Technical Note

Project:	Drainage Water Management Plan		
Subject:	Strategic Environmental Assessment - Overview and Example Catchment Output		
Author:	P McEntee		
Date:	21/01/2022	Project No.:	5201208

Document history

Revision	Purpose description	Originated	Checked	Reviewed	Authorised	Date
1.0	Draft for comment	CA	AJ	PMcE	PMB	Jan. 2022

Client signoff

Client	Thames Water
Project	Drainage Water Management Plan
Project No.	5201208
Client signature / date	

1. Introduction

The purpose of this Technical Note is to outline the key steps undertaken to examine the options for addressing drainage issues (hereafter referred to as 'Solutions') brought forward through the Drainage and Wastewater Management Plan (DWMP) and determine their environmental significance. It provides an overview of the process for key stakeholders in the absence of any formal Scoping Phase, and builds on information shared in previous presentations to L1 stakeholders including Natural England and the Environment Agency. Results of this process have then been used to inform further consideration of DWMP programme appraisal.

This approach is consistent with environmental assessment guidance noted in the Framework for the production of Drainage and Wastewater Management Plans and as such helps demonstrate that the DWMP delivers the best, sustainable outcomes for customers, stakeholders and the environment. It also demonstrates a comprehensive, evidence based approach that can help to deliver resilience while protecting the environment. As such, this assessment reflects the requirements of Strategic Environmental Assessment (SEA) legislation and guidance, SEA methodologies and also reflects and builds upon earlier work undertaken as part of the Option Development and Appraisal Stage of the DWMP development.

1.1. Approach to the assessment

In order to derive an understanding of significance of effect, this process considered the environmental sensitivities of each Drainage Catchment within the Thames Water plan area, as well as the magnitude of effect for each proposed Solution type to be developed within individual catchments.

It is important to note that at this stage, while the catchments are known (over 310 have been examined) and the broad Solution types are known (with a total of 44 possible Solution types examined), in many cases no further information / details regarding the precise location where a Solution will be developed within a catchment, nor the precise size, layout and nature of the Solution have been defined at this stage (e.g. catchment wide application of sustainable drainage solutions). This means that results are necessarily high level, but it is the intention that they can be built upon as further detail becomes known.

This Technical Note sets out examples of output relating to two sample catchments – Compton STW and Culham STW.

2. Understanding the sensitivity of a catchment

Under the SEA process, a series of environmental topics are examined. Through a review of Plans and Policies of relevance to the DWMP area, Baseline information and other assessments related to the water industry, a series of Objectives were also derived for the assessment of the DWMP as follows:

Table 2-1: SEA Topics and Objectives

SEA Topic	Objective
Biodiversity	To protect and enhance biodiversity, ecological functions, capacity, and habitat connectivity within water company's operating area
	To strengthen the connections between people and nature and realise the value of biodiversity
Population and Human health	To improve human health and well-being of the area, improve access to recreation and the environment, and reduce inequalities
Material Assets	To reduce, and make more efficient, the domestic, industrial and commercial consumption of resources, minimise the generation of waste, encourage its re-use and eliminate waste sent to landfill
Water	To maintain or improve the quality of rivers, lakes, groundwater, estuarine and coastal waterbodies

	To reduce and manage flood risk
Soil	To protect and enhance geology, the quality and quantity of soils and promote a catchment-wide approach to land management
Air and Climate	To reduce air pollutant and greenhouse gas emissions
	To adapt and improve resilience to the threats of climate change
Cultural Heritage	To conserve and enhance the historic environment, the heritage assets therein and their setting
Landscape	To protect, enhance the quality of, and improve access to designated and undesignated landscapes, townscapes and the countryside

Due to the large number of drainage catchments to be examined within the Plan area, a detailed GIS model was utilised to interrogate a suite of open-source datasets of relevance to the above topics and Objectives.

Against each of these topics, this process aimed to apply a sensitivity (high, medium or low) to each catchment, based on a set of 'rules' that could be applied to each catchment. These rules have been developed and refined through previous projects and guided by technical specialists and include the provision of buffer zones in order to help understand the potential for indirect impacts. The rules applied are contained within Table 2-2 below:

Table 2-2: Rules to establish Topic sensitivity of a Catchment

SEA Topic	High	Medium	Low
Biodiversity	Intersects internationally designated sites for Nature Conservation (SPA, SAC, Ramsar) And / Or Intersects Nationally designated sites for Nature Conservation (SSSI and NNR)	Within 10km from internationally designated sites for Nature Conservation (SPA, SAC, Ramsar) And / Or Within 2km from Nationally designated sites for Nature Conservation (SSSI and NNR) And / Or Intersects Locally designated sites for Nature Conservation (LNR) And / Or Intersects Priority Habitat areas	Greater than 10km from internationally designated sites for Nature Conservation (SPA, SAC, Ramsar) And / Or Greater than 2km from Nationally designated sites of Nature Conservation (SSSI and NNR) And / Or Outside Locally designated sites for Nature Conservation (LNR) And / Or Outside Priority Habitat areas
Population and Human health	Intersects areas currently utilised for recreation or which benefit the community (Allotments, religious grounds, playing fields, sports facility, golf course, public park and cemeteries) And Intersects areas impacting upon vulnerable groups (Schools and education centres, hospitals, and residential care homes) And Intersects areas designated as Noise Important Areas	Intersects areas currently utilised for recreation or which benefit the community (Allotments, religious grounds, playing fields, sports facility, golf course, public park and cemeteries) And / Or Intersects areas impacting upon vulnerable groups (Schools and education centres, hospitals, and residential care homes) And / Or Intersects areas designated as Noise Important Areas	Within 500m from areas currently utilised for recreation or which benefit the community (Allotments, religious grounds, playing fields, sports facility, golf course, public park and cemeteries) And / Or Within 500m from areas impacting upon vulnerable groups (Schools and education centres, hospitals, and residential care homes) And / Or Within 500m of areas designated as Noise Important Areas
Material Assets	Catchment is >67% Urban	Catchment is 34% - 66% Urban	Catchment is <34% Urban
Water	Intersects Source Protections Zones 1 and 2 And Intersects Drinking Water Safeguard Zones And Intersects a statutory river / unnamed water body And Intersects Flood Zones 2 and 3	Intersects Source Protections Zones 1 and 2 And / Or Intersects Drinking Water Safeguard Zones And / Or Intersects a statutory river / unnamed water body And / Or Intersects Flood Zones 2 and 3	Within 500m of Source Protections Zones 1 and 2 And / Or Within 500m of Drinking Water Safeguard Zones And / Or Within 500m of a statutory river / unnamed water body And / Or Outside of Flood Zones 2 and 3

SEA Topic	High	Medium	Low
Soil	Intersects Areas of Agricultural Land Use Grade 1	Intersects Areas of Agricultural Land Use Grades 2 and 3a	Outside of best and most versatile (Grades 1-3a)
Air	Intersects areas designated as Air Quality Management Area. And Intersects a Nature Conservation site (SAC, SPA, SSSI, NNR or Ramsar) And Intersects sensitive receptors, such as schools and education centres, hospitals and residential care homes	Intersects areas designated as Air Quality Management Area. And / Or Within 200m of a Nature Conservation site (SAC, SPA, SSSI, NNR or Ramsar) And / Or Within 200m of sensitive receptors, such as schools and education centres, hospitals and residential care homes And / Or Within 200m of areas currently utilised for recreation or which benefit the community (Allotments, religious grounds, playing fields, sports facility, golf course, public park and cemeteries)	Outside of areas designated as Air Quality Management Area. And / Or Greater than 200m from a Nature Conservation site (SAC, SPA, SSSI, NNR or Ramsar) And / Or Greater than 200m from sensitive receptors, such as schools and education centres, hospitals and residential care homes And / Or Greater than 200m from areas currently utilised for recreation or which benefit the community (Allotments, religious grounds, playing fields, sports facility, golf course, public
Climate factors	Intersects Communities at Risk Area And Contains Flood Warning Areas And Contains Flood Alert Areas	Intersects Communities at Risk Area And / Or Contains Flood Warning Areas And / Or Contains Flood Alert Areas	Outside Communities at Risk Area And / Or Outside Flood Warning Areas And / Or Outside Flood Alert Areas
Cultural heritage[1]	Intersects World Heritage Sites Or Intersects Listed Buildings And Intersects areas designated as Scheduled Monuments And Intersects areas designated as Registered parks and gardens And	Within 500 m of a World Heritage Site Or Intersects Listed Buildings And Intersects areas designated as Scheduled Monuments And / Or Intersects areas designated as Registered parks and gardens And / Or	Outside of World Heritage Sites And / Or Does not contain any Listed Buildings And / Or Outside of areas designated as Scheduled Monuments And / Or Outside of areas designated as Registered parks and gardens And / Or

[1] Note some GIS datasets (including Listed Buildings) are obtained in point format, and that a nominal boundary of 10m radius around each point is assumed to represent the asset in such cases

SEA Topic	High	Medium	Low
	Intersects areas designated as Registered Battlefields	Intersects areas designated as Registered Battlefields	Outside of areas designated as Registered Battlefields
Landscape	Intersects areas designated as Area of Outstanding Natural Beauty And / Or Intersects areas designated as National Park	Within 500m of areas designated as Area of Outstanding Natural Beauty And / Or Within 500m of areas designated as National Park	Greater than 500m from areas designated as Area of Outstanding Natural Beauty And / Or Greater than 500m from areas designated as National Park

Applying the rules to the catchments allows identification of the sensitivity of the catchment, per SEA topic.

Table 2-3: Identified Topic sensitivity of Drainage Catchments

	Biodiversity	Population and Human health	Material Assets	Water	Soil	Air	Climate factors	Cultural Heritage	Landscape
COMPTON STW	Medium	Medium	Low	Medium	Medium	Medium	Medium	Low	High
CULHAM STW	Medium	High	Low	Medium	Medium	Medium	High	Medium	Low

The assigned sensitivities is supported by a map to show the data output for each catchment and aid understanding of environmental issues within each Catchment. Sample maps for the Compton STW and Culham STW catchments are provided in Appendix A to this Technical Note. Alongside these are 'Catchment Proforma', which aim to highlight what the identified key issues are in relation to each catchment. Those Catchment Proforma for Compton STW and Culham STW catchments are provided in Appendix B.

2.1. Understanding the magnitude

To derive significance of effect, it is important to understand the magnitude of impact that might be manifested as a result of a proposed solution. A description of each of the proposed Solutions, alongside typical construction impacts and mitigations considered at design, construction and operation is collated to inform an impact magnitude scoring rationale against each of the SEA Objectives. This is in respect of both beneficial and adverse impacts.

The magnitude of effects presented here are determined on the basis that typical 'embedded' mitigation measures are already included, e.g. best practice construction methods, though a precautionary approach has typically been taken. This information is collated in Magnitude of Impact Proformas for each of the 44 no. Solution types. An example proforma setting out magnitude for the Solution 'Deep tank(s) and tunnel(s) to store combined sewage' is provided here, with other examples for relevant Solutions in the Compton STW and Culham STW catchments contained within Appendix C.

Table 2-4: Example Solution Magnitude proforma

Solution	C4.0 Deep tank(s) and tunnel(s) to store combined sewage		
Description	Deep tanks and tunnels to convey combined sewage to treatment location. Creates conveyance capacity for storm water.		
Typical Construction Impacts	The construction impact is likely to be relatively extensive and intrusive with the removal of large volumes of soils, trenching, watercourse modifications etc and associated noise and air quality impacts. Impacts anticipated in respect of biodiversity, population and human health, material assets and water among others.		
Typical Mitigation	Design • Locate at distance from sensitive receptors • Consider potential for ecological enhancement • Consider compensatory green infrastructure • Careful site selection – avoid areas of better quality soils if possible and target previously used land	Construction • Integration of Construction Environmental Management Plan • Consideration of the timing of construction works in relation to ecological windows, health and wellbeing and traffic considerations • Consideration of biodiversity and designated sites and habitats in	Operation • Regular programme of maintenance and monitoring to ensure operation at most efficient level • Scheduled control of invasive species where necessary

	• Consideration of opportunities for enhancement of known features of industrial & cultural heritage significance	Construction Environmental Management Plans (CEMPs) • Appropriate management of invasive species • Use of best practice construction techniques and Construction Environmental Management Plan (CEMP) to ensure that the character and quality of landscapes and townscapes are maintained as far as practical during construction • Care of topsoil for future reuse • Consideration of contaminated spoil in Construction Environmental Management Plans (CEMPs) • Precautions for unexpected heritage discovery during construction • Consideration of unexpected heritage discovery in Construction Environmental Management Plans (CEMPs)	

Topic	Objective	Scoring Rationale	Impact Magnitude	
			Beneficial	Adverse
Biodiversity	To protect and enhance biodiversity, ecological functions, capacity, and habitat connectivity within water company's operating area	Beneficial Increased capacity in network will reduce spills into receiving watercourses Adverse Short to medium-term loss or damage, though reversible, may be expected through construction	High	Medium
	To strengthen the connections between people and nature and realise the value of biodiversity	Beneficial Magnitude of impact negligible Adverse Magnitude of impact negligible	Negligible	Negligible
Population and Human health	To improve human health and well-being of the area, improve access to recreation and the environment, and reduce inequalities	Beneficial Reduced instances of out of sewer flooding expected to result in improvement to human health and well-being. Adverse Short to medium-term loss or damage, though reversible, may be expected through construction	Medium	Low
Material Assets	To reduce, and make more efficient, the domestic, industrial and commercial consumption of resources, minimise the generation of waste, encourage its re-use and eliminate waste sent to landfill	Beneficial Creation of storage expected to result in improvement through alleviating capacity pressures on wastewater networks and resources. Adverse Short to medium-term loss or damage, though reversible, may be expected through construction	Medium	Low
Water	To maintain or improve the quality of rivers, lakes, groundwater, estuarine and coastal waterbodies	Beneficial Creation of storage capacity will reduce instances of overflows into receiving watercourses Adverse Short to medium-term loss or damage, though reversible, may be expected through construction	High	Low
	To reduce and manage flood risk	Beneficial Reduced instances of out of sewer flooding expected as a result of storage capacity increases. Adverse Short to medium-term loss or damage, though reversible, may be expected through construction	Medium	Low
Soil	To protect and enhance geology, the quality and quantity of soils and	Beneficial Magnitude of impact negligible	Negligible	High

	promote a catchment-wide approach to land management	Adverse Permanent loss or damage, may be expected through construction though magnitude dependant on size		
Air and Climate	To reduce air pollutant and greenhouse gas emissions	Beneficial Magnitude of impact is negligible Adverse Short to medium-term loss or damage, though reversible, may be expected through construction	Negligible	Low
	To adapt and improve resilience to the threats of climate change	Beneficial Medium improvements may be anticipated where storage improves resilience to flooding events within combined networks Adverse Magnitude of impact negligible	Medium	Negligible
Cultural heritage	To conserve and enhance the historic environment, the heritage assets therein and their setting	Beneficial Where reduced flood risk is anticipated, this may indirectly afford greater protection to cultural heritage assets Adverse Loss or damage, with the potential to be permanent may be expected through construction	Low	Medium
Landscape	To protect, enhance the quality of, and improve access to designated and undesignated landscapes, townscapes and the countryside	Beneficial Where reduced flood risk is anticipated, this may indirectly afford greater protection to townscapes, landscape and the countryside. Adverse Short to medium-term loss or damage, though reversible, may be expected through construction	Low	Medium

2.2. Deriving likely significant effect

The following matrix was then applied to combine considerations of locational sensitivity against the Solution impact magnitude in order to derive the Likely Significance of Effect (LSE) of Solutions. The significance of effect can be presented as a code, score or by term, as shown in Table 2-5. Within SEA a numeric score is not typically given, but in this instance it was used to help inform further Option appraisal.

Table 2-5: Significance of Effect matrix

Location Sensitivity	Solution Magnitude of Effect									
	High		Medium		Low		Negligible		Neutral	
High	+3	-3	+2	-2	+2	-2	+1 / 0	-1 / 0	0	0
Medium	+2	-2	+1	-1	+1	-1	0	0	0	0
Low	+1	-1	+1	-1	0	0	0	0	0	0

Significance of Effect	Score (utilised for embedding environmental performance in ODA and Programme Appraisal stages)	Code
Major beneficial	+3	+++
Moderate beneficial	+2	++

Slight beneficial	+1	**+**
Neutral / Negligible	0	**0**
Slight adverse	-1	**-**
Moderate adverse	-2	**--**
Strong Adverse	-3	**---**

2.3. Significance of effect for example catchments

Within the Compton STW catchment, the following Solution types were proposed:

- B1.1 Source control SUDS measures
- C4.0 Deep tank(s) and tunnel(s) to store combined sewage
- C5.0 Sewer lining to target infiltration hotspots

Within the Culham STW, the following Solution types were proposed:

- B1.1 Source control SUDS measures
- C4.0 Deep tank(s) and tunnel(s) to store combined sewage
- C7.0 Transfer flows between catchments via new connections [considered but then discounted during feasible options stage]

The derived significance of effect for both catchments are shown on Tables 2-6 and 2-7 as follows:

Across every catchment examined, all Solution types were considered, and the output was provided to the Programme Appraisal team for consideration, alongside a wider range of issues such as technical or financial. An example of this output for the Compton STW catchment is provided in Appendix D.

Table 2-6: Significance of effect – Compton STW catchment

Solution Ref	Pos/Neg	Biodiversity		Population and Human health	Material Assets	Water		Soil	Air and Climate		Cultural heritage	Landscape
		To protect and enhance biodiversity, ecological functions, capacity, and habitat connectivity within water company's operating area	To strengthen the connections between people and nature and realise the value of biodiversity	To improve human health and well-being of the area, improve access to recreation and the environment, and reduce inequalities	To reduce, and make more efficient, the domestic, industrial and commercial consumption of resources, minimise the generation of waste, encourage its re-use and	To maintain or improve the quality of rivers, lakes, groundwater, estuarine and coastal waterbodies	To reduce and manage flood risk	To protect and enhance geology, the quality and quantity of soils and promote a catchment-wide approach to land management	To reduce air pollutant and greenhouse gas emissions	To adapt and improve resilience to the threats of climate change	To conserve and enhance the historic environment, the heritage assets therein and their setting	To protect, enhance the quality of, and improve access to designated and undesignated landscapes, townscapes and the countryside
B1.1 Source control SUDS measures	Positive	1	1	1	0	1	1	1	0	1	0	2
	Adverse	-1	-1	-1	0	-1	-1	-1	-1	-1	0	-2
C4.0 Deep tank(s) and tunnel(s) to store combined sewage	Positive	2	0	1	1	2	1	0	0	1	0	2
	Adverse	-1	0	-1	0	-1	-1	-2	-1	0	-1	-2
C5.0 Sewer lining to target infiltration hotspots	Positive	0	0	0	2	0	1	0	0	1	0	0
	Adverse	0	0	0	0	0	0	0	0	0	0	0

Table 2-7: Significance of effect – Culham STW catchment

Solution Ref	Pos/Neg	Biodiversity		Population and Human health	Material Assets	Water		Soil	Air and Climate		Cultural heritage	Landscape
		To protect and enhance biodiversity, ecological functions, capacity, and habitat connectivity within water company's operating area	To strengthen the connections between people and nature and realise the value of biodiversity	To improve human health and well-being of the area, improve access to recreation and the environment, and reduce inequalities	To reduce, and make more efficient, the domestic, industrial and commercial consumption of resources, minimise the generation of waste, encourage its re-use and eliminate waste sent to landfill	To maintain or improve the quality of rivers, lakes, groundwater, estuarine and coastal waterbodies	To reduce and manage flood risk	To protect and enhance geology, the quality and quantity of soils and promote a catchment-wide approach to land management	To reduce air pollutant and greenhouse gas emissions	To adapt and improve resilience to the threats of climate change	To conserve and enhance the historic environment, the heritage assets therein and their setting	To protect, enhance the quality of, and improve access to designated and undesignated landscapes, townscapes and the countryside
B1.1 Source control SUDS measures	Positive	1	1	2	0	1	1	1	0	2	1	0
	Adverse	-1	-1	-2	0	-1	-1	-1	-1	-2	-1	0
C4.0 Deep tank(s) and tunnel(s) to store combined sewage	Positive	2	0	2	1	2	1	0	0	2	1	0
	Adverse	-1	0	-2	0	-1	-1	-2	-1	0	-1	-1
C7.0 Transfer flows between catchments via new connections	Positive	2	1	2	2	2	2	0	0	2	1	1
	Adverse	-1	0	-2	0	-1	-1	-2	-1	0	-1	-1

In relation to each of the Solution types proposed for each Catchment, the following sets out considerations of these in respect of both the Compton STW and Culham STW.

2.3.1. B1.1 Source Control SuDS

Significant Beneficial effects

In Compton STW and Culham STW where Solution B1.1 has been proposed, implementation of source control SuDS measure has the potential to provide significant benefits. While no Major Beneficial effects have been identified, Moderate beneficial effects are anticipated against Objective 11 (Landscape/Townscape) for Compton STW and against Objectives 3 (Population and Human Health) and Objective 9 (Climate) for Culham STW.

From a general review of the B1.1 Magnitude of Impact proforma, it is clear that the benefits anticipated largely stem from reduced capacity pressures on wastewater networks, wastewater resources and, consequently, reduced flooding events (including out of sewer flooding). In catchments that are highly sensitive in respect of population, biodiversity and water, such consequences have the potential to return the greatest benefits. For catchments particularly sensitive in respect of landscape, soil and historic environment, reduced flooding, soil erosion and amenity impacts (e.g. installation of green roofs) also contribute to tangible benefits within the respective catchments. Importantly, these effects are anticipated during the operational phase and are therefore long term, permanent in duration.

Significant Adverse effects

As with the significant beneficial effects, in the catchments where Solution B1.1 are proposed is also anticipated to result in significant adverse effects. While no Major Adverse effects have been identified, Moderate adverse effects are anticipated against Objective 11 (Landscape/Townscape) for Compton STW and against Objectives 3 (Population and Human Health) and 9 (Climate) for Culham STW.

From a general review of the B1.1 Magnitude of Impact proforma however, these adverse effects identified are, in every case, temporary to the construction phase and are therefore reversible. For example, with respect to air quality it is anticipated that implementation of SuDS measures may result in short to medium-term loss or damage owing to activities associated with their construction including the use of heavy plant and machinery. In catchments that are particularly sensitive to air quality changes (e.g. by contained an AQMA), such effects will be magnified. In respect of each SEA Objective, adverse effects associated with Solution B1.1 have been considered short to medium-term, reversible and limited to the construction phase. Such effects will not persist in the operational phase of this option.

Mitigation

Mitigations in respect of Solution B1.1 should aim to capitalise on the benefits identified, whether this be through integrating design features that maximise biodiversity gains, strengthen flood protection or engender public connections with the natural environment. As evident from assessment, Source Control SuDS measures present significant opportunity to realise long term benefit across a range of topics. Careful planning should ensure these benefits are exploited in catchments that can expect to gain most benefit.

Mitigation to address the significant adverse effects identified should focus on the construction phase of works, addressing issues such as potential biodiversity loss, health and well-being impacts on local communities/vulnerable human receptors present within catchment, water and air quality impacts. While it is important to stress that the adverse impacts identified in respect of Solution B1.1 are all temporary to the construction phase, design (including site selection) and construction should seek to minimise as far as reasonably practical such disruptions, particularly in those catchments which have been identified with increased susceptibility to such impacts.

2.3.1. C4.0 Deep tank(s) and tunnel(s) to store combined sewage

Significant Beneficial effects

Major Beneficial effects have not been identified in either Compton STW or Culham STW catchments. Moderate beneficial effects in Compton STW are identified in respect of Objective 1 (Biodiversity), Objective 5 (water quality) and Objective 11 (landscape/townscape). In Culham STW moderate beneficial effects are identified in respect of Objective 1 (Biodiversity), Objective 3 (Population and human health), Objective 5 (water quality) and Objective 9 (Climate).

From a general review of the C4.0 Magnitude of Impact proforma, benefits anticipated stem from increased storage capacity, increased resilience to extreme weather events (specifically flood events) and reduced instances of overflows and flooding (including out of sewer flooding). In catchments that are highly sensitive in respect of population, biodiversity, water, climate, material assets and heritage, reductions in flooding (including out of sewer flooding) have the potential to return the greatest benefits.

These effects are anticipated during the operational phase and are therefore long term, permanent in duration.

Significant Adverse effects

As with the significant beneficial effects, all of the catchments where Solution C4.0 is proposed are also anticipated to result in significant adverse effects. Moderate adverse effects have been identified for in respect of Objectives 7 (Soil) and 11 (Landscape/townscape) for Compton STW and Objective 3 (Population and Human Health) and Objectives 7 (Soil) for Culham STW.

From review of the C4.0 Magnitude of Impact proforma it is evident that these adverse effects are, for the most part, temporary to the construction phase and are therefore reversible. Heavy engineering and construction works are likely to be required to install deep tanks and tunnels however, restoration and enhancement of features impacted during the construction phase should be possible. For example, with respect to biodiversity it is anticipated that construction of deep tanks and tunnels may result in short to medium-term loss or damage owing to requirement to clear land and habitat and through use of heavy plant and machinery. With the exception of access shafts and other above ground supporting infrastructure, it should be possible to restore much of the areas impacted to previous land uses and/or enhance these areas for the betterment of local communities, biodiversity and landscape/townscape, upon completion of construction works.

Potentially permanent loss or damage has been identified in respect of soil (Objective 7) and heritage (Objective 10) considerations. While the magnitude of loss/damage depends on the size of tanks and tunnels installed, alongside considerations including precise location, such interventions have the potential to result in the permanent loss or disturbance to soils, their quality and function as well as to heritage assets such as Listed Buildings and Scheduled Monuments. Catchments that are particularly sensitive in respect of such considerations, are therefore at increased risk of harm. Nevertheless, careful consideration to mitigation measures should alleviate and/or remove such risks.

Mitigation

Mitigations in respect of Solution C4.0 should aim to capitalise on the benefits identified, whether this be through integrating design features that minimise loss, protect and enhance local biodiversity, increase resilience to extreme weather events (flooding) or engender public connections with the natural environment through targeting reduced combined sewer overflows in recreational waters. As evident from assessment, deep tanks and tunnels present significant opportunity to realise long term benefit across a range of topics. Careful planning should ensure these benefits are exploited in catchments that can expect to gain most benefit.

Mitigation to address the significant adverse effects identified largely associated with the construction phase of works, should focus on issues such as potential biodiversity loss, health and well-being impacts on local communities/vulnerable human receptors, water and air quality impacts. Opportunities to promote and enhance biodiversity where restoration activities are required should also be seized, through appropriate consideration in design.

Permanent loss or damage to soils is a considerable risk associated with this Solution identified in the catchments at Moderate adverse significance. Whilst evidently not a significant consideration for all catchments, loss or damage to heritage assets is also a key consideration owing to the permanence of the impact. Such impacts can be mitigated through careful site selection (avoiding areas of increased heritage value and best and most versatile soils), pre-construction surveys such as soil classification surveys and archaeological trenching and supervision of works.

Construction should seek to minimise as far as reasonably practical such disruptions (temporary and permanent), particularly in those catchments which have been identified with increased susceptibility to such impacts.

2.3.2. C5.0 Sewer lining to target infiltration hotspots

Significant Beneficial effects

Significant beneficial effects are likely to result where GSO C5.0 has been proposed in Compton STW. Moderate Beneficial effects have been identified for Objective 4 (Material Assets).

From a review of the C5.0 Magnitude of Impact proforma, benefits associated with implementation of sewer lining to target infiltration hotspots include a potential reduction in flooding (including out of sewer flooding) and increased network efficiency, with consequential benefits for material assets, flood risk and climate change.

Significant Adverse effects

No significant adverse effects have been identified. A review of the Magnitude of Impact proforma shows that adverse effects across the SEA topics are considered negligible.

Mitigation

No specific mitigations are recommended, though as with any scheme, careful consideration should be given to construction methodology and good site management in respect of any issues relevant to the location.

2.3.3. C7.0 Transfer flows between catchments via new connections

Significant Beneficial effects

Solution C7.0 has been proposed in Culham STW only. Implementation of this measure here will likely result in significant beneficial effects across a range of SEA Objectives. While no Major Beneficial effects have been identified, Moderate beneficial effects are anticipated against Objectives 1, 3-6 and 9 (covering topics of Biodiversity, Population and human health, Material Assets, Water and Climate Change).

From review of the C7.0 Magnitude of Impact proforma, benefits associated with implementation of transfer flows between catchments via new connections surround a potential reduction in flooding (including out of sewer flooding), overspills, reduced capacity pressures and the opportunity for discovery of previously unknown heritage features, with consequential benefits for biodiversity, health and wellbeing, material assets, the water environment, climate change, cultural heritage and landscape.

Significant Adverse effects

Moderate adverse effects have been identified for in respect of Objectives 3 (Population and human health) and 7 (Soil).

From review of the C7.0 Magnitude of Impact proforma it is evident that these adverse effects are, for the most part, temporary to the construction phase and are therefore reversible. Heavy engineering and construction works are likely to be required to install new connections however, restoration and enhancement of features impacted during the construction phase should be possible. For example, with respect to biodiversity it is anticipated that construction of new connections may result in short to medium-term loss or damage owing to requirement to clear land and habitat and through use of heavy plant and machinery. With the exception of access shafts and other above ground supporting infrastructure, it should be possible to restore much of the areas impacted to previous land uses and/or enhance these areas for the betterment of local communities, biodiversity and landscape/townscape, upon completion of construction works.

Potentially permanent loss or damage has been identified in respect of soil (Objective 7) and heritage (Objective 10) considerations. While the magnitude of loss/damage depends on the size of new connections installed, alongside considerations including precise location, such interventions have the potential to result in the permanent loss or disturbance to soils, their quality and function as well as to heritage assets such as Listed Buildings and Scheduled Monuments. Careful consideration to mitigation measures should alleviate and/or remove such risks.

Mitigation

Mitigations in respect of Solution C7.0 should aim to capitalise on the benefits identified, whether this be through integrating design features that minimise loss, protect and enhance local biodiversity, increase resilience to extreme weather events (flooding) or engender public connections with the natural environment through targeting reduced combined sewer overflows in recreational waters. As evident from assessment, transfer of flows between catchments via new connections presents significant opportunity to realise long term benefit across a range of topics. Careful planning should ensure these benefits are exploited in the catchment.

Mitigations to address the significant adverse effects identified largely associated with the construction phase of works, should focus on issues such as potential biodiversity loss, health and well-being impacts on local communities/vulnerable human receptors, water and air quality impacts. Opportunities to promote and enhance

biodiversity where restoration activities are required should also be seized, through appropriate consideration in design.

Permanent loss or damage to soils is a considerable risk associated with this option identified at Moderate adverse significance. Loss or damage heritage assets is also a key consideration owing to the permanence of the impact. Such impacts can be mitigated through careful site selection (avoiding areas of increased heritage value and best and most versatile soils), pre-construction surveys such as soil classification surveys and archaeological trenching and supervision of works.

Construction should seek to minimise as far as reasonably practical such disruptions (temporary and permanent.

3. Conclusions

The assessment approach carried out has been thorough and comprehensive and applied equally and consistently to all Drainage Catchments in the Thames Water DWMP area. Continuous dialogue has been maintained by the environmental assessment team with the Programme Appraisal team. It is considered that this has resulted in an enhanced consideration of environmental issues to the programme appraisal and associated Solution selection process.

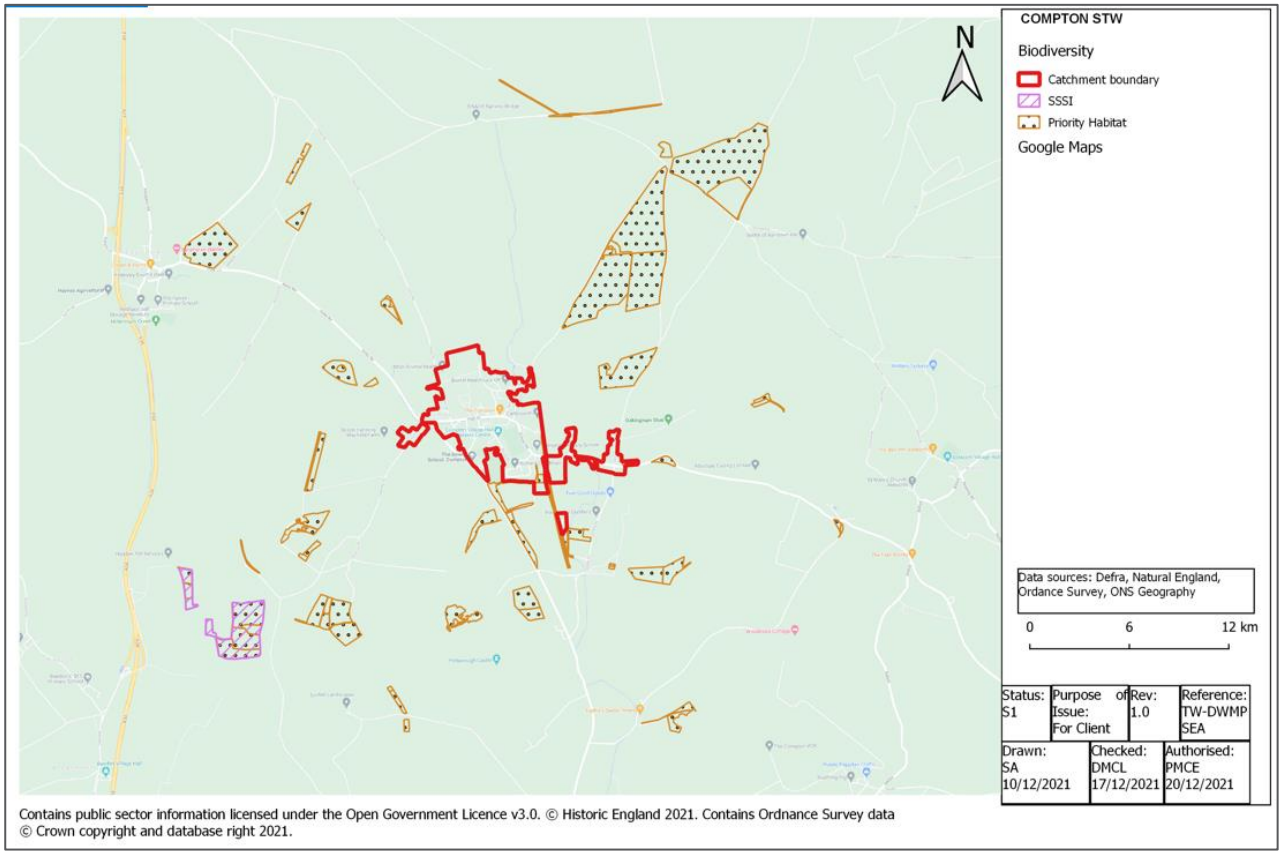
Based on the findings of the assessment process outlined in this Technical Note, it is possible to draw a number of key considerations across all the Drainage Catchments examined in terms of environmental effect and these are illustrated here with reference to two sample catchments - Compton STW and Culham STW Catchments.

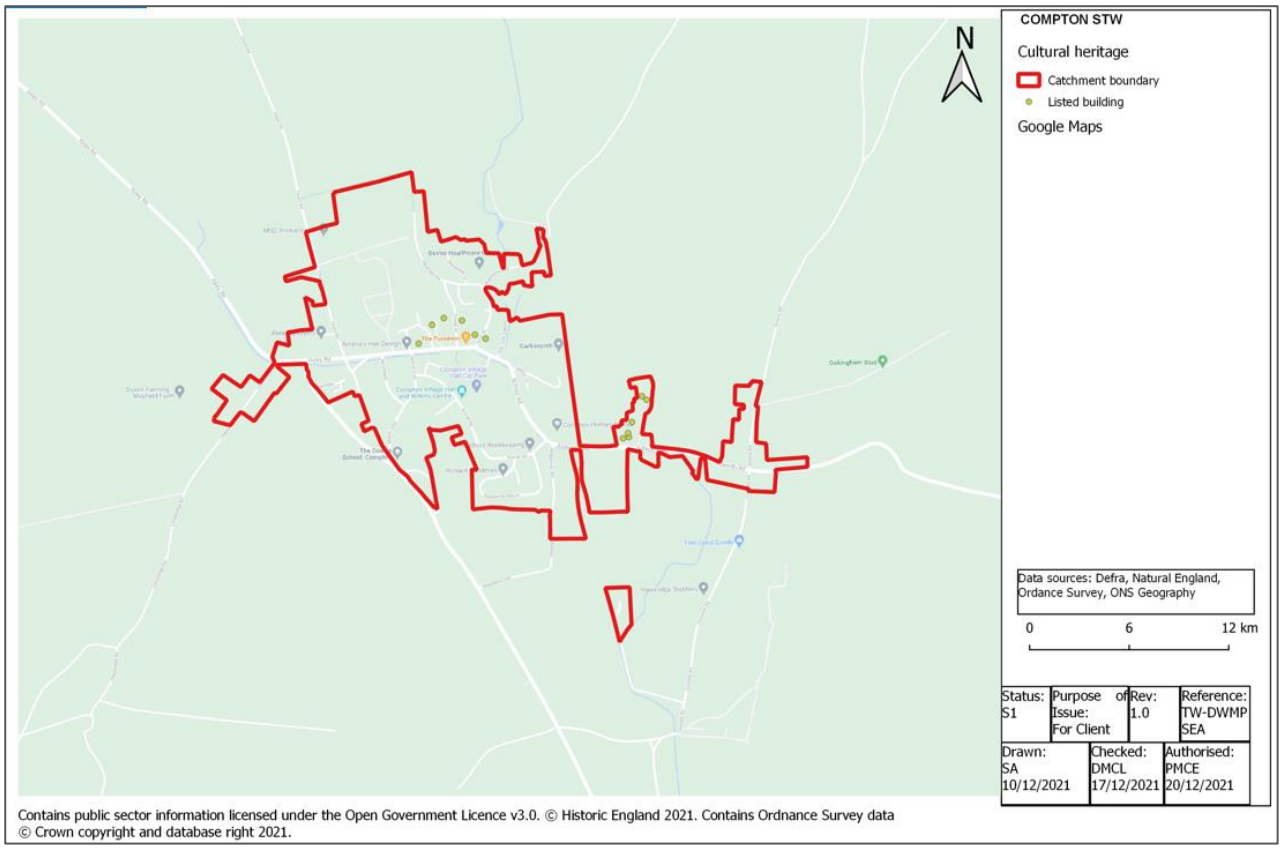
In both catchments, it is clear that there are a series of environmental and social benefits to be derived from the implementation of the proposed Solutions and in many instances it is considered that these benefits are significant. Such benefits include biodiversity, population and human health, material assets, water and climate change. It is important to note that benefits will be manifested in the operational phase and will be a direct outcome of the DWMP. These benefits are also likely to be permanent.

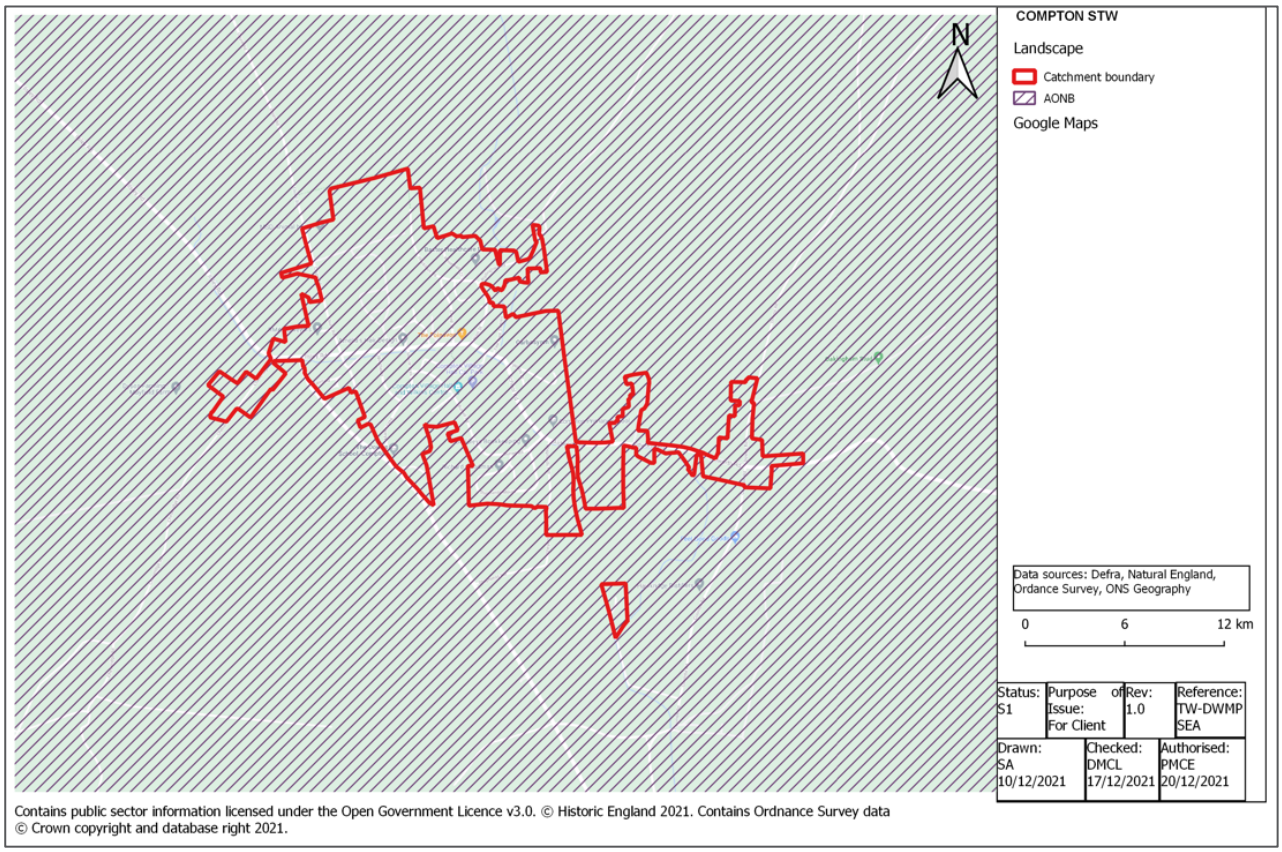
The nature of the DWMP and the Solutions proposed will frequently involve civil engineering / construction works to a greater or lesser degree. Precise scale and location of such works is not known at this stage and as such there is uncertainty of assessment, but it is anticipated that a range of adverse effects are likely and that these will also on occasion be significant. Examples of adverse effects identified include potential (permanent) loss of soils, biodiversity or heritage resource, as well as impacts on landscape and population. However, effective mitigation measures are available to reduce such adverse effects and it is likely that for the most part, effects would be temporary and limited to the construction phase, at which point the beneficial operational effects of the drainage Solutions would begin to be manifested.

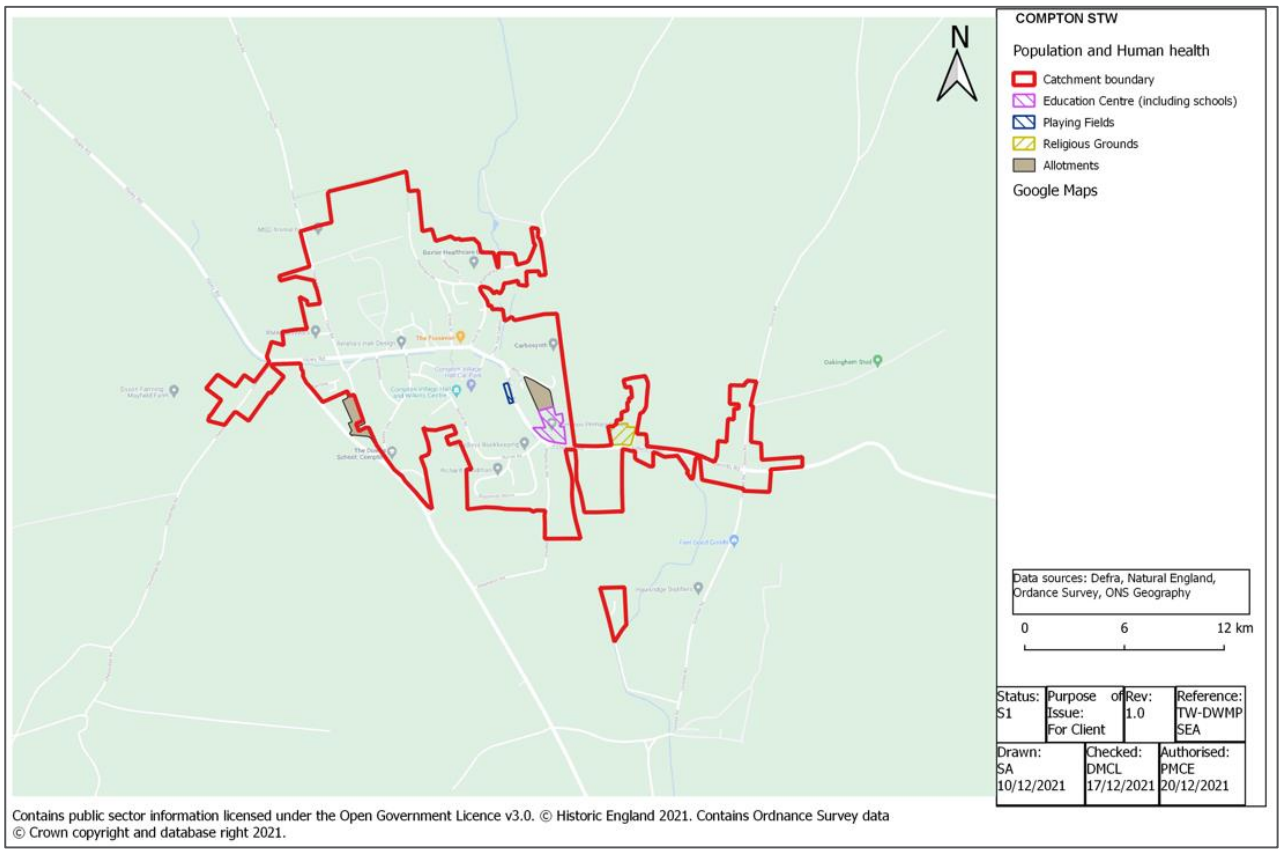
Appendix A. Catchment Maps

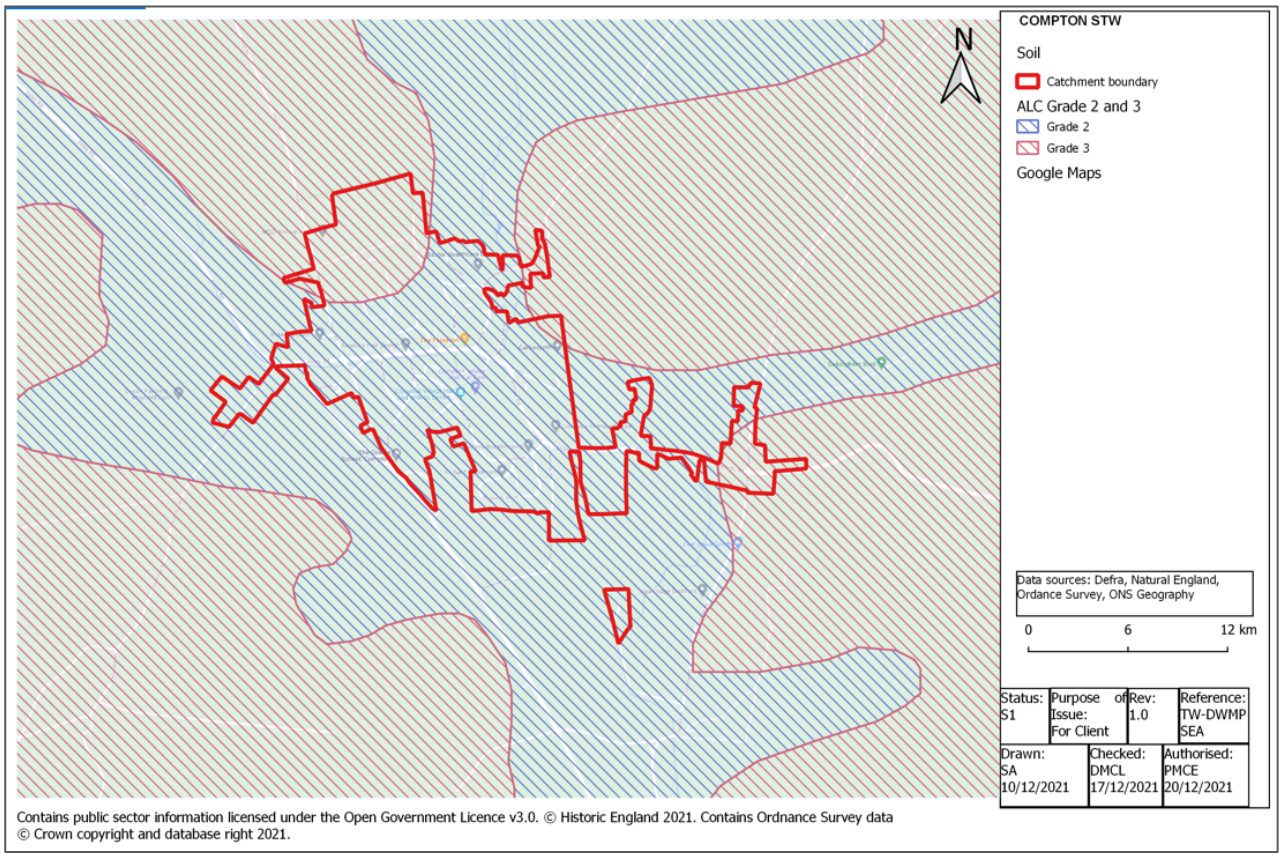
A.1. Compton STW

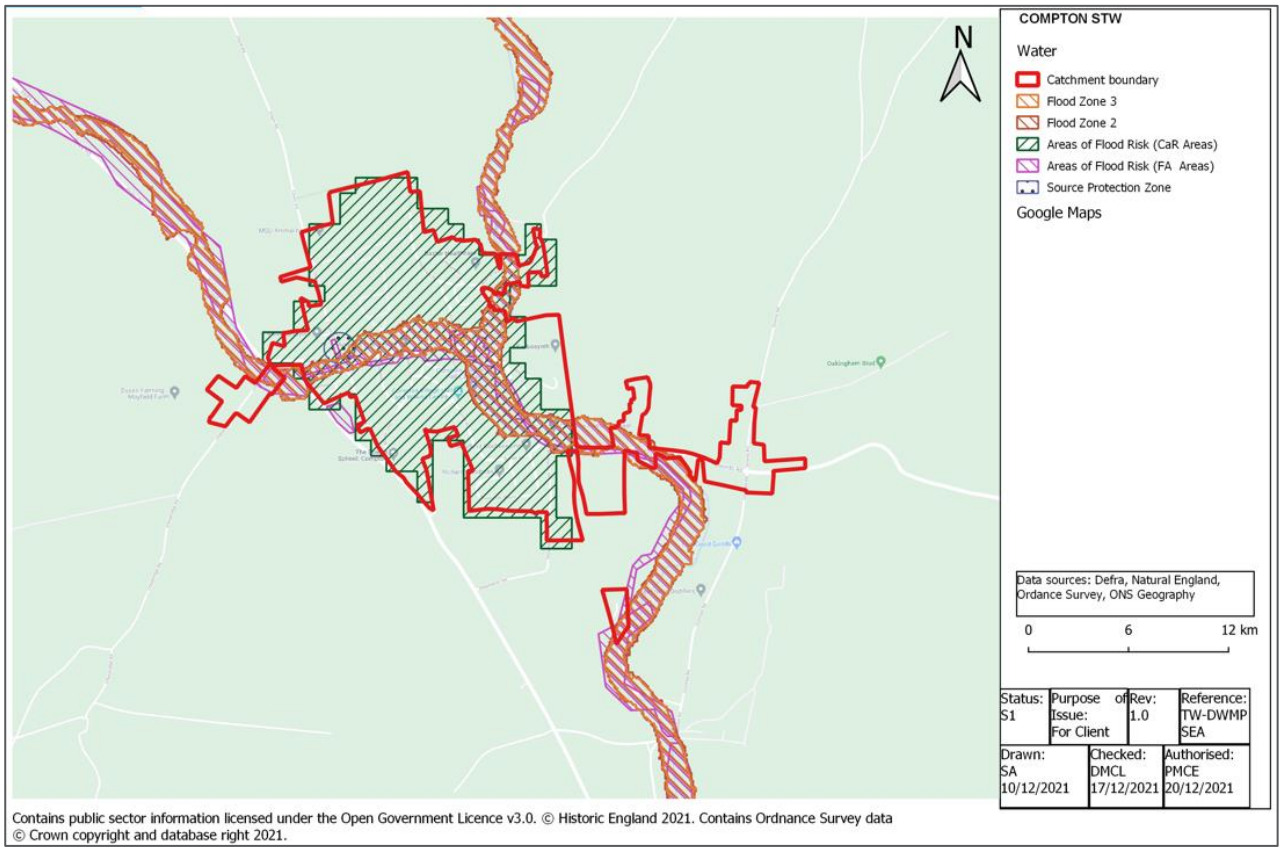




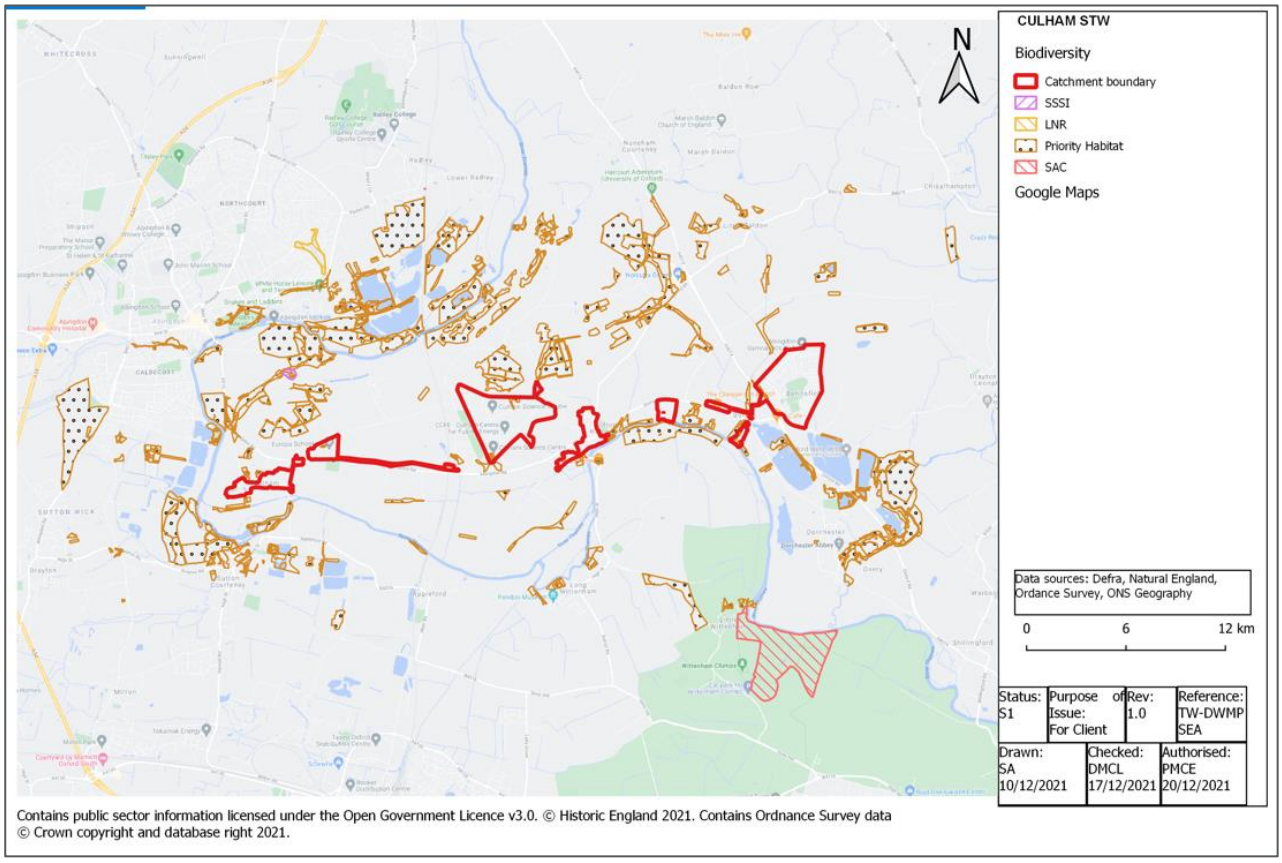

COMPTON STW
Landscape
Catchment boundary
AONB
Google Maps
N
Data sources: Defra, Natural England, Ordance Survey, ONS Geography
0
6
12 km
Status: S1
Purpose of Issue: For Client
Rev: 1.0
Reference: TW-DWMP SEA
Drawn: SA 10/12/2021
Checked: DMCL 17/12/2021
Authorised: PMCE 20/12/2021
Contains public sector information licensed under the Open Government Licence v3.0. © Historic England 2021. Contains Ordnance Survey data
© Crown copyright and database right 2021.


COMPTON STW
Population and Human health
Catchment boundary
Education Centre (including schools)
Playing Fields
Religious Grounds
Allotments
Google Maps
N
Data sources: Defra, Natural England, Ordance Survey, ONS Geography
0
6
12 km
Status: S1
Purpose of Issue: For Client
Rev: 1.0
Reference: TW-DWMP SEA
Drawn: SA 10/12/2021
Checked: DMCL 17/12/2021
Authorised: PMCE 20/12/2021
Contains public sector information licensed under the Open Government Licence v3.0. © Historic England 2021. Contains Ordnance Survey data
© Crown copyright and database right 2021.

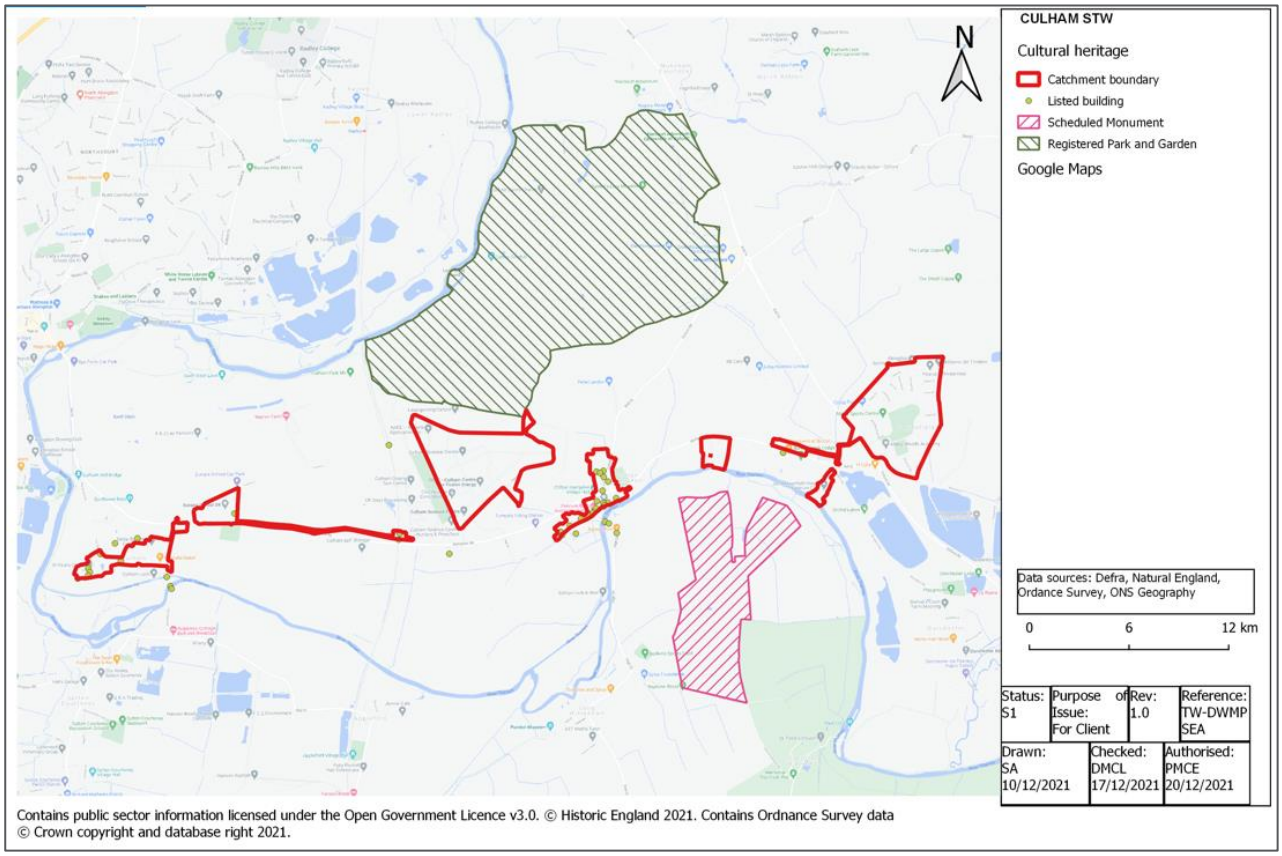




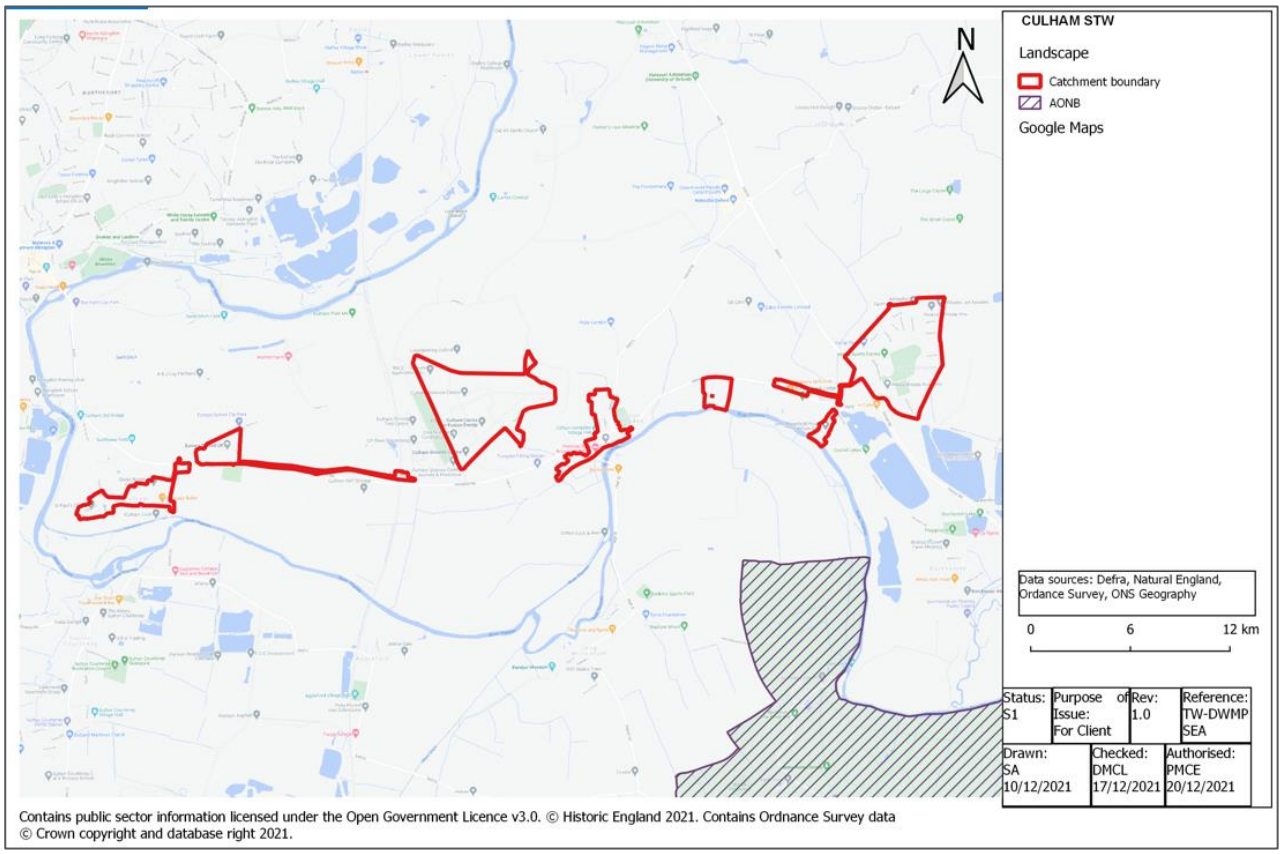
A.2. Culham STW

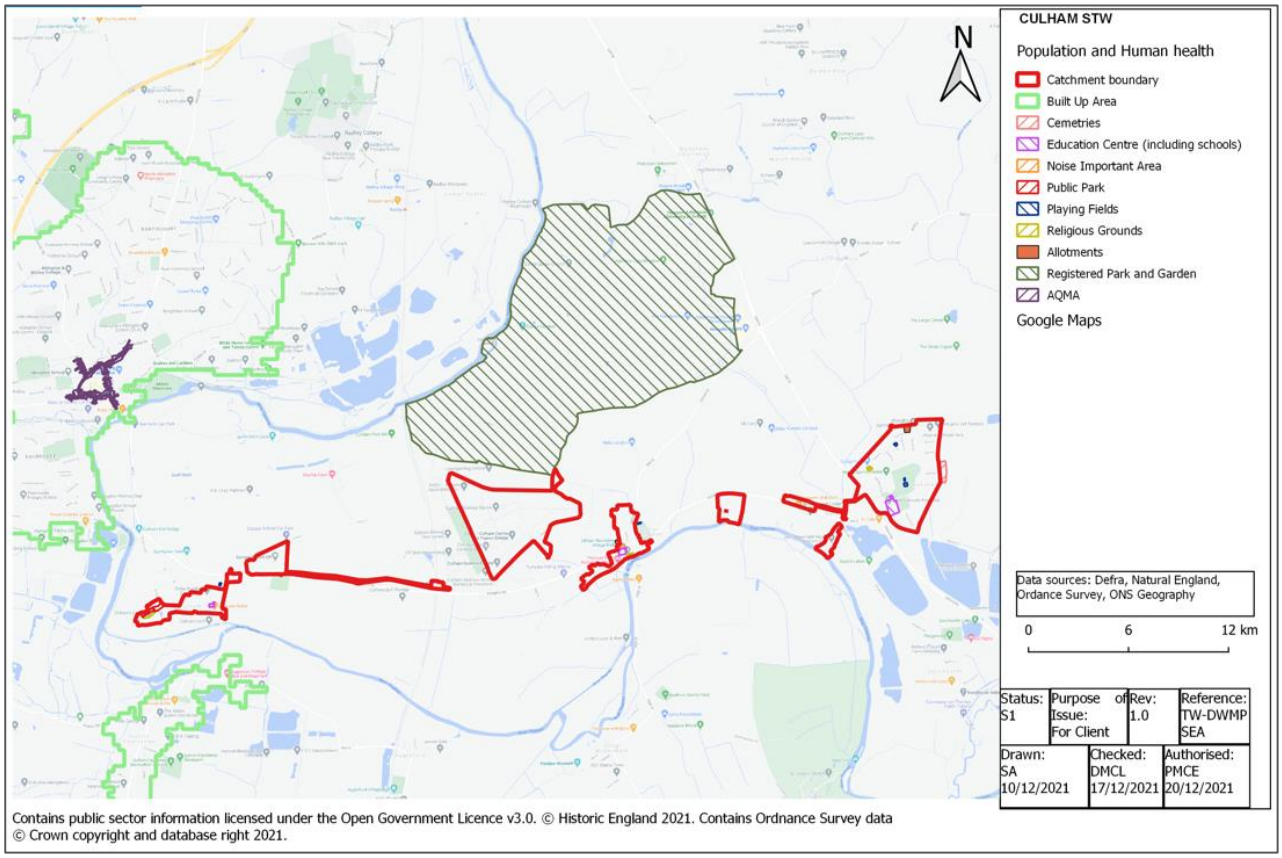


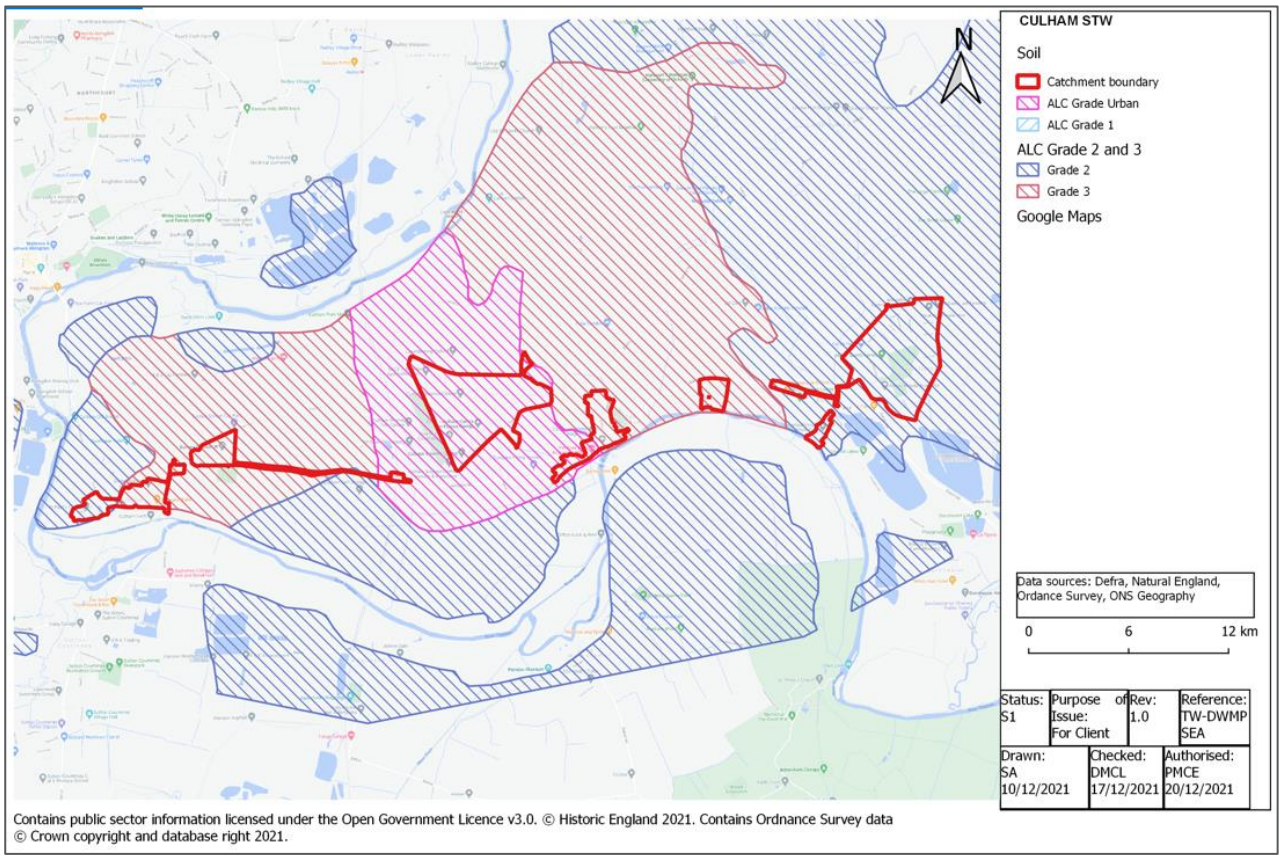
Contains public sector information licensed under the Open Government Licence v3.0. © Historic England 2021. Contains Ordnance Survey data © Crown copyright and database right 2021.

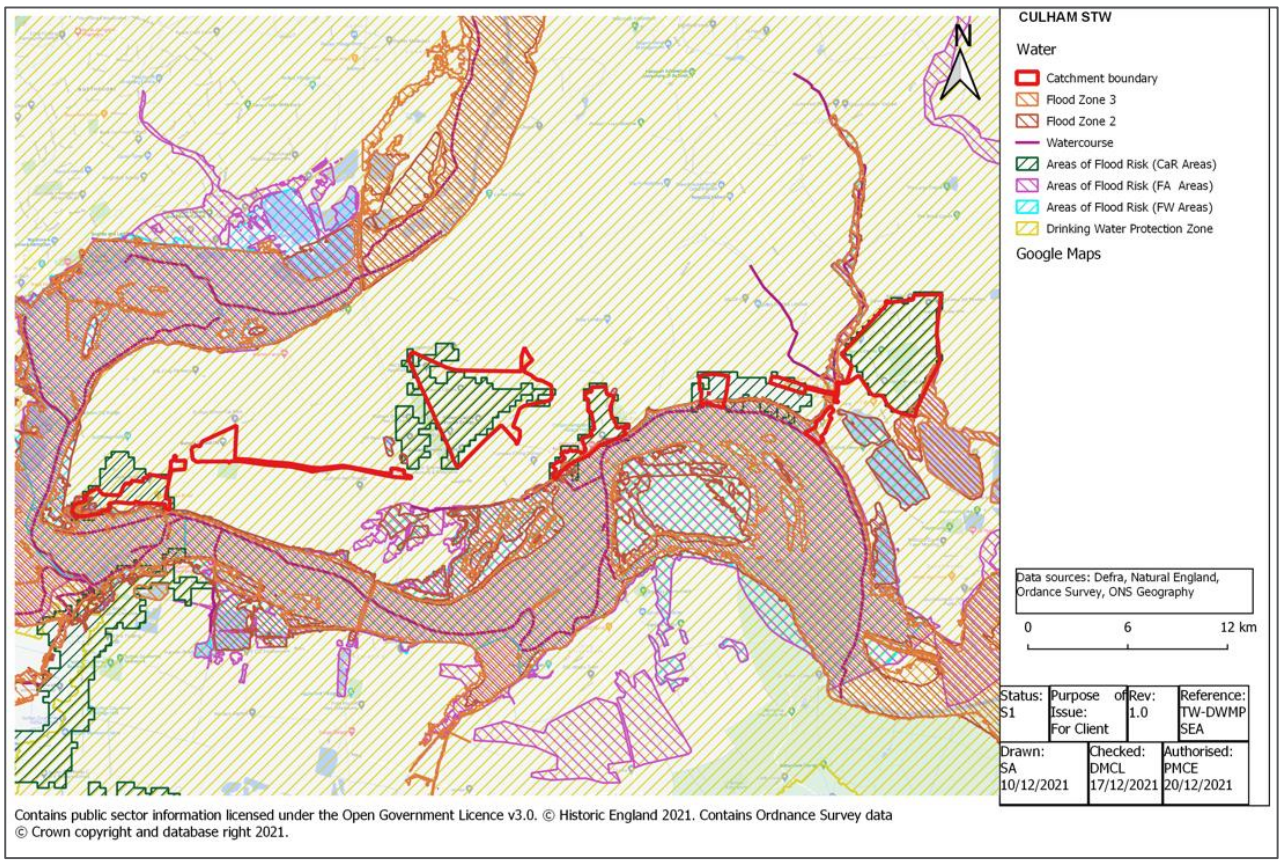


Contains public sector information licensed under the Open Government Licence v3.0. © Historic England 2021. Contains Ordnance Survey data © Crown copyright and database right 2021.









Appendix B. Catchment Proforma

B.1. Compton STW Catchment Proforma

This identifies sensitivity for the catchment along with the rationale driving the classifications

GSOs Promoted	B1.1 - Source control SUDS measures C4.0 - Deep tank(s) and tunnel(s) to store combined sewage C5.0 - Sewer lining to target infiltration hotspots	
SEA Topic	**Commentary**	**Sensitivity assigned**
Biodiversity	Infrastructure works can put pressure on sites designated for nature conservation and wider green infrastructure, particularly through construction impacts. Wider green infrastructure can however benefit from opportunities to deliver Biodiversity Net Gain through new development. Across England, there are sites internationally (SACs, SPAs, Ramsar sites) and nationally (e.g. SSSIs) designated for nature conservation. A breakdown of the sites designated for biodiversity within the wastewater catchment are as below; Intersects 0 Internationally designated sites (SPA, SAC, Ramsar) Intersects 0 Nationally designated sites (SSSI and NNR) Intersects 0 Locally designated sites (LNR) Within 10km there are 1 no. SPAs, SACs and/or Ramsar sites Hartslock Wood, Special Area of Conservation (SAC) Within 2km there are 1 no. SSSI and/or NNR sites Ashridge Wood, Site of Special Scientific Interest As a whole 0% of COMPTON STW catchment, is designated either at an International, National or Local level. Intersects 10 areas of Priority Habitat which makes up 1 % of the COMPTON STW catchment area.	Medium
Population and Human health	England has a growing population, with a general underlying trend towards an ageing population, though there are areas with younger population profiles. These demographic characteristics contribute to a complex pattern of highly-contrasting communities, with differing requirements for economic and social infrastructure. There is a role for the environment in enabling people to feel connected to place; and growing evidence that physical activity and access to nature and opportunities for community interaction is an important contributor to mental health and well-being. Sensitive receptors within the catchment have been identified and include the following; 5 areas currently utilised for recreation or which benefit the community. This includes 2 allotments, 1 religious grounds, 1 playing fields, 0 sports facility, 0 golf courses, 0 public parks and 0 cemeteries. Also within the catchment are 1 areas where vulnerable population groups would be expected. This includes 1 Schools and education centres, 0 hospitals, and 0 residential care homes. This is also reflected in the designation of 0 no. Noise Important Areas within the catchment.	Medium
Material Assets	By their nature, wastewater catchments are anticipated to be relatively developed and contain a range of material assets. A high level characterisation of the extent to which material assets exist within a catchment is provided through understanding of the level of urbanisation within it. In respect of COMPTON STW catchment 0% is classified as urban.	Low
Water	Development related pollutants pose considerable risks to quality of water. Additional water demand from development will put further pressure on water resources. There are considerable pressures on water resources with resulting major impacts on many of the waterbodies across the UK. Water Quality and Flood Risk within this catchment is characterised by the following: Intersects 1 areas of Source Protections Zones 1 and 2 Intersects 0 Drinking Water Safeguard Zones Intersects 0 statutory rivers / unnamed water bodies. Water environment features intersected include:	Medium

	Groundwater Flooding In West Ilsley, East Ilsley, Compton, Chilton And West Hagbourne, Flood Alert Areas River Pang From East Ilsley To Pangbourne And Sulham Brook, Flood Alert Areas Of the total area of the catchment, 16 % is covered by flood risk zones 2 or 3 and is therefore at elevated level of flood risk.	
Soil	Measures should be taken to avoid those areas of the highest quality agricultural soils and aim to protect soil and agricultural holdings through avoidance of impacts such as contamination or severance which might be expected through construction and operation of new infrastructure. Grades 1-3a are classed as the best and most versatile land. The catchment intersects the following Agricultural Land Classification Grades: Grade 2, Soil grades 2 and 3a Grade 3, Soil grades 2 and 3a As a whole 100 % of COMPTON STW catchment is classified as either Grades 1, 2 or 3 and therefore more likely to fall under a classification of Best and Most Versatile Land.	Medium
Air	Air quality has improved in the UK over the last sixty years as a result of the switch from coal to gas and electricity for heating of domestic and industrial premises, stricter controls on industrial emissions, higher standards for the composition of fuel and tighter regulations on emissions from motor vehicles. Construction practices in particular have the potential to increase pressure on air quality locally with knock on consequences for vulnerable population groups and biodiversity. The catchment is characterised as follows; Intersects 0 no. areas designated as Air Quality Management Area as follows: AQMAs constitute 0 % area of COMPTON STW catchment. Intersects 0 Nature Conservation sites (SAC, SPA, SSSI, NNR or Ramsar) Intersects 1 no. sensitive receptors. This includes 1 Schools and education centres, 0 hospitals, and 0 residential care homes Intersects 4 no areas utilised for recreation or which benefit the community. This includes 2 Allotments, 1 religious grounds, 1 playing fields, 0 sports facility, 0 golf course, 0 public park and 0 cemeteries Within 200 meters, there are 0 Nature Conservation sites (SAC, SPA, SSSI, NNR or Ramsar) Within 200 meters, there are 4 sensitive receptors (School and education centres, hospitals or residential care homes) Compton Church Of England Primary School, Schools and Education centres None, Allotments St Mary And St Nicholas's Church, Religious grounds None, Playing fields	Medium
Climate factors	Climate change represents a considerable and growing challenge for the UK which is more frequently associated with increased flood risk. The UK also anticipate hotter, drier summers; warmer, wetter winters; and rising sea levels. The catchment is characterised as follows: Intersects 1 Communities at Risk Areas (flooding) Contains 0 Flood Warning Areas Contains 10 Flood Alert Areas	Medium
Cultural heritage	There is a substantial cultural heritage resource across England; however, there is considerable variation in the condition and integrity of assets and are at risk from infrastructure development where not sensitively considered. Those cultural heritage assets of the greatest recognition in England are World Heritage Sites. These sites are recognised as having Outstanding Universal Value. The World Heritage Sites and other cultural heritage designations in relation to this catchment are outlined below; Intersects 0 World Heritage Sites Intersects 12 Listed Buildings Intersects 0 areas designated as Scheduled Monuments Intersects 0 areas designated as Registered parks and gardens Intersects 0 areas designated as Registered Battlefields Within 500 meters, there are 0 World Heritage Sites	Low
Landscape	There are marked contrasts in the quality, character and distinctiveness of landscapes across England. There is a need to fully protect the highest quality locations, whilst	High

	integrating best practice principles through all infrastructure development in addressing pressures on landscape environments. In this catchment the following landscape designations have been considered; Intersects 1 areas designated as Area of Outstanding Natural Beauty North Wessex Downs, Area of Outstanding Natural Beauty Intersects 0 areas designated as National Park As a whole 100 % of COMPTON STW catchment is designated either AONB or National Park.	

B.2. Culham STW Catchment Proforma

GSOs Promoted	B1.1 - Source control SUDS measures C4.0 - Deep tank(s) and tunnel(s) to store combined sewage C7.0 - Transfer flows between catchments via new connections	
SEA Topic	**Commentary**	**Sensitivity assigned**
Biodiversity	Infrastructure works can put pressure on sites designated for nature conservation and wider green infrastructure, particularly through construction impacts. Wider green infrastructure can however benefit from opportunities to deliver Biodiversity Net Gain through new development. Across England, there are sites internationally (SACs, SPAs, Ramsar sites) and nationally (e.g. SSSIs) designated for nature conservation. A breakdown of the sites designated for biodiversity within the wastewater catchment are as below; Intersects 0 Internationally designated sites (SPA, SAC, Ramsar) Intersects 0 Nationally designated sites (SSSI and NNR) Intersects 0 Locally designated sites (LNR) Within 10km there are 2 no. SPAs, SACs and/or Ramsar sites Little Wittenham, Special Area of Conservation (SAC) Cothill Fen, Special Area of Conservation (SAC) Within 2km there are 1 no. SSSI and/or NNR sites Culham Brake, Site of Special Scientific Interest As a whole 0% of CULHAM STW catchment, is designated either at an International, National or Local level. Intersects 23 areas of Priority Habitat which makes up 2 % of the CULHAM STW catchment area.	Medium
Population and Human health	England has a growing population, with a general underlying trend towards an ageing population, though there are areas with younger population profiles. These demographic characteristics contribute to a complex pattern of highly-contrasting communities, with differing requirements for economic and social infrastructure. There is a role for the environment in enabling people to feel connected to place; and growing evidence that physical activity and access to nature and opportunities for community interaction is an important contributor to mental health and well-being. Sensitive receptors within the catchment have been identified and include the following; 16 areas currently utilised for recreation or which benefit the community. This includes 2 allotments, 3 religious grounds, 5 playing fields, 0 sports facility, 0 golf courses, 2 public parks and 1 cemeteries. Also within the catchment are 3 areas where vulnerable population groups would be expected. This includes 3 Schools and education centres, 0 hospitals, and 0 residential care homes. This is also reflected in the designation of 1 no. Noise Important Areas within the catchment.	High
Material Assets	By their nature, wastewater catchments are anticipated to be relatively developed and contain a range of material assets. A high level characterisation of the extent to which material assets exist within a catchment is provided through understanding of the level of urbanisation within it. In respect of CULHAM STW catchment 0% is classified as urban.	Low

Water	Development related pollutants pose considerable risks to quality of water. Additional water demand from development will put further pressure on water resources. There are considerable pressures on water resources with resulting major impacts on many of the waterbodies across the UK. Water Quality and Flood Risk within this catchment is characterised by the following: Intersects 0 areas of Source Protections Zones 1 and 2 Intersects 2 Drinking Water Safeguard Zones Intersects 3 statutory rivers / unnamed water bodies. Water environment features intersected include: , Watercourses River Thames, Watercourses River Thames At Culham, Flood Warning Areas River Thames At Clifton Hampden, Dorchester And Little Wittenham, Flood Warning Areas River Thames For The Abingdon Area, Flood Alert Areas River Thame And Chalgrove Brook, Flood Alert Areas Of the total area of the catchment, 4 % is covered by flood risk zones 2 or 3 and is therefore at elevated level of flood risk.	Medium
Soil	Measures should be taken to avoid those areas of the highest quality agricultural soils and aim to protect soil and agricultural holdings through avoidance of impacts such as contamination or severance which might be expected through construction and operation of new infrastructure. Grades 1-3a are classed as the best and most versatile land. The catchment intersects the following Agricultural Land Classification Grades: Grade 2, Soil grades 2 and 3a Grade 3, Soil grades 2 and 3a Urban, Urban Land As a whole 100 % of CULHAM STW catchment is classified as either Grades 1, 2 or 3 and therefore more likely to fall under a classification of Best and Most Versatile Land.	Medium
Air	Air quality has improved in the UK over the last sixty years as a result of the switch from coal to gas and electricity for heating of domestic and industrial premises, stricter controls on industrial emissions, higher standards for the composition of fuel and tighter regulations on emissions from motor vehicles. Construction practices in particular have the potential to increase pressure on air quality locally with knock on consequences for vulnerable population groups and biodiversity. The catchment is characterised as follows; Intersects 0 no. areas designated as Air Quality Management Area as follows: AQMAs constitute 0 % area of CULHAM STW catchment. Intersects 0 Nature Conservation sites (SAC, SPA, SSSI, NNR or Ramsar) Intersects 3 no. sensitive receptors. This includes 3 Schools and education centres, 0 hospitals, and 0 residential care homes Intersects 11 no areas utilised for recreation or which benefit the community. This includes 2 Allotments, 3 religious grounds, 3 playing fields, 0 sports facility, 0 golf course, 2 public park and 1 cemeteries Within 200 meters, there are 0 Nature Conservation sites (SAC, SPA, SSSI, NNR or Ramsar) Within 200 meters, there are 10 sensitive receptors (School and education centres, hospitals or residential care homes) Culham Parochial C Of E School, Schools and Education centres Clifton Hampden C Of E Primary School, Schools and Education centres Abbey Woods Academy, Schools and Education centres None, Allotments The Church Of Mary And St Berin, Religious grounds St Paul'S Church, Religious grounds St Michael And All Angels' Church, Religious grounds None, Playing fields The Green, Public park None, Cemeteries	Medium
Climate factors	Climate change represents a considerable and growing challenge for the UK which is more frequently associated with increased flood risk. The UK also anticipate hotter, drier	High

	summers; warmer, wetter winters; and rising sea levels. The catchment is characterised as follows: Intersects 5 Communities at Risk Areas (flooding) Contains 15 Flood Warning Areas Contains 71 Flood Alert Areas	
Cultural heritage	There is a substantial cultural heritage resource across England; however, there is considerable variation in the condition and integrity of assets and are at risk from infrastructure development where not sensitively considered. Those cultural heritage assets of the greatest recognition in England are World Heritage Sites. These sites are recognised as having Outstanding Universal Value. The World Heritage Sites and other cultural heritage designations in relation to this catchment are outlined below; Intersects 0 World Heritage Sites Intersects 29 Listed Buildings Intersects 1 areas designated as Scheduled Monuments Intersects 1 areas designated as Registered parks and gardens Intersects 0 areas designated as Registered Battlefields Within 500 meters, there are 0 World Heritage Sites	Medium
Landscape	There are marked contrasts in the quality, character and distinctiveness of landscapes across England. There is a need to fully protect the highest quality locations, whilst integrating best practice principles through all infrastructure development in addressing pressures on landscape environments. In this catchment the following landscape designations have been considered; Intersects 0 areas designated as Area of Outstanding Natural Beauty Intersects 0 areas designated as National Park As a whole 0 % of CULHAM STW catchment is designated either AONB or National Park.	Low

Appendix C. Magnitude of impact proformas for Solutions proposed in example Catchments

C.1. B1.1 - Source control SUDS measures

<table>
<tr><td>Solution</td><td colspan="4">B1.1 Source control SuDS measures
This solution is assumed to be the surface water component of solution C4.0</td></tr>
<tr><td>Description</td><td colspan="4">Installation of surface water management devices to collect, store and infiltrate surface water from buildings and surrounding impermeable areas such as driveways and car parks. This option includes residential properties, schools and other public buildings, commercial and industrial buildings.

Installation of surface water management devices to collect, store and infiltrate surface water from roads, pavements and pedestrianised areas.</td></tr>
<tr><td>Typical Construction Impacts</td><td colspan="4">Most source control components will be located within the private properties or highway areas. Their purpose is to manage rainfall close to where it falls, not allowing it to become a problem elsewhere. Source control measures can include:
Green roofs
Rainwater harvesting
Permeable paving
Other permeable surfaces
SuDS construction usually requires the use of fairly standard civil engineering construction and landscaping operations, such as excavation, filling, grading, topsoiling, seeding and planting. Pollution and sediment control is a key c.0onsideration during construction as construction runoff can be heavily laden with silt, which can clog infiltration systems, build up in storage systems and pollute receiving waters[2].</td></tr>
<tr><td>Typical Mitigation</td><td>Design
Locate at distance from sensitive receptors
Consider potential for ecological enhancement
Consider compensatory green infrastructure</td><td>Construction
Integration of Construction Environmental Management Plan
Consideration of the timing of construction works in relation to ecological windows, health and wellbeing and traffic considerations
Appropriate management of invasive species</td><td colspan="2">Operation
Regular programme of maintenance and monitoring to ensure operation at most efficient level</td></tr>
<tr><td rowspan="2">Topic</td><td rowspan="2">Objective</td><td rowspan="2">Scoring Rationale</td><td colspan="2">Impact Magnitude</td></tr>
<tr><td>Beneficial</td><td>Adverse</td></tr>
<tr><td rowspan="2">Biodiversity</td><td>To protect and enhance biodiversity, ecological functions, capacity, and habitat connectivity within water company’s operating area</td><td>Beneficial
Minor improvement to, or addition of, one or more key characteristics, features or elements of biodiversity resource, its function, capacity and / or connectivity may be expected as a result of SuDS
Adverse
Short to medium-term loss or damage, though reversible, may be expected through construction</td><td>Medium</td><td>Low</td></tr>
<tr><td>To strengthen the connections between people and nature and realise the value of biodiversity</td><td>Beneficial
Creation of SuDS expected to result in improvement in public understanding and engender connections with the natural environment
Adverse
Very minor adverse, limited to construction.</td><td>Medium</td><td>Low</td></tr>
</table>

[2] https://www.susdrain.org/delivering-suds/using-suds/delivery/construction.html

Population and Human health	To improve human health and well-being of the area, improve access to recreation and the environment, and reduce inequalities	Beneficial Creation of SuDS expected to result in minor improvement to human health and well-being improvements where there is an increase in green infrastructure and reduced flood risk. Adverse Short to medium-term loss or damage, though reversible, may be expected through construction	Low	Low
Material Assets	To reduce, and make more efficient, the domestic, industrial and commercial consumption of resources, minimise the generation of waste, encourage its re-use and eliminate waste sent to landfill	Beneficial Creation of SuDS expected to result in minor improvement through alleviating capacity pressures on wastewater networks and resources. Adverse Short to medium-term loss or damage, though reversible, may be expected through construction	Low	Low
Water	To maintain or improve the quality of rivers, lakes, groundwater, estuarine and coastal waterbodies	Beneficial Creation of SuDS expected to result in improvements to waterbodies including reducing sediment loading Adverse Short to medium-term loss or damage, though reversible, may be expected through construction	Medium	Low
	To reduce and manage flood risk	Beneficial Creation of SuDS expected to result in improvement through alleviating capacity pressures on drainage network and receiving waters during storm events. Adverse Short to medium-term loss or damage, though reversible, may be expected through construction	Medium	Low
Soil	To protect and enhance geology, the quality and quantity of soils and promote a catchment-wide approach to land management	Beneficial Minor improvements may be anticipated where SuDS reduces risk of soil erosion Adverse Short to medium-term loss or damage, though reversible, may be expected through construction	Low	Low
Air and Climate	To reduce air pollutant and greenhouse gas emissions	Beneficial Magnitude of impact is negligible Adverse Short to medium-term loss or damage, though reversible, may be expected through construction	Negligible	Low
	To adapt and improve resilience to the threats of climate change	Beneficial Medium improvements may be anticipated where SuDS improves resilience to flooding events Adverse Short to medium-term loss or damage, though reversible, may be expected through construction	Medium	Low
Cultural heritage	To conserve and enhance the historic environment, the heritage assets therein and their setting	Beneficial Where reduced flood risk is anticipated, this may indirectly afford greater protection to cultural heritage assets Adverse Short to medium-term loss or damage, though reversible, may be expected through construction	Low	Low
Landscape	To protect, enhance the quality of, and improve access to designated and undesignated landscapes, townscapes and the countryside	Beneficial Where reduced flood risk is anticipated, this may indirectly afford greater protection to townscapes, landscape and the countryside. SuDS may also act to improve amenity of townscapes through green roofs and other interventions. Adverse	Low	Low

		Short to medium-term loss or damage, though reversible, may be expected through construction		

C.2. C4.0 - Deep tank(s) and tunnel(s) to store combined sewage

Solution	C4.0 Deep tank(s) and tunnel(s) to store combined sewage		
Description	Deep tanks and tunnels to convey combined sewage to treatment location. Creates conveyance capacity for storm water.		
Typical Construction Impacts	The construction impact is likely to be relatively extensive and intrusive with the removal of large volumes of soils, trenching, watercourse modifications etc and associated noise and air quality impacts. Impacts anticipated in respect of biodiversity, population and human health, material assets and water among others.		
Typical Mitigation	Design • Locate at distance from sensitive receptors • Consider potential for ecological enhancement • Consider compensatory green infrastructure • Careful site selection - avoid areas of better quality soils if possible and target previously used land • Consideration of opportunities for enhancement of known features of industrial & cultural heritage significance	Construction • Integration of Construction Environmental Management Plan • Consideration of the timing of construction works in relation to ecological windows, health and wellbeing and traffic considerations • Consideration of biodiversity and designated sites and habitats in Construction Environmental Management Plans (CEMPs) • Appropriate management of invasive species • Use of best practice construction techniques and Construction Environmental Management Plan (CEMP) to ensure that the character and quality of landscapes and townscapes are maintained as far as practical during construction • Care of topsoil for future reuse • Consideration of contaminated spoil in Construction Environmental Management Plans (CEMPs) • Precautions for unexpected heritage discovery during construction • Consideration of unexpected heritage discovery in Construction Environmental Management Plans (CEMPs)	Operation • Regular programme of maintenance and monitoring to ensure operation at most efficient level • Scheduled control of invasive species where necessary

Topic	Objective	Scoring Rationale	Impact Magnitude	
			Beneficial	Adverse
Biodiversity	To protect and enhance biodiversity, ecological functions, capacity, and habitat connectivity within water company's operating area	Beneficial Increased capacity in network will reduce spills into receiving watercourses Adverse Short to medium-term loss or damage, though reversible, may be expected through construction	High	Medium
	To strengthen the connections between people and nature and realise the value of biodiversity	Beneficial Magnitude of impact negligible Adverse Magnitude of impact negligible	Negligible	Negligible
Population and Human health	To improve human health and well-being of the area, improve access to recreation and the environment, and reduce inequalities	Beneficial Reduced instances of out of sewer flooding expected to result in	Medium	Low

		improvement to human health and well-being. Adverse Short to medium-term loss or damage, though reversible, may be expected through construction		
Material Assets	To reduce, and make more efficient, the domestic, industrial and commercial consumption of resources, minimise the generation of waste, encourage its re-use and eliminate waste sent to landfill	Beneficial Creation of storage expected to result in improvement through alleviating capacity pressures on wastewater networks and resources. Adverse Short to medium-term loss or damage, though reversible, may be expected through construction	Medium	Low
Water	To maintain or improve the quality of rivers, lakes, groundwater, estuarine and coastal waterbodies	Beneficial Creation of storage capacity will reduce instances of overflows into receiving watercourses Adverse Short to medium-term loss or damage, though reversible, may be expected through construction	High	Low
	To reduce and manage flood risk	Beneficial Reduced instances of out of sewer flooding expected as a result of storage capacity increases. Adverse Short to medium-term loss or damage, though reversible, may be expected through construction	Medium	Low
Soil	To protect and enhance geology, the quality and quantity of soils and promote a catchment-wide approach to land management	Beneficial Magnitude of impact negligible Adverse Permanent loss or damage, may be expected through construction though magnitude dependant on size	Negligible	High
Air and Climate	To reduce air pollutant and greenhouse gas emissions	Beneficial Magnitude of impact is negligible Adverse Short to medium-term loss or damage, though reversible, may be expected through construction	Negligible	Low
	To adapt and improve resilience to the threats of climate change	Beneficial Medium improvements may be anticipated where storage improves resilience to flooding events within combined networks Adverse Magnitude of impact negligible	Medium	Negligible
Cultural heritage	To conserve and enhance the historic environment, the heritage assets therein and their setting	Beneficial Where reduced flood risk is anticipated, this may indirectly afford greater protection to cultural heritage assets Adverse Loss or damage, with the potential to be permanent may be expected through construction	Low	Medium
Landscape	To protect, enhance the quality of, and improve access to designated and undesignated landscapes, townscapes and the countryside	Beneficial Where reduced flood risk is anticipated, this may indirectly afford greater protection to townscapes, landscape and the countryside. Adverse Short to medium-term loss or damage, though reversible, may be expected through construction	Low	Medium

C.3. C5.0 - Sewer lining to target infiltration hotspots

Solution	**C5.0 Sewer lining to target infiltration hotspots**
Description	Programme of sewer and manhole lining in areas of high infiltration and high potential benefit.

Typical Construction Impacts	Although there would be limited construction, as it involves existing sewers, works would still need to be carried out in order to line the existing sewers. There is the potential for biodiversity and water, among others, to be impacted.			
Typical Mitigation	Design • N/A	Construction • Integration of Construction Environmental Management Plan • Consideration of biodiversity and designated sites and habitats in Construction Environmental Management Plans (CEMPs)	Operation • Regular programme of maintenance and monitoring to ensure operation at most efficient level • Scheduled control of invasive species where necessary	
Topic	Objective	Scoring Rationale	Impact Magnitude	
			Beneficial	Adverse
Biodiversity	To protect and enhance biodiversity, ecological functions, capacity, and habitat connectivity within water company's operating area	Beneficial Magnitude of impact considered negligible Adverse Magnitude of impact considered negligible	Negligible	Negligible
	To strengthen the connections between people and nature and realise the value of biodiversity	Beneficial Magnitude of impact considered negligible Adverse Magnitude of impact considered negligible	Negligible	Negligible
Population and Human health	To improve human health and well-being of the area, improve access to recreation and the environment, and reduce inequalities	Beneficial Magnitude of impact considered negligible Adverse Magnitude of impact considered negligible	Negligible	Negligible
Material Assets	To reduce, and make more efficient, the domestic, industrial and commercial consumption of resources, minimise the generation of waste, encourage its re-use and eliminate waste sent to landfill	Beneficial Reducing infiltration will act to increase efficiency of wastewater networks and alleviate capacity constraints Adverse Magnitude of impact considered negligible	High	Negligible
Water	To maintain or improve the quality of rivers, lakes, groundwater, estuarine and coastal waterbodies	Beneficial Magnitude of impact considered negligible Adverse Magnitude of impact considered negligible	Negligible	Negligible
	To reduce and manage flood risk	Beneficial Potential to alleviate out of sewer flooding where capacity pressures from infiltration is reduced Adverse Magnitude of impact considered negligible	Medium	Negligible
Soil	To protect and enhance geology, the quality and quantity of soils and promote a catchment-wide approach to land management	Beneficial Magnitude of impact considered negligible Adverse Magnitude of impact considered negligible	Negligible	Negligible
Air and Climate	To reduce air pollutant and greenhouse gas emissions	Beneficial Magnitude of impact considered negligible Adverse Magnitude of impact considered negligible	Negligible	Negligible
	To adapt and improve resilience to the threats of climate change	Beneficial Reduced risk of flooding by alleviating infiltration related capacity pressures on drainage and wastewater networks Adverse Magnitude of impact considered negligible	Low	Negligible
Cultural heritage	To conserve and enhance the historic environment, the heritage assets therein and their setting	Beneficial Magnitude of impact considered negligible Adverse Magnitude of impact considered negligible	Negligible	Negligible

Landscape	To protect, enhance the quality of, and improve access to designated and undesignated landscapes, townscapes and the countryside	Beneficial Magnitude of impact considered negligible Adverse Magnitude of impact considered negligible	Negligible	Negligible

C.4. C7.0 - Transfer flows between catchments via new connections

Solution	C7.0 Transfer flow between catchments via new connections		
Description	This option is about creating new connections between the STW catchments to optimise capacities and to find the best balance of flow and load i.e. removing catchment boundaries. It would allow utilisation of the short term capacity in some STWs whilst other STWs are expanded or redeveloped. Similar to the London Water Ring Main this could be a large infrastructure project that would allow most/all catchments to discharge into a single infrastructure pipe/tunnel and then allow any or all of the STWs to extract from this ring main and treat the flows. Reliant on availability of suitable STWs - London may be the only possible location for such a strategic option		
Typical Construction Impacts	The construction impact is likely to be extensive and intrusive. Impacts may therefore be realised with respect to biodiversity, population and human health, material assets and water among others.		
Typical Mitigation	Design • Locate at distance from sensitive receptors • Consider potential for ecological enhancement • Consider compensatory green infrastructure • Careful site selection - avoid areas of better quality soils if possible and target previously used land • Consideration of opportunities for enhancement of known features of industrial & cultural heritage significance	Construction • Integration of Construction Environmental Management Plan • Consideration of the timing of construction works in relation to ecological windows, health and wellbeing and traffic considerations • Consideration of biodiversity and designated sites and habitats in Construction Environmental Management Plans (CEMPs) • Appropriate management of invasive species • Use of best practice construction techniques and Construction Environmental Management Plan (CEMP) to ensure that the character and quality of landscapes and townscapes are maintained as far as practical during construction • Care of topsoil for future reuse • Consideration of contaminated spoil in Construction Environmental Management Plans (CEMPs) • Precautions for unexpected heritage discovery during construction • Consideration of unexpected heritage discovery in Construction Environmental Management Plans (CEMPs)	Operation • Regular programme of maintenance and monitoring to ensure operation at most efficient level • Scheduled control of invasive species where necessary
Topic	Objective	Scoring Rationale	Impact Magnitude Beneficial	Adverse
Biodiversity	To protect and enhance biodiversity, ecological functions, capacity, and habitat connectivity within water company's operating area	Beneficial Managing pressures on capacity through transfers would reduce	High	Medium

		potential for overspills into receiving watercourses. Adverse Short to medium-term loss or damage, may be expected through construction		
	To strengthen the connections between people and nature and realise the value of biodiversity	Beneficial Managing pressures on capacity through transfers would reduce potential for overspills into receiving watercourses therefore making watercourses more attractive places for recreation and amenity. Adverse Magnitude of impact negligible	Medium	Negligible
Population and Human health	To improve human health and well-being of the area, improve access to recreation and the environment, and reduce inequalities	Beneficial Reduced instances of out of sewer flooding expected to result in improvement to human health and well-being. Adverse Short to medium-term loss or damage, though reversible, may be expected through construction	Medium	Low
Material Assets	To reduce, and make more efficient, the domestic, industrial and commercial consumption of resources, minimise the generation of waste, encourage its re-use and eliminate waste sent to landfill	Beneficial Improved efficiency of wider infrastructure in making better use of resource availability. Adverse Short to medium-term loss or damage, though reversible, may be expected through construction	High	Low
Water	To maintain or improve the quality of rivers, lakes, groundwater, estuarine and coastal waterbodies	Beneficial Managing pressures on capacity through transfers would reduce potential for overspills into receiving watercourses. Adverse Short to medium-term loss or damage, though reversible, may be expected through construction	High	Low
	To reduce and manage flood risk	Beneficial Potential to alleviate risk of flooding where capacity pressures are reduced by transfer flows between catchments Adverse Short to medium-term loss or damage, though reversible, may be expected through construction	High	Low
Soil	To protect and enhance geology, the quality and quantity of soils and promote a catchment-wide approach to land management	Beneficial Magnitude of impact negligible Adverse Permanent loss or damage to soil resources as a result of new connections between catchments.	Negligible	High
Air and Climate	To reduce air pollutant and greenhouse gas emissions	Beneficial Magnitude of impact is negligible Adverse Short to medium-term loss or damage, though reversible, may be expected through construction	Negligible	Low
	To adapt and improve resilience to the threats of climate change	Beneficial Reduced risk of flooding by alleviating capacity pressures on drainage and wastewater networks by transfer flows between catchments Adverse Magnitude of impact negligible	Medium	Negligible
Cultural heritage	To conserve and enhance the historic environment, the heritage assets therein and their setting	Beneficial Ground investigation presents opportunity for discovery of previously unknown heritage features Adverse Loss or damage, with the potential to be permanent may be expected through construction	Medium	Medium
Landscape	To protect, enhance the quality of, and improve access to designated and undesignated landscapes, townscapes and the countryside	Beneficial Reduced potential for flooding has the potential to protect and enhance townscapes and countryside Adverse	Medium	Medium

		Short to medium-term loss or damage, though reversible, may be expected through construction		

Appendix D. Significance of effect

D.1. Compton STW – significance of effect of all Solution types

Catchment	GSO	Solution Ref	Pos/Neg	Biodiversity		Population and Human health	Material Assets	Water		Soil	Air and Climate		Cultural heritage	Landscape
				To protect and enhance biodiversity, ecological functions, capacity, and habitat connectivity within water company'	To strengthen the connections between people and nature and realise the value of biodiversi	To improve human health and well-being of the area, improve access to recreation and the environment, and reduce	To reduce, and make more efficient, the domestic, industrial and commercial consumption of resources, minimise	To maintain or improve the quality of rivers, lakes, groundwater, estuarine and coastal waterbodies	To reduce and manage flood risk	To protect and enhance geology, the quality and quantity of soils and promote a catchment-wide approach to land managem	To reduce air pollutant and greenhouse gas emissions	To adapt and improve resilience to the threats of climate change	To conserve and enhance the historic environment, the heritage assets therein and their setting	To protect, enhance the quality of, and improve access to designated and undesignated landscapes, townscapes and the
COMPTON STW	B1.1	Source control SUDS measures	Positive	1	1	1	0	1	1	1	0	1	0	2
			Adverse	-1	-1	-1	0	-1	-1	-1	-1	-1	0	-2
COMPTON STW	C4.0	Deep tank(s) and tunnel(s) to store combined sewage	Positive	2	0	1	1	2	1	0	0	1	0	2
			Adverse	-1	0	-1	0	-1	-1	-2	-1	0	-1	-2
COMPTON STW	C5.0	Sewer lining to target infiltration hotspots	Positive	0	0	0	2	0	1	0	0	1	0	0
			Adverse	0	0	0	0	0	0	0	0	0	0	0
COMPTON STW	B1.2	Targeted source control SuDS measures at major opportunity areas	Positive	1	1	1	1	1	2	1	0	2	0	2
			Adverse	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	-2
COMPTON STW	B2.1	Combined sewer separation 1 (parallel foul sewer network)	Positive	2	1	1	2	2	2	0	0	1	0	2
			Adverse	-1	0	-1	0	-1	-1	-1	-1	0	0	-2
COMPTON STW	??	Combined sewer separation (Fully below/above ground surface water sewer network collecting different types of run off)	Positive	2	1	1	2	2	2	0	0	1	0	2
			Adverse	-1	0	-1	0	-1	-1	-1	-1	0	0	-2

Catchment	GSO	Solution Ref	Pos/Neg	Biodiversity		Population and Human health	Material Assets	Water		Soil	Air and Climate		Cultural heritage	Landscape
				To protect and enhance biodiversity, ecological functions, capacity, and habitat connectivity within water company'	To strengthen the connections between people and nature and realise the value of biodiversi	To improve human health and well-being of the area, improve access to recreation and the environment, and reduce	To reduce, and make more efficient, the domestic, industrial and commercial consumption of resources, minimise	To maintain or improve the quality of rivers, lakes, groundwater, estuarine and coastal waterbodies	To reduce and manage flood risk	To protect and enhance geology, the quality and quantity of soils and promote a catchment-wide approach to land managem	To reduce air pollutant and greenhouse gas emissions	To adapt and improve resilience to the threats of climate change	To conserve and enhance the historic environment, the heritage assets therein and their setting	To protect, enhance the quality of, and improve access to designated and undesignated landscapes, townscapes and the
COMPTON STW	B2.3	Disconnect existing surface water systems from combined sewers and discharge to watercourse	Positive	2	1	1	2	1	1	0	0	1	0	2
			Adverse	-1	0	-1	0	-1	-1	-1	-1	0	0	-2
COMPTON STW	B2.4	Deep tunnel(s) to connect surface water networks to major reuse or discharge location(s)	Positive	2	1	1	2	1	2	0	0	2	1	2
			Adverse	-1	0	-1	-1	-1	-1	-2	-1	0	0	-2
COMPTON STW	B2.5	Combined sewer separation 3 Convert existing combined sewers to fowl only and convey surface water on the surface using SuDS measures	Positive	2	1	1	1	2	2	1	0	2	0	2
			Adverse	-1	-1	-1	0	-1	-1	-1	-1	-1	0	-2
COMPTON STW	B2.6	Recreate historical rivers to convey surface water	Positive	1	2	2	2	2	2	1	1	1	1	2
			Adverse	-1	-1	-1	0	-1	-1	-1	-1	0	-1	-2
COMPTON STW	B2.7	Use parks and urban spaces to store excess surface water during rainfall events (Daylight surface	Positive	2	1	2	1	2	2	1	0	2	0	2
			Adverse	-1	0	-1	0	-1	-1	-1	-1	0	0	-2

Catchment	GSO	Solution Ref	Pos/Neg	Biodiversity		Population and Human health	Material Assets	Water		Soil	Air and Climate		Cultural heritage	Landscape
				To protect and enhance biodiversity, ecological functions, capacity, and habitat connectivity within water company'	To strengthen the connections between people and nature and realise the value of biodiversi	To improve human health and well-being of the area, improve access to recreation and the environment, and reduce	To reduce, and make more efficient, the domestic, industrial and commercial consumption of resources, minimise	To maintain or improve the quality of rivers, lakes, groundwater, estuarine and coastal waterbodies	To reduce and manage flood risk	To protect and enhance geology, the quality and quantity of soils and promote a catchment-wide approach to land managem	To reduce air pollutant and greenhouse gas emissions	To adapt and improve resilience to the threats of climate change	To conserve and enhance the historic environment, the heritage assets therein and their setting	To protect, enhance the quality of, and improve access to designated and undesignated landscapes, townscapes and the
		water systems through parks to create a water-based public amenity)												
COMPTON STW	??	Use parks and urban spaces to store excess surface water during rainfall events 2 (Parks and urban spaces designed to retain water when gullies and/or the sewer network are unable to accept any more flow)	Positive	2	1	1	1	2	2	1	0	2	0	2
			Adverse	-1	0	-1	0	-1	-1	-1	-1	0	0	-2
COMPTON STW	B3.0	Property-level protection measures to prevent buildings from flooding	Positive	0	0	1	1	0	1	0	0	1	1	0
			Adverse	0	0	0	0	0	0	0	0	0	0	0
COMPTON STW	C1.0	Intelligent sewer network to control flows	Positive	1	0	0	0	1	1	0	0	1	0	0
			Adverse	0	0	0	0	0	0	0	0	0	0	0
COMPTON STW	C2.0	Proactive maintenance	Positive	1	0	1	0	1	1	0	0	0	0	0
			Adverse	0	0	0	0	0	0	0	0	0	0	0
	C3.1		Positive	2	1	1	1	1	2	0	0	1	0	2

Catchment	GSO	Solution Ref	Pos/Neg	Biodiversity		Population and Human health	Material Assets	Water		Soil	Air and Climate		Cultural heritage	Landscape
				To protect and enhance biodiversity, ecological functions, capacity, and habitat connectivity within water company'	To strengthen the connections between people and nature and realise the value of biodiversi	To improve human health and well-being of the area, improve access to recreation and the environment, and reduce	To reduce, and make more efficient, the domestic, industrial and commercial consumption of resources, minimise	To maintain or improve the quality of rivers, lakes, groundwater, estuarine and coastal waterbodies	To reduce and manage flood risk	To protect and enhance geology, the quality and quantity of soils and promote a catchment-wide approach to land managem	To reduce air pollutant and greenhouse gas emissions	To adapt and improve resilience to the threats of climate change	To conserve and enhance the historic environment, the heritage assets therein and their setting	To protect, enhance the quality of, and improve access to designated and undesignated landscapes, townscapes and the
COMPTON STW		Increased network capacity by installing larger sewers	Adverse	-1	0	-1	0	-1	-1	-2	-1	0	-1	-2
COMPTON STW	C6.0	Transfer flows between catchments via existing connections	Positive	1	1	1	1	1	1	0	0	1	0	0
			Adverse	0	0	0	0	0	0	0	0	0	0	0
COMPTON STW	C7.0	Transfer flows between catchments via new connections	Positive	2	1	1	2	2	2	0	0	1	1	2
			Adverse	-1	0	-1	0	-1	-1	-2	-1	0	-1	-2
COMPTON STW	C9.0	Intercompany wastewater transfers	Positive	0	0	1	0	0	1	0	0	1	0	0
			Adverse	0	0	0	0	0	0	0	-1	0	0	0
COMPTON STW	D1.2	Remove Fats, Oils and Grease (FOG) in the network	Positive	1	0	1	1	1	1	0	0	1	0	2
			Adverse	0	0	-1	0	0	0	0	0	0	0	0
COMPTON STW	C3.2	Deep tunnel(s) to convey combined sewage	Positive	2	0	1	1	2	1	0	0	1	0	2
			Adverse	-1	0	-1	0	-1	-1	-2	-1	0	-1	-2
COMPTON STW	B2.2	Combined sewer separation. Construct new surface water sewers	Positive	2	1	1	2	2	2	0	0	1	0	2
			Adverse	-1	0	-1	0	-1	-1	-1	-1	0	0	-2
COMPTON STW	B2.8	Use highways to store and convey	Positive	1	0	1	1	1	1	0	0	1	0	2
			Adverse	0	0	-1	0	-1	0	0	-1	0	0	-2

Catchment	GSO	Solution Ref	Pos/Neg	Biodiversity		Population and Human health	Material Assets	Water		Soil	Air and Climate		Cultural heritage	Landscape
				To protect and enhance biodiversity, ecological functions, capacity, and habitat connectivity within water company'	To strengthen the connections between people and nature and realise the value of biodiversi	To improve human health and well-being of the area, improve access to recreation and the environment, and reduce	To reduce, and make more efficient, the domestic, industrial and commercial consumption of resources, minimise	To maintain or improve the quality of rivers, lakes, groundwater, estuarine and coastal waterbodies	To reduce and manage flood risk	To protect and enhance geology, the quality and quantity of soils and promote a catchment-wide approach to land managem	To reduce air pollutant and greenhouse gas emissions	To adapt and improve resilience to the threats of climate change	To conserve and enhance the historic environment, the heritage assets therein and their setting	To protect, enhance the quality of, and improve access to designated and undesignated landscapes, townscapes and the
		surface water during rainfall events												
COMPTON STW	D1.1	Screening in the network	Positive	1	0	1	1	1	1	0	0	1	0	2
			Adverse	0	0	0	0	0	0	0	0	0	0	0
COMPTON STW	D1.3	Primary settlement in the network	Positive	1	1	1	1	1	1	0	0	1	0	2
			Adverse	-1	0	-1	0	0	0	-1	0	0	0	0
COMPTON STW	D1.4	Chemical Treatment within the network (Ferric)	Positive	0	0	0	1	0	0	0	0	0	0	0
			Adverse	0	0	0	0	0	0	0	0	0	0	0
COMPTON STW	D1.5	Biological treatment within the network	Positive	0	0	0	1	0	0	0	0	0	0	0
			Adverse	0	0	0	0	0	0	0	0	0	0	0
COMPTON STW	D1.6	Other within-sewer treatment	Positive	1	0	1	1	1	1	0	0	1	0	0
			Adverse	0	0	0	0	0	0	0	0	0	0	0
COMPTON STW	D2.1	Optimising maintenance performance	Positive	1	0	1	2	1	1	0	0	1	0	0
			Adverse	0	0	0	0	0	0	0	0	0	0	0
COMPTON STW	D2.2	Real Time Control Implementation (including SCADA upgrades and automation)	Positive	1	0	1	2	1	1	0	0	1	0	0
			Adverse	0	0	0	0	0	0	0	0	0	0	0

Catchment	GSO	Solution Ref	Pos/Neg	Biodiversity		Population and Human health	Material Assets	Water		Soil	Air and Climate		Cultural heritage	Landscape
				To protect and enhance biodiversity, ecological functions, capacity, and habitat connectivity within water company'	To strengthen the connections between people and nature and realise the value of biodiversi	To improve human health and well-being of the area, improve access to recreation and the environment, and reduce	To reduce, and make more efficient, the domestic, industrial and commercial consumption of resources, minimise	To maintain or improve the quality of rivers, lakes, groundwater, estuarine and coastal waterbodies	To reduce and manage flood risk	To protect and enhance geology, the quality and quantity of soils and promote a catchment-wide approach to land managem	To reduce air pollutant and greenhouse gas emissions	To adapt and improve resilience to the threats of climate change	To conserve and enhance the historic environment, the heritage assets therein and their setting	To protect, enhance the quality of, and improve access to designated and undesignated landscapes, townscapes and the
COMPTON STW	D3.0	Replace/retrofit/expand existing primary/secondary treatment processes	Positive	1	1	1	2	1	1	0	0	1	0	0
			Adverse	-1	0	-1	0	-1	-1	-1	-1	0	0	-2
COMPTON STW	D4.1	Buy land and expand STW (Effluent and sludge treatment)	Positive	2	1	1	2	2	1	0	0	2	0	2
			Adverse	-2	-1	-1	0	-1	-1	-1	-1	0	0	-2
COMPTON STW	D4.2	Buy land and move sludge treatment to new location. Expand effluent stream on remaining land.	Positive	2	1	1	2	2	1	0	0	2	0	2
			Adverse	-2	-1	-1	0	-1	-1	-1	-1	0	0	-3
COMPTON STW	D5.0	Construct new/additional STWs	Positive	2	1	1	2	2	1	0	0	2	0	2
			Adverse	-2	-1	-1	0	-1	-1	-1	-1	0	0	-3
COMPTON STW	D7.1	River catchment-based discharge permitting	Positive	1	0	1	0	1	0	0	0	0	0	0
			Adverse	-1	0	-1	0	-1	0	0	0	0	0	0
COMPTON STW	D7.2	Environmental effects based permitting	Positive	1	0	0	0	1	0	0	0	0	0	0
			Adverse	-1	0	0	0	-1	0	0	0	0	0	0
COMPTON STW	D7.3	Treatment process-based permitting	Positive	1	1	1	0	1	0	0	0	0	0	0
			Adverse	-1	-1	-1	0	-1	0	0	0	0	0	0
	D8.1		Positive	1	0	0	0	1	0	0	0	0	0	0

Catchment	GSO	Solution Ref	Pos/Neg	Biodiversity		Population and Human health	Material Assets	Water		Soil	Air and Climate		Cultural heritage	Landscape
				To protect and enhance biodiversity, ecological functions, capacity, and habitat connectivity within water company'	To strengthen the connections between people and nature and realise the value of biodiversi	To improve human health and well-being of the area, improve access to recreation and the environment, and reduce	To reduce, and make more efficient, the domestic, industrial and commercial consumption of resources, minimise	To maintain or improve the quality of rivers, lakes, groundwater, estuarine and coastal waterbodies	To reduce and manage flood risk	To protect and enhance geology, the quality and quantity of soils and promote a catchment-wide approach to land managem	To reduce air pollutant and greenhouse gas emissions	To adapt and improve resilience to the threats of climate change	To conserve and enhance the historic environment, the heritage assets therein and their setting	To protect, enhance the quality of, and improve access to designated and undesignated landscapes, townscapes and the
COMPTON STW		Real-time quality monitoring and dynamic consenting	Adverse	0	0	0	0	0	0	0	0	0	0	0
COMPTON STW	D8.2	Real-time quality monitoring with automated process response	Positive	1	0	0	1	1	0	0	0	0	0	0
			Adverse	0	0	0	0	0	0	0	0	0	0	0
COMPTON STW	D9.1	Treatment of diffuse pollution sources (inputs to river)	Positive	2	1	1	1	2	0	1	0	0	0	0
			Adverse	-1	0	-1	0	-1	0	0	0	0	0	0
COMPTON STW	D9.3	Treatment of point pollution sources (inputs to sewer)	Positive	1	0	0	2	1	0	0	0	0	0	0
			Adverse	0	0	0	0	0	0	0	0	0	0	0
COMPTON STW	D9.4	Control of chemicals at source	Positive	1	0	0	2	1	0	0	0	0	0	0
			Adverse	0	0	0	0	0	0	0	0	0	0	0
COMPTON STW	D12.1	Sludge Transfers (cross-company, internal, from centralised STW)	Positive	0	0	0	1	0	0	0	0	0	0	0
			Adverse	0	0	0	0	0	0	0	-1	0	0	0
COMPTON STW	D9.2	Treatment of diffuse pollution sources (inputs to sewers)	Positive	1	0	0	2	1	0	0	0	0	0	0
			Adverse	0	0	0	0	0	0	0	0	0	0	0