameworks (see **Section 2.11**).

4.5 Annual accounts and regularly updated sources

A number of sources are annual accounts (e.g. ONS Natural Capital Accounts), regularly updated sources (e.g. John Nix Pocket Book), or recommended libraries of values and information (e.g. ENCA Services

Databook). Many of these sources are updated annually or more frequently. Throughout the development of the CVF, up to V2.1, we have to the best of our ability kept these sources up to date. A full list of all known sources which require regular updating, and the known update period, are provided in Table 20.

Table 20: CVF V2.1 sources requiring periodic update

Source ID	Source name	Update period	Version used	SMs where source is used
1	Environment Agency (2013) Updating the National Water Environment Benefit Survey values: summary of the peer review.	Expected in 2026. No regular update interval set.	2013	27, 28
6	ONS (2024) Subregional productivity: labour productivity indices by city region	Updates are expected but timescale is unclear at the moment.	2024	35, 39, 40
12	ONS (2023) Housing, England and Wales: Census 2021.	Census data is updated every 10 years.	2021	34
13	ONS (2025) House price data: annual tables - Table 26.	Updated annually.	2025	34
19	DEFRA (2025) Air quality appraisal: damage cost guidance	Updated annually, see Annex 1 for current damage cost values	2025	23, 32
21	HSE (2023) Appraisal values or 'unit costs'.	Updated annually.	2023	44
24	ONS (2024) Census - Families and households in the UK: 2023.	Not indicated on the website but might be updated annually.	2024	N/A – reference source
31	Marine Management Organisation (2025) UK sea fisheries annual statistics report 2024	Updated annually	2025	29
33	ONS (2023) Urban natural capital accounts, UK: 2023	Likely to be updated but timescales unclear.	2023	36
40	DESNZ (2021) Valuing greenhouse gas emissions in policy appraisal	Likely to be updated but timescales unclear.	2021	7, 10, 11, 14, 15, 16, 17, 23, 24, 30, 31, 42, **Carbon values tab**
42	ONS (2021) Average Sterling exchange rate: US Dollar.	Updated monthly. Value option 2 is not used in final values, however, if it was used, the exchange rate would need to be updated.	2021	29
49	ONS (2025) National Household Size.	Not used in any valuation in V2.1 but provided for reference, would require updating if used.	2024	N/A – reference source
50	Outdoor Recreation Valuation Tool (ORVal: Version 2.0) (2018)	Updates expected but timeframe currently unknown.	2018	38
52, 73, 115, 148	Ofwat (2024) PR24 Final Determinations Models	Updated at every price review (5 years)	2024	28, 10, 2, 26
59	Valuation Office Agency (2020) Non-domestic rating: stock of properties including business floorspace, 2020 - Table SOP7.0	Updated annually. Not used in any calculation but if used, source and values will need updating.	2020	N/A – reference source
60	ONS (2022) Households by household size, regions of England and GB constituent countries	Might be updated but timelines unclear. Not used in any calculation but if used, source and values will need updating.	2022	N/A – reference source
62	Department for Digital, Culture, Media & Sport (2022) Cyber Security Breaches Survey 2022	Updated annually	2022	45
68	Sport England (2024) Active Lives Adult Survey November 2022-23 Report	Updated annually with delay on report publishing.	2024	43

Source ID	Source name	Update period	Version used	SMs where source is used
70/71	Valuation Office Agency (2023) Non-domestic rating: stock of properties 2023 and NDR Business Floorspace Tables	Updated annually	2023	16
79	Ofgem (2024) Smart Export Guarantee Annual Report - April 2023 to March 2024	Updated annually with delay on report publishing	2024	23
84	ADAS (2022) Farmscoper Decision Support Tool (v5)	Unknown update frequency.	2022	33
86-87, 89-91,	DfT (2024) Average speed, delay and reliability of travel times (CGN), Road traffic estimates (TRA)	Updated annually	2024	42
92	DfT (2024) TAG Data Book v1.24	Updated periodically, usually annually	2024	42
95	DESNZ/Defra (2025) UK Government GHG Conversion Factors for Company Reporting	Updated annually	2025	42
96-101	DfT (2021-25) Road Congestion Statistics and average delays	Updated annually	2025	42
102	WRAP (2024) Gate Fees Report 2023/24	Updated annually	2024	24
105	AHDB (2025) GB Fertiliser Prices	Unclear but likely annual	2025	24
113	ONS (2025) Output per hour worked, UK.	Updated annually	2025	35
120	ONS (2025) UK Natural Capital Accounts: 2025 - detailed summary tables.	Updated annually	2025	30
128	NAEI (2024) Emissions from point sources 2022	Updated annually with delay on report publishing	2024	23
130	DESNZ (2024) Prices of fuels purchased by non-domestic consumers in the UK	Individual tables updated periodically throughout the year	2024	23
137	Redman, G. (2025) The John Nix Pocketbook for Farm Management 2026	Updated annually	2025	30
149	Defra (2025) ENCA Services Databook	Updated annually	2025	N/A – reference source
152	ONS (2026) CPIH Index, 21 Jan 2026 release	Updated monthly	Jan 2026	**CPIH Index tab**

5. Service Measures

5.1 Drinking water quality (biological & chemical)

This Service Measure captures the risk of failing to produce drinking water to a satisfactory standard leading to the potential of a sample failure against one or more water quality parameters. The failure, i.e. above an external prescribed concentration value (PCV), can happen at a Water Treatment Work (WTW), Service Reservoir (SRE) or Customer Property:

- No health impact: Is not an immediate contributor to public health.
- Health impact: May impact on public health or customer acceptability.

Impact Categories

Ref	Impact Categories	Units
1	Internal threshold sample failure (near miss 30% PCV)	Nr of samples
2	Internal threshold sample failure (near miss 60% PCV)	Nr of samples
3	WQ parameter sample exceeds PCV at WTW - no health impact	Nr of samples
4	WQ parameter sample exceeds PCV at WTW - health impact	Nr of samples
5	WQ parameter sample exceeds PCV at SR - no health impact	Nr of samples
6	WQ parameter sample exceeds PCV at SR - health impact	Nr of samples
7	WQ parameter sample exceeds PCV at Customer Property - no health impact	Nr of samples
8	WQ parameter sample exceeds PCV at Customer Property - health impact	Nr of samples

User input

Ref	Frequency	Quantity
1-14	The quantity is annualised, so the frequency should be entered as '1'	The number of samples per annum exceeding thresholds of PCV

Value build-up

The values are made up of WTP to avoid a deterioration of water quality pass rates. Two studies from United Utilities and Wessex Water have been averaged for residential values, as they are both regional studies and there is no factor to select between them. The values are inflated to the same price year before averaging. For business properties, valuations are only available from the United Utilities study, so those values are used.

Value application

Quality of place / Local economy valuations use publicly available company specific willingness to pay (WTP) studies.

Quality of place / Local economy valuations use company specific data. Please ensure company data is correct and update tables, if necessary, on the **Company data tab** in the CVF workbook.

There is a literature gap for health and wellbeing impacts from health-impacting Impact Categories. While that literature gap is not filled, use the Health and safety (public & employees) (44) Service Measure to capture health and wellbeing impacts. When that literature gap is filled with a valuation, do not use SM 1 and SM 44 together to capture health and wellbeing impacts from water quality sample failures.

For parameters that have an aesthetic impact noticed by customers and could be captured under the Drinking water quality (appearance, taste and odour) (2) Service Measure, use this Service Measure if there is any health impact from those same parameters. If the parameter only has an aesthetic impact noticed by customer, use the Drinking water quality (appearance, taste and odour) (2) Service Measure instead. Do not use Service Measures 1 and 2 together to capture the impacts from the same parameter.

For parameters that have no aesthetic impact noticed by customers or a health impact, i.e. those that only contribute to reporting, use this Service Measure with Impact Categories that capture no health impact.

Do not use this Service Measure with the Water quality (lead risk) (3) Service Measure to capture the same impacts from lead risk, which may be picked up in parameter sampling. If any other non-lead parameter

impacts occur from the same lead contamination, these can be captured through this Service Measure. Otherwise, lead impacts should be captured through the Water quality (lead risk) (3) SM.

5.2 Drinking water quality (appearance, taste and odour)

This Service Measure captures the risk of failing to provide drinking water to a satisfactory standard leading to the potential for customer complaints due to a variety of incidents listed within the Impact Categories. Such incidents would negatively impact customer trust, reduce quality of place and reduce productivity for the local economy.

Impact Categories

Ref	Impact Categories	Units
1	Taste & Odour Complaints - chlorine	Nr of contacts per incident
2	Taste & Odour Complaints - earthy/musty	Nr of contacts per incident
3	Taste & Odour Complaints - petrol/diesel	Nr of contacts per incident
4	Taste & Odour Complaints - other causes	Nr of contacts per incident
5	Appearance Complaints - discoloured water (brown/black/orange)	Nr of contacts per incident
6	Appearance Complaints - discoloured water (blue/green)	Nr of contacts per incident
7	Appearance Complaints - particles	Nr of contacts per incident
8	Appearance Complaints - white (air)	Nr of contacts per incident
9	Appearance Complaints - white (chalk)	Nr of contacts per incident
10	Appearance Complaints - animalcules	Nr of contacts per incident
11	Appearance Complaints - general conditions	Nr of contacts per incident

User input

Ref	Frequency	Quantity
1-11	Number of incidents in a year	Number of contacts per incident

Value build-up

Quality of place / Local economy valuations use Ofwat's Collaborative Customer Research. The impact on residential properties is captured by the Quality of Place value metric while the impact on business properties is captured under Local Economy.

For the overall CVF, we have used Ofwat's Collaborative Customer Research values over triangulating company-specific Willingness to Pay values to promote consistency between companies.

Value application

Quality of place / Local economy valuations use company specific data. Please ensure company data is correct and update tables, if necessary, on the **Company data tab** in the CVF workbook.

For parameters that have an aesthetic impact noticed by customers and a health impact from the same parameters, use the Drinking water quality (biological & chemical) (1) Service Measure. If the parameter only has an aesthetic impact noticed by customer, use this Service Measure. Do not use Service Measures 1 and 2 together to capture the impacts from the same parameter.

For parameters that have no aesthetic impact noticed by customers or a health impact, i.e. those that only contribute to reporting, use the Drinking water quality (biological & chemical) (1) Service Measure with Impact Categories that capture no health impact.

5.3 Water quality (lead risk)

This Service Measure captures the risk of lead pollution in drinking water. Reduced lead pipe usage can lead to improved water quality, which in turn can lead to improved customer trust, improved quality of place for customers and improvement to local economy.

Impact Categories

Ref	Impact Categories	Units
1	Properties with lead risk reduced	Nr of properties

User input

Ref	Frequency	Quantity
1	The quantity is annualised, so the frequency should be entered as '1'	Number of properties with risk reduced in a year

Value build-up

Quality of place / Local economy valuations use the total number of household and non-household customers and company specific willingness to pay studies that measure the mean willingness to accept (WTA) for deterioration water quality of 0.06%. The WTA data and the number of household and non-household customers come from the United Utilities Triangulation Report (2017).

A valuation for health & wellbeing is not provided to avoid double counting with the quality of place / local economy value metrics which use customer research valuations. These valuations implicitly include a health and wellbeing benefit.

Value application

Do not use this Service Measure with the Drinking water quality (biological & chemical) (1) Service Measure to capture the same impacts from lead risk, which may be picked up in parameter sampling. If any other non-lead parameter impacts occur from the same lead contamination, these can be captured through the Drinking water quality (biological & chemical) (1) Service Measure.

5.4 Planned interruptions

This Service Measure captures the risk of failing to provide a continuous supply of drinking water to households and businesses during planned interruptions to activities of various durations.

Impact Categories

Ref	Impact Categories	Units
1	0 to 3 Hour Interruption to Supply - residential property	Nr of properties per interruption
2	0 to 3 Hour Interruption to Supply - business property	Nr of properties per interruption
3	3 to 6 hour interruption to Supply - residential property	Nr of properties per interruption
4	3 to 6 hour interruption to Supply - business property	Nr of properties per interruption
5	6 to 12 hour interruption to Supply - residential property	Nr of properties per interruption
6	6 to 12 hour interruption to Supply - business property	Nr of properties per interruption

User input

Ref	Frequency	Quantity
1-6	Number of interruptions in a year	Number of properties impacted per interruption

Value build-up

The valuations of impact of 3-6 hour interruptions to supply on Quality of Place / Local Economy are based on household and non-household customer per incident WTA valuations of planned water supply interruptions (6h) from Ofwat's Collaborative Customer Research. Valuations for 6-12 hour interruptions use scaled values for unplanned interruptions from the Unplanned Interruptions Service Measure, described in the following section.

Value application

There is no Service Measure specific guidance to note.

5.5 Unplanned interruptions

This Service Measure captures the risk of failing to provide a continuous supply of drinking water to households and businesses during unplanned interruptions to activities of various durations.

Impact Categories

Ref	Impact Categories	Units
1	0 to 3 Hour Interruption to Supply	Nr of properties per incident
2	>3 to 6 Hour Interruption to Supply	Nr of properties per incident
3	>6 to 12 Hour Interruption to Supply	Nr of properties per incident
4	>12 to 24 Hour Interruption to Supply	Nr of properties per incident
5	24+ Hour Interruption to Supply	Nr of properties per incident

User input

Ref	Frequency	Quantity
1-5	Number of incidents in a year	Number of properties impacted per incident

Value build-up

The valuations are based on household and non-household customer WTA per incident for unexpected water supply interruption from Ofwat's Collaborative Customer Research. The WTA per incident is then divided by the number of residential and business properties to obtain cost per incident per property. The WTA data is available for 6 hour and 24 hour supply interruptions and is used to calculate values for Impact Categories 2 and 4 respectively. Values for Impact Categories 3 and 5 are based on scaling of the other two categories, assuming impacts increase linearly with increasing duration of interruption.

Value application

Quality of place / Local economy valuations use company specific data. Please ensure company data is correct and update tables, if necessary, on the **Company data tab** in the CVF workbook.

5.6 Water pressure

This Service Measure refers to the supply of drinking water to households and businesses at pressure levels outside Ofwat's acceptable limits. Such events would negatively impact quality of place and reduce productivity in the local economy. They could also affect customer trust and lead to private costs.

Impact Categories

Ref	Impact Categories	Units
1	Pressure below acceptable level (Ofwat DG2)	Nr of properties
2	Properties at risk of addition to low pressure register	Nr of properties
3	Low pressure noticed by customer but above or at acceptable level	Nr of properties per incident
4	High Pressure noticed by customer	Nr of properties per incident

User input

Ref	Frequency	Quantity
1-2	The quantity is annualised, so the frequency should be entered as '1'	Number of properties impacted in a year
3-4	Number of incidents in a year	Number of properties impacted per incident

Value build-up

The valuations for quality of place and local economy are based on household and non-household customer WTA for unexpected low water pressure events (6 hours), derived from an Ofwat study. No value options were found to assess this Service Measure's impacts on customer trust.

Value application

There is no Service Measure specific guidance to note.

5.7 Leakage

This Service Measure refers to water leakage from the distribution system due to failure of water mains, failure of joints & ancillaries or as a result of intrinsic leakage. This has a negative impact through removal

of water resources from the natural environment, carbon emissions from water treatment and reduced customer trust.

Impact Categories

Ref	Impact Categories	Units
1	Water lost through leakage	Ml/d

User input

Ref	Frequency	Quantity
1	The quantity is annualised, so the frequency should be entered as '1'	Ml/d lost in a year

Value build-up

For the Water resources value metric, the valuation is based on average incremental social cost of public water supply. The cost of carbon emissions for the GHG value metric uses abatement costs based on company-specific carbon intensity data from a study of English and Welsh water companies.

Value application

The Water resources valuation uses company specific data. Please ensure company data is correct and update tables, if necessary, in the **COMPANY INPUT tab** in the CVF workbook. Before application, the appraisal period should be updated to make sure carbon values are correct (for the GHG value metric).

The units for this Service Measure are megalitres per day, Ml/d, to align with regulatory reporting.

This metric should be evaluated for any leakage identified within the distribution system. It is calculated as an annualised rate, representing the annual average in megalitres per day (Ml/d). To accurately reflect the impact of interventions that reduce leakage, the average reduction in Ml/d needs to be determined.

This Service Measure is not designed to account for short-term or acute water losses such as main burst incidents.

5.8 Bursts

This is a reporting only Service Measure relating to asset health. The consequence of failure should be captured by other Service Measures e.g. surface water flooding (16/17).

5.9 Water use restrictions

This Service Measure refers to insufficient water resources within the system, leading to a failure to meet the defined level of service. Such failures would threaten the security of water supply and result in the imposition of restrictions on water use. These events would negatively impact quality of place and health and wellbeing, reduce productivity in the local economy. They could also affect customer trust and lead to private costs.

Impact Categories

Ref	Impact Categories	Units
1	Loss of resource yield / WAFU (water available for use)	Ml/d per event
2	Drought trigger level 1: Issue of customer communication	Nr of properties impacted per event
3	Drought trigger level 2: Implementation of hosepipe ban	Nr of properties impacted per event
4	Drought trigger level 3: Implementation of drought permit / drought order	Nr of properties impacted per event
5	Drought trigger level 4: Emergency conditions	Nr of properties impacted per event

User input

Ref	Frequency	Quantity
1	Number of events in a year	Loss of resource yield in Ml/d per event
2-5	Number of events in a year	Number of properties impact per event

Value build-up

The valuations for Quality of place and Local economy are based on household and non-household customer WTA for water use restriction events, derived from Ofwat's Collaborative Customer Research. No value options were found to assess this Service Measure's impacts on customer trust. Valuations were not included separately for the health and wellbeing impact of drought measures to avoid double counting with the WTA value provided under Quality of place and Local economy.

Value application

Quality of place / Local economy valuations use company data on property numbers. Please ensure company data is correct and, if necessary, update tables on the **Company data tab** in the CVF workbook.

The impact of drought on water resources should be valued through the Other benefits and avoidable costs (47) SM on a company-specific basis. When drought trigger level 3 or level 4 is selected, if a reduction in abstraction can be quantified, the benefit to water resources should be represented using the Other benefits and avoidable costs (47) SM.

5.10 Water use

This Service Measure captures the benefits associated with measures to reduce water use and demand for water resources. These measures would have positive impact on water resources, GHG emissions associated with water consumption and treatment. They could also positively affect customer trust.

Impact Categories

Ref	Impact Categories	Units
1	Reduction in per capita consumption	l/head/day
2	Reduction in business demand	Ml/day
3	Treated effluent recycled as a potable substitute	Ml/yr
4	Grey water recycled as a potable substitute	Ml/yr
5	Groundwater recharge - Seriously water stressed areas	Ml/d
6	Groundwater recharge - Areas not water stressed	Ml/d

User input

Ref	Frequency	Quantity
1	The quantity is annualised, so the frequency should be entered as '1'	Change in per capita consumption in litre per head per day
2	The quantity is annualised, so the frequency should be entered as '1'	Change in business demand in megalitres per day
3-4	The quantity is annualised, so the frequency should be entered as '1'	Recharge rate in Ml/day
5-6	The quantity is annualised, so the frequency should be entered as '1'	Recharge rate in Ml/day

Value build-up

The valuations are based on the following approaches:

- Water resources: avoided abstraction costs informed by NIC and CIRIA guidance
- GHG emissions: abatement costs for GHG emissions based on UK government carbon prices and sector-specific emissions data

No value options were found to assess this Service Measure's impact on customer trust.

Value application

Water resources / GHG emissions valuations use company specific data. Please ensure company data is correct and update tables, if necessary, in the **COMPANY INPUT tab** in the CVF workbook. Before application, the appraisal period should be updated to make sure carbon values are correct (for the GHG value metric).

If there are any private financial benefit to the water company e.g. through energy saving, this should be entered using the Other benefits and avoidable costs (47) SM on a case-specific basis.

5.11 Rainwater management (separating / intercepting / harvesting surface water)

This Service Measure covers rainwater management activities, including surface water separation, interception, and harvesting. These measures can impact on water resources, GHG emissions, and customer trust.

Impact Categories

Ref	Impact Categories	Units
1	Surface water separated from combined	Ml/yr
2	Surface water intercepted/harvested	Ml/yr

User input

Ref	Frequency	Quantity
1-2	The quantity is annualised, so the frequency should be entered as '1'	Ml in a year

Value build-up

The valuations are based on the following approaches:

- Water resources: avoided abstraction costs informed by NIC analysis
- GHG emissions: avoided costs associated with reduced GHG emissions arising from water resource impacts of rainwater management activities

No value options were found to assess this Service Measure's impact on customer trust.

Value application

This Service Measure captures the water resource and energy use benefits linked to rainwater management activities. For flooding and pollution benefits, please use other Service Measures as appropriate.

GHG emissions valuations use company specific data. Please ensure company data is correct and update tables, if necessary, in the **COMPANY INPUT tab** in the CVF workbook. Before application, the appraisal period should be updated to make sure carbon values are correct (for the GHG value metric).

If there are any private financial benefit from surface water separation or interception to the water company, this should be entered using the Other benefits and avoidable costs (47) SM on a case-specific basis.

5.12 Abstraction consent compliance

This Service Measure refers to failures to comply with abstraction consent conditions. Such failures can impact on water resources, water regulation and biodiversity. They can also affect quality of place, customer trust, and lead to private costs.

Impact Categories

Ref	Impact Categories	Units
1	Abstraction consent compliance failure	Nr of events
2	Volume of over-abstraction	m3 per event

User input

Ref	Frequency	Quantity
1	The quantity is annualised, so the frequency should be entered as '1'	Number of events in a year
2	Number of events in a year	m3 of over abstraction per event

Value build-up

The valuations for water resources are based on the resource rent value for water abstracted for public water supply, informed by NIC analysis.

No value options were found to assess this Service Measure's impacts on quality of place and customer trust. Water regulation and biodiversity valuations are not included to avoid double counting with the water resources valuation.

Value application

There is no additional guidance on the value application of this Service Measure.

5.13 Reservoir act compliance failure

This Service Measure captures the risk of a non-compliance event under the Reservoirs Act. Occurrence of a non-compliance event would have negative impacts on public perception, health and wellbeing of local population and greater exposure to accidents and injuries.

Impact Categories

Ref	Impact Categories	Units
1	Non-compliance event	Nr of events

User input

Ref	Frequency	Quantity
1	The quantity is annualised, so the frequency should be entered as '1'	Number of events in a year

Value build-up

This Service Measure reflects compliance failure only. No value was found for the trust impact of this Service Measure. Other impact e.g. safety, flooding, should be valued using other Service Measures.

Value application

If there is any anticipated health and safety or safety and security impact of reservoir act non-compliance, please use the Health and safety (44) Service Measure to capture it. For risk to properties from flooding, please use External/Internal surface water flooding (16/17) Service Measures.

5.14 Internal sewer flooding

This Service Measure assesses the risk of internal flooding from the sewerage network. Such events would negatively impact quality of place and health and wellbeing, reduce productivity in the local economy, and increase associated GHG emissions. They could also affect customer trust and lead to private costs.

Impact Categories

Ref	Impact Categories	Units
1	Hydraulic - Internal flooding of residential living space	Nr of properties per incident
2	Hydraulic - Internal flooding of social infrastructure (e.g. schools, hospitals)	Nr of properties per incident
3	Hydraulic - Internal flooding of commercial and industrial properties	Nr of properties per incident
4	Residential properties at risk from internal hydraulic flooding from a 1 in 50-year storm	Nr of properties per incident
5	FOC - Internal flooding of residential living space	Nr of properties per incident
6	FOC - Internal flooding of social infrastructure (e.g. schools, hospitals)	Nr of properties per incident
7	FOC - Internal flooding of commercial and industrial properties	Nr of properties per incident

User input

Ref	Frequency	Quantity
1-7	Number of incidents in a year	Number of properties flooded per incident

Value build-up

The valuations are based on the following approaches:

- GHG emissions: abatement costs associated with increased GHG emissions resulting from internal sewer flooding incidents, informed by EA source.

- Quality of place & local economy: household and non-household customers WTA for internal sewer flooding incidents, based on Ofwat's Collaborative Customer Research.
- Health and wellbeing: mental health costs of flooding, reflecting increased anxiety, depression, and PTSD among household customers, based on EA study.

No value option was found to assess this Service Measure's impact on customer trust.

Value application

Before application, the appraisal period should be updated in the **COMPANY INPUT tab** within the CVF to make sure carbon values are correct (for the GHG value metric).

The SuDS Impact Categories of Habitat impact (incl. biodiversity) (30) should not be used with External/Internal sewer flooding (16/17) Service Measures as these both capture water regulation and mental health values.

5.15 External sewer flooding

This Service Measure assesses the risk of external flooding from the sewerage network. Such events would negatively affect quality of place and health and wellbeing, reduce productivity in the local economy, and increase associated GHG emissions. They could also affect customer trust and lead to private costs.

Impact Categories

Ref	Impact Categories	Units
1	Hydraulic - External flooding of residential properties	Nr of properties per incident
2	Hydraulic - External flooding of social infrastructure (e.g. schools, hospitals)	Nr of properties per incident
3	Hydraulic - External flooding of commercial and industrial properties	Nr of properties per incident
4	Hydraulic - External flooding of open social infrastructure (e.g. playing field)	Nr of open social spaces per incident
5	FOC - External flooding of residential properties	Nr of properties per incident
6	FOC - External flooding of social infrastructure (e.g. schools, hospitals)	Nr of properties per incident
7	FOC - External flooding of commercial and industrial properties	Nr of properties per incident
8	FOC - External flooding of open social infrastructure (e.g. playing field)	Nr of open social spaces per incident

User input

Ref	Frequency	Quantity
1-8	Number of incidents in a year	Number of properties flooded per incident

Value build-up

The valuations are based on the following approaches:

- GHG emissions: abatement costs associated with increased GHG emissions resulting from external sewer flooding incidents, informed by EA source.
- Quality of place & local economy: household and non-household customers WTP for reduced external sewer flooding incidents, based on Ofwat's Collaborative Customer Research.
- Health and wellbeing: mental health costs of flooding, reflecting increased anxiety, depression, and PTSD among household customers, based on EA study.

No value option was found to assess this Service Measure's impacts on customer trust.

Value application

Before application, the appraisal period should be updated in the **COMPANY INPUT tab** within the CVF to make sure carbon values are correct (for the GHG value metric).

The SuDS Impact Categories of Habitat impact (incl. biodiversity) (30) should not be used with internal or external sewer flooding Service Measures as these both capture water regulation and mental health values.

When valuing flooding of highways or transport, use Transport disruption Service Measure.

5.16 Internal surface water flooding

This Service Measure assesses the risk of internal flooding caused by surface water runoff exceeding drainage capacity. Such events would negatively affect quality of place and health and wellbeing, reduce productivity in the local economy, and increase associated GHG emissions. They could also affect customer trust and lead to private costs.

Impact Categories

Ref	Impact Categories	Units
1	Internal flooding of residential living space	Nr of properties per incident
2	Internal flooding of social infrastructure (e.g. schools, hospitals)	Nr of properties per incident
3	Internal flooding of commercial and industrial properties	Nr of properties per incident

User input

Ref	Frequency	Quantity
1-3	Number of incidents in a year	Number of properties flooded per incident

Value build-up

The valuations are based on the following approaches:

- GHG emissions: abatement costs associated with increased GHG emissions resulting from internal surface water flooding incidents, informed by EA source.
- Quality of place & local economy: household and non-household customers WTA for internal surface water flooding incidents, based on Ofwat's Collaborative Customer Research.
- Health and wellbeing: mental health costs of flooding, reflecting increased anxiety, depression, and PTSD among household customers, based on EA study.

No value option was found to assess this Service Measure's impacts on customer trust.

Value application

Before application, the appraisal period should be updated in the **COMPANY INPUT tab** within the CVF to make sure carbon values are correct (for the GHG value metric).

The SuDS Impact Categories of Habitat impact (incl. biodiversity) (30) should not be used with internal or external surface water flooding Service Measures as these both capture water regulation and mental health values.

5.17 External surface water flooding

This Service Measure assesses the risk of external flooding caused by surface water runoff exceeding drainage capacity. Such events would negatively affect quality of place and health and wellbeing, reduce productivity in the local economy, and increase associated GHG emissions. They could also affect customer trust and lead to private costs.

Impact Categories

Ref	Impact Categories	Units
1	External flooding of residential living space	Nr of properties per incident
2	External flooding of social infrastructure (e.g. schools, hospitals)	Nr of properties per incident
3	External flooding of commercial and industrial properties	Nr of properties per incident
4	External flooding of open social infrastructure (e.g. playing field)	Nr of open social spaces per incident

User input

Ref	Frequency	Quantity
1-4	Number of incidents in a year	Number of properties flooded per incident

Value build-up

The valuations are based on the following approaches:

- GHG emissions: abatement costs associated with increased GHG emissions resulting from external surface water flooding incidents, informed by EA source.
- Quality of place & local economy: household and non-household customers WTA for external surface water flooding incidents, based on Ofwat's Collaborative Customer Research, alongside damage cost estimates for external flooding of commercial and industrial properties derived from Department for Culture, Media & Sport (DCMS) evidence.
- Health and wellbeing: mental health costs of flooding, reflecting increased anxiety, depression, and PTSD among household customers, based on EA study.
- No value option was found to assess this Service Measure's impacts on customer trust.

Value application

Before application, the appraisal period should be updated in the **COMPANY INPUT tab** within the CVF to make sure carbon values are correct (for the GHG value metric).

The SuDS Impact Categories of Habitat impact (incl. biodiversity) (30) should not be used with internal or external surface water flooding Service Measures as these both capture water regulation and mental health values.

When valuing flooding of highways or transport, use Transport disruption Service Measure.

5.18 Final effluent quality

This Service Measure assesses the risk of failing to treat final effluent to the required standard, resulting in non-compliance with one or more wastewater quality parameters. Such failures could negatively impact recreation, biodiversity, quality of place, and health and wellbeing. They could also affect customer trust, and lead to private costs.

Impact Categories

Ref	Impact Categories	Units
1	Numeric Consent WwTW - Near Miss (Internal sample failure)	Nr of failures
2	Numeric Consent WwTW - OSM sample failure	Nr of failures
3	Numeric Consent WwTW - OSM sample failure (phosphorus)	Nr of failures
4	Descriptive failure (pass/fail) (sites <250pp)	Nr of failures

User input

Ref	Frequency	Quantity
1-4	The quantity is annualised, so the frequency should be entered as '1'	Number of failures per year

Value build-up

This Service Measure reflects compliance failure only. No value was found for the trust impact of this Service Measure. Other impact e.g. water quality, recreation, should be valued using other Service Measures.

Value application

Where impacts on the water quality of rivers or other water bodies are expected, the Quality of the water environment (27) SM should be used. SM 27 captures impact on recreation, biodiversity, and quality of place resulting from changes in the quality of rivers or other water bodies.

If the receiving water body is a designated bathing water or a shellfish water, use the Bathing water quality (28) SM or Shellfish water quality (29) SM respectively. Service Measures 27, 28 and 29 should not be used together to capture impacts to the same water body.

The Quality of the water environment (27) SM should not be used alongside the Recreation (38) SM unless specific and distinct impact pathways can be clearly identified for each. Where there is no clear distinction between impact pathways, either SM 27 or SM 38 should be applied to avoid double counting.

5.19 Final effluent compliance

This Service Measure assesses the risk of failing to treat final effluent to a satisfactory standard against a descriptive consent. Such failures could affect water quality, customer trust, and lead to private costs.

Impact Categories

Ref	Impact Categories	Units
1	Dry weather flow Q80 failure	Nr of incidents per site
2	Dry weather flow Q90 failure	Nr of incidents per site
3	Failing 3 out of 5 years Q90	Nr of incidents per site
4	Failing Full Flow to Treatment (FFT)	Nr of incidents per site
5	Failure to record/report flow/sample correctly	Nr of incidents per site

User input

Ref	Frequency	Quantity
1-5	Number of incidents per site	Number of sites affected in a year

Value build-up

This Service Measure reflects compliance failure only. No value was found for the trust impact of this Service Measure. Other impact e.g. water quality, recreation, should be valued using other Service Measures.

Value application

Where impacts on the water quality of rivers or other water bodies are expected, the Quality of the water environment (27) SM should be used. SM 27 captures impact on recreation, biodiversity, and quality of place resulting from changes in the quality of rivers or other water bodies.

If the receiving water body is a designated bathing water or a shellfish water, use the Bathing water quality (28) SM or Shellfish water quality (29) SM. Service Measures 27, 28 and 29 should not be used together to capture impacts to the same water body.

The Quality of the water environment (27) SM should not be used alongside the Recreation (38) SM unless specific and distinct impact pathways can be clearly identified for each. Where there is no clear distinction between impact pathways, either SM 27 or SM 38 should be applied to avoid double counting.

5.20 Intermittent discharge consent compliance (spills)

This Service Measure assesses the risk of failing to comply with the network/storm storage consent compliance requirements where discharges occur outside of consent or in breach of other consent conditions. Such failures could negatively impact recreation, biodiversity, and quality of place. They could also affect customer trust and lead to private costs.

Impact Categories

Ref	Impact Categories	Units
1	Network - Unconsented Spills	Nr of events
2	Network - Unscreened Spills Outside of Consent (Breach)	Nr of events
3	Network - Screened Spills Outside of Consent (Breach)	Nr of events
4	Network - Breach of Consent Conditions (technical)	Nr of events
5	Treatment - Unconsented Spills	Nr of events
6	Treatment - Unscreened Spills Outside of Consent (Breach)	Nr of events
7	Treatment - Screened Spills Outside of Consent (Breach)	Nr of events
8	Treatment - Breach of Consent Conditions (technical)	Nr of events

User input

Ref	Frequency	Quantity
1-8	The quantity is annualised, so the frequency should be entered as '1'	Number of events in a year

Value build-up

This Service Measure reflects compliance failure only. No value was found for the trust impact of this Service Measure. Other impact e.g. water quality, recreation, should be valued using other Service Measures.

Value application

Where impacts on the water quality of rivers or other water bodies are expected, the Quality of the water environment (27) SM should be used. SM 27 captures impact on recreation, biodiversity, and quality of place resulting from changes in the quality of rivers or other water bodies.

If the receiving water body is a designated bathing water or a shellfish water, use the Bathing water quality (28) SM or Shellfish water quality (29) SM. Service Measures 27, 28 and 29 should not be used together to capture impacts to the same water body.

The Quality of the water environment (27) SM should not be used alongside the Recreation (38) SM unless specific and distinct impact pathways can be clearly identified for each. Where there is no clear distinction between impact pathways, either SM 27 or SM 38 should be applied to avoid double counting.

5.21 Blockages

This is a reporting only Service Measure relating to asset health. The consequence of failure should be captured by other Service Measures e.g. sewer flooding (14/15).

5.22 Collapse

This is a reporting only Service Measure relating to asset health. The consequence of failure should be captured by other Service Measures e.g. sewer flooding (14/15).

5.23 Sludge treatment

This Service Measure assesses the risk of failing to treat sludge to the required standard, leading to non-compliance with one or more sludge treatment parameters and/or a requirement for additional treatment. Such failures can reduce soil quality, provide private financial benefits to water companies, and affect GHG emissions outcomes, with impacts that may be positive or negative depending on the Impact Category considered. They can also affect air quality and lead to private costs.

Impact Categories

Ref	Impact Categories	Units
1	Re-treatment through thickening and de-watering	Tonnes dry solids (TDS) per failure event
2	Re-treatment through liming	Tonnes dry solids (TDS) per failure event
3	Re-treatment through AD	Tonnes dry solids (TDS) per failure event
4	Re-treatment through AAD	Tonnes dry solids (TDS) per failure event
5	Third party treatment	£ per failure event
6	Conventional quality product	Tonnes dry solids (TDS) per failure event
7	Enhanced quality product	Tonnes dry solids (TDS) per failure event
8	Un-treated product	Tonnes dry solids (TDS) per failure event
9	Loss of generation (e.g. CHP, gas to grid failure)	gWh per failure event
10	Loss of nutrient recovery	Tonnes per failure event

User input

Ref	Frequency	Quantity
1-4	Number of failure events in a year	TDS per failure event
5	Number of failure events in a year	£ per failure event
6-8	Number of failure events in a year	TDS per failure event
9	Number of failure events in a year	gWh per failure event
10	Number of failure events in a year	Tonnes per failure event

Value build-up

The valuations are based on the following approaches:

- Private benefits: potential revenue from exporting energy to the national grid, generated through sludge re-treatment, based on DESNZ values.
- GHG emissions (AD and AAD re-treatment Impact Categories): avoided GHG emission damage costs resulting from biogas energy generation.
- GHG emissions (loss of generation Impact Category): damage costs associated with increased GHG emissions arising from the need to use grid energy due to the loss of renewable energy generation.

No value options were found to assess this Service Measure's impact on air quality. Valuations were also not included for soil to mitigate the risk of double counting, as these impacts are valued under a different Service Measure (see Value application below).

Value application

There is a universal private benefits valuation provided, based on literature. If a company has private costs calculated separately these can be used as overrides.

Before application, the appraisal period should be updated in the **COMPANY INPUT tab** within the CVF to make sure carbon values are correct.

If impact on soil is expected e.g. through sludge spreading, the Sludge disposal (e.g. landfill, incineration, land) (24) Service Measure should be used to represent this impact.

5.24 Sludge disposal

This Service Measure assesses the risk of being unable to dispose of treated sludge via the preferred disposal routes, leading to the need for alternative disposal routes or increased disposal costs. Such failures could negatively impact soil, increase associated GHG emissions, and lead to private costs. They could also affect quality of place.

Impact Categories

Ref	Impact Categories	Units
1	Sludge to landfill (instead of to land)	Tonnes dry solids (TDS) per failure event
2	Sludge to restoration (instead of to land)	Tonnes dry solids (TDS) per failure event
3	Sludge to incineration (instead of to land)	Tonnes dry solids (TDS) per failure event
4	Third party disposal	£ per failure event

User input

Ref	Frequency	Quantity
1-3	Number of failure events in a year	TDS per failure event
4	Number of failure events in a year	£ per failure event

Value build-up

The valuations are based on the following approaches:

- Private costs: waste disposal costs to companies, represented by the mean gate fee for non-hazardous landfill (excluding landfill tax), taken from WRAP report.
- Soil: increased expenditure on chemical fertilisers resulting from sludge being diverted to alternative disposal routes (valued at market prices), informed by AHDB guidance.
- GHG emissions: abatement costs associated with increased GHG emissions arising from alternative sludge disposal routes, based on academic evidence.

No value options were found to assess this Service Measure's impacts on quality of place.

Value application

There is a universal private costs valuation provided, based on literature. If a company has private costs calculated separately these can be used as overrides.

Before application, the appraisal period should be updated in the **COMPANY INPUT tab** within the CVF to make sure carbon values are correct.

5.25 Sludge compliance

This Service Measure assesses the risk of failing to comply with sludge regulatory and permit requirements. Such failures could affect customer trust and lead to private costs.

Impact Categories

Ref	Impact Categories	Units
1	Treatment compliance	Nr of non-compliance
2	Disposal compliance	Nr of non-compliance

User input

Ref	Frequency	Quantity
1-2	The quantity is annualised, so the frequency should be entered as '1'	Number of non-compliance events in a year

Value build-up

This Service Measure reflects compliance failure only. No value was found for the trust impact of this Service Measure.

Value application

There is no Service Measure specific guidance to note.

5.26 Pollution incidents

This Service Measure assesses the risk of discharging a potentially harmful substance to the environment, causing a pollution incident. Such incidents would negatively impact quality of place, biodiversity, recreation, and health and wellbeing, and reduce productivity in the local economy. They could also affect water quality, customer trust, and lead to private costs.

Impact Categories

Ref	Impact Categories	Units
1	Category 1 pollution incident (wastewater) - Major incident	Nr of incidents
2	Category 2 pollution incident (wastewater) - Significant impact	Nr of incidents
3	Category 3 pollution incident (wastewater) - Minor impact	Nr of incidents
4	Category 4 pollution incident (wastewater) - No impact	Nr of incidents

User input

Ref	Frequency	Quantity
1-4	The quantity is annualised, so the frequency should be entered as '1'	Number of incidents in a year. Use a value of less than 1 to represent cases where incidents take place less that once per year.

Value build-up

The valuations for quality of place and local economy are based on household and non-household customers WTA for pollution incidents, based on Ofwat's Collaborative Customer Research.

Valuations are not provided for biodiversity or health & wellbeing value metrics, as the WTP-derived valuation used for quality of place includes impact on wildlife and health risks to river users. Therefore, to include separate valuations for biodiversity and health & wellbeing outcomes would be to double count with the valuation provided under quality of place.

Please note that impacts on water quality of pollution incidents are transient, temporal and relative to the type of incident. Potential proxy to consider would be extent, duration, or fish killed. Therefore, in this case we have marked the value metric as a literature gap.

Value application

Quality of place valuations use company data on property numbers. Please ensure company data is correct and, if necessary, update tables in the **Company data tab** in the CVF.

If impact on recreation is expected, please use the Recreation (38) SM in tandem to represent this impact.

5.27 Quality of the water environment

This Service Measure captures improvements in the quality of the water environment, as defined by Water Framework Directive (WFD) and River Basin Management Plan (RBMP) classifications. It reflects positive changes in ecological and chemical status across rivers, lakes, coastal and transitional waters, and groundwater, including in-class improvements and increases in the length or area of water bodies achieving a higher status. Such improvements would positively impact recreation, biodiversity, and quality of place. They could also affect customer trust and health and wellbeing.

Impact Categories

Ref	Impact Categories	Units
1	In class benefit on river quality	km
2	Length of river improved (bad to poor)	km
3	Length of river improved (poor to moderate)	km
4	Length of river improved (moderate to good)	km
5	Length of river improved (good to high)	km
6	In class benefit on transitional water, coastal water, or lake water quality	km2
7	Area of transitional water, coastal water, or lake water improved (bad to poor)	km2
8	Area of transitional water, coastal water, or lake water improved (poor to moderate)	km2
9	Area of transitional water, coastal water, or lake water improved (moderate to good)	km2
10	Area of transitional water, coastal water, or lake water improved (good to high)	km2
11	In class benefit on area of groundwater body	km2
12	Area of groundwater body improved (poor to good)	Km2

User input

Ref	Frequency	Quantity
1-5	The quantity is annualised, so the frequency should be entered as '1'	km of river improved in a year
6-12	The quantity is annualised, so the frequency should be entered as '1'	km2 of water improved in a year

Value build-up

The valuations for recreation, biodiversity, and quality of place are based on household and non-household customers WTP for improvements in the quality of the water environment, based on EA values and academic research.

For groundwater quality, only poor to good is presented as there were insufficient values to provide more granular categories.

No value options were found to assess this Service Measure's impacts on health and wellbeing or customer trust.

Value application

This Service Measure should not be used alongside the Recreation (38) SM, unless you can identify specific and distinct impact pathways that are captured by both Service Measures. If there is not a clear and distinct impact pathway, use either this Service Measure or the Recreation (38) SM.

This SM should not be used alongside the Bathing water quality (28) SM unless assessing impacts to separate and distinct waters. This SM is for impacts to non-designated waters. Any impacts to waters designated as bathing waters should be captured using the Bathing water quality (28) SM.

For groundwater quality, do not use this SM alongside the Pollution incidents (26) SM. For groundwater quality, this SM is capturing longer term impacts to groundwater quality, whereas the Pollution incidents (26) SM is intended for capturing impacts from individual pollution events.

5.28 Bathing water quality

This Service Measure captures improvements in bathing water quality. It reflects positive changes in the status of designated bathing waters, including in-class improvements and transitions from poor to sufficient, sufficient to good, and good to excellent quality. Such improvements would positively impact quality of place, recreation, and health and wellbeing, and increase productivity in the local economy. They could also affect biodiversity and customer trust.

Impact Categories

Ref	Impact Categories	Units
1	In class benefit on bathing water quality	Nr of bathing water
2	Bathing water quality (poor to sufficient)	Nr of bathing water
3	Bathing water quality (sufficient to good)	Nr of bathing water
4	Bathing water quality (good to excellent)	Nr of bathing water

User input

Ref	Frequency	Quantity
1-4	The quantity is annualised, so the frequency should be entered as '1'	Number of bathing waters improved in a year

Value build-up

The valuations for Quality of place and Local economy are based on household and non-household customers WTA for improvements in bathing water quality, based on Ofwat's Collaborative Customer Research.

When the Ofwat Collaborative Research was carried out, there was no inland bathing water designation in England and Wales. We would recommend that, in the absence of specific studies on inland bathing water, the values presented on this tab can be used to represent inland bathing water.

Valuation for the recreation and health & wellbeing value metrics are not included to avoid double counting with quality of place and local economy.

No value options were found to assess this Service Measure's impacts on biodiversity or customer trust.

Value application

Quality of place / Local economy valuations use company specific data. Please ensure company data is correct and update tables, if necessary, in the **COMPANY INPUT tab** in the CVF workbook.

To represent a movement of more than one classification e.g. poor to good, select both the poor to sufficient and the sufficient to good Impact Categories.

Do not use this Service Measure alongside the Quality of the water environment (27) SM unless assessing impacts to separate and distinct waters. This SM is for impacts to designated waters. Any impacts to non-designated waters should be captured using the Quality of the water environment (27) SM.

Do not use this SM alongside the Recreation (38) SM to capture impacts to visitor numbers to bathing waters, unless assessing impacts to separate and distinct waters. Impacts to recreation related to bathing waters are included in the valuations for quality of place and local economy.

5.29 Shellfish water quality

This Service Measure captures shellfish water quality through the value of shellfish produced and the benefit to biodiversity provided by each classification. Such improvements would positively affect biodiversity and food provision and increase productivity in the local economy. They could also affect customer trust.

Impact Categories

Ref	Impact Categories	Units
1	In class benefit on shellfish water quality	Area of water (ha)
2	Shellfish water quality - class A	Area of water (ha)
3	Shellfish water quality - class B	Area of water (ha)
4	Shellfish water quality - class C	Area of water (ha)
5	Prohibited area	Area of water (ha)

User input

Ref	Frequency	Quantity
1-5	The quantity is annualised, so the frequency should be entered as '1'	Area of shellfish water improved in a year

Value build-up

The valuations are based on the following approaches:

- Biodiversity: replacement cost of substituting the nutrient removal services provided by shellfish ecosystems with artificial treatment. Values are applied on a per hectare basis according to shellfish water quality classification and associated area, based on an EA and University of Portsmouth study.
- Food provision: market value of shellfish production, using MMO values, based on standard shellfish water classification categories and associated calculated shellfish yield.

Valuations for local economy are not provided to avoid double counting with the food provision valuation, due to the related impact of the sale of shellfish, benefiting the economy.

No value options were found to assess this Service Measure's impacts on customer trust.

Value application

Do not use this Service Measure alongside the Habitat impact (30) SM to capture impacts for the same area of shellfish water. To capture impacts to areas of water designated as shellfish waters, use this SM. To capture impacts to areas of water not designated as shellfish waters, use the Habitat impact (30) SM, most likely coastal margins.

Do not use this SM alongside the Bathing water quality (28) SM or Quality of the water environment (27) SM to capture impacts for the same area of shellfish water. To capture impacts to areas of water designated as shellfish waters, use this SM. To capture impacts to a bathing water use SM 28 or impacts to a non-designated waterbody use SM 27.

5.30 Habitat impact (incl. biodiversity)

This Service Measure captures the ecosystem services provided by different habitats. It reflects the natural capital value delivered by the presence of different habitats, including the impact of habitat quality on the value delivered.

Impact Categories

Ref	Impact Categories	Units
1	SuDS - high benefits	Ha of impermeable area managed using SuDS
2	SuDS - medium benefits	Ha of impermeable area managed using SuDS
3	SuDS - low benefits	Ha of impermeable area managed using SuDS
4	Urban woodland --- good	Area (ha) and Condition (poor, moderate, good)
5	Urban woodland --- moderate	Area (ha) and Condition (poor, moderate, good)

Ref	Impact Categories	Units
6	Urban woodland --- poor	Area (ha) and Condition (poor, moderate, good)
7	Urban wetland --- good	Area (ha) and Condition (poor, moderate, good)
8	Urban wetland --- moderate	Area (ha) and Condition (poor, moderate, good)
9	Urban wetland --- poor	Area (ha) and Condition (poor, moderate, good)
10	Urban grassland (greenspace) --- good	Area (ha) and Condition (poor, moderate, good)
11	Urban grassland (greenspace) --- moderate	Area (ha) and Condition (poor, moderate, good)
12	Urban grassland (greenspace) --- poor	Area (ha) and Condition (poor, moderate, good)
13	Rural woodland --- good	Area (ha) and Condition (poor, moderate, good)
14	Rural woodland --- moderate	Area (ha) and Condition (poor, moderate, good)
15	Rural woodland --- poor	Area (ha) and Condition (poor, moderate, good)
16	Rural wetland --- good	Area (ha) and Condition (poor, moderate, good)
17	Rural wetland --- moderate	Area (ha) and Condition (poor, moderate, good)
18	Rural wetland --- poor	Area (ha) and Condition (poor, moderate, good)
19	Rural grassland --- good	Area (ha) and Condition (poor, moderate, good)
20	Rural grassland --- moderate	Area (ha) and Condition (poor, moderate, good)
21	Rural grassland --- poor	Area (ha) and Condition (poor, moderate, good)
22	Farmland --- good	Area (ha) and Condition (poor, moderate, good)
23	Farmland --- moderate	Area (ha) and Condition (poor, moderate, good)
24	Farmland --- poor	Area (ha) and Condition (poor, moderate, good)
25	Mountain moor & heath --- good	Area (ha) and Condition (poor, moderate, good)
26	Mountain moor & heath --- moderate	Area (ha) and Condition (poor, moderate, good)
27	Mountain moor & heath --- poor	Area (ha) and Condition (poor, moderate, good)
28	Peatland --- good	Area (ha) and Condition (poor, moderate, good)
29	Peatland --- moderate	Area (ha) and Condition (poor, moderate, good)
30	Peatland --- poor	Area (ha) and Condition (poor, moderate, good)
31	Coastal margins --- good	Area (ha) and Condition (poor, moderate, good)
32	Coastal margins --- moderate	Area (ha) and Condition (poor, moderate, good)
33	Coastal margins --- poor	Area (ha) and Condition (poor, moderate, good)
34	Bare ground / hard standing	Area (ha)
35	Designated area (e.g. SSSI, Ramsar) --- favourable	Area (ha) and Condition (favourable, unfavourable)
36	Designated area (e.g. SSSI, Ramsar) --- unfavourable	Area (ha) and Condition (favourable, unfavourable)
37	Biodiversity Unit --- high value	Biodiversity Unit
38	Biodiversity Unit --- central value	Biodiversity Unit
39	Biodiversity Unit --- low value	Biodiversity Unit
40	Biodiversity Unit --- watercourses only	Biodiversity Unit

User input

Ref	Frequency	Quantity
1-36	The quantity is annualised, so the frequency should be entered as '1'	Area and condition of habitat affected
37-40	The quantity is annualised, so the frequency should be entered as '1'	Number of biodiversity units generated (one off)

Value build-up

The valuations are based on the following approaches:

Water resources

- Water resources (SuDS Impact Category): avoided costs associated with increased infiltration to groundwater, which helps maintain natural hydrological regimes, increase the availability of water for abstraction, and/or reduce water treatment requirements. Values are based on Water UK and Stantec research.

- Water resources (coastal margins Impact Category): benefits from the provision of surface and groundwater supply services delivered by coastal wetlands, valued using evidence from academic research. These benefits reflect the natural water supply services provided by coastal habitats, as an alternative to engineered or abstracted water sources.

Water quality

- Water quality (farmland and mountain moor & heath Impact Categories): avoided costs associated with reduced soil degradation (soil erosion and compaction), reflecting avoided nutrient and sediment losses to surface waters and the resulting improvements in water quality. Values are based on academic evidence on the costs of soil degradation to water environments.
- Water quality (coastal margins Impact Category): benefits from the provision of water quality improvement services delivered by coastal wetlands, including nutrient retention and filtration. Values are based on UK National Ecosystem Assessment (NEA) evidence.

Water regulation

- Water regulation (SuDS Impact Category): benefits arising from reduced surface water and sewer flooding risk, including associated mental health impacts of flooding. Values assume a 'typical' mix of SuDS measures, incorporating a range of green infrastructure supported by limited grey infrastructure to provide connectivity. Based on Water UK and Stantec research.
- Water regulation (rural and urban woodland Impact Categories): replacement cost of flood regulation services, valued using the annualised capital and operating costs of flood storage reservoirs that would be required in the absence of woodland providing equivalent flood attenuation. Based on academic research.
- Water regulation (coastal margins Impact Category): benefits from flood control and storm buffering services provided by coastal habitats, valued using UK NEA evidence.

Air quality

- Air quality (SuDS Impact Category): air pollution regulation benefit of SuDS. Values assume a 'typical' mix of SuDS measures, incorporating a range of green infrastructure supported by limited grey infrastructure to provide connectivity. Based on Water UK and Stantec research.
- Air quality (rural and urban woodland, urban and rural wetland, urban and rural grassland, farmland, mountain moor & heath, peatland, and coastal margins Impact Categories): benefits from air pollution regulation services provided by these habitats, expressed in terms of health outcomes (quality-adjusted life years, QALYs), based on an Office for National Statistics (ONS) study.

GHG emissions

- GHG emissions (SuDS Impact Category): avoided abatement costs arising from carbon sequestration benefits delivered by SuDS. Values assume a 'typical' mix of SuDS measures, comprising a range of green infrastructure supported by limited grey infrastructure to provide connectivity. Based on Water UK and Stantec research.
- GHG emissions (rural and urban woodland, urban and rural wetland, urban and rural grassland, farmland, mountain moor & heath, peatland, and coastal margins Impact Categories): avoided abatement costs associated with carbon sequestration by habitats, based on DESNZ sequestration rates.

Biodiversity

- Biodiversity (urban and rural woodland Impact Categories): non-use biodiversity value, represented by public WTP for the conservation and existence of woodland biodiversity, based on academic research

- Biodiversity (designated area Impact Category): aggregate WTP to secure the continued delivery of biodiversity services and benefits provided by designated sites (e.g. SSSIs), based on 'maintain funding' and 'increase funding' conservation scenarios reported in academic research

Quality of place

- Quality of place (SuDS Impact Category): WTP for improved amenity arising from the amenity value of SuDS. Values assume a 'typical' mix of SuDS measures, comprising a range of green infrastructure supported by limited grey infrastructure to provide connectivity. Based on Water UK and Stantec research.
- Quality of place (urban woodland, urban wetland and bare ground/hardstanding Impact Categories): percentage increase in house prices associated with a one-hectare increase in freshwater within a 1 km grid square attributable to SuDS. Based on academic research.
- Quality of place (urban grassland Impact Category): increase in house prices within 600 m and 1 km of green infrastructure. Based on a GLA Economics study.

Loca economy

- Local economy (farmland Impact Category): benefit to the local economy from farm produce profits, valued using the five-year average gross margin, based on The John Nix Pocketbook for Farm Management (2026)

Skills and knowledge

- Skills and knowledge (SuDS Impact Category): Educational benefit of SuDS. Assumes a 'typical' mix of SuDS measures including a range of green infrastructure with some grey infrastructure to connect them together. Based on Water UK and Stantec research

Health and wellbeing

- Health and wellbeing (SuDS Impact Category): improved health outcomes for those with a view over greenspace. Assumes a "typical" mix of SuDS measures including a range of green infrastructure with some grey infrastructure to connect them together. Based on Water UK and Stantec research

Biodiversity units

- Biodiversity units (biodiversity unit and biodiversity unit - watercourses only Impact Categories): market value of biodiversity units, using the national average price per unit, based on DEFRA and eftec values and Biodiversity Units UK data

No value options were found to assess this Service Measure's impacts on temperature regulation.

Value application

Before application, the appraisal period should be updated in the **COMPANY INPUT tab** within the CVF to make sure carbon values are correct.

Air quality values should be uplifted by an additional 2% per annum to be consistent with interdepartmental guidance to reflects increases in willingness to pay for avoided health outcomes over time.

To represent Biodiversity Unit gained from creation/improvement of watercourses, please use the Biodiversity Unit - watercourses only Impact Category. For Biodiversity Unit gained from any other habitat types, please use Biodiversity Unit (high/medium/low) as appropriate.

Timber profit appraisal is not included in the CVF as it's not a common investment outcome. If the user requires this outcome to be valued, please refer to the NCEM workbook for guidance and use the Other benefits and avoided costs (47) SM to capture it.

Water quality impacts on habitats: SuDS, urban wetland, rural wetland, urban woodland, and rural woodland, should be valued through the Nutrient removal (33) SM on agreement from the User Group during CVF development.

Practice to avoid:

- The SuDS Impact Categories should not be used with the Sewer/clean water flooding (14-17) Service Measures as both capture water regulation and mental health values.
- The SuDS and urban Impact Categories should not be used with the Amenity (34) SM as both capture quality of place benefits.

- The Biodiversity Unit Impact Categories should not be used with the other Impact Categories in this Service Measure to avoid double counting biodiversity value.
- The designated sites Impact Category should not be used with other impact habitat type Impact Categories when valuing impacts to the same area of habitat. E.g. impacts to a Ramsar wetland should be valued under the wetland Impact Categories or the designated sites Impact Category, but not both.

The table below provides guidance on how habitat condition 'good', 'moderate', and 'poor' can be selected.

Table 21: How to select habitat condition for the Habitat impact (30) SM

	High benefits	Medium benefits	Low benefits
SuDS	Where SuDS provide multiple environmental and social benefits beyond water management. They often act as community assets - supporting recreation, education, and well-being while enhancing air quality and urban cooling.	Where SuDS provide effective flood regulation and water quality improvements but offer limited ecological or social co-benefits.	Where SuDS only provide flood regulation or water quality benefits.
	Good	**Moderate**	**Poor**
Woodland (urban & rural)	Structurally diverse and rich in native species. It includes a mix of tree maturities and shows signs of natural regeneration. Good tree health with low mortality and no major pests, disease or damage. There are no invasive plant species present.	Some structural and species diversity with more than half of the area composed of native species. There is a mix of tree maturities and some regeneration. Fair tree health with minor signs of pests or disease. Invasive plant species may be present but small in area.	Poor condition, lacks structural and species diversity, with little or no natural regeneration. Tree health is poor, with visible signs of mortality, disease, or pest damage. Invasive plant species are widespread with clear evidence of disturbance. Clear signs of nutrient enrichment.
Wetland (urban & rural), Peatland	Consistently high water table, with saturated ground or standing water visible. Vegetation is typical and featuring wetland species. Water inputs are clean and unpolluted with no signs of artificial drainage or nutrient enrichment. Invasive species are absent, and scrub or bare ground cover is minimal.	Some natural wetland features but shows inconsistency in water levels, vegetation structure, or species composition. Low levels of scrub, bare ground, or early signs of disturbance may be present. Ecological potential remains, but signs of stress are evident.	Significant degradation, with water levels often low or artificial drainage affecting hydrology. Typical wetland plants are sparse. Pollution, invasive species, excessive scrub, or extensive bare ground are common.
Urban grassland	Rich variety of native wildflowers and grasses. The vegetation is structurally varied with a mix of shorter and taller areas that support a wide range of wildlife. Bare ground occurs only in small, natural patches, while scrub and bracken are minimal. No signs of invasive species, damaging activities, or poor management.	Some diversity of native species and a degree of structural variation, but lacks the richness or balance seen in healthier grasslands. Some scrub or bracken may be present, and there may be early signs of disturbance. The habitat remains functional but shows evidence of ecological decline or reduced value for wildlife.	Narrow range of grasses or non-native species, with little structural variety or botanical interest. Scrub, bracken, or bare ground may be widespread. Common signs of poor management, invasive species, and heavy damage. The habitat lacks ecological function and offers little benefit for biodiversity.
Farmland	Well-managed soils that support sustainable farming and ecosystem health. Farmers use minimal tillage or no-till methods, preserving soil structure, moisture, and microorganisms. Nutrients are recycled through cover crops, compost or manure. Water infiltrates easily, with minimal runoff or erosion.	Signs of good soil management but with some shortcomings. Fields may still be regularly tilled, reducing soil stability and biological activity. Water movement may cause occasional runoff or minor erosion. Soil compaction or bare patches may occur leading to nutrient loss.	Clear signs of degraded soil structure and unsustainable practices. Soils are frequently ploughed or heavily disturbed, with little or no organic cover between crops. Water runoff, erosion, or surface crusting is common. Compaction is widespread. Nutrients leach easily or are over-applied in patches.

Mountain, moors & heath	Diverse mix of typical heathland plants is present, including a healthy variety of dwarf shrubs and heather at different life stages. Small areas of bare ground are visible and beneficial for wildlife. There are no signs of invasive species, artificial disturbance, or pollution. Grazing or browsing is balanced.	Some key heathland features but lacks the full ecological balance of a thriving site. Bare ground may be either too sparse or too widespread, and scrub or gorse may be beginning to encroach. There may be signs of past disturbance, light damage, or small patches of invasive species.	Absence of distinctive heathland structure and species, where key heathland plants may be replaced by grasses, scrub, or bracken. Invasive species may be widespread, and there are visible signs of damage. Bare ground may be missing or excessive.
Peatland	Consistently wet surface with a strong cover of Sphagnum and other typical peat-forming species, showing little drying and only small, natural patches of bare peat. Hydrology is intact with no active drainage, and there is no noticeable scrub, invasive species, or signs of burning or heavy grazing.	Retains key bog characteristics but shows signs of decline, with patchier Sphagnum, increasing heather or purple moor-grass, and occasional small areas of bare or slightly eroding peat. The water table is variable, and there may be light scrub encroachment or evidence of past drainage or disturbance.	Noticeably degraded, with a lowered water table, widespread bare or eroding peat, and a marked loss of peat-forming vegetation. The surface is dominated by heather, purple moor-grass or scrub, and drainage features or other disturbances such as burning, cutting or heavy grazing are usually evident.
Coastal margins	Shaped by natural coastal processes, with little or no human interference. Native vegetation forms clear and continuous zones that blend naturally into neighbouring coastal habitats. There are no visible signs of pollution, nuisance algal growth, or invasive species. Litter is minimal, and signs of human use are rare.	Some signs of disturbance. Coastal processes may be slightly altered, and vegetation patterns may be uneven in places. Invasive species or algal growth may occur in small areas, and some litter or light human use may be noticeable.	Significantly altered or fragmented. Natural coastal processes are disrupted and vegetation zones are indistinct or damaged. Invasive species, algal blooms, or visible pollution may be widespread. Signs of litter, trampling, or other damage are common.
	High value	**Central value**	**Low value**
Biodiversity unit	Habitat types that are scarce on Biodiversity market, such as high distinctiveness woodland, wet woodland, and mixed deciduous woodland.	Habitat types that are less common on Biodiversity market, such as medium distinctiveness woodland, lowland meadow, lakes/ ponds (non-priority habitat), individual trees, and traditional orchard.	Habitat types in abundant supply on Biodiversity market, such as other neutral grassland and heathland & scrub.

5.31 Greenhouse gas emissions (including embodied and operational carbon)

This Service Measure assesses the negative impacts from GHG emissions, including direct emissions (Scope 1), indirect emissions from purchased electricity (Scope 2), and other indirect emissions across the value chain (Scope 3).

Impact Categories

Ref	Impact Categories	Units
1	GHG emissions - direct e.g. combustion (scope 1)	tCO2e
2	GHG emissions - indirect electricity (scope 2)	tCO2e
3	GHG emissions - indirect other (scope 3)	tCO2e

User input

Ref	Frequency	Quantity
1-3	The quantity is annualised, so the frequency should be entered as '1'	tCO2e in a year

Value build-up

The valuations for GHG emissions are based on abatement costs for emissions, using DESNZ values and accounting for annual inflation over the appraisal period.

No value options were found to assess this Service Measure's impacts on customer trust.

Value application

The value used for monetised impact per tCO_2e is calculated from a time series in the **Carbon values tab** in the Standard Data section. The years used to calculate the carbon impact are determined by the user, who can select the start and end year of the appraisal on the **COMPANY INPUT tab**.

5.32 Air pollution

This Service Measure assesses the impacts of water company activities on air pollution. These could negatively impact biodiversity, health and wellbeing, and affect customer trust.

Impact Categories

Ref	Impact Categories	Units
1	Air pollution emissions - NOx	Tonnes
2	Air pollution emissions - SOx	Tonnes
3	Air pollution emissions - NH3	Tonnes
4	Air pollution emissions - PM2.5	Tonnes

User input

Ref	Frequency	Quantity
1-4	The quantity is annualised, so the frequency should be entered as '1'	Tonnes of air pollutants emitted in a year

Value build-up

The valuations are based on the following approaches:

- Biodiversity: annual damage costs associated with negative impacts on habitats resulting from air pollution emissions of NOx and NH_3, based on academic research.
- Health and wellbeing: damage costs associated with negative impacts on health and wellbeing resulting from air pollution emissions of NOx, SOx, NH_3, and PM2.5, based on DEFRA values.

No value options were found to assess this Service Measure's impacts on customer trust.

Value application

Air quality values should be uplifted by an additional 2% per annum to be consistent with interdepartmental guidance to reflect increases in willingness to pay for avoided health outcomes over time.

5.33 Nutrient removal

This Service Measure assesses the opportunity of reducing nutrient and sediment influx into waterways to improve water quality. This could affect stakeholder relationships and lead to private financial benefits to the water company.

Impact Categories

Ref	Impact Categories	Units
1	Removal of nitrates	kg
2	Removal of phosphorus	kg
3	Removal of sediment	kg

User input

Ref	Frequency	Quantity
1-3	The quantity is annualised, so the frequency should be entered as '1'	Kg of nutrients removed in a year

Value build-up

The valuations for water quality are based on avoided damage costs from improvements in water quality achieved through pollutant removal (nitrates, phosphorus, and sediment). Unit values represent the annual benefit of reducing one kilogram of nitrate/phosphorus/sediment in water from agricultural sources, derived using the Farmscoper Decision Support Tool (v5).

Valuations were not included for stakeholder relationships and private benefits, to account for avoidable costs and mitigate the risk of double counting, as these impacts are valued under a different Service Measure (see Value application below).

Value application

If there are expected impact on stakeholder engagement and relationships, the Community engagement (39) SM should be used to represent this impact.

If there are any private financial benefit from the removal of nutrients to the water company, this should be entered using the Other benefits and avoidable costs (47) SM on a case-specific basis.

5.34 Amenity

This Service Measure captures amenity benefits associated with proximity to natural features for households and businesses. These benefits reflect improvements in the local natural environment that enhance visual amenity, sense of place, and access to nature, and also contribute to better health and wellbeing outcomes.

Impact Categories

Ref	Impact Categories	Units
1	No. homes benefitting from improved natural environment	No. homes impacted
2	No. businesses benefitting from improved natural environment	No. businesses impacted

User input

Ref	Frequency	Quantity
1	The quantity is annualised, so the frequency should be entered as '1'	Number of homes impacted in a year
2	The quantity is annualised, so the frequency should be entered as '1'	Number of businesses impacted in a year

Value build-up

The valuations are based on the following approaches:

- Quality of place: percentage change in house prices where green spaces are created or significantly enhanced and residential properties are nearby (market value), based on RICS values. In the RICS source, the maximum distance considered for property impacts from greenspace is 450m.
- Health and wellbeing: health benefits expressed as changes in quality of life associated with having a view of green space from the home (compared to no view), valued using quality-adjusted life years (QALYs), based on academic research.

The assessment of amenity is related to proximity to land types or features, e.g. green space or inland waters. A home or business benefitting from improved natural environment does not necessarily only benefit from an improved view but may also benefit from improved sense of place or improved access through proximity. The Mourato et al (2010) source used here only captures impact of view on health, rather than overall amenity, but is included as the only source found which captures impacts to health.

Value application

This Service Measure should not be used with the SuDS and urban Impact Categories under Habitat impact (30) SM as both capture quality of place benefits.

5.35 External contacts

This Service Measure captures the impact of customer complaints on the local economy from the perspective of lost productivity for the caller. Such complaints would reduce local economic productivity. They could also affect customer trust and lead to private costs.

Impact Categories

Ref	Impact Categories	Units
1	Customer Complaint	Nr of complaints
2	Pressure Group Involvement	Nr of incidents
3	Environmental Health Involvement	Nr of incidents

User input

Ref	Frequency	Quantity
1	The quantity is annualised, so the frequency should be entered as '1'	Number of complaints in a year. Use a value of less than 1 to represent cases where complaints take place less that once per year.
2-3	The quantity is annualised, so the frequency should be entered as '1'	Number of incidents in a year. Use a value of less than 1 to represent cases where incidents take place less that once per year.

Value build-up

The valuations for local economy are based on the costs incurred due to lost productivity of callers, expressed in terms of gross value added (GVA), based on an ONS study.

No value options were found to assess this Service Measure's impact on customer trust.

Value application

This Service Measure only captures the impact of customer complaints on local economy from a lost productivity perspective of the caller. Any local economy impact from disruption to businesses due to water supply issues should be represented using the Drinking water quality (1-2) Service Measures.

5.36 Nuisance

This Service Measure assesses the risk of releasing odour causing nuisance from a sewage treatment works, sludge treatment facility, sewage pumping station, or the network, as well as the risk of creating intolerable noise to adjacent properties. Such events would reduce quality of place and negatively impact health and wellbeing. They could also affect customer trust and lead to private costs.

Impact Categories

Ref	Impact Categories	Units
1	Statutory Nuisance Abatement Notice	Nr of incidents
2	Properties subjected to transient intolerable odour	Property days impacted
3	Properties subjected to chronic (seasonal) intolerable odour	Property days impacted
4	Properties subjected to transient intolerable noise	Property days impacted
5	Properties subjected to chronic (seasonal) intolerable noise	Property days impacted

User input

Ref	Frequency	Quantity
1	The quantity is annualised, so the frequency should be entered as '1'	Number of incidents in a year
2-5	The quantity is annualised, so the frequency should be entered as '1'	Number of property days impacted in a year

Value build-up

The valuations are based on the following approaches:

- Quality of place: percentage property price reduction caused by the negative impact of odour on quality of place, varying with distance from the disamenity site, based on academic research.
- Health and wellbeing: damage cost associated with the negative impact on individuals' health and wellbeing as a result of noise exposure, based on an ONS study.

No value options were found to assess this Service Measure's impact on customer trust.

Value application

There is no Service Measure specific guidance to note.

5.37 Compliance Risk Index (CRI)

This is a reporting only Service Measure relating to a composite metric to assess the risk arising from treated drinking water compliance failure, as developed and maintained by the UK Drinking Water Inspectorate (DWI).

5.38 Recreation

This Service Measure refers to leisure activities pursued for enjoyment, relaxation or personal enrichment. Recreation has a positive impact on health and wellbeing and increases productivity of the local economy. Visitors are assumed to be undertaking an active visit to an outdoor space.

Impact Categories

Ref	Impact Categories	Units
1	Recreational visits	Nr of visits
2	Fishing visits	Nr of visits

User input

Ref	Frequency	Quantity
1-2	The quantity is annualised, so the frequency should be entered as '1'	Number of visits in a year

Value build-up

The valuations are based on the following approaches:

- Local economy: benefits to the local economy arising from recreational and fishing visits, captured through trip related expenditure (market value), alongside avoided public health costs. Values are based on the Outdoor Recreation Valuation Tool and academic research, respectively.
- Health and wellbeing: benefit to individuals health and wellbeing as a result of recreational and fishing visits, based on EA study.

The benefit to the local economy from avoided public health costs is based on an activity of approximately 30 minutes a week of 'moderate-intense' physical activity. Therefore, this Service Measure should be used for outdoor, active recreational activities. Other valuations in the Impact Category recreational visits also assume outdoor recreational visits.

Local economy values include trip-related expenditure and avoidance of public health costs combined.

Value application

If capturing recreation benefits as a result of river or other water body water quality improvements, use the Quality of the water environment (27) SM and not this SM. If an intervention is expected to impact on fishing visits but has no impact on river or other water body water quality, use this SM and not SM 27.

5.39 Community engagement

This Service Measure captures the benefits of community engagement activities. Such activities would positively impact health and wellbeing and skills and knowledge and increase the productivity of the local

economy. They could also affect customer trust, stakeholder relationships, and lead to private costs and benefits.

Impact Categories

Ref	Impact Categories	Units
1	Educational visits (e.g. school engagement)	Number of children benefitting
2	Engaging with adults - STEM & water-based engagement	Number of adults engaged
3	Investment leveraged	£s
4	Time leveraged (through in-kind contribution)	Hrs
5	Company employees participating in volunteering	Nr of people
6	Non-company employees participating in volunteering	Nr of people

User input

Ref	Frequency	Quantity
1	The quantity is annualised, so the frequency should be entered as '1'	Number of children benefitting in a year
2	The quantity is annualised, so the frequency should be entered as '1'	Number of adults engaged in a year
3	The quantity is annualised, so the frequency should be entered as '1'	£s in a year
4	The quantity is annualised, so the frequency should be entered as '1'	Hours in a year
5-6	The quantity is annualised, so the frequency should be entered as '1'	Number of people impacted in a year

Value build-up

The valuations are based on the following approaches:

- Local economy: replacement costs applied to volunteering by company and noncompany participants using ONS values for unpaid work, alongside the application of GVA per hour to time leveraged through in-kind contributions, based on ONS labour productivity data.
- Skills and knowledge: average cost of an educational visit or adult engagement, treated as an investment in ecological knowledge, based on academic research.
- Health and wellbeing: value of volunteering at least once a year to a volunteer's wellbeing, based on HM Treasury's Green Book supplementary guidance.

No value options were found to assess this Service Measure's impacts on customer trust or stakeholder relationships.

Value application

For company/non-company employees participating in volunteering, the unit is number of people. The valuations associated with these Impact Categories assume the duration of volunteering is 1 day, which is 8 hours.

The impact of investment leveraged on local economy should be value through the Other benefits and avoidable costs (47) SM on a case-specific basis.

5.40 Employment

This Service Measure captures the risks and opportunities related to employee retention, training, and education schemes. Opportunities from training and education schemes translate into positive impacts on skills and knowledge, health and wellbeing, and increased productivity in the local economy. Risks associated with poor employee retention translate into negative impacts on organisational routines and practices, and the generation of private costs.

Impact Categories

Ref	Impact Categories	Units
1	People in apprenticeships	Nr people
2	People in graduate roles	Nr people
3	Employee retention	Nr employees lost

Ref	Impact Categories	Units
4	Employee training	Nr people

User input

Ref	Frequency	Quantity
1-4	The quantity is annualised, so the frequency should be entered as '1'	Number of people impacted in a year

Value build-up

The valuations are based on the following approaches:

- Local economy: benefit to the local economy arising from increased earnings and spending power. This is calculated using an estimate of apprentices' productive contribution over a typical year (GVA per apprentice per year), as well as the economic GVA associated with an additional filled role, based on academic research and ONS data.
- Skills and knowledge: social return on investment (SROI) value for vocational training of apprentices, based on an EN:ABLE Communities CIO report.
- Health and wellbeing: SROI values for part-time employment for apprentices; for individuals aged under 25 moving from unemployment to full-time employment in graduate roles; and for individuals undertaking general job-related training (including training for a new job or to improve skills for a job), based on an EN:ABLE Communities CIO report.
- Routines and practices and private costs: lost productivity costs associated with the loss and replacement of each employee, and logistical costs to the employer per loss and replacement, based on an Oxford Economics study.

No value options were found to assess this Service Measure's impacts on customer trust.

Value application

To capture impacts on employee upskilling, please use the 'Employee training' Impact Category.

5.41 Enabling growth

This Service Measure captures the benefits to local economic productivity arising from enabling residential and industrial development across different geographies in the UK.

Impact Categories

Ref	Impact Categories	Units
1	Enabling residential development - East Midlands	ha
2	Enabling residential development - West Midlands	ha
3	Enabling residential development - East	ha
4	Enabling residential development - Yorkshire and the Humber	ha
5	Enabling residential development - North East	ha
6	Enabling residential development - North West	ha
7	Enabling residential development - South East	ha
8	Enabling residential development - South West	ha
9	Enabling residential development - London	ha
10	Enabling industrial development - East Midlands	ha
11	Enabling industrial development - West Midlands	ha
12	Enabling industrial development - East	ha
13	Enabling industrial development - Yorkshire and the Humber	ha
14	Enabling industrial development - North East	ha
15	Enabling Industrial development - North West	ha
16	Enabling industrial development - South East	ha
17	Enabling industrial development - South West	ha
18	Enabling industrial development - London	ha

User input

Ref	Frequency	Quantity
1-18	The quantity is annualised, so the frequency should be entered as '1'	Hectares impacted per year

Value build-up

The valuations for local economy are based on the increased area of land made available for residential or economic activity, measured through land value uplift. Values represent the increase in land value when land is repurposed for residential or industrial development. The valuations have been undertaken using a truncated residual valuation model. This involves valuing the proposed development (based on the sale price of the proposed scheme) and deducting development costs, including allowances for base build costs, developer profit, marketing costs, fees, and finance, to derive a residual site value.

Value application

There is no Service Measure specific guidance to note.

5.42 Transport disruption

This Service Measure assesses the risk of causing disruption to transport routes either through the daily operation of the asset base, asset failure or through ad-hoc work carried out on the asset base. Such disruptions would reduce the productivity of the local economy, negatively impact GHG emissions and air quality, and affect customer trust.

Impact Categories

Ref	Impact Categories	Units
1	Minor roads (B and C roads)	Number of days disruption per event
2	Main roads (A and principal roads)	Number of days disruption per event
3	Motorways	Number of days disruption per event
4	Rail	Number of days disruption per event

User input

Ref	Frequency	Quantity
1-4	Number of events in a year	Number of days of disruption per event

Value build-up

The valuations are based on the following approaches:

- Local economy: additional travel costs associated with delays arising from transport disruption, based on the Multi-Coloured Manual.
- Air quality: damage costs associated with reduced air quality resulting from travel delays, based on DESNZ Green Book supplementary guidance.
- GHG emissions: abatement costs associated with increased GHG emissions arising from travel delays, based on DESNZ values.

No value options were found to assess this Service Measure's impacts on customer trust.

Value application

Before application, the appraisal period should be updated in the **COMPANY INPUT tab** within the CVF to make sure carbon values are correct.

Air quality values should be uplifted by an additional 2% per annum to be consistent with interdepartmental guidance to reflects increases in willingness to pay for avoided health outcomes over time.

5.43 Active travel opportunities

This Service Measure assesses the opportunities for active travel associated with cycling and walking trips on newly created routes, which would have a positive impact on recreation and health and wellbeing for the users.

Impact Categories

Ref	Impact Categories	Units
1	Cycling trips on newly created route	Number of trips
2	Walking trips on newly created route	Number of trips

User input

Ref	Frequency	Quantity
1-2	The quantity is annualised, so the frequency should be entered as '1'	Number of trips in a year

Value build-up

The valuations for health and wellbeing are based on the benefits arising from improved health outcomes associated with increased physical activity, measured through reductions in mortality risk and valued using the value of a statistical life. The values are based on the World Health Organisation's Health Economic Assessment Tool (HEAT).

Value application

If impact on recreational activities is expected, the Recreation (38) Service Measure should be used in tandem to capture this impact.

5.44 Health and safety (public & employees)

This Service Measure assesses the risk of causing personal injury or illness to employees, contracting staff or members of the public. Such incidents would undermine safety and security and health and wellbeing, reduce productivity in the local economy, and lead to private costs for companies. They could also affect customer trust.

Impact Categories

Ref	Impact Categories	Units
1	Near-miss	Nr of
2	Fatality	Number of people affected
3	Non-fatal injuries	Number of people affected
4	Injuries leading to 7 or more days absence	Number of people affected
5	Injuries leading up to 6 days absence	Number of people affected
6	Ill health	Number of people affected
7	Ill health leading to 7 or more days absence	Number of people affected
8	Ill health leading up to 6 days absence	Number of people affected
9	Failure to comply with HSE legislation	Nr of failures

User input

Ref	Frequency	Quantity
1	The quantity is annualised, so the frequency should be entered as '1'	Number of near misses in a year
2-8	The quantity is annualised, so the frequency should be entered as '1'	Number of people affected in a year
9	The quantity is annualised, so the frequency should be entered as '1'	Number of failures in a year

Value build-up

The valuations for private costs, local economy, and safety and security are based on the costs to employers or water companies arising from reduced productivity; costs to government resulting from increased health and social care expenditure; and costs to individuals reflecting the loss of life or reduction in quality of life, respectively. Values are based on HSE guidance.

No value options were found to assess this Service Measure's impacts on customer trust. Valuations are not provided for the health and wellbeing value metric to avoid double counting with the safety and security value metric.

Value application

This Service Measure should be used for the public as well as company own employees.

When using this Service Measure, the 'non-fatal injuries' Impact Category should not be used together with the 'injuries leading to 7 or more days absence' or 'injuries leading up to 6 days absence'. If the type of non-fatal injuries is known (i.e. up to 6 days or 7 or more, please use the respective Impact Category, otherwise, use the non-fatal injuries Impact Category. The same advice should be followed for the ill health Impact Categories.

There is a universal private costs valuation provided, based on literature. If a company has private costs calculated separately these can be used as overrides.

Do not use this Service Measure alongside the Security (physical and cyber) (45) SM for the physical security breach Impact Category, as they both value the impacts to individuals' physical health.

5.45 Security (physical & cyber)

This Service Measure assesses the risk of a physical or cyber security breach, which would undermine safety and security, health and wellbeing, and customer trust, negatively impact routine and practices, reduce the productivity of the local economy, and lead to private costs for companies.

Impact Categories

Ref	Impact Categories	Units
1	Physical security breach	Nr of breach
2	Cyber security breach - without outcome	Nr of breach
3	Cyber security breach - with outcome e.g. data loss	Nr of breach
4	Loss of customer data	Nr of customer affected per breach

User input

Ref	Frequency	Quantity
1-3	The quantity is annualised, so the frequency should be entered as '1'	Number of breaches in a year
4	Number of breaches in a year	Number of customers affected per breach

Value build-up

The valuations are based on the following approaches:

- Private costs: damage costs to the water company arising from responding to a security breach, including the average value of property stolen or damaged for commercial crimes (Home Office values), and costs associated with service failure for medium and large businesses. This includes payments to external IT consultants or contractors, any payments to attackers, or money stolen, based on DCMS values.
- Local economy: damage costs to the health and justice systems, based on average costs relating to health services, victim services, policing, and other criminal justice system costs for commercial crimes, using Home Office values.
- Health and wellbeing: negative impacts on emotional wellbeing, based on average values for physical and emotional harm for commercial crimes and individual cybercrime involving loss of customer data, using Home Office values.
- Safety and security: negative impacts on physical health, based on average values for physical harm associated with commercial crimes, using Home Office values.
- Routines and practices: loss of staff productivity and intellectual property, based on average lost output for commercial crimes, and staff and indirect costs representing loss of productivity and organisational know-how, using Home Office and DCMS values.

No valuation is provided for the structural resources value metric to avoid double counting with the routine and practices value metric.

For the loss of customer data Impact Category, no valuation is provided for the trust value metric to avoid double counting with the cyber security breach - breach with outcome Impact Category.

Value application

There is a universal private costs valuation provided, based on literature. If a company has private costs calculated separately these can be used as overrides.

Do not use the physical security breach Impact Category alongside the Health and safety (public and employees) (44) SM, as they both value the impacts to individuals' physical health.

5.46 Circular economy

This Service Measure captures the opportunities associated with circular economy practices such as reducing waste to landfill, supplying subpotable water, and recovering heat from sludge. These opportunities would improve the quality of water resources, reduce GHG emissions, and lead to private benefits for companies. They could also lead to private costs.

Impact Categories

Ref	Impact Categories	Units
1	Waste diverted from landfill	Tonnes diverted from landfill
2	Subpotable water supply	Ml/year
3	Heat recovery from sludge	GWh/year

User input

Ref	Frequency	Quantity
1	The quantity is annualised, so the frequency should be entered as '1'	Number of tonnes
2	The quantity is annualised, so the frequency should be entered as '1'	Number of megalitres
3	The quantity is annualised, so the frequency should be entered as '1'	Number of GWh

Value build-up

The valuations are based on the following approaches:

- GHG emissions: abatement costs associated with reduced GHG emissions from diverting waste from landfill, based on WRAP's Benefits of Reuse Tool.
- Water resources: avoided costs arising from reductions in potable water demand, calculated using the average incremental social cost of public water supply, based on NIC analysis.
- Private benefits: reductions in waste disposal costs to the company through avoided gate fees, using mean gate fees for non-hazardous landfill (excluding landfill tax), based on WRAP's Gate Fees Report.

Value application

There is no Service Measure specific guidance to note.

5.47 Other benefits and avoided costs

This is a capture-all Service Measure which provides the place for users to enter any additional benefit calculations that can't be represented using other Service Measures.

A.1 Appendix A: NCEM and CVF alignment

This appendix shows a line-by-line comparison of the values used in NCEM and the CVF, including any outstanding differences. These tables were developed in collaboration with the NCEM team at the Environment Agency.

Table 22: Comparison of quantitative values used in NCEM and CVF

NCEM ecosystem service	Values given in NCEM quantitative library	Unit	Number of values in group	CVF approach to quantitative values	Outstanding discrepancies
Biodiversity	Number of biodiversity units from Biodiversity Metric Tool	Biodiversity units	1	N/A - quantitative value is input to CVF use	/
Cultivated plants & reared animals	NEVO timber and food production yields per	tonnes m3	2	N/A - CVF does not use location-based data (further than regional or country scale)	/
	John Nix Pocket Book for Farm Management	t/ha/yr litres/ha/yr kg/ha/yr	5	N/A - CVF valuation implicitly uses farm yield in monetised valuation	
	ONS timber removal rates	m3/ha/year	6	N/A - timber appraisal not included in CVF V2.1	
Education and Investigation	Children attending nature-based school trip	Number of pupils	1	N/A - quantitative value is input to CVF use	/
	Children attending educational trip to farms	Number of school children visits	1		
Global atmospheric regulation	Coastal margins sequestration values	tCO2e/ha/yr	13	Central sequestration value for intertidal sediments used in CVF for coastal margin habitat type.	CVF does not have the same range or detail of habitats as NCEM. This is due to the application - it is unlikely that users of the CVF will have highly detailed habitat data available when doing long term investment planning. Therefore, in some cases, the CVF has used average sequestration/emission values or sequestration/emission values of the most applicable habitat type.
	Enclosed farmland sequestration/emission values	tCO2e/ha/yr	5	CVF uses farmland sequestration values from same Natural England (2021) study, using three values for good/moderate/poor quality reflecting the type of farming (zero and min til, land under arable, arable-erosion respectively). Only the land under arable value is shown in NCEM with other selected values from the source.	
	Mountains, moorlands and heaths; Freshwaters - open waters, wetlands and floodplains sequestration/emission values	tCO2e/ha/yr	11	For CVF mountain, moor and heath habitat type, emission value for lowland heath and upland heath NCEM habitat type used. There are no other heathland values provided in NCEM. For CVF wetland (urban and rural) habitat type, emission value for 'ponds' used from same Natural	

NCEM ecosystem service	Values given in NCEM quantitative library	Unit	Number of values in group	CVF approach to quantitative values	Outstanding discrepancies
				England (2021) study referenced in NCEM, though the ponds emission value is not extracted and shown in the NCEM quantitative table. For CVF peatland habitat type, emission values for moderate and poor quality use same values as presented in NCEM, out of a longer list of peatland types. Value for good habitat quality in CVF sourced from same Natural England (2021) study, though not shown in NCEM quantitative table.	
	Semi-natural grassland sequestration values	tCO2e/ha/yr	2	For CVF grassland (urban and rural) habitat type, one of two sequestration values shown in NCEM is used.	
	Urban habitat type sequestration/emission values	tCO2e/ha/yr	1	N/A - value is zero	
	Woodland sequestration values	tCO2e/ha/yr	14	CVF uses average of all woodland (not including hedgerow) habitat types, which includes specific tree species and management styles.	
Local atmospheric pollution	Habitat specific pollution removal rates	t/ha/yr	24	N/A - CVF uses direct monetised pollution removal habitat values from ONS Natural Capital Accounts.	/
Physical/Mental Health & Wellbeing	Proportion of recreational visits that are active	% of recreational visits which are active	2	N/A - the Recreation (38) Service Measure assumes all visits active.	/
	Number of recreational visitors	recreational visits	2	N/A - quantitative value is input to CVF use	
Quality of the water environment	Area/length of water body	km2 km	2	N/A - quantitative value is input to CVF use	/
Recreation	Location specific visitor numbers	recreational visits	1	N/A - quantitative value is input to CVF use	/
	Habitat area	hectares	1	N/A - CVF values recreation through Recreation (38) Service Measure, rather than habitat area and type	
Volunteering	Number of volunteer hours	hours	1	N/A - quantitative value is input to CVF use	/
Water flow regulation	Flood storage volume by habitat	m3/ha/year hectares	10	N/A - CVF uses direct monetisation of habitat type flood mitigation properties	/
	Area of wetland	hectares	1	N/A - quantitative value is input to CVF use	/

NCEM ecosystem service	Values given in NCEM quantitative library	Unit	Number of values in group	CVF approach to quantitative values	Outstanding discrepancies
Water quality regulation	Loading of pollutant to watercourses	kg/ha/yr kg/farm/yr	1		
Water supply	Volume of water abstracted	m3/year	2	N/A - quantitative value is input to CVF use	/
Wild produce	Shellfish landing values	tonnes	1	CVF uses all sites to calculate average yield for each shellfish water quality category	/

Table 23: Comparison of monetary values used in NCEM and CVF

NCEM ecosystem service	Values given in monetary library	Unit	Number of values in group	CVF approach to monetary values	Outstanding discrepancies
Biodiversity	Habitat specific biodiversity unit values	£/biodiversity unit	11	In the Habitat impact (30) SM: CVF uses watercourse specific biodiversity unit value. CVF uses habitat specific biodiversity values for other habitats, sourced from ENCA and wider literature. In the Quality of the water environment (27) SM: Biodiversity value bundled within WTP value. In the Shellfish water quality (29) SM: Environment Agency source used to value biodiversity benefits. In the Air pollution (32) SM: ENCA referenced source used for biodiversity impacts of pollutants. Other Service Measures: Biodiversity identified as an impacted value metric, but excluded to avoid double counting. Biodiversity is often bundled with other ecosystem services so can be difficult to pull out individually.	NCEM only provides biodiversity unit values, rather than any habitat specific values, as users are likely to have calculated biodiversity units when at a project stage to use NCEM. CVF provides both habitat specific biodiversity benefits and biodiversity unit values, as users may not have calculated biodiversity units when using CVF.
	Habitat non-specific biodiversity unit values	£/biodiversity unit	3	CVF uses these values in the Habitat impact (30) SM for habitat non-specific biodiversity unit values	

NCEM ecosystem service	Values given in monetary library	Unit	Number of values in group	CVF approach to monetary values	Outstanding discrepancies
Cultivated plants & reared animals	Timber profit values	£/year or £/m3 overbark/year	2	N/A - timber appraisal not included in CVF V2.1	
	Farm produce values	£/ha/year	6	CVF uses average of farm produce values for all farm types (except sheep (upland))	As for carbon sequestration values, the CVF habitat type farmland does not specify the farm type as this is unlikely to be available information to CVF users.
Education and Investigation	Cost of nature-based school trip values	£/pupil trip	3	CVF uses the central of these values (low/central/high provided in NCEM) for skills & knowledge value of educational visits and engaging with adults Impact Categories in the Community engagement (39) SM.	/
	Cost of educational trip to farms	£/visit	1	Value not used as the CVF does not have a farm visit specific Impact Category.	/
Global atmospheric regulation	Abatement cost of carbon sequestration	£/tCO2e	1	CVF uses same sources and value series. CVF calculates an average of all carbon values for the appraisal period set and applies this as the monetised value.	/
Local atmospheric regulation (air quality)	Pollutant removal values	£/tonne/year	4	In the Habitat impact (30) SM: CVF uses ONS Natural Capital Accounts for habitat specific air pollution removal monetary values, instead of removal rate by habitat and a standard pollutant removal volume monetary value. In the Air pollution (32) SM: CVF uses the Defra air quality appraisal values (damage cost) and biodiversity impact values, both referenced in ENCA	For pollutant removal monetary values, CVF and NCEM use different sources. NCEM does not include any benefits from pollutant removal on biodiversity, only health damage costs (Jones et al 2017).
Physical/Mental Health & Wellbeing	Active visit value	£/active visit/year	1	CVF uses the same value as NCEM, replicating the calculation done in ENCA. Value is applied as benefit to local economy from avoided healthcare costs, for the Recreational (38) SM.	
Quality of the Water Environment	NWEBS WTP values	£/km or £/km2	2	CVF uses England and Wales wide values for improvements to rivers and transitional, coastal waters and lakes. CVF also extrapolates to a good to high Impact Category and calculates an 'in-class benefit on water quality' category.	NCEM provides river basin/water course specific values, where the CVF uses England & Wales wide values.

NCEM ecosystem service	Values given in monetary library	Unit	Number of values in group	CVF approach to monetary values	Outstanding discrepancies
Recreation	ORVal values and ORVal derived values	£/ha/year	19	CVF uses ORVal (2018) average values per visit for farmland and woodland for trip related expenditure as part of local economy benefits for recreational visits (SM 38). CVF does not apply recreational benefits on a habitat basis. Other location specific uses of ORVal are not applicable to CVF.	CVF does not apply recreational benefits on a habitat basis. This differs from NCEM which applies ORVal if location is known or habitat specific recreational benefits if specific location is not known.
	Bathing water WTP values	£/household	3	CVF uses the bathing water WTP values from the Ofwat Collaborative Research instead of the source provided in NCEM (eftec, The South West Research Company, Ipsos MORI 2014).	CVF uses a different source to NCEM. The CVF has aligned to the Ofwat Collaborative Research for consistency with other Service Measures.
Volunteering	Volunteering hour value	£/volunteer hour	1	CVF uses the same value as NCEM for the value of 1 volunteering hour. This is multiplied by 8 to value 1 volunteering day (1 day is assumed to be 8 hours).	
Water flow regulation	Avoided cost of constructed reservoir	£/m3/year	3	CVF uses a different value from the same study (Broadmeadow et al 2023), as a constructed reservoir may be an option being appraised by the CVF. The value selected for the CVF for the water regulation benefits of woodland is 'Average value of avoided flood water storage costs by floodplain woodland because of its hydraulic roughness'. This value was selected as it did not require a counterfactual scenario, which could not have been used because the counterfactual is the pre-intervention state and therefore set by the CVF user.	
	Flood control by habitat values (wetlands)	£/ha/year	4	For water regulation benefits of coastal margin habitat, CVF uses the wetland (coastal) habitat values, taking an average of the two values given.	
	Flood control by habitat values (benefit to other habitats by saltmarsh)	£/ha/year	5	N/A - requires pre-defined counterfactual, which is set by the user of the CVF in the pre-intervention state.	
Water quality regulation	Water quality benefits by habitat (wetlands)	£/ha/year	4	CVF identifies the same source and values for water quality benefits of wetlands and coastal margins, averaging the two values provided for each. Benefits from wetlands (urban/rural) are excluded to mitigate risk of double counting with SM 33.	CVF also identifies an additional source to value impacts to water quality of woodland, farmland, and mountain, moor and heath

NCEM ecosystem service	Values given in monetary library	Unit	Number of values in group	CVF approach to monetary values	Outstanding discrepancies
					from soil erosion (Cranfield University 2011).
	Water quality benefits by nutrient removal	£/kg	3	CVF uses the same values from Farmscoper (Adas 2022) for the Nutrient removal (33) SM.	
Water supply	Value of water abstracted for other industries	£/m3	3	N/A - this source values the impact of direct abstraction by industrial or agricultural landowners. This is not relevant to the CVF as this form of abstraction is not relevant to water company investment planning.	
	Average incremental social cost of public water supply	£/m3	1	This value is used across the CVF as the unit value for water resources left in the environment, in Service Measures 7, 10, 11, 12, 46.	The current NCEM guidance on the use of this value is to represent water resource made available for water supply. This is different to the CVF application of this value, which is to represent water resource left in the environment. The CVF team has sought further guidance from the EA Natural Capital team on how “water resource left in the environment” and “water resource available for supply” should be valued respectively.
Wild produce	Landed price of shellfish	£/tonne	1	CVF uses the same source (MMO 2025), using the latest year to value the food provision from categories of shellfish waters.	NCEM uses average of past 5 years to calculate value of shellfish yield. CVF uses latest market data to value the change between categories of shellfish water quality. CVF and NCEM are valuing separate things, as NCEM is valuing the produce yield, and CVF is valuing the change in quality.

A.2 Appendix B: List of engagement groups and members

Implementation Group

Adrian Rees Consulting
Affinity Water
Anglian Water
Arup
Dŵr Cymru Welsh Water
Environment Agency
NI Water
Northumbrian Water
Ofwat
Portsmouth Water
Severn Trent Water
South Staffs Water
South West Water
Southern Water
Thames Water
United Utilities
Wessex Water
Yorkshire Water

Project Implementation Board

Blue and Green Consulting
Consumer Council for Water
Country Land and Business Association
Defra
Environment Agency
Green Alliance
HM Treasury
National Farmers Union
Natural England
Ofwat
The Rivers Trust
United Utilities
Water UK
Wildlife and Countryside Link
WWF

User Group

Adrian Rees Consulting
AMCL
Arup
Cyfoeth Naturiol Cymru
Dŵr Cymru Welsh Water
Environment Agency
Northumbrian Water
Pennon Group
Ribble Trust
Severn Trent
South West Water
United Utilities
Yorkshire Water

Task and Finish Group

Adrian Rees Consulting	NI Water
Chartered Institution of Water and Environmental Management	North Star Transition
Defra	Ofwat
Environment Agency	Rivers Trust
Jacobs	RSK Group
Mott MacDonald	Severn Trent