Colchester Water Cycle Study

Colchester City Council

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Quality information

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Abbreviations

Acronym	Definition
ALS	Abstraction Licensing Strategies
AMP	Asset Management Plan
AW	Affinity Water
AWS	Anglian Water Services
BREAAM	Building Research Establishment Environmental Assessment Method
CAMS	Catchment Management Abstraction Strategy
CCC	Colchester City Council
CIWEM	Chartered Institution of Water & Environmental Management
Defra	Department for Environment, Food & Rural Affairs
DWF	Dry Weather Flow
DWMP	Drainage and Wastewater Management Plan
EA	Environment Agency
EIS	Environmental Incentive Scheme (run by Anglian Water Services)
EIP	Environmental Improvement Plan (2023)
ECC	Essex County Council
EFI	Environmental Flow Indicator
EWSC	Enabling Water Smart Communities
LFRMS	Local Flood Risk Management Strategy
LLFA	Lead Local Flood Authority
LPA	Local Planning Authority
MWELS	Mandatory Water Efficiency Labelling Scheme
NbS	Nature based Solution(s)
NFM	Natural Flood Management
NPPF	National Planning Policy Framework
Ofwat	Office for Water Services
PCC	Per Capita Consumption
PPG	Planning Practice Guidance
RBMP	River Basin Management Plan
RNAG	Reasons for Not Achieving Good (WFD Regulations)
RQP	River Quality Planning
SFRA	Strategic Flood Risk Assessment
SPZ	Source Protection Zones
SSSI	Site of Special Scientific Interest
SuDS	Sustainable Drainage Systems
TDC	Tendring District Council
WAFU	Water Available For Use

Acronym	Definition
WCS	Water Cycle Study
WEDS	Water Efficient Design Statement
WFD	Water Framework Directive
WMS	Written Ministerial Statement
WRC	Water Recycling Centre
WRE	Water Resources East
WRMP	Water Resources Management Plan
WRZ	Water Resource Zone
WSI	Water Services Infrastructure
WWNP	Working with Natural Processes

1. Introduction

1.1 Water Cycle Study purpose

This Water Cycle Study (WCS) has been produced for Colchester City Council (CCC) as part of the evidence base informing the Council's updated Local Plan. The WCS has been produced in line with Environment Agency guidance[1] for WCS, and incorporates both the Scoping and Detailed WCS requirements in one report.

The objective of a WCS is to identify any constraints on planned housing and employment growth that may be imposed by the water cycle. The WCS then identifies whether there are solutions to resolve constraints e.g. through ensuring that appropriate Water Services Infrastructure (WSI) can be provided to support the proposed development, including the planning policy required to deliver it.

A broad overview of the interaction between the water environment and WSI which the WCS is concerned with is provided within Figure 1-1[2].

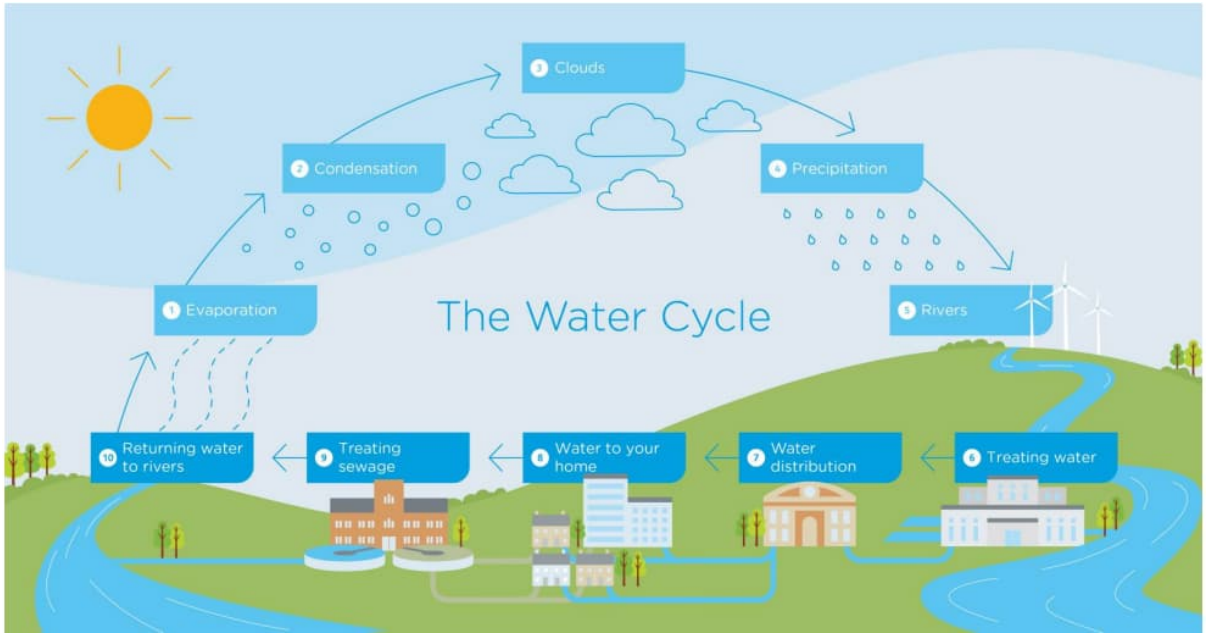


Figure 1-1 The water environment and water services infrastructure components

1.2 Study partners

The WCS has been carried out with the following contributors and partners:

- CCC as the Local Planning Authority (LPA).
- Anglian Water Services (AWS) as the wastewater provider, and the main provider of public water supply in CCC's administrative area.
- Affinity Water (AW) as a provider of public water supply in small parts of CCC's administrative area.
- The Environment Agency.

The WCS has also used relevant information from the following organisations:

- Natural England.
- Essex County Council (ECC) as the Lead Local Flood Authority (LLFA).

[1] Environment Agency (2021) Water cycle studies. Available at: https://www.gov.uk/guidance/water-cycle-studies (Accessed July 2023)
[2] Source: https://www.thameswater.co.uk/about-us/responsibility/education/the-water-cycle

- Water Resources East (WRE).
- British Geological Survey.

At the time of completing this version of the WCS (P02), consultation on the report is underway with the Environment Agency and Natural England and any updates to the WCS will be made if required in due course.

1.3 Report structure

The Scoping WCS report is structured as follows:

- Section 2: **Study drivers** – explains why a WCS required, including the policy context.
- Section 3: **Growth proposals and study area** - defines the study area and growth sites assessed.
- Section 4: **Water environment baseline summary** - provides information on the existing hydrological and hydrogeological baseline context in the CCC administrative area.
- Section 5: **Water infrastructure baseline summary** - provides information on the current WSI baseline, including capacity within the infrastructure before growth is assessed.
- Section 6: **Wastewater capacity assessment -** sets out the assessment of wastewater infrastructure capacity and environmental capacity allowing for the impact of growth and identifies required solutions.
- Section 7: **Water supply assessment** - sets out the assessment of available water supply allowing for the impact of growth and identifies required solutions.
- Section 8: **Growth area scoping summary** – acts as a summary of the WCS findings, presented spatially across the CCC area according to areas of growth.
- Section 9: **Recommendations** – summarises key recommendations for the Local Plan emerging from the WCS, including policy recommendations.

2. Study drivers

There are several legislative, regulatory and policy level drivers which define the need for and shape the approach to the WCS. A full list of key legislative drivers is detailed in Appendix A with key aspects summarised in this report section.

2.1 National planning policy

The National Planning Policy Framework (NPPF)[3] includes several water-related requirements which support the need for a WCS to support Local Plans and influence the scope of the WCS, including:

- Strategic policies in development plan documents should make sufficient provision for infrastructure for water supply, wastewater and flood risk and coastal change management.
- The planning system should take full account of climate change impacts including water scarcity, storm and flood risks and coastal change. Local Plans should take a proactive approach to mitigating and adapting to these climate change risks.

The Planning Policy Guidance (PPG)[4] which accompanies the NPPF states that a WCS can help plan for sustainable growth as part of Local Plan development. WCSs prepared at an early stage of plan-making can provide the evidence base to ensure local development plans are sound. This is the key driver for completing a WCS as part of the Local Plan evidence base.

2.2 Legislation

The primary legislative drivers for this study are the Water Environment Water Framework Directive (WFD) Regulations 2017 (referred to herein as the 'WFD regulations'), the Conservation of Habitats and Species Regulations 2017 (as amended) and the Environment Act (2021). This is because these instruments set out how the water environment needs to be protected and hence influence the regulation of WSI which interacts with the environment. In making Local Plans, LPAs need to have due regard to the protection of the water environment and associated habitats. These instruments are summarised below, alongside other relevant legislative instruments which influence the WCS.

2.2.1 Water Framework Directive Regulations

The environmental objectives of the WFD Regulations, as published in the Environment Agency's River Basin Management Plans (RBMPs)[5] relevant to this WCS are:

- To prevent deterioration of the status of surface waters and groundwater.
- To achieve objectives and standards for protective areas.
- To aim to achieve Good Status for all water bodies or, for heavily modified water bodies and artificial water bodies, good ecological potential and good surface water chemical status.

These environmental objectives are legally binding, and all public bodies should have regard to these objectives when making decisions (such as allocating sites for development in their Local Plan) that could affect the quality of the water environment. The Environment Agency publishes the WFD status and objectives of each surface water and groundwater body. Surface water bodies can be classed as high, good, moderate, poor or bad status and groundwater bodies are classed based on quantitative and chemical status which can be classified as good or poor.

The WFD Regulations are important to the WCS because provision of new WSI needs to ensure that the objectives of the Regulations are not compromised by ensuring that additional demand for water

[3] Ministry of Housing, Communities & Local Government (Dec 2024) National Planning Policy Framework. Available at: https://assets.publishing.service.gov.uk/media/675abd214cbda57cacd3476e/NPPF-December-2024.pdf (Accessed December 2024)
[4] Department for Levelling Up, Housing and Communities, Ministry of Housing, Communities and Local Government (2024) Planning Practice Guidance. Available at: https://www.gov.uk/government/collections/planning-practice-guidance (Accessed Dec 2024)
[5] Thames River Basin District Management Plan (2022). Available at: https://www.gov.uk/guidance/thames-river-basin-district-river-basin-management-plan-updated-2022 (Accessed July 2023)

and generation of additional wastewater does not adversely impact on the current and future status of waterbodies.

2.2.2 Conservation of Habitats and Species Regulations

The Conservation of Habitats and Species Regulations 2017 have designated some sites as areas that require protection to maintain or enhance the rare ecological species or habitats associated with them. Although the Regulations do not directly set overarching environmental standards related to water quality and quantity (flow or level), the Regulations can, by the requirement to ensure no detrimental impact on designated sites, require site specific water quality, water level and water flow targets to be set for specific locations.

This may in turn require restrictions on discharges to (or abstractions from) water bodies which are hydrologically connected to water dependant habitats. These Regulations are important to the WCS as the provision of new WSI needs to ensure no detrimental impact on designated sites through discharge and abstraction impacts.

2.2.3 Environment Act 2021

The Environment Act 2021 provides a legal framework for environmental governance in the UK bringing in measures for improvement of the environment including for water. The Act is relevant to the WCS process as it:

- Places a duty on water companies to secure a reduction in adverse impacts of discharges from storm overflows on the environment; growth proposed in Local Plans significantly influences how these reductions can be achieved.
- Makes drainage and sewerage planning a statutory duty through the requirement for water companies to produce Drainage and Wastewater Management Plans which should take account of planned growth.
- Enables the revocation or variation of permanent abstraction licences where the change is necessary to protect the environment or where the licence is consistently underused; this may affect water available to service proposed growth.

2.3 Relevant strategies and plans

Full details of relevant regulatory strategies or plans which relate to the water environment or provision of WSI for development in CCC are provided in Appendix A. The key strategies or plans most relevant to the WCS include, but are not limited to:

- Storm overflows discharge reduction plan (Defra, 2023)
- Integrated Plan for Delivering Clean and Plentiful Water (Defra, 2023).
- Environmental Improvement Plan 2023 (DEFRA, 2023).
- Drainage and Wastewater Management Plan (DWMP) (AW, 2024).
- Draft Water Resources Management Plan (AW, 2024).
- Draft Water Resources Management Plan (WRMP) (ESW, 2023).
- Draft Regional Water Resources Plan for Water Resources East (WRE, 2022).
- Colchester City Council Level 1 Strategic Flood Risk Assessment (SFRA) (AECOM, 2024).
- Water Strategy for Essex (ECC 2024).
- Essex Local Flood Risk Management Strategy (LFRMS) (ECC, 2018).
- Essex Local Nature Recovery Strategy (ECC, 2024).
- Anglian River Basin District River Basin Management Plan (Environment Agency, 2016).

3. Growth proposals and study area

3.1 Study area

The WCS area is based largely on the administrative boundary of CCC as displayed in Appendix F Figure 1. Much of the Council's administrative boundary follows watercourses or roads. The northern boundary broadly runs along the River Stour. The eastern boundary follows the River Colne estuary at the south, as well as sections of Salary Brook and Shir Burn.

3.2 Growth proposal summary

CCC's new Local Plan will cover the period 2025 to 2041 and will make allocations (including those carried from the current Plan[6]) which would deliver approximately 11,240 new dwellings over the plan period as shown in Table 3-1. Appendix F, Figure 2 shows the location of the allocation sites in the new Local Plan.

Through the assessments within the WCS, it was essential to include future development which is not allocated in the new Plan, but which is already committed and not yet connected to WSI (i.e. sites with planning permission but which haven't been built or occupied). This is to ensure the impact of all planned cumulative growth on WSI capacity is fully understood. Table 3-1 includes details of existing commitments not yet built.

Taking account of existing commitments and all allocations in the updated Plan, gives a total of 19,329 dwellings assessed in the WCS. It should be noted that this does not include for a windfall allowance as by definition, it cannot be spatially determined where this windfall will occur.

Table 3-1 Growth proposals

WRC catchment	Existing Allocations	Potential Emerging Allocations	Existing Commitments	Total
Birch WRC	0	15	2	**17**
Colchester WRC	1,181	3,405	6,602	**11,188**
Copford WRC	0	2,800	660	**3,460**
Dedham WRC	0	15	0	**15**
Earls Colne WRC	35	200	2	**237**
Eight Ash Green WRC	0	470	46	**516**
Fingringhoe WRC	0	80	55	**135**
Great Tey WRC	0	125	31	**156**
Langham WRC (Essex)	0	1,060	33	**1,093**
Layer de-la-Haye WRC	0	70	70	**140**
Tiptree WRC	200	670	422	**1,292**
West Bergholt WRC	13	650	2	**665**
West Mersea WRC	0	300	165	**465**
Wormingford WRC	0	0	0	**0**
Total	**1,379**	**9,860**	**8,090**	**19,329**

[6] Referred to as existing allocations

4. Water environment baseline

4.1 Introduction

This section defines the existing water environment baseline in the CCC area to understand the current condition and where there may be constraints or opportunities for future growth linked to the provision of WSI.

It sets out current condition of the surface water and groundwater bodies which are relevant to proposed allocation sites in the CCC area (e.g. through wastewater discharges and surface water runoff), as well as dependencies on those water bodies such as water dependent habitats and bathing water designations.

4.2 Surface water

4.2.1 Catchment context

Appendix F, Figure 3 displays the WFD surface water catchments covering CCC as defined within the Anglian RBMP.

The entirety of CCC is covered by the Essex Combined Management Catchment which comprises numerous WFD Operational Catchments, four of which cover the study area. The majority of CCC is covered by the Colne Essex Operational Catchment, the north is covered by the Stour OC Operational Catchment, and parts of the south west are within the Blackwater Operational Catchment. The area around the River Colne estuary falls with the Essex Transitional Water Body.

The Colne Essex Operational Catchment is made up of 16 WFD surface water body catchments, five of which fall within the study area: Colne (d/s of Doe's Corner), Salary Brook, Sixpenny Brook, Roman River, and Layer Brook. The Colne originates outside of Colchester, rising near Steeple Bumpstead before flowing south east through Halstead & the Colne Valley and finally through Colchester City.

The Stour OC Operational Catchment is made up of 21 WFD surface water body catchments, two of which fall within the study area: Stour (DS Lamarsh), and the Lower Stour.

The Blackwater Operational Catchment is made up of 5 WFD surface water body catchments, two of which fall within the study area: Domsey Brook and Virley Brook.

The extent of the catchment areas of each of these surface water bodies can be seen in Appendix F, Figure 4.

The rest of the Essex Combined Management Catchment area within Colchester which is not covered by the Operational catchments stated above consist of small watercourses which drain to the Colne Transitional Catchment or Blackwater Outer Coastal water body (demarked by the pink catchment boundary in Appendix F, Figure 4).

4.2.2 Surface water body condition

Defining the overall WFD 'status' of a surface water body is a complex assessment that combines standards for water quality, hydromorphology, and biology. Where a surface water body is classified under the WFD, the overall status of the water body is derived from the classification hierarchy made up of 'elements', and the type of water body will dictate what types of elements are assessed within it. Broadly, a WFD surface water body is given an ecological status and a chemical status, and these two aspects make up the overall WFD status of each surface waterbody.

Appendix F, Figure 4 depicts the ecological status component of the WFD surface water bodies in the study area. Domsey Brook is the only waterbody within the study area which has a 'Good' Ecological Status; this means the biological, hydromorphology and water quality elements making up Ecological Status are all classified as Good. The Sixpenny Brook waterbody, as well as the Layer Brook waterbody, have 'Poor' Ecological Status. The remaining WFD water body catchments in the study area, have a 'Moderate' Ecological Status.

Appendix F, Figure 5 shows the Physico-Chemical status (which is a contributing element to Ecological Status) of most of these surface waterbodies is moderate. In some cases, the status of one of the physico-chemical elements is less than Moderate (e.g. Poor or Bad), but in keeping with WFD classification methodology, the water bodies are limited at Moderate status. In all cases, where an element is less than Moderate, it relates to the phosphate element for example, the Roman River has a Poor status for Phosphate. This demonstrates that water quality, particularly nutrient quality, is a key aspect for why Ecological Status is limited to moderate for the majority of WFD surface waterbodies in the study area. The exception is the Domsey Brook which has a Good physico-chemical status.

Appendix F Figure 6 identifies reasons the WFD catchments have not achieved a status of 'Good'; these are termed Reasons for Not Achieving Good status (RNAG) under the WFD regulations. Seven waterbodies within Colchester have RNAGs associated with water industry sewage discharges, while nine have RNAGs associated with poor nutrient management, and four associated with physical modifications. Both The Colne and Blackwater transitional water bodies' RNAGs are only associated with physical modifications. Table 4-1 provides additional detail on water body RNAGs.

Table 4-1 Reasons for Not Achieving 'Good' status- surface water bodies

Waterbody	Cause	WFD Physico-Chemical Status Element Affected
Stour DS Lamarsh	- Water Industry Sewage Discharge - Poor Nutrient Management	- HMWB Mitigation Measures
Lower Stour	- Water Industry Sewage Discharge - Poor Nutrient Management	- HMWB Mitigation Measures
Salary Brook	- Poor Nutrient Management	- Biological Elements
Colne (d/s Does Corner)	- Water Industry Sewage Discharge - Poor Nutrient Management - Physical Modifications	- HMWB Mitigation Measures - Biological Elements
Roman River	- Water Industry Sewage Discharge - Poor Nutrient Management - Physical Modifications	- HMWB Mitigation Measures - Biological Elements
Sixpenny Brook	- Poor Nutrient Management	- Biological Elements
Blackwater	- Water Industry Sewage Discharge - Poor Nutrient Management - Physical Modifications	- HMWB Mitigation Measures - Biological Elements
Layer Brook	- Water Industry Sewage Discharge - Poor Nutrient Management - Physical Modifications	- HMWB Mitigation Measures - Biological Elements
Virley Brook	- Water Industry Sewage Discharge - Poor Nutrient Management	- HMWB Mitigation Measures
Domsey Brook	- N/A	- N/A
Blackwater Trac	- Physical Modifications	- Biological Elements
Colne Trac	- Physical Modifications	- HMWB Mitigation Measures

4.3 Groundwater

4.3.1 Geology

The bedrock geology underlying the CCC study is mostly comprised of London Clay Formation including Thames Group which overlies and confines the deeper Chalk formations; this represents 95% of the study area.

Along the northern boundary and the River Stour there is a band of Thanet Formation and Lambeth Group (undifferentiated), as well as pockets of Red Crag Formation. There is also a small area of Thanet Formation and Lambeth Group (undifferentiated) near The Hythe in central Colchester and a very small extent of Lewes Nodular Chalk Formation and Seaford Chalk Formation to the north of Wormingford.

In most parts of the CCC area, the bedrock is overlain by superficial deposits except for the southern area (not within intertidal mudflats) around Abberton, Peldon, Great Wigborough and parts of Mersea island where there are no superficial deposits. The superficial geology across CCC is shown in Appendix F, Figure 7. In total, there are 14 types of superficial geology with the three most spatially common being the Lowestoft Formation, the Cover Sand and the Kesgrave Catchment SubGroup. These three formations make up approximately 85% of the superficial geology exposed at surface in the CCC area. Intertidal deposits are present in the Colne Estuary with alluvium and River Terrace present in the larger river valleys.

4.3.2 Hydrogeology context

In terms of bedrock aquifers, the London Clay Formation (including Thames Group), as well as the Red Crag Formation is classed as Unproductive. Unproductive aquifers are largely unable to provide usable water supplies and are unlikely to have surface water and wetland ecosystems dependent on them.

The Thanet Formation and Lambeth Group (undifferentiated) is classed as a 'Secondary A' Aquifer. These aquifers are defined as those which comprise permeable layers that can support local water supplies and may form an important source of baseflow to rivers. This geology type underlies less than 5% of the study area.

Table 4-2 shows the aquifer designations for each of the bedrock geology types underlying the study area, demonstrating that the majority of Colchester is underlain by impermeable bedrock geology.

Table 4-2 Bedrock Geology Aquifer Designations

Bedrock Geology	Aquifer Designation
London Clay Formation including Thames Group	Unproductive
Red Crag Formation	Unproductive
Thanet Formation and Lambeth Group (undifferentiated)	Secondary A

Apart from a small part of the far north of the study area (associated with the Thanet Formation and Lambeth Group Secondary A Aquifer) the bedrock geology is not significant from an aquifer perspective.

Aquifers are present in the superficial geology associated with the Lowestoft Formation (which is a Secondary undifferentiated Aquifer), the Cover Sand, the Kesgrave Catchment SubGroup and the various river valley deposits. The Cover Sand, Kesgrave Catchment SubGroup and river valley deposits are mostly Secondary A Aquifers. The Secondary A Aquifers are collectively classified as a groundwater body under the WFD regulations (Essex Gravels). This groundwater body is shown in Appendix F, Figure 8 alongside very small spatial extents of the North Essex Chalk WFD water body and the North Essex Lower London tertiaries groundwater body to the north.

Appendix F, Figure 8 also displays the extent of Source Protection Zones (SPZs) across CCC. SPZs are defined around large and public potable groundwater abstraction sites with the aim of reducing potentially polluting activities around these areas and to protect the quality of the groundwater for abstraction and potable use. SPZs are defined based on the time it takes for pollutants to reach an abstraction point from any point at the water table. The transmission time enables the Environment Agency to define three zones around a groundwater abstraction point.

- Zone 1 (Inner Protection Zone) – This is defined by a 50-day travel time for pollution from any point below the water table to reach the abstraction source.
- Zone 2 (Outer Protection Zone) – This is defined by a 400-day travel time from a point below the water table.
- Zone 3 (Total Catchment) – This is defined as the area around an abstraction source within which all groundwater can potentially feed into the abstraction source.

There is a large extent of Zone 3 area which covers the majority of CCC; this reflects the extent of the deeper Chalk formation (widely used for public water supply abstraction) which underlies the

impermeable London Clay and is confined over most of the CCC area by the impermeable Clay bedrock.

4.3.3 Hydrogeological condition

Appendix F, Figure 9 displays the WFD chemical status of the WFD groundwater bodies in Colchester. The very small extent of North Essex Lower London Tertiaries has 'Good' chemical status, while the Essex Gravels has 'Poor' chemical status. According to the Catchment Data Explorer, the General Chemical Test is rated as 'Poor' leading to this overall groundwater body chemical status.

Appendix F, Figure 10 displays the WFD quantitative status of the two WFD groundwater bodies in Colchester. The Essex Gravels has 'Good' quantitative status while the small extent of North Essex Lower London Tertiaries has 'Poor' quantitative status. According to the Catchment Data Explorer, the Quantitative Dependent Surface Water Body was rated as 'Poor' leading to a 'Poor' quantitative status.

There are no confirmed RNAG for the groundwater bodies in the study area.

4.4 Flood risk

Table 4-3 summarises flood risk across Colchester using flood risk maps produced within the Level 1 Strategic Flood Risk Assessment (SFRA). Further detail on flood risk is set out within the Level 1 SFRA.

Table 4-3 Summary of Flood Sources and Risk

Flood Source	Description
Rivers and the Sea (Colchester City Council Level 1 SFRA Appendix A Figure 8)	Parts of the city adjacent to the River Colne are defined as Flood Zone 3 i.e. high probability of flooding ignoring the presence of defences from a combination of tidal flooding and fluvial flooding. In the south of the study area, small parts of West Mersea as well as Salcott are shown to be within Flood Zone 3. The majority of these areas are shown to be within the Reduction in Risk of Flooding From Rivers and Sea dataset, indicating that defences are present to mitigate the risk. Areas adjacent to the Roman River as well as the river Stour and its tributaries are also shown to be within Flood Zone 3, including parts of Dedham and Rowhedge.
Surface Water (Colchester City Council Level 1 SFRA Appendix A Figure 15)	There are numerous flow paths of surface water flooding throughout the study area ranging from high to low probability.
Groundwater (Colchester City Council Level 1 SFRA Appendix A Figure 14)	The groundwater flood risk varies throughout the study area. There are bands of 'Potential for groundwater flooding to occur at surface' following the rivers Colne and Stour associated with the river terrace gravels and alluvium superficial geology. Much of the north section of Colchester city is 'Not considered to be prone to groundwater flooding'. Large sections around central and south Colchester are shown to have 'Potential for groundwater flooding of property situated below ground level' and 'Limited potential for groundwater flooding to occur', with smaller bands with 'Potential for groundwater flooding to occur at surface'.
Sewers (Colchester City Council Level 1 SFRA Appendix A Figure 7)	Postcodes CO4 and CO6 have over 300 sewer flooding recorded incidents from the last 10 years. Sewer flooding incidents are lower within postcodes CO3 and CO1, with under 200 incidents reported in the same timeframe. CO8 is the postcode with the lowest incidents reported (29-100). It should be noted that not all postcodes are contained within the study area.
Reservoirs (Colchester City Council Level 1 SFRA Appendix A Figure 16)	Most of the study area is not at risk of reservoir flooding. Land adjacent to the Roman River is at risk of flooding from reservoirs. Land adjacent to the river Stour and Colne is also at risk of flooding from reservoirs, including much of the Colne Estuary.

4.5 Water dependent habitats

There are several sites of ecological importance within the study area (or hydrologically connected to it), including Sites of Special Scientific Interest (SSSIs) and Special Protection Areas (SPAs). These sites have been reviewed to identify which have a material water dependency and hence which are considered as ‘water dependent habitats’ for this study.

Appendix F, Figure 11 displays the water dependent habitats within (or downstream of) the CCC area. Table 4-4 provides further information for each water dependent habitat, including connected water body, WRCs which may influence water quality at the site, hydrological dependency and water based pressures.

Table 4-4 Water dependant habitats & hydrological connectivity

Site	Connected water body (in Colchester)	Connected WRCs	Key water dependencies/aspects	Identified hydrological and water quality issues & pressures
Abberton Reservoir SPA, SSSI and Ramsar	• Layer Brook	• Tiptree WRC	In numerical terms, the most important reservoir for wintering wildfowl in Great Britain; also, a key water supply source for Essex and Suffolk.	• WFD classified waterbody – less than Good Status for: – Total Nitrogen (Poor). – Total Phosphorus (Moderate). • Also fails WFD chemical status for Bexo(a)pyrene, Mercury (and its compounds), PFOS and PBDE. • SSSI Pressures: Sediment regime and siltation (Potential pressure with medium risk). • SPA Site Improvement Plan (SIP) actions: – Reduce sediment load in reservoir inflow. – Investigate nutrient levels.
Upper Colne Marshes SSSI	• Roman River • River Colne • Layer Brook	• Birch WRC • Earls Colne WRC • Eight Ash Green WRC • Copford WRC • Tiptree WRC • Layer de-la-Haye WRC • West Bergholt WRC • Fingringhoe WRC • Colchester WRC	The site's hydrology is closely linked to the River Colne and its tidal influences. The estuarine environment supports a range of wetland habitats that are subject to tidal inundation, contributing to the ecological diversity of the area. The hydrological dynamics of the Upper Colne Marshes play a crucial role in maintaining the site's ecological integrity, supporting a variety of plant and animal species adapted to these wetland environments.	• Colne Trac WFD classified waterbody – less than Good Status for: – Dissolved inorganic N (Moderate). – Hydrological regime (doesn't support Good). – Failing Mitigation Measures assessment. • Also fails WFD chemical status for Mercury (and its compounds), and PBDE. • No SSSI Pressures.
Roman River SSSI	• Roman River	• Tiptree WRC • Birch WRC • Layer de-la-Haye WRC	The site is a complex mosaic of woodland, scrub, heath, grassland and fen, comprising Donyland and Friday Woods and Berechurch Common. It is located on glacial sands and gravels overlying London Clay with spring lines arising at the junction of these two soil types. The river's hydrology is influenced by various factors, including	• WFD classified waterbody – less than Good Status for: – Fish & Macrophytes (Moderate). – Phosphate (Poor). – Hydrological Regime (does not support good). – Failing Mitigation Measures assessment. • Also fails WFD chemical status for Mercury (and its compounds), PFOS and PBDE.

Site	Connected water body (in Colchester)	Connected WRCs	Key water dependencies/aspects	Identified hydrological and water quality issues & pressures
			natural processes and human activities.	
Blackwater Estuary SSSI, SPA & Ramsar (part of Essex Estuaries SAC)	• Virley Brook • River Colne (WFD) Transitional Water body	• West Mersea	The Blackwater Estuary is the largest estuary in Essex north of the Thames and, is one of the largest estuarine complexes in East Anglia. Shingle and shell banks and offshore islands are a feature of the tidal flats.	• Colne Trac WFD classified waterbody – less than Good Status for: – Dissolved inorganic N (Moderate). – Hydrological regime (doesn't support Good). – Failing Mitigation measures assessment. • Also fails WFD chemical status for Mercury (and its compounds), and PBDE. • SSSI Pressures: – Unknown sources of pollution (Potential pressure, medium risk). – Hydrological management at the coast (Potential pressure, medium risk). – Ditch Management regime (Active, high risk). • SAC SIP (Essex Estuaries): – Investigate coastal squeeze impacts.
Colne Estuary SSSI SPA and Ramsar (part of Essex Estuaries SAC)	• River Colne	• Birch WRC • Earls Colne WRC • Eight Ash Green WRC • Copford WRC • Tiptree WRC • Layer de-la-Haye WRC • West Bergholt WRC • Fingringhoe WRC • Colchester WRC	The Colne Estuary is a comparatively short and branching estuary, with five tidal arms which flow into the main river channel. The estuary has a narrow intertidal zone predominantly composed of flats of fine silt with mudflat communities typical of south-eastern estuaries. The variety of habitats which include mudflat, saltmarsh, grazing marsh, sand and shingle spits, disused gravel pits and reedbeds, support outstanding assemblages of invertebrates and plants.	• Colne Trac WFD classified waterbody – less than Good Status for: – Dissolved inorganic N (Moderate). – Hydrological regime (doesn't support Good). – Failing Mitigation measures assessment. • Also fails WFD chemical status for Mercury (and its compounds), and PBDE. • SSSI Pressures: Flood & Coastal Erosion Management Measures (active pressure, high risk). – SAC SIP (Essex Estuaries):Investigate coastal squeeze impacts.
Cattawade Marshes SSSI (Part of the Stour	• River Stour	• Dedham WRC • Langham WRC	The marshes experience tidal inundation, leading to the deposition of silt and nutrients, which supports the growth of saltmarsh vegetation. The	• Stour (d/s R.Brett) WFD water body - less than Good Status for: – Macrophytes (Poor). – Dissolved Oxygen (Moderate).

Site	Connected water body (in Colchester)	Connected WRCs	Key water dependencies/aspects	Identified hydrological and water quality issues & pressures
& Orwell Estuaries SPA)			River Stour provides freshwater to the marshes, influencing salinity gradients and supporting diverse plant and animal communities. The dynamic interaction between tidal flows and river discharge results in sediment transport, contributing to the marshes' geomorphology and habitat diversity.	– Phosphate (Moderate). – Failing Mitigation measures assessment. • Also fails WFD chemical status for Mercury (and its compounds), PFOS and PBDE. • SSSI Pressures: Water level changes – not flood management or abstraction related (potential pressure, medium risk). • SAC SIP (Stour & Orwell Estuaries SPA): – Investigate coastal squeeze impacts. – Inappropriate coastal management.
Stour Estuary SSSI (Part of the Stour & Orwell Estuaries SPA)	• River Stour	• Dedham WRC • Langham WRC	The hydrological system, with its mix of tidal influences, freshwater inputs, and sediment dynamics, supports a range of habitats that are crucial for birdlife, including wildfowl and waders. The intertidal and salt marsh habitats created by these hydrological processes are important for feeding, nesting, and migration of bird species.	• Stour (Essex) Trac WFD classified waterbody – less than Good Status for: – Angiosperms & macroalgae (Moderate). – Dissolved Inorganic Nitrogen (Moderate). – Phosphate (Moderate). – Hydrological regime does not support Good Status. • Also fails WFD chemical status for Mercury (and its compounds) and PBDE. • SSSI Pressures: – Flood & Coastal Risk Management (FCERM) measures. – Sediment management. – Water level changes (no FCERM or abstraction related). – Agricultural sources of pollution. • SAC SIP (Stour & Orwell Estuaries SPA): – Investigate coastal squeeze impacts. – Inappropriate coastal management.

4.6 Other designations

4.6.1 Bathing waters

The UK has over 600 designated bathing waters defined as areas of inshore waters designated for public swimming, these areas are typically characterised by large numbers of swimmers and visitors per year. The Bathing Waters Directive sets out water quality standards to protect the environment at bathing waters throughout the Bathing Water Season, in England this is between 15th May and 30th September. The Environment Agency are required to monitor water quality at these sites regularly throughout the Bathing Water Season.

Water quality standards are based on the incidence of potentially harmful bacteria, E. coli and intestinal enterococci, and are categorised as ‘excellent’, ‘good’, ‘sufficient’ or ‘poor’ based on bacteria levels. Sites are rated annually and on a short-term basis in response to any temporary pollution incidents.

As shown in Appendix F, Figure 12 There is one designated bathing water in CCC; the beach at West Mersea. The most recent classification of this bathing water is Good, based on samples taken from 2021 through to 2024. There is also a designated bathing water at Brightlingsea which, whilst not located within CCC’s administrative area, it is hydrologically connected to discharges to the Colne catchment. This bathing water has been rated Excellent for the last three years.

4.6.2 Shellfish waters

The WFD Regulations are designed to protect the ecological health of water bodies, and where relevant the shellfish growing within it. The WFD regulations follow the repeal of the Shellfish Waters Directive in 2013 and are intended to ensure that the protections provided by the Shellfish Waters Directive continue as part of the WFD Regulations.

Technical advice from the UK technical advisory group for the implementation of the WFD indicate that the physical and chemical parameters set within the WFD for protecting water quality are equivalent or better than the requirements which were set in the Shellfish Waters Directive. The shellfish water protected areas in the study area are shown in Appendix F, Figure 12 and include Colne, Pyefleet, Strood, Salcott Channel, Blackwater and Dengie.

4.7 NbS opportunities

Nature based Solutions (NbS) are a multidisciplinary tool for sustainably utilising the landscape and its features to address socio-environmental challenges. Opportunities for NbS in CCC have been identified to explore existing and potential new nature-based solutions to manage water resources and flood risk. NbS can be used as standalone adaptation measures, or they can be combined with traditional grey infrastructure solutions to provide water and flood risk benefit.

To identify the potential for water based NbS solutions which could provide water and flood risk management benefits in CCC, a review was undertaken of opportunities within the Working With Natural Processes (WWNP)[7] dataset for natural Flood Management (NFM) opportunities. Appendix F, Figure 13 displays the opportunities for water based NbS identified.

In addition to these datasets, the Essex Local Nature Recovery Strategy document produced in August 2024 includes a series of maps highlighting areas with potential to be of particular importance and could contribute to habitat creation opportunities. River buffer creation, ghost pond re-establishment, saltmarsh restoration, and creation of coastal grazing marsh are identified as key actions within the plan. The Bigger Habitat Priorities relating to freshwater and coastal habitats listed within the report were:

- *To create 22,000 hectares of new freshwater habitats and to enhance the water quality of our river network, by creating 6,000 hectares of new river buffer habitat;* and,

[7] Working with Natural Processes (2018). Available at: https://assets.publishing.service.gov.uk/media/6036c5468fa8f5480a5386e9/Working_with_natural_processes_evidence_directory.pdf (Accessed January 2024)

- *To create 4,000 hectares of new coastal habitat, and 1,000 hectares of new marine habitat to support the creation of a dynamic, resilient ecosystem.*

Appendix G shows a series of maps included in the Essex Local Nature Recovery Strategy which detail areas with potential for habitat creation.

The WWNP dataset shows that an area within central Colchester has limited opportunities identified for NFM, due to urbanisation. Much of the northern area of CCC is constrained to riparian woodland potential, with small pockets of potential for runoff attenuation features. Areas with floodplain woodland potential are mostly restricted alongside the rivers Lamarsh Stour, Doe's Corner, and the Roman River, as well as along the edges of the Abberton Reservoir. The south eastern area is shown to be limited to opportunities for smaller scale riparian woodland. Runoff attenuation features are possible within the south west of Colchester, as well as alongside the River Colne and River Stour as well as their tributaries.

5. Water infrastructure baseline summary

5.1 Infrastructure provision

There are two WSI providers operating within the study area:

- AWS are responsible for providing sewerage and wastewater treatment for all the CCC area, as well as potable (clean) water to most of the population and non-domestic customers within CCC.
- AW are responsible for providing potable (clean) water to small areas of CCC around Dedham and Wivenhoe.

5.2 Water infrastructure planning

Before setting out the baseline condition of WSI provision, it is important to set out how water companies must plan for water and wastewater services through various statutory processes. It is also important to the planning timelines for both the Local Plan and AWS and AW in terms of the funding mechanisms for new WSI. AWS and AW have a statutory duty to supply water and wastewater services for residential development and therefore input to the planning process; however, the statutory planning process for water companies differs in timing to that of Local Plan making.

WSI financial and asset planning

Water company planning for asset management and funding is governed by the Asset Management Plan (AMP) process which runs in 5 year cycles. The Office for Water Services (Ofwat) is the economic regulator of the water and sewerage industry in England and Wales and regulates this overall process.

To undertake maintenance of its existing assets and to enable the building of new assets, water companies seek funding by charging customers according to the level of investment the company needs to make. The process of determining how much asset investment is required is undertaken in conjunction with key regulators and the outcome is a 5-yearly Business Plan which is produced by each water company setting out the required asset investment over the next 5 year period. The Business Plan also sets out the justification for the investment and the price increase required to fund it.

Overall, the determination of how much a water company can charge its customers is undertaken by Ofwat. Ofwat consider the views of the water company, the other regulators (Environment Agency, and the Drinking Water Inspectorate) and consumer groups such as the Consumer Council for Water when determining the price limits it will allow a water company to charge to enable future asset investment.

This process is known as the Price Review (PR) and is undertaken in 5 year cycles. When Ofwat determine a water company's business plan, the price limits are set for the following 5 years allowing the water company to raise funds required to undertake the necessary investment within the AMP round. The current AMP period at the time of completing this WCS is known as AMP8 which commenced on the 1st April 2025. The business plan for this period was initially submitted to Ofwat in 2024 (the PR24 process). The PR24 business plans for AWS and AW therefore contain the WSI proposals to be delivered (or commenced) up to 2030 which will be critical to supporting proposed growth within the Local Plan.

Regional Water resources planning

Water Resources East (WRE) is an alliance of the four water companies that supply drinking water across East England, including AWS and AW. WRE published a regional plan in December 2023 to ensure that there are resilient water resources available to meet the needs of the environment, growing population and regional economy through to 2050 and beyond, taking full account of climate change.

Water Resources Management Plan (WRMP)

Water companies undertake statutory medium to long term planning of water resources to demonstrate that there is a long-term plan for delivering sustainable water supply within its operational area to meet existing and future demand. This is reported via a statutory WRMP produced every five years to coincide with each of the water companies' five-yearly asset management (or business) plans. Both AWS and AW produced their WRMPs in 2024.

Drainage and Wastewater Management Plan (DWMP)

Water companies undertake long-term planning of wastewater management to improve drainage and environmental water quality. This is reported via a statutory DWMP which is a long-term plan spanning 25 years that sets out how wastewater companies intend to extend, improve, and maintain a robust and resilient drainage and wastewater system.

The Environment Act 2021 has made the production of DWMPs statutory to assess current and future capacity, pressures, and risks to sewerage networks, and outline the investment needs to meet the challenges posed by population growth and climate change. AWS published their current DWMP in May 2023 which covers CCC's area.

5.3 Water supply baseline

5.3.1 Water stress classification

Along with the rest of the south east and east of England, the Environment Agency classified CCC to be within an area of serious water stress in 2021[8]. Water stress in this context applies to both the natural environment and to public water supplies, including how both are affected by climate change. A severe water stressed classification reflects that the household demand for water is a high proportion of effective rainfall that is available in the area to meet that demand.

The classification outcome shows where the Environment Agency believe there are (or are likely to be) environmental impacts caused by public water supplies and/or where the Environment Agency consider the need for major water resources developments.

5.3.2 Local surface water availability

The Environment Agency manages water resources at the local level using abstraction licensing strategies (ALS). Within the ALS, the Environment Agency's assessment of the availability of water resources is presented as a classification system. The classification gives a resource availability status which indicates the relative balance between the environmental requirements for water and how much remains as available to be licensed for abstraction. In doing so, it sets out whether water is available for further abstraction and areas where abstraction is already too high and needs to be limited or reduced.

The general categories of resource availability status for ALS are shown in Table 5-1. The classification is based on an assessment of a river system's ecological sensitivity to abstraction-related flow reduction. This classification is then used to assess the potential for additional water resource abstractions in each catchment.

[8] Environment Agency Water Stressed Areas https://www.gov.uk/government/publications/water-stressed-areas-2021-classification (Accessed July 2023)

Table 5-1 Water Resource Availability Status Categories

Indicative Resource Availability Status	License Availability
Water Available for Licensing	There is more water than required to meet the need of the environment. New licenses can be considered depending on local and downstream impacts.
Restricted water available for licensing	Full Licensed flows fall below the Environmental Flow Indicators (EFIs). If all licensed water is abstracted there will not be enough water left for the needs of the environment. No new consumptive licenses would be granted. It may also be appropriate to investigate the possibilities for reducing fully licensed risks. Water may be available if you can 'buy' (known as licence trading) the entitlement to abstract water from an existing license holder.
No water available for licensing	Recent actual flows are below the EFI. This scenario highlights water bodies where flows are below the indicative flow requirement to help support Good Ecological Status. No further consumptive licences will be granted. Water may be available if you can 'buy' (known as license trading) the amount equivalent to recently abstracted from an existing licence holder.
Discharge Rich Waterbodies	These waterbodies have a modified flow that is influenced by reservoir compensation releases, or they have flows that are augmented. These are often known as 'regulated rivers' and may be managed though an operating agreement often held by a water company. The availability of water is dependent on these operating agreements. There may be water available for abstraction, the EA would need to be contacted to find out more.

The Environment Agency aims to protect the annual flow variability in rivers, from low to high flow conditions through the application of flow statistics. Flow statistics are expressed as the percentage of time that flow is exceeded. Resource availability is calculated by the Environment Agency for four different flow scenarios:

- Q95 (lower flow);
- Q70;
- Q50; and,
- Q30 (higher flow)

Appendix F, Figure 14 identifies the water availability for the four different flow scenarios for river catchments within CCC and indicates that water is available for licensing during the high flow (Q30 scenario) in the Salary Brook, Sixpenny, and Virley Brook catchment areas, but with the Roman River, Colne and Stour catchments (most of the CCC area) having either restricted water available for licensing or no availability.

Both the Q70 and Q50 scenarios have the entire area limited to either restricted water available for licensing or water not available for licensing. During the Q95 lower flow scenario however, the entirety of CC has no water available for licensing.

This demonstrates there is little reliable capacity in the surface water systems for new (consumptive) abstractions to support non-water company usage and that any new abstractions would have restrictions and be unable to take water at all during low flows.

5.3.3 Local groundwater availability

The entirety of Colchester is covered by confined chalk and therefore is assumed as having no water available for abstraction. This means that the groundwater unit balance shows more water has been abstracted based on recent amounts than the amount available and hence the EA will not grant further licenses.

5.3.4 Water company supply

AWS and AW supply potable water to Colchester. Both companies have a statutory duty to plan for water supply over a minimum of 25-year periods via the production of 5-yearly WRMPs. Once approved by regulators, the WRMPs then inform the Business Plans produced by AWS and AW for each AMP period, identifying where and when investment in water resources is required in that period.

All water companies plan for water resource availability within planning areas called Water Resource Zones (WRZ) where all customers within each WRZ share access and connectivity to the same sources of potable supply via the water supply grid.

AW's supply area coverage within CCC is limited to small areas around Dedham and Wivenhoe as shown in Appendix F, Figure 15. AWS are the therefore the main supplier of potable water for future demands resulting from site allocations. The AW WRMP[9] informing AMP8 shows that the Brett WRZ which covers Dedham and Wivenhoe would have a surplus for most of the Local Plan period, until 2040; as there is only a small amount of allocated growth within the AW supply area from the CCC area and they have a forecast surplus of supply, the water supply assessment for the Colchester WCS is focused on AWS' supply area.

5.3.4.1 AWS Supply Zone

Colchester is located within AWS's Essex South Water WRZ which does not have any direct supply sources within the zone. Instead, supplies to this WRZ are made up of a combination of groundwater, abstractions in the wider Essex Chalk Aquifer, and surface water sources via Ardleigh Reservoir. Operation of Ardleigh Reservoir is a shared between AWS and AW as part of a mutual statutory arrangement. AW take 50% of the output from the reservoir but have agreed a share of 70/30 in favour of AW until 2025. This share will revert to a 50/50 share from 2025.

The need for new water resource interventions to meet demand is identified through a detailed process of calculating available water supply available to the WRZ over the WRMP period (25 years) and comparing it to future demand for water within the WRZ allowing for growth and climate change. This process is called supply and demand balance forecasting and results in all water company WRZs assessed as having a balanced supply and demand (supply equals demand), a surplus (supply exceeds demand), or a deficit (demand exceeds supply).

The AWS WRMP[10] informing AMP8, shows that the Essex South WRZ is predicted to go into supply deficit by 2025 (and remaining so until 2050) if no water resource interventions are implemented. This is predominantly due to a growth in demand coupled with a fall in water supply available. The fall in water available is due to climate change and the need to reduce the existing volume of water abstracted from sensitive environments. This means the majority of the CCC area (including Colchester City) would not have sufficient potable water to meet AWS' minimum supply standards of service without the implementation of water resource management interventions.

5.4 Wastewater services baseline

Colchester is served by eighteen Water Recycling Centres (WRCs) which process, treat and return wastewater from housing and non-residential sources safely back to the water environment; these WRCs are all operated by AWS. The Colchester WRC serves most of the urban areas of the city, with the remaining WRCs being spread across the surrounding settlements.

[9] Affinity Water (2024) Water Resources Management Plan. Available at: https://affinitywater.uk.engagementhq.com/wrmp. (Accessed 30/01/2025).
[10] Anglian Water (2024) Water Resources Management Plan. Available at: https://www.anglianwater.co.uk/corporate/strategies-and-plans/water-resources-management-plan/ (Accessed January 2025)

Much of Colchester is connected to the WRCs by a wastewater network separated into foul and surface water sewers. A combined (surface and foul collected in one system) network is present within parts of the city of Colchester, mostly within the City Centre and south of the city. There are also small areas of combined sewer within Eight Ash Green.

The WRC catchments and wastewater network can be seen in Appendix F, Figure 16.

A baseline capacity assessment for each WRC was completed prior to considering the impact of growth on capacity (see Appendix B, B1 for detailed method and details). This identified that the baseline capacity of existing WRCs across CCC is variable as shown in Table 5-2 which identifies capacity for WRCs where growth is likely to occur in the WRC drainage catchment.

The baseline capacity assessment shows that WRCs serving Dedham, Fingringhoe, Langham, and West Bergholt have no existing capacity. Growth in these locations would trigger the immediate need for new permits to discharge and possible WRC investment and upgrades to allow additional wastewater flow to be treated. Colchester WRC is shown to have only 10% capacity remaining. The assessment of future capacity after growth is set out in section 6.

Table 5-2: Baseline (pre-growth) capacity at WRCs likely to receive growth

Site Name	Permitted Capacity[11] Remaining
BIRCH WRC	45%
COLCHESTER WRC	10%
COPFORD WRC	33%
DEDHAM WRC	No capacity
EARLS COLNE	9%
EIGHT ASH GREEN WRC	32 %
FINGRINGHOE WRC	No capacity
GREAT TEY WRC	33%
LANGHAM WRC (ESSEX)	No capacity
LAYER DE-LA-HAYE WRC	32%
TIPTREE WRC	19%
WEST BERGHOLT WRC	No capacity
WEST MERSEA WRC	29%

5.4.1 Wastewater planning

AWS undertake long-term planning of wastewater assets via the production of a five-yearly DWMP. The DWMP sets out risks and solutions for wastewater asset management over a 25 year planning period.

AWS published their current DWMP[12] in May 2023. The DWMP identifies existing risks to a series of planning objectives linked to capacity of the wastewater network and treatment capacity at WRCs. Where a very significant baseline risk (2020) to a planning objective has been identified for each of the WRC catchments in CCC, these have been set out in Table 5-3.

[11] Based on permitted Dry Weather Flows (DWF) see Appendix B1
[12] Anglian Water (2023) Drainage and Wastewater Management Plan. Available at: https://www.anglianwater.co.uk/about-us/our-strategies-and-plans/drainage-wastewater-management-plan/ (Accessed May 2025)

Table 5-3 Existing (2025) 'very significant' risks to planning objectives for WRC catchments in CCC

WRC/catchment	Sewer catchment risks	WRC risks
Birch WRC	- Access to amenity	- None identified
Colchester WRC	- Internal sewer flooding - Sewer collapses - Storm overflows - Level of Green Infrastructure	- None identified
Copford WRC	- Access to amenity	- Flow (permit) compliance
Dedham WRC	- Sewer collapses - Storm overflows - Access to amenity	- Flow (permit) compliance - Pollution risk
Eight Ash Green WRC	- Storm overflows - Access to amenity	- Pollution risk
Earls Colne	- Sewer collapses	- None identified
Fingringhoe WRC	- Storm overflows	- Flow (permit) compliance
Layer De-la-Haye WRC	- Access to amenity	- None identified
Tiptree WRC	- Sewer collapses - Storm overflows - Access to amenity	- None identified
West Bergholt WRC	- Sewer collapses - Access to amenity	- Flow (permit) compliance
West Mersea WRC	- Sewer collapses - Storm overflows	- Pollution risk

6. Wastewater capacity assessment

This section presents the assessment of wastewater infrastructure capacity taking into the scale and spatial pattern of preferred site allocations. It considers the following aspects of wastewater infrastructure:

- The capacity of wastewater treatment facilities (WRCs) to be able to accommodate additional wastewater from growth without impacting on the water environment.
- Connectivity of proposed site allocations to existing wastewater network – this identifies challenges with how site allocations can be connected to existing sewers, including operation of storm overflows.

6.1 Approach to assessments

6.1.1 WRC capacity

Each WRC has an environmental permit under the Environmental Permitting Regulations[13]. For the majority of WRCs, these permits set out limitations on the discharge of treated wastewater to a water body, with the key aim of protecting environmental quality. The conditions generally include a limit on how much treated flow can be discharged to a water body as well as limits on the quality of the water discharged across a range of potentially polluting substances.

The limit on treated flow volumes essentially defines the flow capacity, or 'headroom capacity' of each WRC; this in turn determines how many additional people the facility can serve before a new permit, or treatment upgrades may be required. The conditions on quality influence the environmental capacity of the receiving waterbody and hence determine limits on how much additional wastewater flow (beyond their permitted limit) each WRC can realistically treat.

Both the flow capacity and environmental capacity of the WRCs in the CCC study area have been considered based on the spatial distribution and scale of allocated sites. The assessment methodology detail is included in Appendix B and outcomes are presented in the WRC detailed assessments presented in this chapter.

6.1.2 Wastewater network connectivity

The WCS has considered the location of sewer overflows relative to growth locations. This assessment has used publicly available information on measured spill frequency from existing overflows and compared it to the long term government set targets[14] for spill frequency reduction (no more than 10 spills per annum on average).

6.2 WRC detailed assessments

6.2.1 Assessment results summary

Appendix C sets out the results of the flow capacity assessments across all WRCs considering growth to the end of the Plan period. This assessment accounts for new dwelling connections based on:

- existing commitments which have planning permission, but which are not yet built and connected to the sewer system;
- existing allocations within the adopted Local Plan; and,
- sites to be allocated in the new Local Plan.

[13] https://www.legislation.gov.uk/uksi/2016/1154/contents (accessed Dec 2004)
[14] Storm overflows discharge reduction plan (updated September 2023)

The assessment also accounts generically for employment growth by assuming a proportional uplift in wastewater flows relative to dwellings numbers (10%), and for an increase in water ingress to the sewer network (infiltration) based on a percentage increase - see Appendix B for details.

In summary, the capacity assessment demonstrates the following:

- A total of 13 WRCs would be expected to receive wastewater flows from allocations or existing commitments by the end of the plan period. These WRCs are: Birch, Colchester, Copford, Dedham, Earls Colne, Eight Ash Green, Fingringhoe, Great Tey, Langham, Layer de-la-Haye, Tiptree, West Bergholt and West Mersea.
- Three of these WRC would have sufficient flow capacity within their existing permit to accommodate the level of proposed growth and would have greater than 10% of the permitted capacity remaining after growth is connected. These WRCs are: Birch, Layer de-la-Haye, and West Mersea WRCs. Growth at these WRCs does not represent a significant infrastructure barrier and hence simplified environmental and solution assessments only have been undertaken for these WRCs.
- The remaining 10 WRCs would be expected to be at, or exceed, flow limits within their existing discharge permits once all growth is considered and hence treatment capacity is a potential barrier to growth in these locations. Environmental capacity associated with the receiving watercourse has been tested at these WRCs, to determine if future solutions are feasible based on legislative water quality standards, wider environmental needs and limitations on the timing of funding within the AMP cycle.

6.2.2 Cumulative growth from other authorities

Two WRCs which would receive growth from the new Local Plan have catchments with areas covering sections of neighbouring authorities and which therefore have the potential to be affected by cumulative growth – these are:

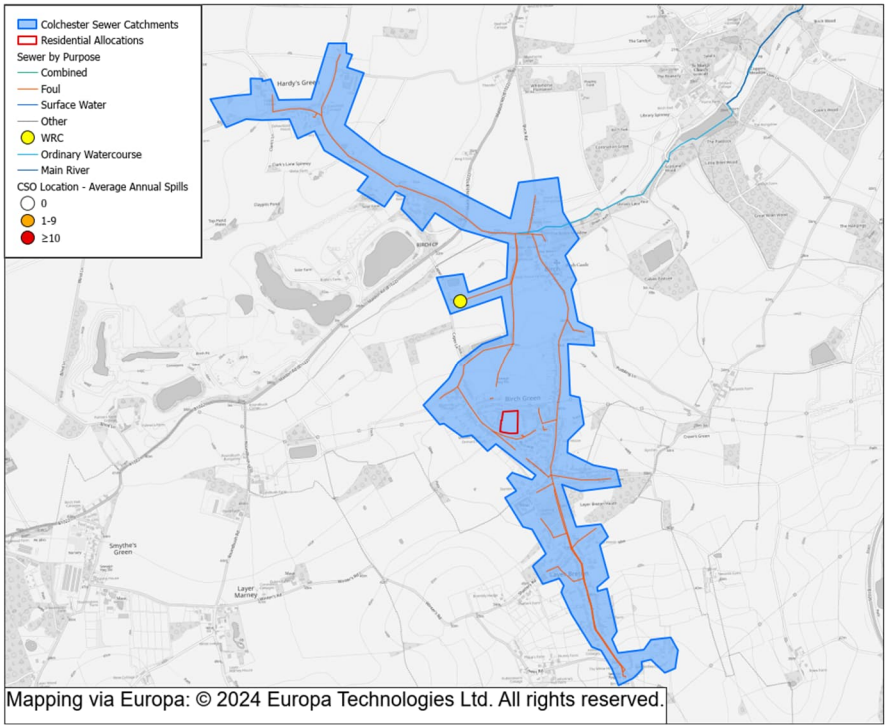
- Earls Colne WRC which is partly located in Braintree District in addition to being in CCC's area; and
- Dedham WRC which is partly located in Babergh District (but mostly in CCC).

Both Braintree and Babergh councils were contacted by CCC at the outset of this WCS to determine if either authority could estimate likely allocations and dwelling numbers in the catchments of these WRCs. Neither council were able to determine accurate numbers, or they considered growth in these WRC catchments within their council areas would be small. Therefore, no allowance has been made from neighbouring councils for growth in Earls Colne's or Dedham WRC's catchments and only growth within CCC has been accounted for. Cumulative growth in these catchments will need to be considered by each authority in support of their later Local Plan updates.

The results of the WRC assessments are set out in the proceeding report sections.

6.2.3 Birch WRC

Figure 6-1: Birch WRC catchment - key features



6.2.3.1 Flow capacity assessment

Birch WRC serves the settlements of Birch Green, Layer Breton and Hardy's Green. A total of 17 dwellings would be constructed within the catchment of Birch WRC by the end of Plan period. 15 would be from an allocation within the new plan and 2 from existing commitments. This is a very small percentage of the total housing to be delivered across CCC over the Plan period.

The WRC currently has a large headroom capacity in its permit (46% capacity remaining) which means there is sufficient headroom to serve the proposed growth without requiring WRC upgrades. The WRC would have 43% capacity remaining by the end of the Plan period. No detailed water quality modelling was therefore required.

6.2.3.2 Environmental capacity assessment

High level water quality assessment

Load standstill calculations (see Appendix D) show minimal change is required to quality permits to ensure no increase in permitted load. The changes are clearly within Technically Achievable Limits (TAL) and it is unlikely that any process upgrades would be required to ensure no change in quality of the receiving watercourse.

Connected water dependent habitats

Table 4-4 shows that Birch WRC is hydrologically connected to the Roman River SSSI, Upper Colne Marshes SSSI via Roman River, the Colne Estuary SSSI, SPA and Ramsar (including the Essex Estuaries SAC) via the Roman River and its confluence with the tidal Colne.

The small amount of growth within the catchment which can be managed within the existing permit to discharge of the WRC should mean no determinantal impact to these connected sites.

Future investment for treatment

The AWS DWMP identifies that a SuDS strategy within the WRC drainage network may be required in the medium term with 50% surface water removal by 2050; however, the DWMP assumes a much higher population increase in the catchment than has been assessed for the WCS, therefore, these solutions may not be required in the timeframe of the Local Plan.

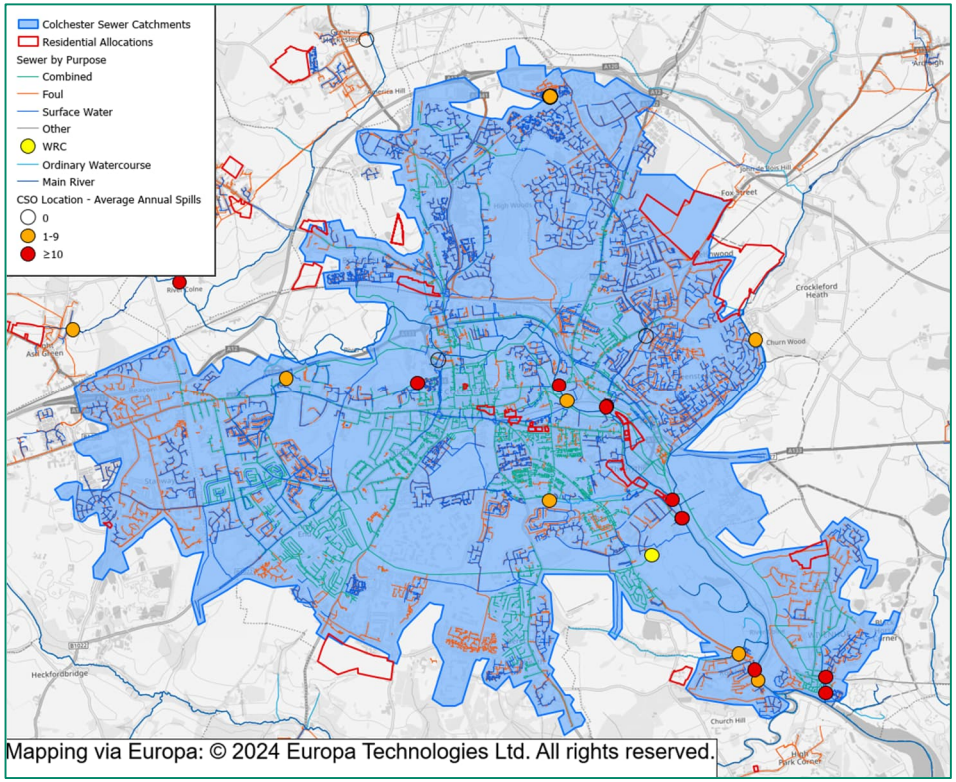
The current AWS Business Plan for the AMP8 investment period does not include for planned investment at Birch WRC.

Sewer network and CSOs

There are no CSOs in the WRC sewer network as shown in Appendix F, Figure 17.

6.2.4 Colchester WRC

Figure 6-2: Colchester WRC catchment - key features



6.2.4.1 Flow capacity assessment

Colchester WRC is a large treatment facility which serves the city of Colchester and its suburban area, including the settlements of Wivenhoe and Rowhedge.

A total of 11,138 dwellings would be constructed within the catchment of Colchester WRC by the end of Plan period, which includes for a quantum of growth in this period from the Tendring Borders Garden Community (providing housing target contribution to both CCC and Tendring District Council's Local Plans). A total of 3,405 dwellings would be from allocations made within the new plan, 1,113 from existing commitments in the current plan, and 6,602 from existing commitments (which includes 3,400 from the Garden Community). This represents just over half (57%) of the total housing to be delivered across CCC over the Plan period.

Short-term capacity shortfall

Each year, AWS must provide the Environment Agency with measured Dry Weather Flow (DWF) data from their WRCs to demonstrate compliance with the DWF discharge limits within their environmental permits. However, at the time of completing this WCS, there is an issue related to where treated flows from Colchester WRC are measured at the site. This has impacted measured DWF since 2023 and has created an interim permit compliance reporting issue for the WRC, which in turn, prevents the capacity of the Colchester WRC being accurately defined. The data recorded since 2023 essentially shows there is no capacity within the limits of the WRC's environmental permit.

This is an ongoing (but interim) issue and is in the process of being investigated by AWS to identify an appropriate solution. AWS plan to have a solution in place for this issue in the current AMP8 period (2025 to 2030).

Once this issue rectified and a full year of revised measured flow data is available, the capacity for developments coming forward in the first 5 years of the Local Plan can be re-confirmed. For this issue specifically, it is recommended that a Local Plan policy is put in place covering sites coming forward in the Colchester WRC catchment to 2028, that they must demonstrate that capacity is available for connection before submitting their planning application.

The rest of this assessment considers the long-term capacity assuming the measured WRC flow data which precedes 2023 is reflective of the position which will be confirmed when the AMP8 flow monitoring solution is put in place.

Long-term capacity summary

Using measured data which precedes 2023 (from 2021 and 2022), shows there would be a baseline position of 10% of the permitted capacity available at the WRC for future growth. Considering employment growth and ingress of surface water and groundwater to the sewer system, this would equate to a capacity of

approximately 5,500 additional dwellings. This assessment of capacity has been used in the WCS for long term growth assessment across the Local Plan period; it has been used to determine when the capacity of the WRC is likely to be exceeded in the future and what the water quality and environmental implications of using that capacity is.

Based on the future connection of 11,138 dwellings and an even annual delivery rate over the plan period, the capacity at Colchester WRC is likely to have been utilised by 2031 (into the next investment period, AMP9). Therefore, an environmental capacity assessment for changing the permitted discharge volumes was required. The WRC discharges to tidal waters, and hence detailed River Quality Planning (RQP) modelling was not suitable. A load standstill calculation has been completed to determine consent conditions required for future discharge volumes.

6.2.4.2 Environmental capacity assessment

High level water quality assessment

Colchester WRC discharges into the Colne Transitional WFD water body, (GB520503713800). Load standstill calculations (see Appendix D) show a change in permitted quality conditions would be required to ensure that a new permit to discharge would not significantly alter the quality of the Colne transitional WFD water body. The changes are within TAL and hence achievable within the Plan period. However, upgrades in both flow and process capacity will be required and a new permit needs to be agreed and issued by the Environment Agency.

Connected designated sites

Table 4-4 shows Colchester WRC is hydrologically connected to the Upper Colne Marshes SSSI (discharge immediately upstream of the designated site), and the Colne Estuary SSSI, SPA and Ramsar (including the Essex Estuaries SAC) via discharge to the tidal Colne.

The discharge is also indirectly linked to the Brightlingsea designated Bathing Water and the designated Shellfish Waters of the Colne, Dengie and Pyefleet.

Managing the pollutant load through a new discharge permit and implementation of improvements to the discharge quality from Colchester WRC such that there is no change in overall pollutant load would also ensure no impact on the designated sites identified.

Future investment for treatment

The current AWS Business Plan for the AMP8 investment period does not include planned investment at Colchester WRC. The DWMP also does not identify a clear medium or long term solution to capacity issues and there is no planned growth solution. The DWMP refers to a ‘wait and see’ outcome. However, Colchester WRC was put forward by AWS for ‘infrastructure to reserve’ for a future extension within the new plan. CCC will include this as an allocation for the WRC extension hence AWS acknowledge that a growth solution, via expansion is likely to be needed in the future.

Once the short-term capacity/measure flow issue is rectified, early phasing of growth to 2030 should not be limited by capacity. Load Standstill calculations have shown that when capacity is reached after 2031, a solution to ensure no deterioration in water quality is achievable subject to upgrades at the WRC to treat more flow to a better quality; the exact need for change would need to be planned in AMP9 by AWS and will form a key part of the next DWMP to be developed in AMP8.

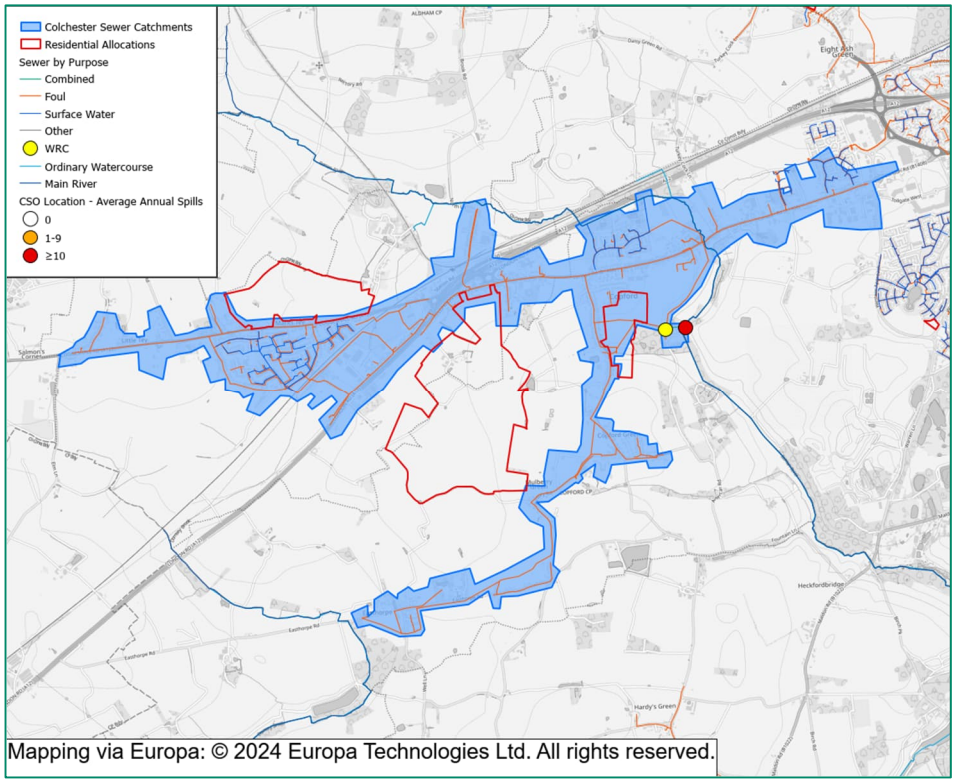
The WCS recommends that an 85 litres per person per day (l/p/d) per capita consumption (PCC) be imposed for allocated sites in this catchment as this approach would significantly improve available capacity at the WRC, reducing the scale of improvements required (related to growth) and increase the number of dwellings which can be delivered within the first half of the Plan period.

Sewer network and CSOs

Appendix F, Figure 17 shows there are several sewer overflows in the WRC sewer network where baseline (before growth) spill frequency exceeds the long-term improvement plan targets. AWS are considering measures to address spills to meet the future target. To enable spills to be managed in the long-term, the WCS recommends a policy for allocated development in these settlements which prevents surface water generated from sites from being discharged to the foul or combined sewer network.

6.2.5 Copford WRC

Figure 6-3: Copford WRC catchment - key features



6.2.5.1 Flow capacity assessment

Copford WRC serves the settlements of Copford, Marks Tey, Little Tey, Mulberry Green, Copford Green, and Easthorpe. A total of 3,460 dwellings would be constructed within the catchment of Copford WRC by the end of Plan period. 2,800 would be from allocations within the new plan and 660 from existing commitments. This represents 17.9% of the total housing to be delivered over the Plan period.

The WRC is currently below its permitted maximum discharge volumes indicating capacity; however, it is predicted to have inadequate capacity to accommodate all growth without a change in permit.

Based on an equal annual distribution of completions across the plan period, it is expected that capacity would be reached by 2033. Therefore, a growth solution would be required, and an environmental capacity assessment was required using RQP modelling to determine if a growth solution would be deliverable.

6.2.5.2 Environmental capacity assessment

Receiving water quality

Copford WRC discharges into the Roman River, specifically the WFD water body (GB105037034150), and RQP modelling for the discharge into this water body has been undertaken. Full results are provided in Appendix E. In summary, the modelling demonstrates that:

- The current quality of the Roman River water body at the point of discharge can be maintained after growth if changes to the permitted quality limits are applied to the new permit to discharge for BOD and phosphate. These changes would be achievable within TAL.
- The current quality of ammonia within the Roman River water body at the point of discharge cannot be maintained after growth, as the quality of discharge would not be achievable within TAL. However, the current High WFD Status for ammonia at the point of mixing can still be maintained without changes in permit quality conditions; this would still require significant improvements in treatment quality.
- Changes in permit quality conditions could also be applied within TAL to ensure no deterioration in the High WFD BOD status of the Roman River water body at the discharge point to the river. No changes are required to maintain the current Poor Phosphate Status of the river.
- Tests assuming the phosphate quality of the Roman River water body is improved to the future target Moderate WFD Status in the future (through catchment measures) show that, improvements to the discharge quality (beyond the recently instated AMP7 phosphate improvement scheme) would not be required both with and without growth. Growth, related to

Copford WRC is therefore not a limiting factor on achieving the future target Status of the Roman River.

It would therefore be possible to set a new permit that ensures no deterioration in the WFD Status of the Roman River when taking account of future WRC discharges. This would require improvements in the quality of discharge for BOD and ammonia.

Connected designated sites

Table 4-4 shows Copford WRC is hydrologically connected to the Roman River SSSI (via discharge into the river), Upper Colne Marshes SSSI via the River Colne, and the Colne Estuary SSSI, SPA and Ramsar.

Managing the pollutant load through a new discharge permit for additional flow and improved BOD treatment (within TAL) to maintain WFD status, would also ensure no impact on the designated sites linked to the Roman River and the River Colne.

Future investment for treatment

The AWS DWMP identifies that infiltration reduction, a new DWF permit, and improvements to the network are required at Copford in the medium term; the water quality assessment has demonstrated that provision of a new DWF permit should be achievable with improvements in the treatment quality (within TAL). In the longer term to 2050, the preferred strategy is to remove 50% of surface water from the sewer system. The DWMP also sets out the option to transfer future flows to the nearby Eight Ash Green WRC catchment though it should be noted that this WCS has identified planned growth within the Eight Ash Green WRC catchment is likely to use all available capacity at that WRC (see section 6.2.8).

Plans for the AMP8 investment period includes investment at Copford between 2026 and 2030, hence the level of growth is likely to be achievable in the longer term.

Early phasing of growth should not be limited by capacity at the WRC and solutions for water quality (BOD) towards the end of the Plan period have been identified in this WCS.

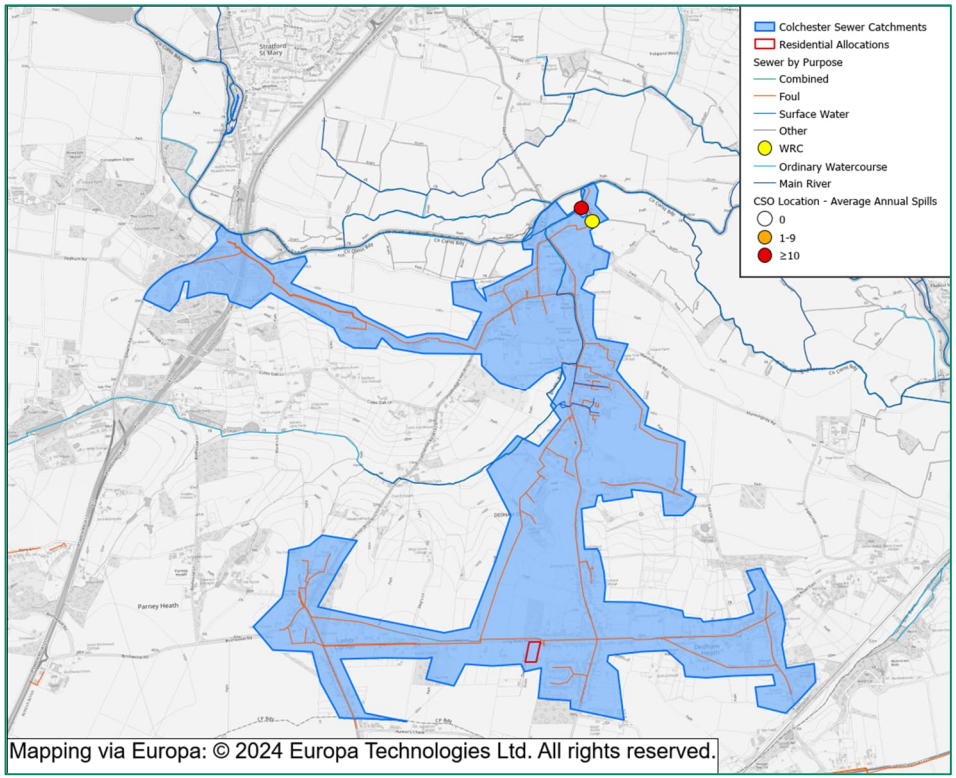
The WCS recommends that an 85 l/p/d PCC be imposed for allocated sites in this catchment as this approach would significantly improve available capacity at the WRC, reducing the scale of improvements required (related to growth) and increase the number of dwellings which can be delivered within the first half of the Plan period and before upgrades may be required (to 2033).

Sewer network and CSOs

There is a sewer overflow in the WRC sewer network where baseline (before growth) spill frequency exceeds the long-term improvement plan targets. AWS are considering measures to address spills to meet the future target. To enable spills to be managed in the long-term, the WCS recommends a policy for allocated development in these settlements which prevents surface water generated from sites from being discharged to the foul sewer network.

6.2.6 Dedham WRC

Figure 6-4: Dedham WRC catchment - key features



6.2.6.1 Flow capacity assessment

Dedham WRC serves the settlements of Dedham, Dedham Heath, and Lamb Corner. A total of 15 dwellings would be constructed within the catchment of Dedham WRC by the end of Plan period[15]. All 15 would be from a single allocation within the new plan. This represents a small percentage of the total housing to be delivered over the Plan period.

The WRC is currently at its permitted maximum discharge volumes and has no capacity to accommodate further connections without a change in permit. Therefore, additional environmental capacity assessment was required using RQP modelling.

6.2.6.2 Environmental capacity assessment

Receiving water quality

Dedham WRC discharges into the Stour River, specifically the Stour (d/s R. Brett) the WFD water body (GB105036041000) and RQP modelling for the discharge into this water body has been undertaken. Full results are provided in Appendix E. In summary, the modelling demonstrates that:

- The current quality of the Stour water body at the point of discharge can be maintained after growth without any changes to permitted quality. This is because the discharge volume from the WRC is very small compared to the volume of river flow in the River Stour.
- Changes in permit quality conditions would not be required to ensure no deterioration in WFD status of the Stour water body at the discharge point to the river for any parameter modelled.
- Tests were undertaking assuming the phosphate quality of the Stour water body is improved to Good WFD Status (from current status of Moderate) in the future (through catchment measures). This modelling shows that, improvements to the discharge quality, beyond the recently instated AMP7 phosphate improvement scheme, would not be required both with and without growth. Growth, related to Dedham WRC is therefore not a limiting factor on achieving future Good Status of the Stour.

It would therefore be possible to set a new permit that ensures no deterioration in the current quality of the Stour when taking account of future WRC discharges. This would not require improvements in the quality of discharge.

[15] This accounts for growth from CCC only – growth from Babergh's share of the WRC catchment could not be defined for this WRC.

Connected designated sites

Table 4-4 shows Dedham WRC is connected to the Cattawade Marshes SSSI (part of the Stour & Orwell Estuaries SPA). Given the minor change in treated wastewater flows from 15 dwellings, which can be managed within the current quality conditions of the discharge permit, there is unlikely to be an impact on these designated sites.

Future investment for treatment

The AWS DWMP identifies improvements to the network with a mixed strategy with the main solution of SuDS in the medium term. In the longer term to 2050, the preferred strategy is to remove 50% of surface water from the sewer system.

However, the current AWS Business Plan for the AMP8 investment period does not include for planned investment at Dedham WRC. A growth solution would need to be considered in AMP9 (from 2030 onwards).

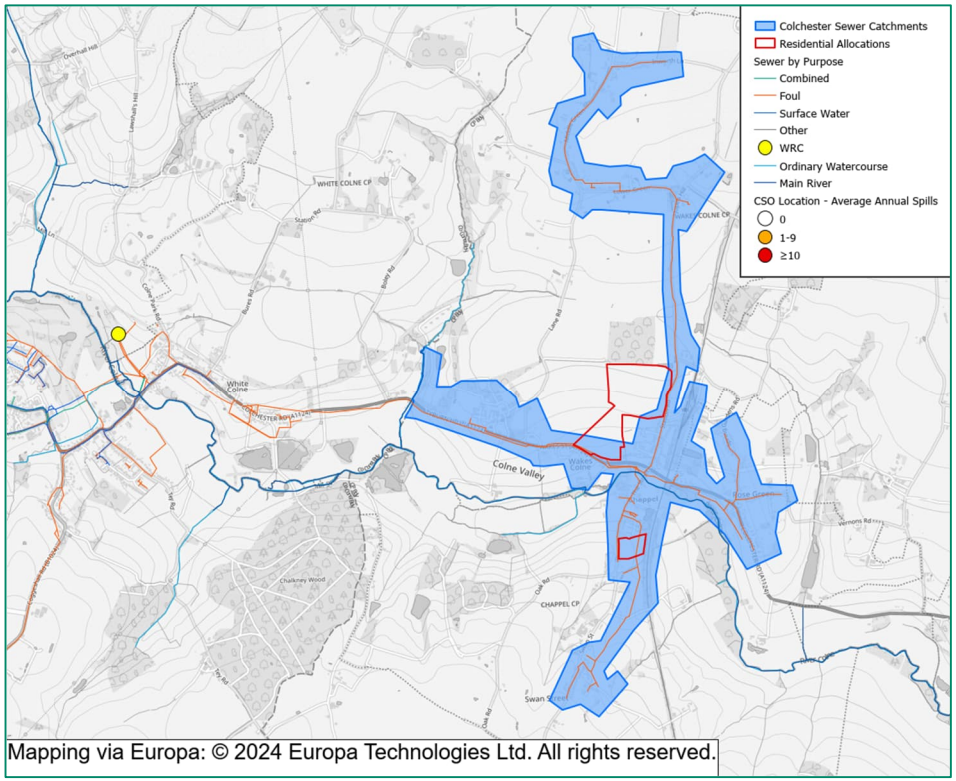
The WCS recommends that an 85 l/p/d PCC be imposed for the allocated site in this catchment given the limited current capacity of the WRC and the likely delivery of the site early in the Plan period. The WCS also recommends that a policy be implemented which requires the developer to demonstrate they have agreed available capacity at the WRC (and the associated sewer network) with AWS prior to submitting a planning application.

Sewer network and CSOs

No sewer spill risk increases have been identified; however, the DWMP identifies Dedham WCS as having a very significant risk related to the planning objective of managing storm overflows, indicating there is a sewer spill risk in the catchment. To enable spills to be managed in the long-term, the WCS recommends a policy for allocated development in these settlements which prevents surface water generated from sites from being discharged to the foul sewer network.

6.2.7 Earls Colne WRC

Figure 6-5: Earls Colne WRC catchment - key features



6.2.7.1 Flow capacity assessment

The Earls Colne WRC serves the settlements of Earls Colne, White Colne, Wakes Colne, and Mount Bures. A total of 237 dwellings could be constructed within the catchment of Earls Colne WRC by the end of CCC Plan period. 35 would be from allocations in the existing plan, 200 from allocations within the new plan and 2 from existing commitments. This represents 1.2% of the total housing to be delivered over the Plan period[16].

The WRC is currently below its permitted maximum discharge volumes; however, it is predicted to have inadequate capacity to accommodate flows from all planned growth without a change in permit and this is not likely to be required until the end of the plan period around 2040. Additional environmental capacity assessment was required using RQP modelling.

6.2.7.2 Environmental capacity assessment

Receiving water quality

Earls Colne WRC discharges into the River Colne, specifically the Colne (d/s Doe's Corner) WFD water body (GB105037041330) and RQP modelling for the discharge into this water body has been undertaken. Full results are provided in Appendix E. In summary, the modelling demonstrates that:

- The current quality of the River Colne water body at the point of discharge can be maintained after growth if changes to the permitted quality limits are applied to the new permit to discharge for ammonia and BOD. These changes would be achievable within TAL.
- Changes in permit quality conditions could also be applied within TAL to ensure no deterioration in WFD status of the River Colne water body at the discharge point to the river; this would only be required for ammonia.
- Tests have been undertaken assuming the phosphate quality of the River Colne water body is improved to Good WFD Status (from current status Poor) in the future through catchment measures. This modelling shows that improvements to the current discharge quality would not be required both with and without growth. Growth, related to Earls Colne WRC is therefore not a limiting factor on achieving the future Status of the River Colne.

It would therefore be possible to set a new permit that ensures no deterioration in the current quality of the River Colne when taking account of future WRC

[16] This accounts for growth from CCC – growth from Braintree's share of the WRC catchment could not be defined for this WRC.

discharges. This would require relatively minor improvements in the quality of discharge for ammonia and BOD.

Connected designated sites

Table 4-4 shows Earls Colne WRC is hydrologically connected to the Upper Colne Marshes SSSI via the River Colne, and the Colne Estuary SSSI, SPA and Ramsar.

Managing the pollutant load through a new discharge permit for additional flow and improved BOD and ammonia treatment (within TAL) to maintain WFD status and current quality, would also ensure no impact on the designated sites linked to the River Colne.

Future investment for treatment

The AWS DWMP identifies that a new DWF permit, and improvements to the network are required at Earls Colne in the medium term; the water quality assessment has demonstrated that this should be achievable with relatively minor improvements in the treatment quality. In the longer term to 2050, the preferred strategy is to remove 25% of surface water from the sewer system.

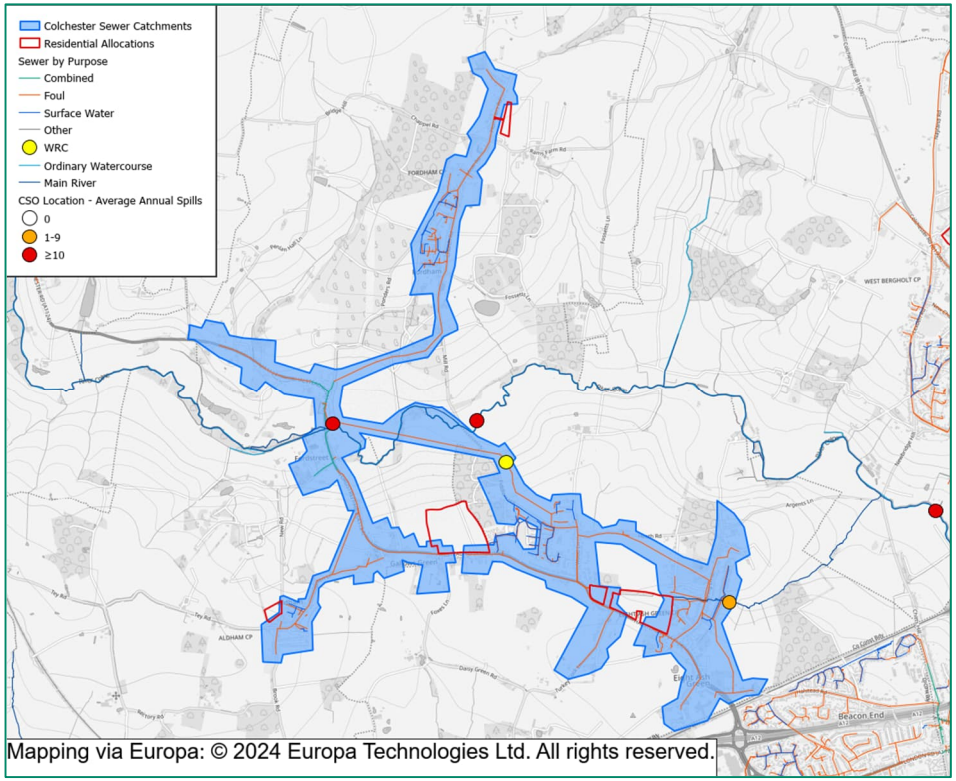
Plans for the AMP8 investment period includes planned investment at Earls Colne between 2029 and 2030, hence the level of growth is likely to be achievable in the longer term.

Sewer network and CSOs

No sewer spill risk increases have been identified.

6.2.8 Eight Ash Green WRC

Figure 6-6: Eight Ash Green WRC catchment - key features



6.2.8.1 Flow capacity assessment

Eight Ash Green WRC serves the settlement of Eight Ash Green, Fordham, and Aldham. A total of 516 dwellings would be constructed within the catchment of Eight Ash Green WRC by the end of Plan period. 470 would be from allocations within the new plan and 46 from existing commitments. This represents 2.7% of the total housing to be delivered over the Plan period.

The WRC is currently below its permitted maximum discharge volumes; however, it is predicted to have inadequate capacity to accommodate all planned growth without a change in permit and this is likely to occur towards the end of the plan period (after 2038). Additional environmental capacity assessment is required using RQP modelling.

6.2.8.2 Environmental capacity assessment

Receiving water quality

Eight Ash Green WRC discharges into the River Colne, specifically the Colne (d/s Doe's Corner) WFD water body (GB105037041330) and RQP modelling for the discharge into this water body has been undertaken. Full results are provided in Appendix E. In summary, the modelling demonstrates that:

- The current quality of the River Colne water body at the point of discharge can be maintained after growth if changes to the permitted quality limits are applied to the new permit to discharge for ammonia, BOD, and phosphate. These changes would be achievable within TAL.
- Changes in permit quality conditions would not be required to ensure no deterioration in the BOD or phosphate WFD status of the Stour water body at the discharge point to the river but would be for ammonia. The changes required for ammonia would be within TAL.
- Tests were undertaken assuming the phosphate quality of the River Colne water body is improved to Good WFD Status (from current Poor status) in the future through catchment measures. This modelling show that, improvements to the discharge quality, beyond the recently instated AMP7 phosphate improvement scheme, would not be required both with and without growth. Growth, related to Eight Ash Green WRC is therefore not a limiting factor on achieving the future Good status of the River Colne.

It would therefore be possible to set a new permit that ensures no deterioration in the current quality of the River Colne when taking account of future WRC discharges. This would require relatively minor improvements in the quality of discharge for ammonia, BOD, and phosphate, all within TAL.

Connected designated sites

Table 4-4 shows Eight Ash Green WRC is hydrologically connected to the Upper Colne Marshes SSSI via the River Colne, and the Colne Estuary SSSI, SPA and Ramsar.

Managing the pollutant load through a new discharge permit for additional flow and improved BOD and ammonia treatment (within TAL) to maintain WFD status and current quality, would also ensure no impact on the designated sites linked to the River Colne.

Future investment for treatment

The AWS DWMP identifies that a new DWF permit, and improvements to the network are required at Eight Ash Green in the medium term; the water quality assessment has demonstrated that this should be achievable with improvements in the treatment quality. In the longer term to 2050, the preferred strategy is to remove 50% of surface water from the sewer system.

The current AWS Business Plan for the AMP8 investment period does not include for planned investment at Eight Ash Green WRC. However, the WCS has identified that the available capacity at the WRC is unlikely to be exceeded until towards the end of the AMP period allowing time for a growth solution to be implemented in later AMPs (AMP 9 or 10).

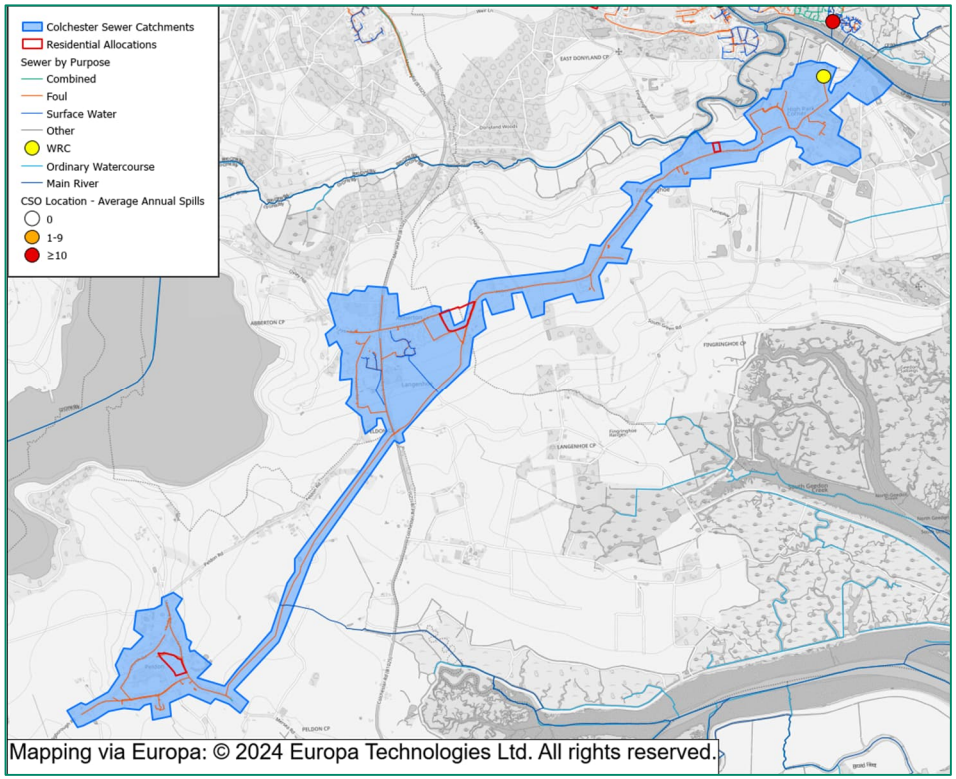
The WCS recommends that an 85 l/p/d PCC be imposed for the allocated sites in this catchment; a sensitivity test on lower PCC identified that the future capacity would not be exceeded if water demand is restricted to this level.

Sewer network and CSOs

There are sewer overflows in the WRC sewer network where baseline (before growth) spill frequency exceeds the long-term improvement plan targets. AWS are considering measures to address spills to meet the future target. To enable spills to be managed in the long-term, the WCS recommends a policy for allocated development in these settlements which prevents surface water generated from sites from being discharged to the foul sewer network.

6.2.9 Fingringhoe WRC

Figure 6-7: Fingringhoe WRC catchment - key features



6.2.9.1 Flow capacity assessment

Fingringhoe WRC serves the settlements of Peldon, Fingringhoe and Abberton. A total of 135 dwellings would be constructed within the catchment of Fingringhoe WRC by the end of Plan period. 80 would be from allocations within the new plan and 55 from existing commitments. This represents a small percentage of the total housing to be delivered across CCC over the Plan period.

The WRC is currently at its permitted maximum discharge volumes and has no capacity to accommodate further connections without a change in permit. Therefore, additional environmental capacity assessment was required. The WRC discharges to tidal waters, and hence RQP modelling was not suitable. A load standstill calculation has been completed to determine consent conditions required for future discharge volumes.

6.2.9.2 Environmental capacity assessment

High level water quality assessment

Fingringhoe WRC discharges into the Colne Transitional WFD water body, (GB520503713800). Load standstill calculations (see Appendix D) show a small change in permitted quality conditions would be required to ensure that a new permit to discharge would not significantly alter the quality of the Colne transitional WFD water body. The changes are within TAL and hence achievable within the Plan period. However, upgrades in both flow and process capacity may be required and a new permit needs to be agreed and issued by the Environment Agency.

Connected designated sites

Table 4-4 shows Fingringhoe WRC is hydrologically connected to the Upper Colne Marshes SSSI (discharge into the designated site), and the Colne Estuary SSSI, SPA and Ramsar (including the Essex Estuaries SAC) via discharge to the tidal Colne.

The discharge is also indirectly linked to the Brightlingsea designated Bathing Water and the designated Shellfish Waters of the Colne, Dengie and Pyefleet.

Managing the pollutant load through a new discharge permit and implementation of improvements to the discharge quality from the WRC such that there is no change in overall pollutant load would also ensure no impact on the designated sites identified here.

Future investment for treatment

The AWS DWMP identifies that an increase in capacity is required at the WRC in the medium term with 50% surface water removal by 2050. The current AWS

Business Plan for the AMP8 investment period includes planned investment at Fingringhoe between 2025 and 2030, hence the level of growth is likely to be achievable in the longer term once the AMP8 solution is complete. However, the allocations in this WRC drainage catchment are likely to deliver housing early in the Plan period, and hence there is likely to be early phasing implications whilst the growth solution is implemented.

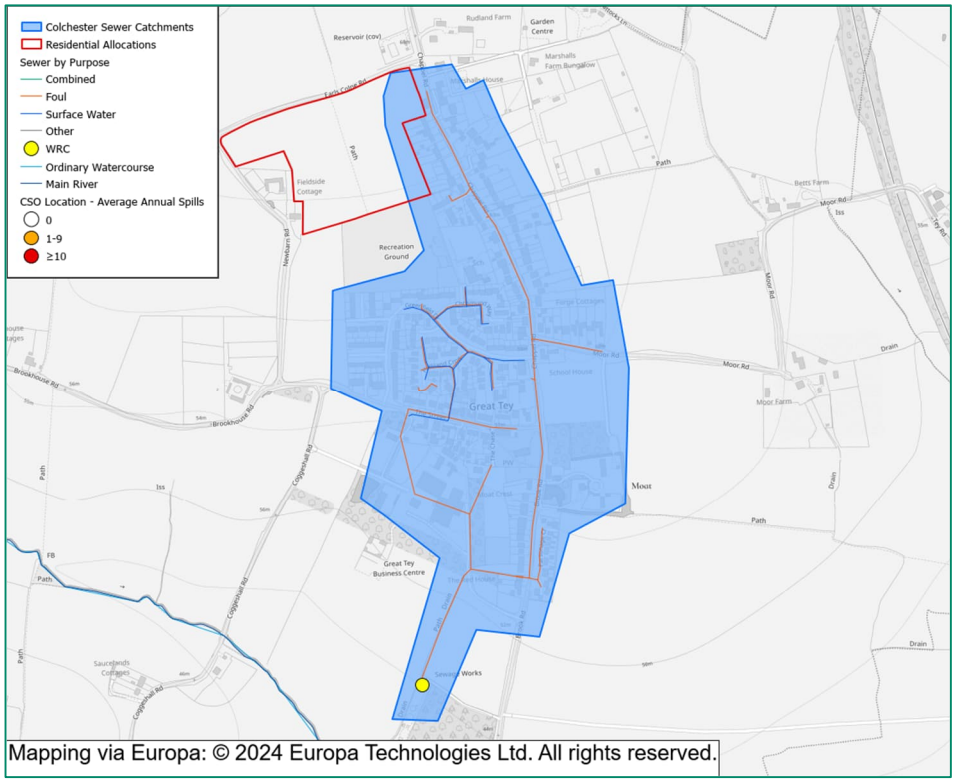
Sewer network and CSOs

No CSO locations were identified in the publicly available CSO GIS data; however, the DWMP identifies Fingringhoe WRC as having a very significant risk related to the planning objective of managing storm overflows, indicating there is a sewer spill risk in the catchment.

To enable spills to be managed in the long-term, the WCS recommends a policy for allocated development in these settlements which prevents surface water generated from sites from being discharged to the foul sewer network.

6.2.10 Great Tey WRC

Figure 6-8: Great Tey WRC catchment - key features



6.2.10.1 Flow capacity assessment

Great Tey WRC serves only the settlement of Great Tey. A total of 156 dwellings could be constructed within the catchment of Great Tey WRC by the end of Plan period. 125 from allocations within the new plan and 31 from existing commitments. This represents 0.8% of the total housing to be delivered over the Plan period.

The WRC is currently below its permitted maximum discharge volumes; however, it is predicted to have inadequate capacity to accommodate all future connections without a change in permit. Capacity at the WRC would likely be used by 2035. Therefore, additional environmental capacity assessment is required using RQP modelling.

6.2.10.2 Environmental capacity assessment

Receiving water quality

Great Tey WRC discharges into the Roman River, specifically the WFD water body (GB105037034150) and RQP modelling for the discharge into this water body has been undertaken. This was only possible for BOD as no discharge data was available for ammonia or phosphate. Full results are provided in Appendix E. In summary, the modelling demonstrates that:

- The current quality of the Roman River water body at the point of discharge can be maintained after growth if minor changes to the permitted quality limits are applied to the new permit to discharge for BOD. These changes would be achievable within TAL.
- The current overall and future target WFD status of Roman River WFD waterbody can be achieved without any changes required for BOD treatment.

It would therefore be possible to set a new permit that ensures no deterioration in the current quality of the Roman River when taking account of future WRC discharges. This would require relatively minor improvements in the quality of discharge for BOD. Further testing would be required by AWS to determine if a new permit condition for phosphate and ammonia would be required to protect the water quality of the Roman River.

Connected designated sites

Table 4-4 shows Great Tey WRC is hydrologically connected to the Roman River SSSI (via discharge into the river), Upper Colne Marshes SSSI via the River Colne, and the Colne Estuary SSSI, SPA and Ramsar.

Managing the pollutant load through a new discharge permit for additional flow and improved BOD treatment (within TAL) to maintain WFD status, would also

ensure no impact on the designated sites linked to the Roman River and the River Colne.

Future investment for treatment

The AWS DWMP identifies that Great Tey WRC did not score as a high risk catchment in the Risk Based Catchment Screening, therefore no medium or long term future solution has been identified.

The current AWS Business Plan for the AMP8 investment period does not include for planned investment at Great Tey WRC.

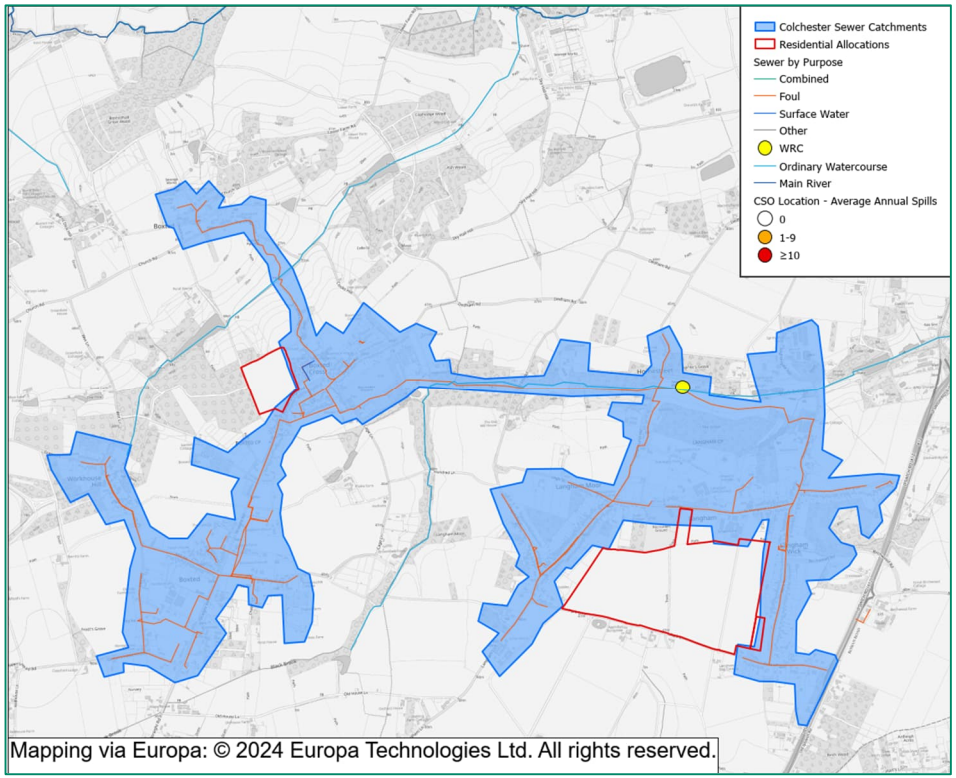
The assessment of capacity has identified that there is likely to be scope to connect new dwellings to the WRC for treatment until at least 2035. This gives time for any required growth scheme to be developed and considered in AMP9 or AMP10. However, the WCS recommends that an 85 l/p/d PCC be imposed for the allocated sites in this catchment as this may mean capacity is not exceeded within the plan period.

Sewer network and CSOs

No sewer spill risk increases have been identified.

6.2.11Langham WRC

Figure 6-9: Langham WRC catchment - key features



6.2.11.1 Flow capacity assessment

Langham WRC serves the settlements of Langham, Hornestreet and Boxted. A total of 1,093 dwellings could be constructed within the catchment of Langham WRC by the end of Plan period. 1,060 from allocations within the new plan and 33 from existing commitments. This represents 5.7% of the total housing to be delivered over the Plan period.

The WRC is currently at its permitted maximum discharge volumes and has no capacity to accommodate further connections without a change in permit.

Therefore, additional environmental capacity assessment is required using RQP modelling.

6.2.11.2 Environmental capacity assessment

Receiving water quality

Langham WRC discharges into the Stour (d/s R. Brett), specifically the WFD water body (GB105036041000) and RQP modelling for the discharge into this water body has been undertaken. Full results are provided in Appendix E. In summary, the modelling demonstrates that:

- The current quality of the Stour water body at the point of discharge can be maintained after growth if changes to the permitted quality limits are applied to the new permit to discharge for ammonia, BOD and phosphate. These changes would be achievable within TAL.
- Changes in permit quality conditions could also be applied within TAL to ensure no deterioration in WFD status of the Roman River water body at the discharge point to the river for BOD.
- Achieving WFD status at the point of discharge would not be possible for future discharge volumes for ammonia and would not be possible either for current or future discharge volumes for phosphate. However, this is due to a limitation with the RQP modelling which considers the mixing point only and if improvements are made to maintain current quality at the point of discharge (which are achievable within TAL), the status of overall Stour WFD water body should not be impacted compared to the current overall water body condition once growth is considered.
- Testing for future Good Status for phosphate shows this would not be achievable at the mixing point either with, or without the impact of future discharges from growth – growth would therefore not be the factor preventing target status from being achieved.

It would therefore be possible to set a new permit that ensures no deterioration in the current quality of the Stour when taking account of future WRC discharges. This would require improvements in the quality of discharge for ammonia, BOD and phosphate.

Connected designated sites

Table 4-4 shows Langham WRC is connected to the Cattawade Marshes SSSI (part of the Stour & Orwell Estuaries SPA). Managing the pollutant load through a new discharge permit for additional flow and improved ammonia, BOD and phosphate treatment (within TAL) to ensure no increase in load at mixing point, would also ensure no impact on the designated sites linked to the Stour.

Future investment for treatment

The AWS DWMP identifies that Langham WRC did not score as a high risk catchment in the Risk Based Catchment Screening, therefore no medium or long term future solution has been identified

The current AWS Business Plan for the AMP8 investment period does not include for planned investment at Langham WRC. However, at the commencement of this WCS, AWS set out that Langham WRC had been identified for a growth scheme in AMP8. Until a growth scheme is confirmed, the available capacity at Langham until 2030 is uncertain. Water quality modelling reported in this WCS demonstrates a new solution is feasible within environmental limits, but it would require investment to provide improved quality and additional flow, and this may not be possible before 2030.

Some allocations in this WRC drainage catchment are likely to deliver housing early in the plan period, and hence there is likely to be early phasing implications whilst a growth solution is considered by AWS in later AMP periods (post 2030).The WCS recommends that an 85 l/p/d PCC be imposed for the allocated sites in this catchment given the limited current capacity of the WRC and the likely delivery of the sites early in the Plan period. It also recommends that phasing of housing in Langham's WRC catchment is limited until 2030.

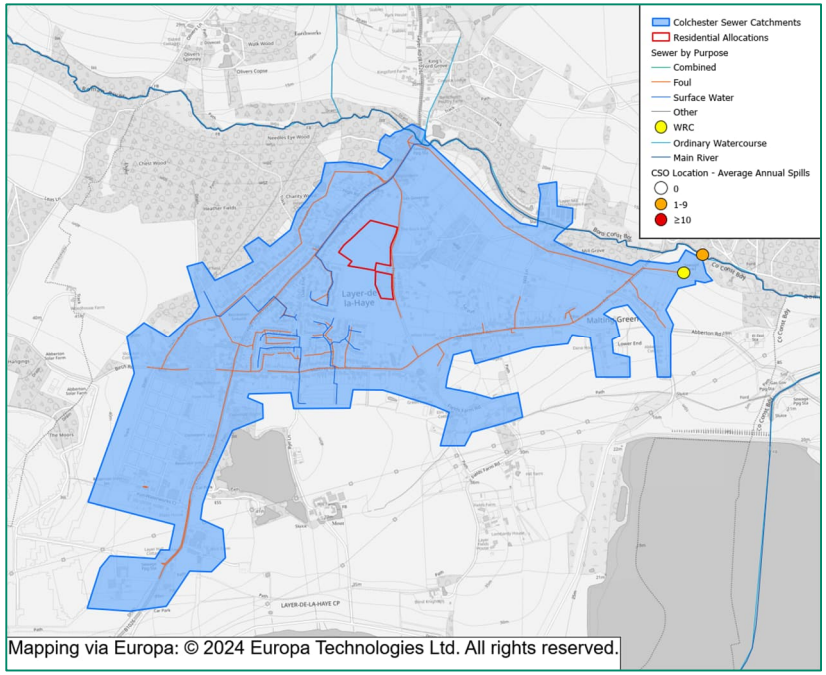
Sewer network and CSOs

There are existing sewer capacity issues within the drainage catchment which are being investigated by AWS for a solution; in particular, these issues relate to infiltration of both surface water and groundwater into the sewer system which reduces capacity for wastewater connections.

Given the known sewer network capacity issues, and the limited WRC capacity, the WCS recommends that a policy be implemented which requires developers in this WRC drainage catchment to demonstrate they have agreed available capacity at the WRC and the associated sewer network with AWS prior to submitting planning applications.

6.2.12Layer de-la-Haye WRC

Figure 6-10: layer de-la-Haye WRC catchment - key features



6.2.12.1 Flow capacity assessment

A total of 140 dwellings could be constructed within the catchment of Layer de-la-Haye WRC by the end of Plan period. 70 would be from allocations within the new plan and 70 from existing commitments. This is a small percentage of the total housing to be delivered across CCC over the Plan period.

The WRC currently has headroom capacity in its permit (32% capacity remaining) which means there is sufficient headroom to serve the proposed growth without requiring WRC upgrades. The WRC would have 16% capacity remaining by the end of the Plan period. No detailed water quality modelling was therefore required.

6.2.12.2 Environmental capacity assessment

High level water quality assessment

Load standstill calculations (see Appendix D) show a small change in permitted quality conditions would be required to ensure using some of the available headroom would not significantly alter the quality of the Roman River. The changes are within TAL and hence achievable within the plan period. Upgrades in process capacity may be required, particularly for ammonia and phosphate to ensure no change in quality of the receiving watercourse. The Roman River has a less than Good Status for WFD physico-chemical elements, with water company discharges (amongst others) as a confirmed reason for not achieving Good Status, hence it is important that future discharge improvements are considered feasible within the Plan period as a result of growth.

Connected designated sites

Table 4-4 shows the WRC is hydrologically connected to the Roman River SSSI (via discharge into the river), Upper Colne Marshes SSSI via the River Colne, and the Colne Estuary SSSI, SPA and Ramsar.

Managing the pollutant load through a new discharge permit for additional flow and improved treatment (within TAL) to maintain current loads, would also ensure no impact on the designated sites linked to the Roman River and the River Colne.

Future investment for treatment

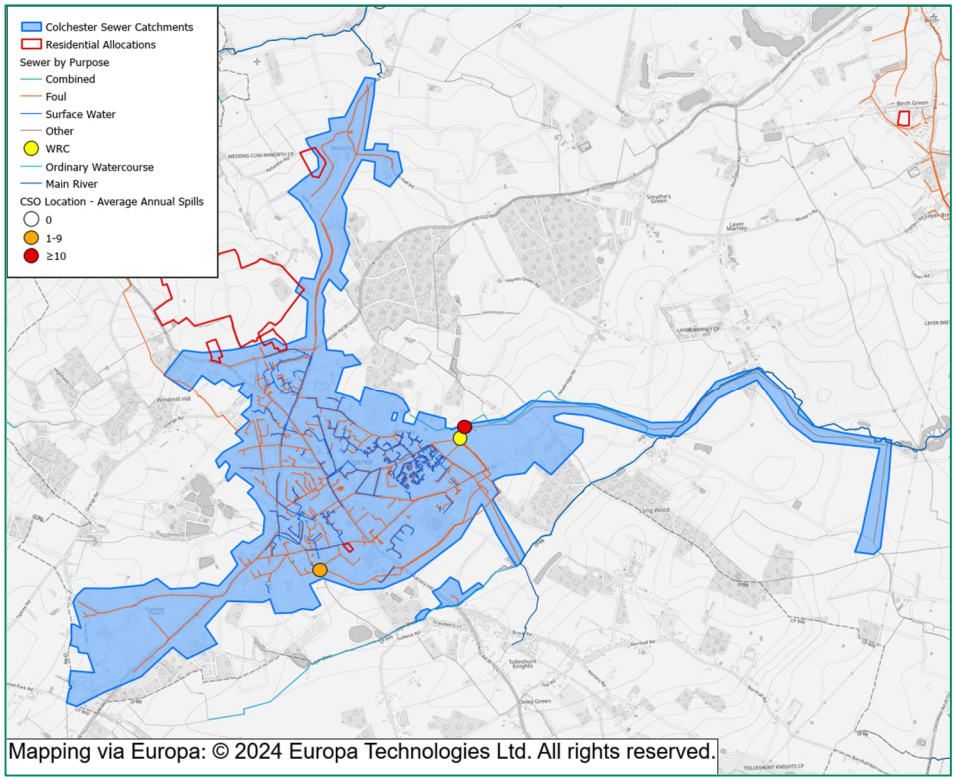
The AWS DWMP does not identify a need for a medium term improvement solution and a ‘wait and see’ strategy is set out for the longer term to 2050; this is in keeping with the capacity assessed as available in the WCS. The current AWS Business Plan for the AMP8 investment period does not include for planned investment at Layer de-le-Haye WRC.

Sewer network and CSOs

There is a sewer spill risk in the WRC sewer network, however the baseline (before growth) spill frequency is below the long-term improvement plan targets. Given the sewer system is separated, this suggests low risk to sewer spills increasing due to growth.

6.2.13Tiptree WRC

Figure 6-11: Tiptree WRC catchment - key features



NB – HAS AN AMP 7 P SCHEME (31/13/22) – 4MG/L AA

6.2.13.1 Flow capacity assessment

Tiptree WRC serves the settlements of Tiptree, Messing and Tolleshunt Knights. A total of 1,292 dwellings could be constructed within the catchment of Tiptree WRC by the end of Plan period. 200 would be from allocations in the existing plan, 670 from allocations within the new plan and 422 from existing commitments. This represents 6.7% of the total housing to be delivered over the Plan period.

The WRC is currently below its permitted maximum discharge volumes; however, is predicted to have inadequate capacity to accommodate further connections as a result of all proposed growth without a change in permit. Capacity is not likely to be used before 2038 (towards the end of the plan period). Additional environmental capacity assessment is required using RQP modelling.

6.2.13.2 Environmental capacity assessment

Receiving water quality

Tiptree WRC discharges into the Layer Brook, specifically the WFD water body (GB105037034130) and RQP modelling for the discharge into this water body has been undertaken. Full results are provided in Appendix E. In summary, the modelling demonstrates that:

- The current quality of the Layer Brook water body at the point of discharge can be maintained after growth if changes to the permitted quality limits are applied to the new permit to discharge for ammonia and BOD. These changes would be achievable within TAL. No change is required for the phosphate condition.
- Achieving WFD status at the point of discharge would not be possible either for current or future discharge volumes for ammonia, although, if improvements are made to maintain current quality at the point of discharge, the status of overall Layer Brook WFD water body should not be impacted compared to the current overall water body condition once growth is considered.
- Testing for future Good Status for phosphate shows this would not be achievable at the mixing point either with, or without the impact of future discharges from growth – growth would not be the factor preventing target status from being achieved.

It would therefore be possible to set a new permit that ensures no deterioration in the current quality of the Layer Brook when taking account of future WRC discharges. This would require improvements in the quality of discharge for ammonia.

Connected designated sites

Table 4-4 shows Tiptree WRC is hydrologically connected to the Abberton Reservoir SSSI, SPA and Ramsar, and the Roman River SSSI

Managing the pollutant load through a new discharge permit for additional flow and improved treatment (within TAL) to maintain current loads, would also ensure no impact on the designated sites.

Future investment for treatment

The AWS DWMP identifies improvements to the network with a mixed strategy with the main solution of SuDS in the medium term. In the longer term to 2050, the preferred strategy is to remove 50% of surface water from the sewer system. The current AWS Business Plan for the AMP8 investment period does not include for planned investment at Tiptree WRC; however, capacity is not likely to be used until the end of the plan period allowing for growth schemes to be considered for AMP 9 or AMP10.

The WCS recommends that an 85 l/p/d PCC be imposed for the allocated sites in this catchment as this may mean that capacity is not utilised prior to 2038.

Sewer network and CSOs

There is a sewer spill risk in the WRC sewer network where baseline (before growth) spill frequency exceeds the long-term improvement plan targets. AWS are considering measures to address spills to meet the future target, but to enable spills to be managed in the long-term, the WCS recommends a policy for allocated development in these settlements to prevent surface water generated from sites being discharged to the foul sewer.

6.2.14 West Bergholt WRC

Figure 6-12: West Bergholt WRC catchment - key features

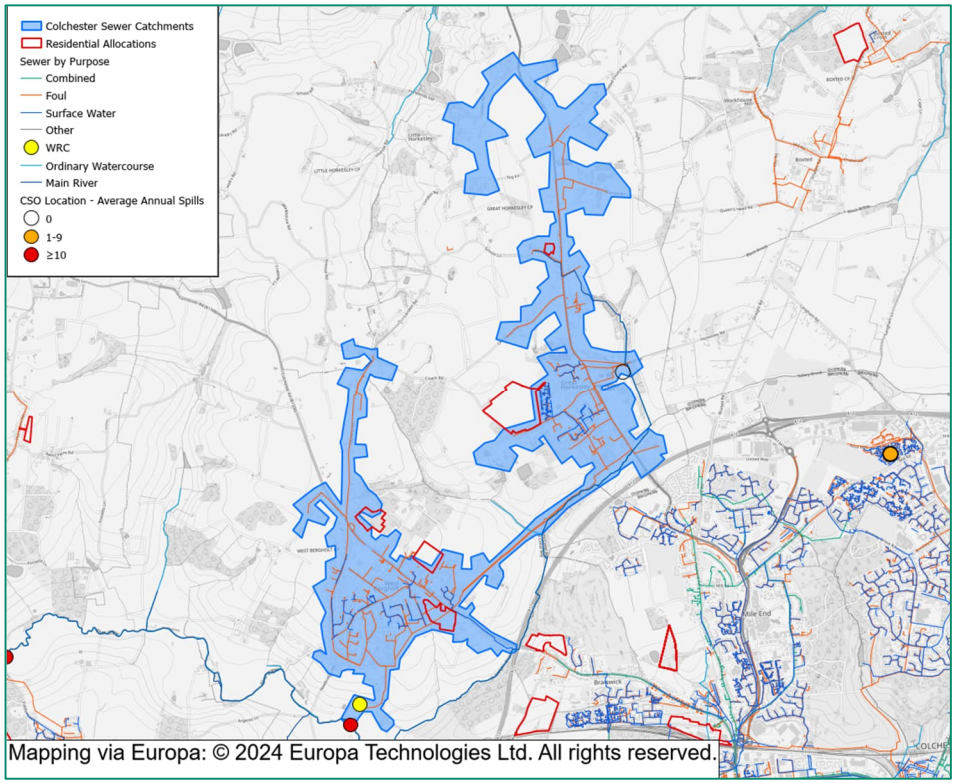


Figure 6-13: West Bergholt WRC Spatial and growth context

6.2.14.1 Flow capacity assessment

West Bergholt WRC serves the settlements of West Bergholt, Tye Green and Great Horkesley. A total of 665 dwellings could be constructed within the catchment of West Bergholt WRC by the end of Plan period. 13 would be from allocations in the existing plan, 650 from allocations within the new plan and 2 from existing commitments. This represents 3.9% of the total housing to be delivered over the Plan period.

The WRC is currently at its permitted maximum discharge volumes and has no capacity to accommodate further connections without a change in permit. Therefore, additional environmental capacity assessment is required using RQP modelling.

6.2.14.2 Environmental capacity assessment

Receiving water quality

West Bergholt WRC discharges into the River Colne, specifically the Colne (d/s Doe's Corner) WFD water body (GB105037041330) and RQP modelling for the discharge into this water body has been undertaken. Full results are provided in Appendix E. In summary, the modelling demonstrates that:

- The current quality of the Colne water body at the point of discharge can be maintained after growth if changes to the permitted quality limits are applied to the new permit to discharge for ammonia and BOD. These changes would be achievable within TAL.
- Changes in permit quality conditions could also be applied within TAL to ensure no deterioration in WFD status of the Colne water body at the discharge point to the river; this would only be required for ammonia.
- Tests assuming the phosphate quality of the Colne water body is improved to Good WFD Status in the future (through catchment measures) show that, no improvements to the discharge quality, beyond the recently instated AMP7 phosphate improvement scheme, would be required both with and without growth. Growth related to West Bergholt WRC is therefore not a limiting factor on achieving the future Status of the River Colne.

It would therefore be possible to set a new permit that ensures no deterioration in the current quality of the Colne when taking account of future WRC discharges. This would require relatively minor improvements in the quality of discharge for ammonia.

Connected designated sites

Table 4-4 shows West Bergholt WRC is hydrologically connected to the Upper Colne Marshes SSSI via the River Colne, and the Colne Estuary SSSI, SPA and Ramsar.

Managing the pollutant load through a new discharge permit for additional flow and improved treatment (within TAL) to maintain WFD status and current quality, would also ensure no impact on the designated sites linked to the River Colne.

Future investment for treatment

The AWS DWMP identifies that a new discharge permit solution is required at West Bergholt in the medium term; the water quality assessment has demonstrated that this should be achievable with relatively minor improvements in the treatment quality for ammonia. In the longer term to 2050, the preferred strategy is to remove 50% of surface water from the sewer system.

However, the current AWS Business Plan for the AMP8 investment period does not include for planned investment at West Bergholt WRC.

Some allocations in this WRC drainage catchment are likely to deliver housing early in the Plan period, and hence there is likely to be early phasing implications whilst a growth solution is considered by AWS in later AMP periods (post 2030).The WCS recommends that an 85 l/p/d PCC be imposed for the allocated sites in this catchment given the limited current capacity of the WRC and the likely delivery of the sites early in the Plan period.

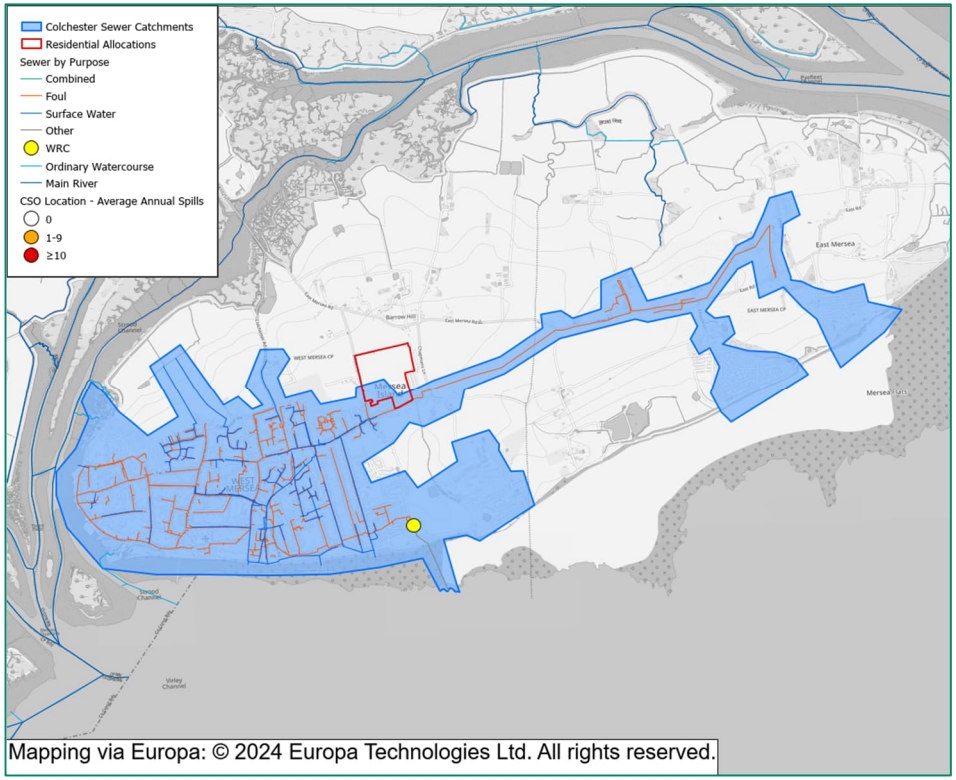
Sewer network and CSOs

There is a CSO in the WRC sewer network where baseline (before growth) spill frequency exceeds the long-term improvement plan targets. AWS are considering measures to address CSO spills to meet the future target. To enable CSO spills to be managed in the long-term, the WCS recommends a policy for allocated development in the WRC catchment to prevent surface water generated from sites being discharged to the foul sewer network.

Given the CSO spill frequency, and the lack of baseline WRC capacity, the WCS recommends that a policy be implemented which requires developers in this WRC catchment to demonstrate they have agreed available capacity at the WRC and the associated sewer network with AWS prior to submitting planning applications.

6.2.15West Mersea WRC

Figure 6-14: West Mersea WRC catchment - key features



6.2.15.1 Flow capacity assessment

West Mersea WRC serves the settlements on the island of Mersea. A total of 465 dwellings could be constructed within the catchment of West Mersea WRC by the end of Plan period. 300 would be from allocations within the new plan and 165 from existing commitments. This represents 2.5% of the total housing to be delivered across CCC over the Plan period.

The WRC currently has headroom capacity in its permit (29% capacity remaining) which means there is sufficient headroom to serve the proposed growth without requiring WRC upgrades. The WRC would have 19% capacity remaining by the end of the Plan period. No detailed water quality modelling was therefore required.

Whilst the permit to discharge indicates headroom capacity based on how much the WRC is allowed to discharge, during AMP7, improvement works were required to increase the volume of flow that the WRC could treat (known as flow to full treatment of FFT). This had an effect of reducing available treatment capacity for a period during 2024 and 2025; however, pump upgrade solutions have been completed immediately prior to the completion of the WCS and hence, this study has assumed that the WRC can now treat FFT up to its current permitted discharge volume limit.

6.2.15.2 Environmental capacity assessment

High level water quality assessment

Load standstill calculations (see Appendix D) show a small change in permitted quality conditions would be required to ensure that using some of the available headroom would not significantly alter the quality of the Blackwater Outer WFD Coastal Water Body. The changes are within TAL and hence achievable within the Plan period. Upgrades in process capacity may be required at some point in the plan period.

Connected designated sites

Table 4-4 shows West Mersea WRC is hydrologically connected to the Essex Estuaries SAC.

The discharge is also indirectly linked to the West Mersea designated Bathing Water and the designated Shellfish Waters of the Colne, Pyefleet, Strood, Salcott Channel, Blackwater and Dengie.

Managing the pollutant load through a new discharge permit and implementation of improvements to the discharge quality from West Mersea WRC such that there is no change in overall pollutant load would also ensure no impact on the designated sites identified here.

Future investment for treatment

The AWS DWMP identifies that a SuDS strategy within the WRC drainage network may be required in the medium term with 25% surface water removal by 2050. These solutions are required to ensure sufficient sewer network connectivity capacity as well as manage water quality of discharges connected to Bathing Water and Shellfish Water.

Sewer network and CSOs

No CSO locations were identified in the publicly available CSO GIS data; however, the DWMP identifies West Mersea WRC as having a very significant risk related to the planning objective of managing storm overflows, indicating there is a sewer spill risk in the catchment, which is linked to Bathing Waters compliance. To enable spills to be managed in the long-term, the WCS recommends a policy for allocated development in these settlements which prevents surface water generated from sites from being discharged to the foul sewer network.

7. Water supply assessment

This part of the WCS sets out how the main water supply company (AWS) proposes to meet the increase in expected water demand in the WRZ covering CCC (Essex South WRZ). It then summarises a comparison of AWS' WRMP projections planned growth within the WRZ with growth targets proposed by CCC in the Local Plan, to determine whether the WRMP adequately caters for the Local Plan level of growth.

Finally, it considers requirements for a policy to reduce water demand in new development to ensure that the supply and demand balance predicted by AWS can be achieved.

7.1 The supply and demand balance for CCC

7.1.1 Baseline summary

As set out in 5.3.4 of this report, AWS calculate a supply deficit in the Essex South WRZ by 2050 without measures to manage demand and provide additional water supply. This is predominantly due to a growth in demand coupled with a fall in water supply available. The fall in water available is due to climate change and the need to reduce the existing volume of water abstracted from sensitive environments. This means the majority of the CCC area would not have sufficient potable water to meet AWS' minimum supply standards of service without the implementation of water resource management measures.

7.1.1.1 Completed schemes

AWS have recently undertaken measures in the City of Colchester to improve water supply resilience. An optimisation project in the Colchester supply system was completed in 2024 due to ongoing challenges with drought, supply-demand pressures and leakage. As the water system for the City has always operated as one large open network, it has been optimised through establishing four distribution zones to manage water resources, operate the network efficiently and tackle leakage effectively. This ambitious project has enabled 296 km of water mains to benefit from network calming and nearly 35,000 properties to receive a more consistent service. In addition, this scheme has:

- Facilitated 1.115 Ml/d in leakage savings.
- Allowed 1.319 Ml/d in distribution input savings.
- Reduced annual average number of bursts from 21.46 to 12.
- Removed High demand issues on Mersea Island through a laying new water main at Layer de-la-Haye to remove network restrictions and installing flow control valves at Abberton reservoir to balance demand.

7.1.2 Proposed future solutions

As set out in their published WRMP, AWS plans to overcome the predicted 2050 deficit in the South Essex WRZ mainly through a demand management strategy (reducing water used by the existing users in the WRZ) as well as providing new, or delivering changes to existing, water supply sources.

The preferred demand management strategy includes a smart metering programme, leakage reductions and water efficiency measures. Table 7-1 outlines the proposed AWS customer-side demand management measures across their supply area and which also apply to the Essex South WRZ which CCC is located in.

Table 7-1 AWS: Preferred demand management options - customer side

Measure	Action
Smart Metering	• Continue smart metering roll out to theoretical maximum of 95% • Engagement with customers to further educate on smart meter use • Reduce customer supply pipe and plumbing losses
Leakage Reduction	• Replacement and repair of leaking assets, both customer supply and network leaks
Water Efficiency	• Campaigns and targeted communications • Retrofit fit smart devices (e.g. smart showers) that can send data to the customer portal • Mandatory labelling of water usage on appliances

Source: AWS Demand Management Preferred Plan[17]

However, demand management alone will not be enough to balance the future supply and demand and hence supply-side measures will also be required. AWS have identified preferred supply-side measures for Essex South WRZ as shown in Table 7-2.

The adjustment to 1:200 drought definition, licence cap adjustment and components of adjustments to imports and exports can be implemented from 2025 to address the immediate 2025 deficit.

Table 7-2 Preferred Supply-Side Options for Essex South WRZ

Option I.D	Supply Side Options
DA01	Adjustment to 1:200 drought
EE01	Adjustment to existing potable water export
E102	Adjustment to existing potable water import
EXS19	Colchester WRC direct to Ardleigh Reservoir (no additional treatment)
EXS7	Essex South WTW Backwash water recovery
LC01	Adjustment for Licence cap scenario 8
OP12	AMP8 OPI Adjustment

Source: Water Resource Zone Summaries: Essex South

In relation to further adjusting potable water imports, the flexibility of AWS' strategic grid (improved in the last AMP7) and the potable transfer network, means the longer term sources of these imports is likely to come from a wider range of existing sources within other WRZs across. This includes the potential for input from the longer-term delivery of new strategic resources such as the proposed Fens and Lincolnshire Reservoirs as demand increases and existing abstractions are reduced or changed.

However, in order to address the short to medium-term shortfall of supply for the Essex South WRZ, a new supply-side option is required before the reservoirs are available. AWS have little opportunity to utilise any surplus ground or surface water locally or more widely, therefore AWS are progressing with plans for a water reuse plant in Colchester. Rather than discharge all the treated effluent from Colchester WRC to the estuary, AWS will treat some of the already cleaned effluent again using membrane technology before transferring, discharging and storing it the Ardleigh Reservoir where it will mix with river water. This option would provide up to 15.2 Ml/d into Ardleigh Reservoir for supply across the WRZ.

[17] Anglian Water (2023). *Demand Management Preferred Plan.* Available at: https://www.anglianwater.co.uk/siteassets/household/about-us/wrmp/rdwrmp24-demand-management-preferred-plan-technical-supporting-document-.pdf (Accessed: 28/11/2024).

AWS have received Accelerated Infrastructure Delivery funding to progress this recycling scheme including delivery of a demonstration centre and the transfer pipeline to take water from the WRC to Ardleigh Reservoir. This option would also have the benefit on reducing DWF from the WRC potentially creating additional treatment capacity. The Delivery timescale is 7-10 years.

AWS have also been granted planning permission by West Suffolk Council, Babergh and Mid Suffolk District Council and Colchester City Council for a 69 km section of pipeline between Bury St Edmunds and Colchester which will be capable of transferring up to 25 Ml/d. As part of this development, an 18 km spur from the proposed Whelnetham to Wherstead section will import potable water to an existing water reservoir at Great Horkesley.

The combined impact of the proposed demand management measures and supply side options in the Essex South WRZ results in a forecast balance of supply and demand by 2050.

7.1.3 Comparing growth – WRMP and the Local Plan

Consultation with both AWS and AW has indicated that the number of dwellings to be delivered over the CCC plan period is broadly in-line with the forecast dwelling and population increases assumed within the WRMP supply and demand forecasting process.

AWS has assumed an increase in approximately 24,700 homes in the Essex South WRZ to 2050 (noting that this number is additional to dwellings which already have planning permission and hence are included in the baseline supply and demand calculations).

Braintree is the only other significant urban centre within the Essex South WRZ, demonstrating that the approximate 11,000 dwellings to be delivered through allocations in the new CCC Local Plan are broadly allowed for in the WRMP process. AW has indicated that the small number of dwellings (less than 200) to be allocated at Dedham and Wivenhoe, which fall into their Brett WRZ, is in-line with the assumptions for growth in that WRZ and are adequately accounted for.

This means the WRMP conclusions of both AWS and AW can be relied upon as evidence that water supply to meet domestic supply is planned for in the long-term and not a constraint to the number of dwellings allocated, if the proposed demand management and new supply schemes can be delivered. The WRMP is subject to various statutory environmental assessments[18], including Strategic Environmental Assessment, WFD Assessment and Habitat Regulations Assessment, further demonstrating that an environmentally sustainable water supply is likely to be available to meet this level of demand.

7.2 Lowering future demand

The comparison of planned growth against the WRMP household projections shows planned housing growth is generally catered for; however, there are clear drivers set out in this WCS, and within legislation and wider national policy and strategies for targeting policies which reduce both PCC for new dwellings and demand in non-household water use.

7.2.1 Household demand – lowering PCC

At the time of completing this WCS, the only national mandatory PCC standard is set out in the Building Regulations (Part G)[19], requiring new homes to be built to use no more than 125 l/p/d. The Regulations recommend an optional standard of 110 l/p/d, but this optional standard is not mandated through the Regulations.

Whilst government have set out actions to review the need for (and potentially set) higher PCC standards for new homes in water stressed parts of England, those actions have yet to result in mandated standards. Local Plans remain one of the only vehicles to mandate higher water efficiency standards for new development through effective local policy.

[18] Available at: https://www.anglianwater.co.uk/corporate/strategies-and-plans/water-resources-management-plan/ (Accessed 30/01/2025)
[19] The Building Regulations (2010) Part G

7.2.1.1 Demonstrating PCC reduction outcomes

Five household domestic water demand scenarios have been tested in this WCS (detailed in Table 7-3) to demonstrate the effect that lower PCCs can have on managing demand. These reflect a range of possible future PCCs for new dwellings ranging from the Building Regulations Mandatory standard to a PCC which would require both the highest efficiency fixtures and fittings as well as some level of water reuse technology for non-potable water uses. The estimated increase in demand has been calculated for the future scenarios and is shown graphically in Figure 7-1.

Table 7-3 Household domestic water demand scenarios.

Projection	PCC (l/p/d)	Reasoning
Projection 1	125	Building Regulations mandatory standard
Projection 2	110	Building Regulations optional standard.
Projection 3	100	A lower intervention approach using efficient fixtures and fittings
Projection 4	85	Lowest likely use achievable with only a fixtures and fittings approach.
Projection 5	80	Maximum efficiency fixtures and fittings and reuse (via rainwater harvesting).

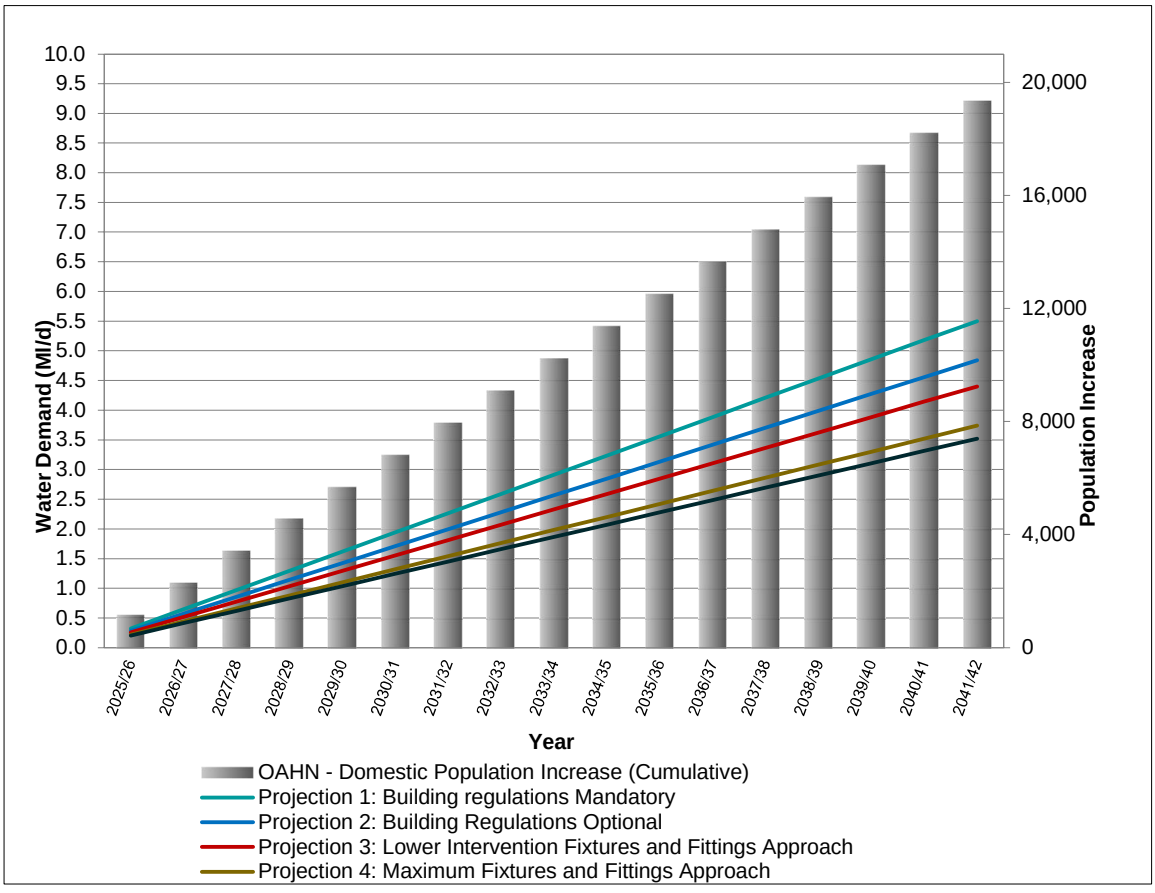


Figure 7-1: Household domestic water demand scenarios

The results show that, by 2041/42 the maximum increase in domestic water demand would be 5.5 Ml/d (assuming PCC limited only by Building Regulations mandatory standard). Adopting a policy delivering 85 l/p/d PCC would result in a significantly lower total demand by the end of the plan period, at 3.74 Ml/d (1.76 Ml/d less than if a business as usual approach is adopted). This saving would significantly improve the supply and demand balance in the Essex South WRZ increasing resilience and reducing reliance on the timing of new strategic resources.

7.2.1.2 Drivers for PPC reduction

WCS identified drivers

The WCS sets out that CCC is in area classified as seriously water stressed, in particular because Essex relies on imports of water from outside of the County as it does not have sufficient resources within the surface water catchments and groundwater locally to provide for its water needs.

The WCS sets out that abstraction volumes (or abstraction licence caps) for existing water sources which supply Essex are to be reduced over this AMP and future AMPs to address abstraction impact on the condition of water bodies and connected protected habitats; these are called sustainability changes (in abstractions). In some cases, the required sustainability changes may not be possible for AWS to accommodate without compromising supplies to existing customers and new customers (from growth). AWS can make an overriding public interest case to defer the licence changes under Regulation 19 of the WFD Regulations; however, the need to defer licence changes is an indicator that abstraction could cause environmental deterioration under the regulations. This makes it a relevant planning consideration under Regulation 33 of the WFD Regulations and the Environment Agency recommends this is the case for the Essex South WRZ which supplies CCC.

The WCS has set out how demand management is essential to AWS achieving a surplus in the supply and demand balance to 2050 (and beyond). This requires both a reduction in existing household demand, as well as future demand from new households to be lowered as far as reasonably practicable. To deliver this part of their WRMP, AWS are reliant on effective local plan policies to mandate higher water efficiency targets for new homes. Figure 7-1 demonstrate the efficacy of lowering PCC for new households on the cumulative increase in water demand by the end of the Plan period.

The WCS has also summarised that the preferred AWS plan to balance supply and demand in the medium to long term relies on new supply-side solutions which have medium to long lead-in times, and hence there is a need to ensure that early phase new dwellings are designed to reduce water demand prior to these new sources being connected to the Essex South WRZ.

Finally, the WCS has set out that reducing PCC (to as low as 85 l/p/d) would have significant benefit in maintaining treatment headroom at many of the WRCs because less wastewater would be generated. This may delay or prevent the need for upgrades to WRCs within the Local Plan period and would have the effect of reducing impact on waterbodies through reduced storm spills and reduced treated discharges from WRC.

Legislative, policy and strategy drivers for PCC reduction

The Environment Act 2021 includes a legally binding target to reduce the use of public water supply in England per head of population by 20% by 2038[20], with interim targets by 2027 and 2032. Minimising water demand in new households (and within non-households) is central to achieving this target.

The Act mandates the 5-yearly update of the 25 Year Environment Plan (2018), with the first update published in 2023 as the Environmental Improvement Plan[21] (EIP). The EIP sets out the actions needed to deliver on the legally binding public water supply reduction target, including the following related to PCC reduction in new housing:

- The production of a Roadmap to Water Efficiency in new developments (included in the EIP and the proceeding Plan for Water).
- Develop clear guidance on ‘water positive’ or ’net zero water’ developments.
- Review water efficiency options in planning and building regulations.
- Work with Ofwat to ensure the water industry can play a central role in retrofitting water efficient products in households, businesses, charities and the public sector.
- Deliver the mandatory water efficiency labelling scheme.
- Investigate dual pipe systems and water reuse options for new housing development as part of the review of the planning framework.

[20] Against a 2019/20 baseline
[21] Environmental Improvement Plan (2023) Defra

- Enable innovative water efficiency approaches in buildings, including technologies and approaches to funding and maintenance.

The government followed the EIP with the development of the 2023 “Plan for Water”[22] which includes the following actions that build on, or are additional to the actions within the EIP:

- Establishing targets for water efficiency in new homes - the plan supports achieving a design standard of up to 85 l/p/d in new residential developments in some parts of England.
- Offering incentives to developers who incorporate water-saving measures and technologies in new homes - this includes financial incentives and support for implementing water reuse systems.
- Encouraging Integrated Water Management - promoting the use of integrated water management practices in new developments, such as rainwater harvesting and greywater recycling, to reduce reliance on mains water supply.

As part of the delivery of these actions, the Written Ministerial Statement (WMS) ‘The Next Stage in Our Long Term Plan for Housing Update’ (2023) encourages LPAs to set more stringent standards in Local Plans and in planning permissions in areas of water stress.

The Water Strategy for Essex[23] summarises that Essex faces significant water stress, consuming more water per person than most of England. By 2050, the East of England is expected to experience a public water supply shortage of around 730 million litres per day. The strategy highlights the importance of reducing demand through the implementation of water-efficient technologies to tackle this. It also sets out an action to ensure implementation of systems to reuse and recycle water for non-potable purposes.

Related to the Essex Strategy, EEC are advising LPAs to target a PCC of between 80l/p/d to 90l/p/d for new homes through Local Plan updates to minimise water demand from housing growth.

Collectively, these drivers support the need for a local plan policy which sets water efficiency/PCC standards for new homes lower than the mandatory Building Regulations requirements. To this end, water companies in the east of England (including AWS and AW) have joined together with WRE, Natural England and the Environment Agency to produce a guidance document: Shared Standards in Water Efficiency for Local Plans[24] (referred to herein as the Shared Standards document). The Shared Standards document, along with other publicly available guidance, has been used in this WCS to set out an evidence base for how a policy of limiting water use in new homes to 85 l/p/d in CCC can be achieved. This evidence is set out in the following sections.

7.2.1.3 How to achieve an 85 l/p/d PCC target

Fixtures and fittings approach

Within the industry, it has widely been considered that to achieve a standard lower than a 100 l/p/d requires some of the non-potable water uses in a home (e.g. toilet flushing, or outdoor use) to be met from recycled water (such as rainwater harvesting or greywater recycling) instead of using potable water for these purposes. However, Table 7.4 outlines water efficient appliances that are widely available on the market that can achieve 85 l/p/d through an efficient fixtures and fittings approach.

Table 7.4 Total Consumption of water efficient household appliances available to achieve a PCC of 85 l/p/d

Category	Unit	Litres	Basis	Product examples
Toilet	l/p/d	15.45	Short flush 3, Long flush 4.5	• EcoDelux Metro Water Saving Close Coupled Modern.
Basin Tap	l/p/d	7.9	4 litres / min	• Deva Profile Basin Taps (Pair) | DCM101/FR101-4 | Deck Mounted | Chrome
Kitchen Tap	l/p/d	13.0	6 litres / min	• Class line eco swan neck kitchen tap -
Bath	l/p/d	0.00	n/a	-

[22] Plan for Water: Our Integrated Plan for Delivering Clean and Plentiful Water (2023) Defra
[23] Water Strategy for Essex (2024) Essex County Council
[24] Shared Standards in Water Efficiency for Local Plans (2025)

Category	Unit	Litres	Basis	Product examples
Dishwasher	l/p/d	2.02	0.56 litres / place setting	• KENWOOD KID16X23 Full-size Fully Integrated Dishwasher
Washing Machine	l/p/d	10.29	4.9 litres /kg	• SAMSUNG Series 5 SpaceMax WW11DG5B25ABEU WiFi-enabled 11 kg 1400 Spin Washing Machine
Shower	l/p/d	39.2	7 litres / min	• Flowpoint Dark Grey Shower Head
Normalisation factor	Factor	0.91	n/a	-
External use	l/p/d	5	n/a	-
Total PCC	**l/p/d**	**85.0**		

Source: Shared Standards in Water Efficiency for Local Plans (2025)

The Shared Standards document states that the approach to water efficiency in new developments, as set out in Table 7.4, will be formalised by the Mandatory Water Efficiency Labelling Scheme (MWELS) with a government aim for implementation in 2025. MWELS applies to plumbing and water consuming appliances to ensure that water efficiency ratings are clearly identifiable to developers and consumers.

The Shared Standards document also refers to the Future Homes Hub's Water Ready report[25], commissioned by Defra to support the government's action of developing a Roadmap to Water Efficiency. Table 3 of the Water Ready report illustrates how water efficiency as low as 75 l/p/d could be achieved using a fittings-based approach, including with a variety of technology options. Achieving as low as 75 l/p/d includes both known and foreseeable fittings which may not be available at scale until 2030; nevertheless, costs are provided in the report which demonstrate feasible and affordable options which will increase in availability and range as the Local Plan timeframe progresses.

Water reuse

At the time of completing this WCS, there is uncertainty as to whether statutory water companies[26] can legally supply recycled water[27] for into properties which require water for domestic purposes, even in the case where it is to be used for non-potable uses; this is due to legislative definitions of statutory water companies needing to supply 'wholesome water' for domestic purposes regardless of its intended end use.

As part of the Roadmap to Water Efficiency (as set out in the EIP and the Plan for Water), Defra has committed to looking into this legislative barrier regarding the provision of wholesome water. Until that is resolved and the legislation updated, this uncertainty limits opportunity for new development to utilise water reuse as potential suppliers and operators of technology and facilities would be limited to private companies who are not statutory water companies. It should be noted that this specific legislative restriction does not apply to non-domestic purposes (i.e. industrial, manufacturing or car washing facilities) where statutory water companies can supply recycled water which does not need to be 'wholesome'.

Due to the current legislative restrictions, the Shared Standards document does not suggest that local plan policies are developed which rely on (or refer to the need for) water reuse. Despite this, there is available research from a publication[28] by the Enabling Water Smart Communities (EWSC) and the Chartered Institution of Water and Environmental Managers (CIWEM) that provides evidence of the financial viability of privately operated community based water reuse schemes to deliver higher PCC standards. The cost ranges set out in Table 7.5 demonstrates that water reuse is a credible approach to significantly reducing PCC.

Table 7.5 Total per plot cost range for water reuse installations

Additional cost	Rainwater harvesting	Greywater recycling
Per community recycling	£1,100 - £3,700	£1,900 - £9,900

[25] Water Ready Report (2024) Future Homes Hub
[26] including companies new to the market known as New Appointments & Variations (or NAV)
[27] From rainwater harvesting or grey water recycling
[28] Water re-use in new housing – understanding the business case (2025) EWSC & CIWEM

Additional cost	Rainwater harvesting	Greywater recycling
Per plot reuse	£1,900 - £6,400	£3,800 - £4,600

Source: Water Reuse in New Housing (2025) - ESWC & CIWEM

In summary the water reuse in new housing report concludes:

- Community-scale rainwater reuse is the most cost-effective option (rather than per plot), even for smaller sized developments of 40-50 homes.
- There is a significant fall in costs for water reuse approaches in developments of at least 100 units.
- Higher density development sites yield lower costs due to factors such as less pipework needed between properties.
- Water reuse can help achieve average per capita household water consumption levels of 80 l/p/d when supported by standard water efficient appliances.

The growth area summaries for this WCS (section 8) set out where allocated sites in key locations are of a sufficient size (150 dwellings or more) to consider water reuse opportunities, provided by private companies, based on the evidence presented.

Offsetting options

In setting a policy which requires a PCC standard to be met, CCC could consider adopting a water re-use offset scheme which allows developers to pay into an offset fund; this would be for the limited number of developers who can demonstrate they are unable to viably meet the set target. The offset fund would then be used by CCC to install retrofit water reuse schemes in council owned property such as schools, council offices, and leisure centres within the Essex South WRZ, thereby providing a water demand offset. Such a scheme has been developed by the London Borough of Tower Hamlets as part of its new Local Plan. Further information can be found in the Council's Local Plan Topic Paper – Water Efficiency (2024).

The government is leading development of a similar 'water credit' scheme for Cambridge as part of the "The Case for Cambridge"[29] proposals for sustainable growth in the city. The proposals for growth in Cambridge are limited by lack of available water in the short-term whilst Cambridge Water and AWS work together to provide longer-term new supply sources. Detailed design work on the credits system is underway with the LPA, developers, the Environment Agency and other key stakeholders but is not yet published and functional.

Developer Incentives

Both AW and AWS offer environmental incentives to developers to deliver water efficient homes in exchange for discounted infrastructure charges which would also assist in improving viability of a PCC policy. For AWS, where all properties in a plot meet a requirement of 90 l/p/d, developers can qualify for the Water Environmental Incentive Scheme (EIS) where a discount of £500 per plot for infrastructure charges will be applied.

Case studies for PCC policy

The Shared Standards document refers to Crawley Borough Council's Local Plan as a case study of how effective local policy can be set which requires stringent water efficiency targets as part of a wider policy need to ensure a 'water neutral' position. Water neutral refers to the outcome where new development does not increase total water supply demand above the baseline demand before the development is occupied. This need is driven by Natural England advice that a water neutral position is required to demonstrate new development/ Local Plans in the affected WRZ will not adversely impact protected ecological sites. This is required until the unsustainable abstractions volumes currently impacting the sites are replaced with new supply schemes by Southern Water.

In response, the Council have developed a water neutral delivery system for their Local Plan which requires both an offset mechanism and strict water efficiency/PCC policy requirements from developers; this demonstrates that such PCC policies are viable and deliverable.

[29] The Case for Cambridge (2024) HM Government

Horsham District Council are also affected by the issue within the same WRZ and in conjunction with Crawley Borough Council and other affected authorities, have developed an offsetting scheme called the Sussex North Offsetting Water Scheme (SNOWS). This allows developers to ensure that increased water demand does not exceed the water savings generated by Southern Water in their next Water Resources Management Plan (WRMP).

7.2.2 Non-housing growth – lowering demand

The Plan for Water includes proposals to reduce non-household water use by 9% by 2038 as part of the response to the legally binding target[30] to reduce the use of public water supply in England per head of population by the same date. This requires reductions in existing non-household demand and demand from new non-housing development to be managed.

AWS have responded to the Environment Act target and the Plan for Water proposals by developing their own non-domestic[31] use policy. A further driver for this policy is that water companies do not have a statutory duty to supply non-domestic uses (as they do with domestic demands), so this policy ensures that available water in the short-term is prioritised for statutory domestic needs in the interim before longer term strategic supply sources are brought on-line.

AWS' policy states that unplanned non-domestic requests for water supply over 20 m^3/d will not be routinely granted. Developers will be required to complete Water Resource Assessments demonstrating how they minimised water use before any request for water supply will be considered.

The water supply baseline section of this WCS sets out that locally available non-tidal water supply sources are severely limited in CCC due to abstraction licencing limitations put in place for environmental protection (see section 5.3.2 and 5.3.3); this will limit options non-household development has to source stand-alone supply. Therefore, the WCS recommends that the following policy (taken partly from the Shared Standards document) be adopted for non-household sites:

- All major non-household developments to include water saving measures and water reuse in their designs with a focus on rainwater harvesting as the primary source (unless it can be demonstrated that reuse is not viable).
- New, extended or redeveloped non-household buildings aim to achieve full credits within the 4 water categories (WAT01, WAT02, WAT03, and WAT04) for BREAAM standard within a minimum score of 3 credits within WAT01 Water Consumption issue category, or an equivalent standard set out in any future update to BREAAM. The applicant will be required to justify and evidence why full credits is not possible/viable for the development.
- A Water Efficient Design Statement (WEDS) must be submitted with the application at the earliest stage to demonstrate how policy requirements have been met and will be maintained in relation to water efficient design. The statement shall provide, as a minimum, the following:
    - Baseline information relating to existing water use within a development site; and
    - Full calculations relating to expected water use within a proposed development (such as water efficient fixtures and fittings, rainwater/stormwater harvesting or reuse).

[30] in the Environment Act
[31] Domestic water use in this context refers to water used for sanitary purposes in both homes and non-households such as hospitals. Non-domestic refers to water used for non-sanitary purposes in non-households such as industrial or manufacturing processes. This distinction acknowledges that essential domestic uses of water are both a household and non-household requirement for health and sanitary requirements.

8. Growth area summaries

8.1 Introduction

This section of the report provides a summary of the WCS assessments and outcomes. It has been presented as growth area summaries, to aid planners using the WCS to see the key infrastructure issues, phasing impacts and policy recommendations for different spatial areas.

WRC catchments have been used to define growth areas, as wastewater treatment is the key aspect which affects infrastructure timing delivery and phasing impacts across CCC.

8.2 Birch Green

8.2.1 Wastewater treatment summary

Is there capacity at the WRC for any new dwellings?	Yes – approximately 400 dwelling capacity.
Is there sufficient capacity for all new homes planned within the WRC catchment?	Yes – only a small number of dwellings would be allocated in the WRC catchment.

8.2.2 Wastewater sewer capacity

Is there a risk of sewer outfall discharges increasing?	There are no identified sewer overflow risks in the growth area.

8.2.3 Catchment risks and opportunities

The allocated site at Birch is located in the Roman River WFD Water body catchment. Surface water runoff from this site has the potential to influence water quality within this WFD water body. Birch WRC, which would treat wastewater from this site, also discharges to this water body via a tributary.

The WFD water body is failing to meet Good Status, in part due to Phosphate levels being less than Good Status. Continuous sewage discharge, poor nutrient management, and physical modification of the waterbody are confirmed reasons for not achieving Good Status.

The underlying Essex Gravels groundwater body also has a Poor overall status, due to Poor chemical status.

This highlights the need for the site in this growth area to manage surface water through the provision of SuDS with a focus on managing water quality. There are limited identified NBS opportunities for the allocated site in Birch Green. The location of NBS and water dependent habitats in the Birch Green growth area are shown in inset Figure 8-1.

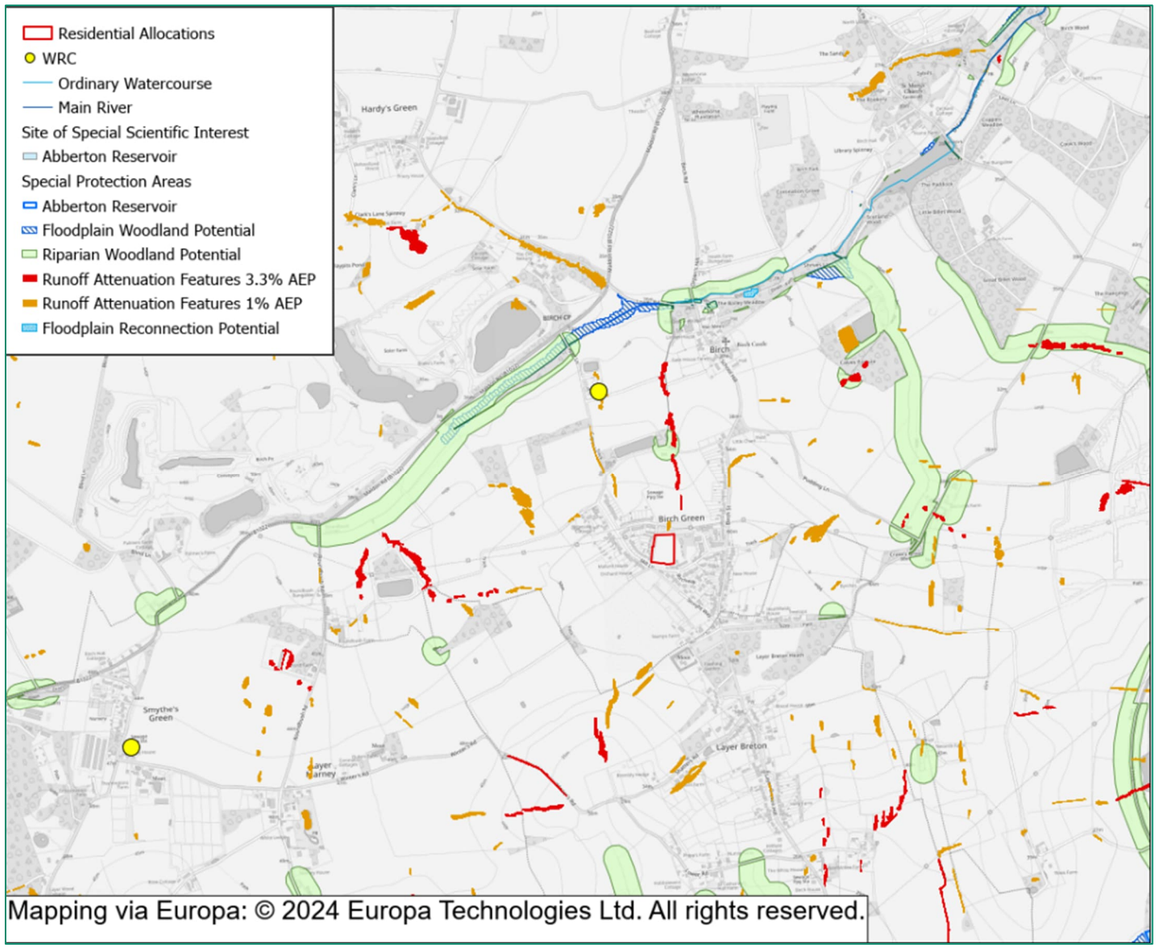


Figure 8-1: Location of water dependent habitats and NBS relative to allocated sites in Birch Green

8.2.4 Water Supply

There is no water available for abstraction from surface water or groundwater in low flow conditions, and only restricted flows available in average to higher flows. Therefore, there is limited scope for development to consider local sources of supply.

The growth area is located within the Essex South WRZ managed by AWS. The WCS has identified that a long term plan is in place to manage the scale of growth proposed within the Local Plan across this WRZ.

8.2.5 Growth area specific policy

The following water policy is recommended for development for this growth area: Require SuDS built to the updated national SuDS standards (2025) to attenuate surface water runoff for flood risk purposes and be expected to manage, and where possible improve water quality, particularly nutrient discharge.

8.3 Colchester & suburbs

8.3.1 Wastewater treatment summary

Is there capacity at the WRC for any new dwellings?	Short-term capacity uncertain (until 2028). Capacity available from 2028 to 2030.
Is there sufficient capacity for all new homes planned within the WRC catchment?	No – capacity would be exceeded by the end of the plan period and likely between 2030 and 2035 depending on site phasing.
Is there a WRC solution proposed in the current investment period to 2030?	Yes – for immediate short-term capacity issue (flow meter) No plans to increase treatment capacity by 2030 but the WCS has shown that growth is unlikely to use this headroom capacity before then.
Is there a medium to long term WRC solution proposed in the AWS Drainage and Wastewater Management Plan?	No – a growth scheme is not identified in the AWS Drainage & Wastewater Management Plan, with a 'wait and see' proposal; however, AWS has requested a land allocation for future expansion of the WRC at some point in the future which recognises the need to potentially expand the facility.
Can a future permit be implemented to protect water quality within Technically Achievable Limits?	Yes – modelling demonstrated minor permit condition changes would be required.

There is potential for on-site wastewater treatment to reduce the burden on the WRC or if required to accommodate the planned development prior to delivery of future WRC improvement schemes. This is applicable to the larger strategic sites (over 150 dwellings) of which there are seven in this growth area, where there is potential for inset providers to provide wastewater (and water supply infrastructure) outside of the AWS service area.

8.3.2 Wastewater sewer capacity

Is there a risk of sewer outfall discharges increasing?	• The DWMP identifies a very significant planning objective risk for Stom overflows in the current baseline (2025). • The sewer network is combined in some parts of the city (specifically the city centre), so there is an elevated risk of increasing sewer spills. • There are eight outfalls in the sewer catchment at high risk (>10 spills) where additional flows to the sewer may limit the efficacy of future spill reduction measures.

8.3.3 Catchment risks and opportunities

Allocated sites in the Colchester area eventually drain to the Colne (Transitional) WFD Water body. Surface water runoff from these sites has the potential to influence water quality within this WFD water body. Colchester WRC, which would treat wastewater from these sites, also discharges to this water body.

The water body is failing to meet Good status, in part due to Nitrogen levels being less than Good Status. Physical modification of the waterbody is a confirmed reason for not achieving Good Status. The underlying Essex Gravels groundwater body also has a Poor overall status, due to Poor chemical status. This highlights the need for developments in the city and suburban areas to manage surface water through the provision of SuDS with a focus on managing water quality and to avoid development within riparian zones around watercourses to reduce pressures around watercourse modification.

There are several NBS opportunities for allocated sites in this growth area, including runoff attenuation features, floodplain reconnection potential, and floodplain and riparian woodland potential. Site PP9 in particular borders the Salary Brook and has significant potential for these types of NBS delivery. Developers throughout the growth area should be encouraged to contribute towards NBS opportunities and incorporate similar NBS in their site as part of SuDS delivery. The location of NBS and water dependent habitats in the Colchester growth area are shown in inset Figure 8-2.

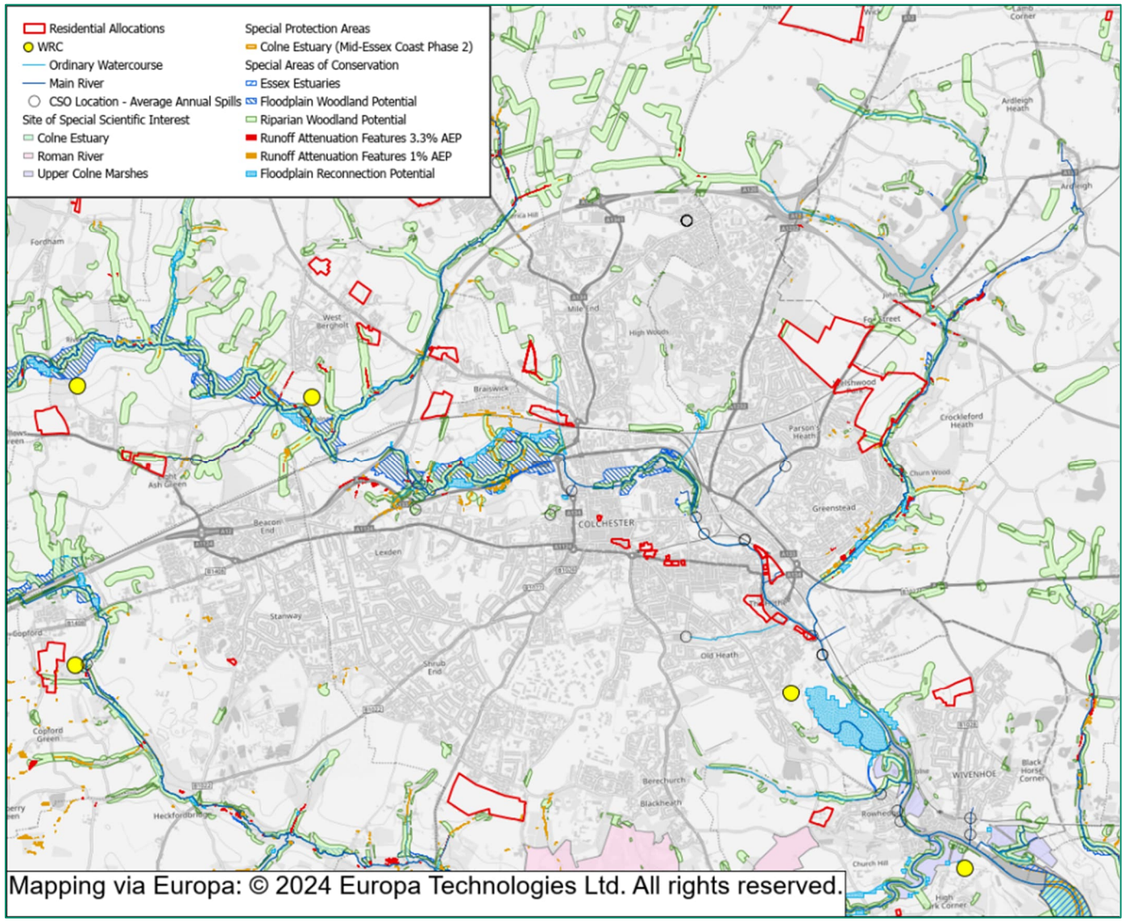


Figure 8-2: Location of water dependent habitats and NBS relative to allocated sites in and around Colchester

Appendix F, Figure 16 shows areas of combined sewer systems in Colchester City, where the DWMP suggest surface water is a significant contributor to flood risk and storm spills from the networks. It is a standard requirement for new developments to use separate sewer systems but where large developments are planned (e.g. site 10953) or a large number of smaller developments are planned in proximity this could be used as a catalyst to deliver a wider catchment scheme to separate out sewers using developer contributions.

8.3.4 Water supply

There is no water available for abstraction from surface water or groundwater in low flow conditions, and only restricted flows available in average to higher flows. Therefore, there is limited scope for development to consider local sources of supply.

The growth area is located mostly within the Essex South WRZ managed by AWS. The WCS has identified that a long term plan is in place to manage the scale of growth proposed within the Local Plan across this WRZ. The allocated site in Wivenhoe would fall into the Brett WRZ managed by AW. The WCS has identified that a long term plan is in place to manage the small amount of growth proposed within the Local Plan across this WRZ.

The following sites within the Colchester City area are large sites (greater than 150 dwellings) and of a scale where water re-use could be considered by developers for supplying non-potable uses to meet an 85l/p/d policy target (or lower):

- Site PP6, Land at Colchester Station, Colchester.
- Site PP9, North East, Colchester.
- Site PP10, Land South Berechurch Hall Road, Colchester.
- Site PP14, Gas Works and Hythe Scrap Yard Site.
- Site PP24, Land North West of Fire Station (Wivenhoe).
- Site OA1, King Edward Quay.
- Site OA2, Land East of Hawkins Road, Hythe.

8.3.5 Growth area specific policy

The following water policy areas are recommended for development for this growth area:

- Development coming forward before 2030 should be required to demonstrate available capacity at the WRC and the associated sewer network with AWS prior to submitting planning applications.
- An 85 l/p/d PCC target for new homes in these allocated sites; this will support both sustainable water resource provision as well as allowing more properties to connect to the WRC before the available capacity is used. It will also reduce impacts related to sewer spills.
- To enable CSO spills to be managed in the long-term, require all allocated development in these settlements to prevent surface water generated from sites being discharged to the foul or combined sewer network.
- Require SuDS built to the updated national SuDS standards to attenuate surface water runoff for flood risk purposes and be expected to manage, and where possible improve water quality, particularly nutrient discharge.
- Encourage developers to contribute to NBS for riparian management (particularly woodland planting) and provision of surface water attenuation.

8.4 Copford & Marks Tey

8.4.1 Wastewater treatment summary

Is there capacity at the WRC for any new dwellings?	Yes – approximately 1600 dwelling capacity.
Is there sufficient capacity for all new homes planned within the WRC catchment?	No – capacity is likely to be exceeded by 2033.
Is there a WRC solution proposed in the current investment period to 2030?	Yes – AWS have funding for improvement works at Copford in AMP8 (2025 to 2030).
Is there a medium to long term WRC solution proposed in the AWS Drainage and Wastewater Management Plan?	Yes – improvements to the network with a mixed strategy with the main solution of SuDs, infiltration reduction, and a new DWF permit in the medium term. 50% surface water removal in the 2050 Strategy. Potential option to transfer flows to Eight Ash Green WRC.
Can a future permit be implemented in the future to protect water quality within Technically Achievable Limits?	Yes – but significant improvements in all parameters required

There is potential for on-site wastewater treatment to reduce the burden on the WRC or if required to accommodate the planned development prior to delivery of future WRC improvement schemes. This is applicable to all sites in Copford which are all larger strategic sites (over 150 dwellings). For these sites, there is potential for inset providers to provide wastewater (and water supply infrastructure) outside of the AWS service area.

8.4.2 Wastewater sewer capacity

Is there a risk of sewer outfall discharges increasing?	• The sewer network is separated so the risk is generally low. • There is one outfall in the sewer catchment at high risk (>10 spills) where additional flows to the sewer may limit the efficacy of future spill reduction measures.

8.4.3 Catchment risks and opportunities

Allocated sites are located in the Roman River WFD Water body catchment. Surface water runoff from these sites has the potential to influence water quality within this WFD water body. The Copford WRC, which would treat wastewater from these sites, also discharges to this water body.

The water body is failing to meet Good Status, in part due to Phosphate levels being less than Good Status. Continuous sewage discharge, poor nutrient management, and physical modification of the waterbody are confirmed reasons for not achieving Good Status. The underlying Essex Gravels groundwater body also has a Poor overall status, due to Poor chemical status. This highlights the need for developments in this growth area to manage surface water through the provision of SuDS with a focus on managing water quality and to avoid development within riparian zones around watercourses.

There are identified NBS opportunities for the allocated sites in Copford including riparian woodland planting potential and runoff attenuation features. These strategic delivery sites could have the requirement for NBS opportunities written into policy as part of (development plan document) DPD development. The location of NBS and water dependent habitats in the Birch Green growth area are shown in inset Figure 8-3.

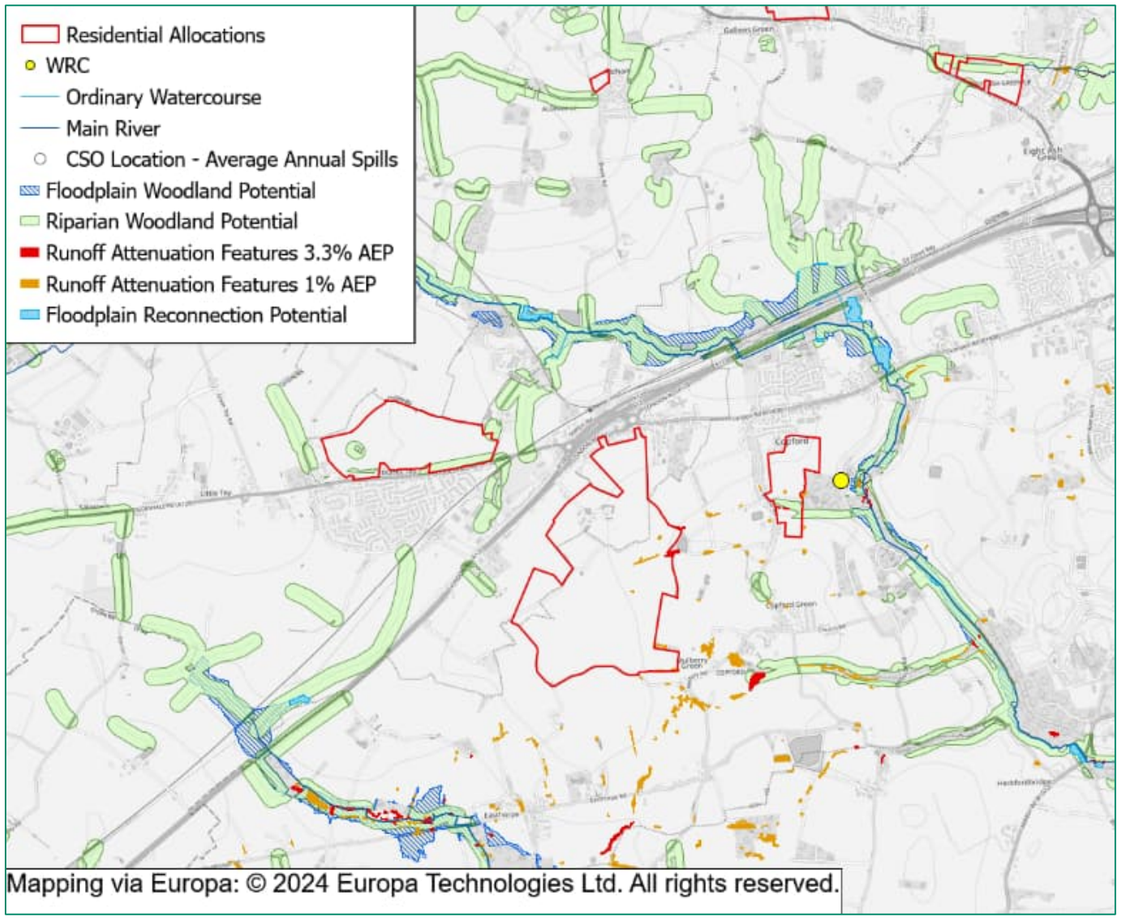


Figure 8-3: Location of water dependent habitats and NBS relative to allocated sites in Copford and Marks Tey

8.4.4 Water Supply

There is no water available for abstraction from surface water or groundwater in low flow conditions, and only restricted flows available in average to higher flows. Therefore, there is limited scope for development to consider local sources of supply.

The growth area is located within the Essex South WRZ managed by AWS. The WCS has identified that a long term plan is in place to manage the scale of growth proposed within the Local Plan across this WRZ.

The following are large sites (greater than 150 dwellings) and of a scale where water reuse could be considered by developers for supplying non-potable uses to meet an 85l/p/d policy target (or lower).

- Site PP17, Land South of Marks Tey Village
- Site PP29, Land East of School Road Copford
- Site PP18, Land North of A120, Marks Tey

8.4.5 Growth area specific policy

The following water policy areas are recommended for development for this growth area:

- An 85 l/p/d PCC target for new homes in these allocated sites; this will support both sustainable water resource provision as well as allowing more properties to connect to the WRC before the available capacity is used. It will also reduce impacts related to sewer spills.
- To enable CSO spills to be managed in the long-term, require all allocated development in these settlements to prevent surface water generated from sites being discharged to the foul sewer network.
- Require SuDS built to the updated national SuDS standards to attenuate surface water runoff for flood risk purposes and be expected to manage, and where possible improve water quality, particularly nutrient discharge.
- Encourage developers to contribute to NBS for riparian management and provision of surface water attenuation.

8.5 Dedham

8.5.1 Wastewater treatment summary

Is there capacity at the WRC for any new dwellings?	No – currently at capacity.
Is there a WRC solution proposed in the current investment period to 2030?	No – AWS do not have a growth solution identified in AMP8 (between 2025 and 2030); however dwelling numbers proposed in the catchment are small (15) and hence AWS may be able to accommodate this allocated site without permit changes.
Is there a medium to long term WRC solution proposed in the AWS Drainage and Wastewater Management Plan?	Yes – improvements to the network with a mixed strategy with the main solution of SuDs in the medium term. 50% surface water removal in the 2050 Strategy.
Can a future permit be implemented in the future to protect water quality within Technically Achievable Limits?	Yes – modelling demonstrated minor permit condition changes would be required.

8.5.2 Wastewater sewer capacity

Is there a risk of sewer outfall discharges increasing?	• The sewer network is separated however, the DWMP identifies a very significant baseline risk of storm overflows. • There is one outfall in the sewer catchment at high risk (>10 spills) where additional flows to the sewer may limit the efficacy of future spill reduction measures.

8.5.3 Catchment risks and opportunities

The allocated site is located in the Stour (d/s R. Brett) WFD Water body catchment. Surface water runoff from this site has the potential to influence water quality within this WFD water body. The Dedham WRC, which would treat wastewater from this site, also discharges to this water body.

The water body is failing to meet Good status, in part due to phosphate and dissolved oxygen levels being less than Good Status. Water industry discharges, as well as poor nutrient management in the wider catchment are confirmed reasons for not achieving Good Status.

The underlying Essex Gravels groundwater body also has a Poor overall status, due to Poor chemical status.

This highlights the need for the development site in this growth area to manage surface water through the provision of SuDS with a focus on managing water quality.

There is an identified NBS opportunity for the allocated site in Dedham related to the provision of riparian woodland planting potential. The developer should be encouraged to contribute towards NBS. The location of NBS and water dependent habitats in the Birch Green growth area are shown in inset Figure 8-4.

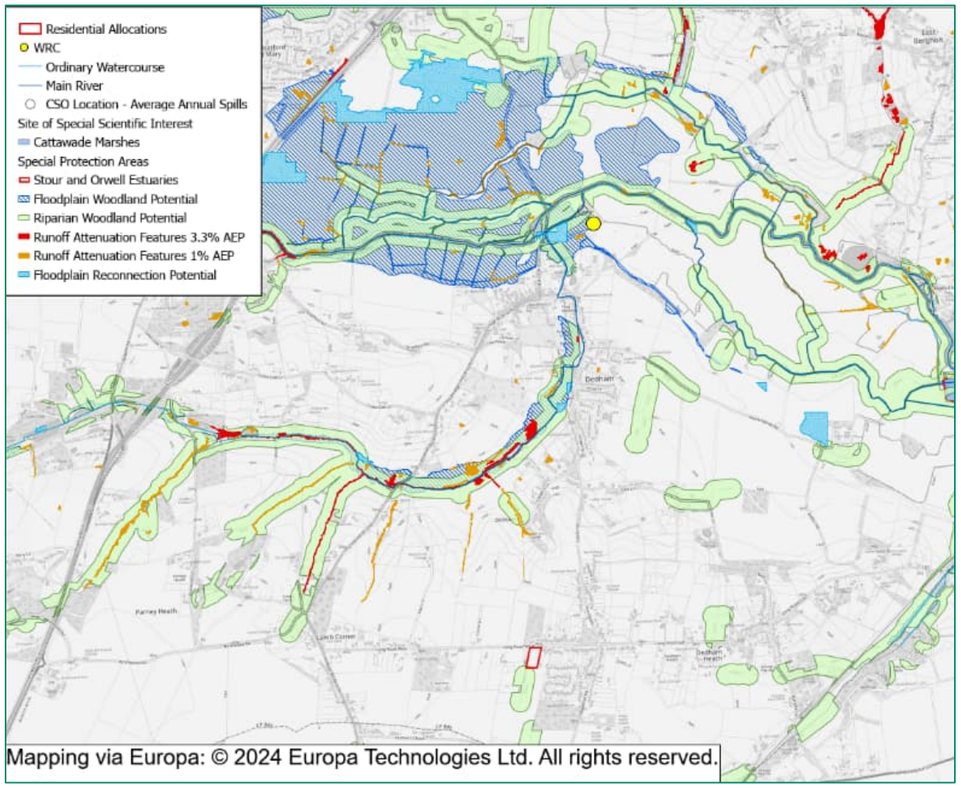


Figure 8-4: Location of water dependent habitats and NBS relative to the allocated site in Dedham

8.5.4 Water Supply

There is no water available for abstraction from surface water or groundwater in any flow condition. Therefore, there is limited scope for development to consider local sources of supply.The growth area is located within the AW Brett WRZ. The WCS has identified that a long term plan is in place to manage the small amount of growth proposed within the Local Plan across this WRZ.

8.5.5 Growth area specific policy

The following water policy areas are recommended for development for this growth area:

- If development comes forward before 2030, it should be required to demonstrate available capacity at the WRC and the associated sewer network with AWS prior to submitting a planning application.
- An 85 l/p/d PCC target for new homes in this allocated site; this will support both sustainable water resource provision as well as assist with capacity issue at Dedham WRC and limit impacts on sewer spills.
- To enable CSO spills to be managed in the long-term, require the allocated development in this settlement to prevent surface water generated from sites being discharged to the foul sewer network.
- Require SuDS built to the updated national SuDS standards to attenuate surface water runoff for flood risk purposes and be expected to manage, and where possible improve water quality, particularly nutrient discharge.
- Encourage developers to contribute to NBS for riparian woodland planting.

8.6 Wake's Colne & Chappel

8.6.1 Wastewater treatment summary

Is there capacity at the WRC for any new dwellings	Yes – approximately 250 dwelling capacity (Earls Colne WRC).
Is there sufficient capacity for all new homes planned within the WRC catchment?	No – capacity would be exceeded but not until the end of the plan period.
Is there a WRC solution proposed in the current investment period to 2030?	Yes – there is improvement funding planned for Earls Colne towards the end of AMP8 (2029 to 2030).
Is there a medium to long term WRC solution proposed in the AWS Drainage and Wastewater Management Plan?	Yes – improvements to the network with a mixed strategy with the main solution of SuDs and a new DWF permit in the medium term. 25% surface water removal in the longer-term 2050 Strategy.
Can a future permit be implemented in the future to protect water quality within Technically Achievable Limits?	Yes – with relatively minor upgrades required to ammonia.

8.6.2 Wastewater sewer capacity

Is there a risk of sewer outfall discharges increasing?	• The sewer network is separated so risk is generally low. • There are no outfalls in the sewer catchment.

8.6.3 Catchment risks and opportunities

Allocated sites are located in the River Colne (d/s Doe's Corner) WFD Water body catchment. Surface water runoff from these sites has the potential to influence water quality within this WFD water body. The Earls Colne WRC, which would treat wastewater from these sites, also discharges to this water body.

The water body is failing to meet Good status, in part due to Phosphate levels being less than Good Status. Continuous sewage discharge, poor nutrient management in the wider catchment and physical modification are confirmed reasons for not achieving Good status.

The underlying Essex Gravels groundwater body also has a Poor overall status, due to Poor chemical status.

This highlights the need for developments in this growth area to manage surface water through the provision of SuDS with a focus on managing water quality and to avoid development within riparian zones around watercourses.

There are identified NBS opportunities for the allocated sites in Wake's Colne including riparian woodland planting potential. Developers should be encouraged to contribute towards NBS opportunities. The location of NBS opportunities in the Wake's Colne and Chappel growth area are shown in Figure 8-5.

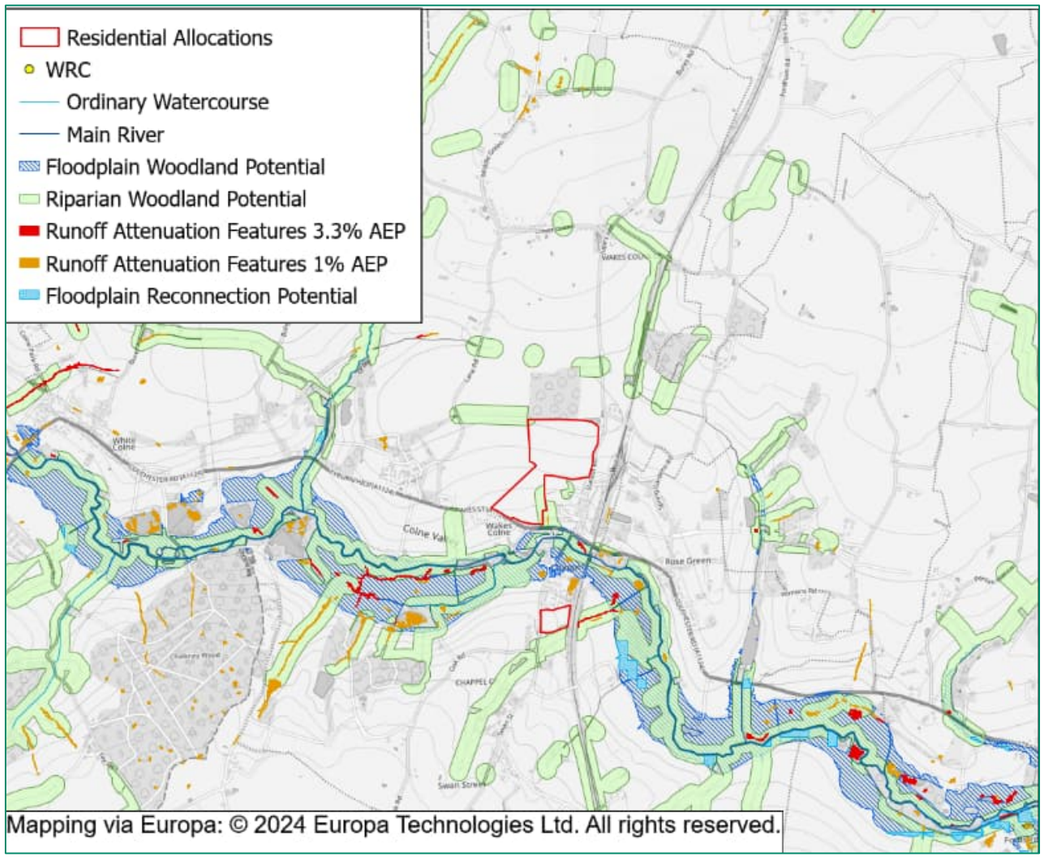


Figure 8-5: Location of and NBS relative to allocated sites in Wake's Colne and Chappel

8.6.4 Water supply

There is no water available for abstraction from surface water or groundwater in low flow conditions, and only restricted flows available in average to higher flows. Therefore, there is limited scope for development to consider local sources of supply.

The growth area is located within the Essex South WRZ managed by AWS. The WCS has identified that a long term plan is in place to manage the scale of growth proposed within the Local Plan across this WRZ.

Site PP28, Station Road at Wakes Colne, is a large site (200 dwellings) and of a scale where water reuse could be considered by developers for supplying non-potable uses to meet an 85l/p/d policy target (or lower).

8.6.5 Growth area specific policy

The following water policy areas are recommended for development for this growth area:

- An 85 l/p/d PCC target for new homes in these allocated sites; this will support both sustainable water resource provision as well as potentially remove the need for further upgrades to Earls Colne WRC at the end of the plan period.
- Require SuDS built to the updated national SuDS standards to attenuate surface water runoff for flood risk purposes and be expected to manage, and where possible improve water quality, particularly nutrient discharge.
- Encourage developers to contribute to NBS for riparian management.

8.7 Eight Ash Green, Fordham & Ford's Street

8.7.1 Wastewater treatment summary

Is there capacity at the WRC for any new dwellings?	Yes – approximately 600 dwelling capacity.
Is there sufficient capacity for all new homes planned within the WRC catchment?	No – capacity would be exceeded but not until the end of the plan period (after 2038).
Is there a WRC solution proposed in the current investment period to 2030?	No – but capacity is not likely to be an issue in AMP8.
Is there a medium to long term WRC solution proposed in the AWS Drainage and Wastewater Management Plan?	Yes – improvements to the network with a mixed strategy with the main solution of SuDs in the medium term. 50% surface water removal in the 2050 Strategy.
Can a future permit be implemented in the future to protect water quality within Technically Achievable Limits?	Yes – modelling has shown this would be feasible within TAL at a future point.

8.7.2 Wastewater sewer capacity

Is there a risk of sewer outfall discharges increasing?	• The sewer network is largely separated; however, there are some areas of combined sewer and the DWMP identifies the catchment as a very significant risk for the planning objective of storm overflows. • There are three outfalls in the sewer catchment, two are medium risk (1-9 spills), the other (at the WRC) is high risk (>10 spills); additional flow to the sewer may limit the efficacy of future spill reduction measures.

8.7.3 Catchment risks and opportunities

Allocated sites are located in the River Colne (d/s Doe's Corner) WFD Water body catchment. Surface water runoff from these sites has the potential to influence water quality within this WFD water body. The Eight Ash Green WRC, which would treat wastewater from these sites, also discharges to this water body.

The water body is failing to meet Good status, in part due to Phosphate levels being less than Good Status. Continuous sewage discharge, poor nutrient management in the wider catchment and physical modification are confirmed reasons for not achieving Good status. The underlying Essex Gravels groundwater body also has a Poor overall status, due to Poor chemical status.

This highlights the need for developments in this growth area to manage surface water through the provision of SuDS with a focus on managing water quality and to avoid development within riparian zones around watercourses.

There are some limited identified NBS opportunities for one of the allocated sites in Eight Ash Green related to riparian woodland planting potential. Developers of this site should be encouraged to contribute towards NBS opportunities. The location of NBS opportunities in the Eight Ash Green growth area are shown Figure 8-6.

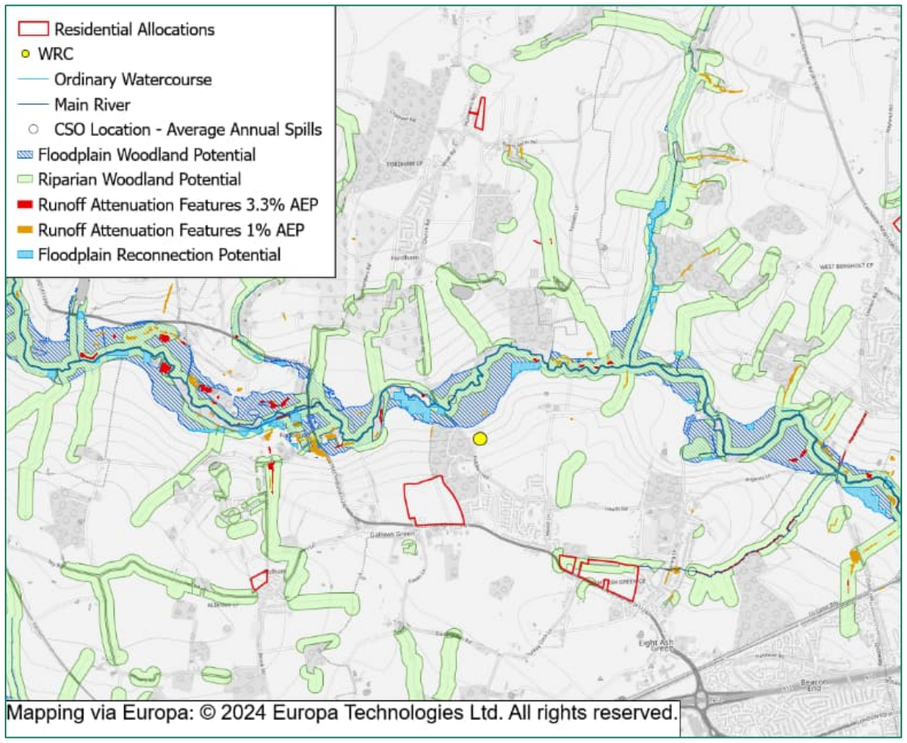


Figure 8-6: Location of and NBS relative to allocated sites in Eight Ash Geen and Fordham

8.7.4 Water Supply

There is no water available for abstraction from surface water or groundwater in low flow conditions, and only restricted flows available in average to higher flows. Therefore, there is limited scope for development to consider local sources of supply. The growth area is located within the Essex South WRZ managed by AWS. The WCS has identified that a long term plan is in place to manage the scale of growth proposed within the Local Plan across this WRZ.

Site PP31 at Land North of Halstead Road, and site PP32 at Land West of Halstead Road, are large sites (greater than 150 dwellings) and of a scale where water reuse could be considered by developers for supplying non-potable uses to meet an 85l/p/d policy target (or lower).

8.7.5 Growth area specific policy

The following water policy areas are recommended for development for this growth area:

- An 85 l/p/d PCC target for new homes in these allocated sites; this will support both sustainable water resource provision as well as potentially remove the need for further upgrades to the WRC at the end of the plan period. It may also help with reducing impact from storm overflows.
- To enable CSO spills to be managed in the long-term, require all allocated development in these settlements to prevent surface water generated from sites being discharged to the foul sewer network.
- Require SuDS built to the updated national SuDS standards to attenuate surface water runoff for flood risk purposes and be expected to manage, and where possible improve water quality, particularly nutrient discharge.
- Encourage developers to contribute to NBS for riparian management.

8.8 Fingringhoe, Peldon & Abberton

8.8.1 Wastewater treatment summary

Is there capacity at the WRC for any new dwellings?	No – WRC is at capacity.
Is there a WRC solution proposed in the current investment period to 2030?	Yes – AWS has planned investment in the current AMP 8 period (to 2030) to increase capacity.
Is there a medium to long term WRC solution proposed in the AWS Drainage and Wastewater Management Plan?	Yes – improvements to the network with an aim for 50% surface water removal in the 2050 Strategy.
Can a future permit be implemented in the future to protect water quality within Technically Achievable Limits?	Yes – only a small change in permitted quality conditions would be required to ensure that a new permit to discharge would not significantly change water quality.

8.8.2 Wastewater sewer capacity

Is there a risk of sewer outfall discharges increasing?	• The sewer network is separated • the DWMP identifies Fingringhoe WCS as having a very significant risk related to the planning objective of managing storm overflows, indicating there is a sewer spill risk in the catchment.

8.8.3 Catchment risks and opportunities

Allocated sites are located in area of CCC which eventually drain to the Colne (Transitional) WFD Water body catchment. Surface water runoff from these sites has the potential to influence water quality within this WFD water body. The Fingringhoe WRC which would treat wastewater from these sites, also discharges to this water body.

The water body is failing to meet Good Status, in part due to Nitrogen levels being less than Good Status. Physical modification of the waterbody is a confirmed reason for not achieving Good Status.

The underlying Essex Gravels groundwater body also has a Poor overall status, due to Poor chemical status.

This highlights the need for developments in this growth area to manage surface water through the provision of SuDS with a focus on managing water quality and to avoid development within riparian zones around watercourses to reduce pressures around watercourse modification.

There are limited NBS opportunities for the allocated site in this growth area, with the exception of the site in Fingringhoe which could consider including riparian woodland planting potential. The location of NBS opportunities in the Fingringhoe growth area are shown Figure 8-7.

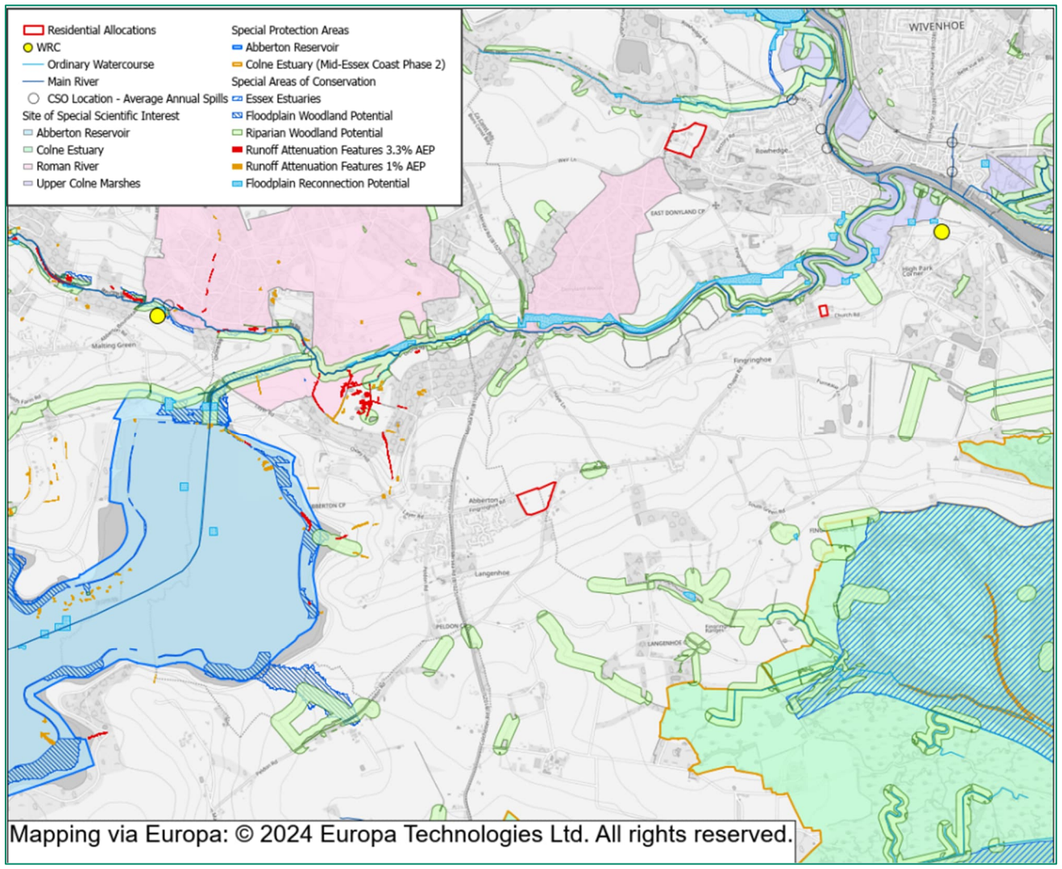


Figure 8-7: Location of water dependent habitats and NBS opportunities relative to sites in Fringringhoe, Peldon and Abberton

8.8.4 Water Supply

There is no water available for abstraction from groundwater and no significant source if surface freshwater abstraction. Therefore, there is limited scope for development to consider local sources of supply.

The growth area is located within the Essex South WRZ managed by AWS. The WCS has identified that a long term plan is in place to manage the scale of growth proposed within the Local Plan across this WRZ.

8.8.5 Growth area specific policy

The following water policy areas are recommended for development for this growth area:

- Development coming forward before 2030 should be required to demonstrate available capacity at the WRC and the associated sewer network with AWS prior to submitting planning applications.
- An 85 l/p/d PCC target for new homes in these allocated sites; this will support both sustainable water resource provision as well as assist with short-term capacity issues at the WRC and limit impacts on sewer spills.
- Require SuDS built to the updated national SuDS standards to attenuate surface water runoff for flood risk purposes and be expected to manage, and where possible improve water quality, particularly nutrient discharge.
- Encourage developers of the site in Fingringhoe to contribute to NBS for riparian management.

8.9 Great Tey

8.9.1 Wastewater treatment summary

Is there capacity at the WRC for any new dwellings?	Yes – approximately 100 dwelling capacity.
Is there sufficient capacity for all new homes planned within the WRC catchment?	No – capacity would be exceeded by the end of the plan period.
Is there a WRC solution proposed in the current investment period to 2030?	No – although capacity is not likely to be used until the end of AMP9 (2035).
Is there a medium to long term WRC solution proposed in the AWS Drainage and Wastewater Management Plan?	No – No medium or long term plan proposed as the catchment was not considered a high risk catchment in the DWMP.
Can a future permit be implemented in the future to protect water quality within Technically Achievable Limits?	Yes – with relatively minor upgrades required.

8.9.2 Wastewater sewer capacity

Is there a risk of sewer outfall discharges increasing?	• The sewer network is largely separated so risk is generally low • There are no outfalls in the sewer catchment.

8.9.3 Catchment risks and opportunities

The allocated site is located in the Roman River WFD Water body catchment. Surface water runoff from this site has the potential to influence water quality within this WFD water body. The Great Tey WRC, which would treat wastewater from this site, also discharges to this water body.

The water body is failing to meet Good status, in part due to Phosphate levels being less than Good Status. Continuous sewage discharge, poor nutrient management, and physical modification of the waterbody are confirmed reasons for not achieving Good Status.

This highlights the need for development in this growth area to manage surface water through the provision of SuDS with a focus on managing water quality and to avoid development within riparian zones around watercourses. There are no identified NBS opportunities for the allocated site in Great Tey.

8.9.4 Water Supply

There is no water available for abstraction from surface water or groundwater in low flow conditions, and only restricted flows available in average to higher flows. Therefore, there is limited scope for development to consider local sources of supply.

The growth area is located within the Essex South WRZ managed by AWS. The WCS has identified that a long term plan is in place to manage the scale of growth proposed within the Local Plan across this WRZ.

8.9.5 Growth area specific policy

The following water policy areas are recommended for development for this growth area:

- An 85 l/p/d PCC target for new homes in these allocated sites; this will support both sustainable water resource provision as well as assist with long-term capacity issues at Great Tey WRC.
- Require SuDS built to the updated national SuDS standards to attenuate surface water runoff for flood risk purposes and be expected to manage, and where possible improve water quality, particularly nutrient discharge.

8.10 Langham & Boxted

8.10.1 Wastewater treatment summary

Is there capacity at the WRC for any new dwellings	No – at capacity.
Is there a WRC solution proposed in the current investment period to 2030?	No planned investment before 2030.
Is there a medium to long term WRC solution proposed in the AWS Drainage and Wastewater Management Plan?	No – no medium or long term plan proposed as the catchment was not assessed as high risk in the DWMP.
Can a future permit be implemented in the future to protect water quality within Technically Achievable Limits?	Yes – upgrades required may be significant.

There is potential for on-site wastewater treatment to reduce the burden on the WRC or if required to accommodate the planned development prior to delivery of future WRC improvement schemes. This is applicable to two of the sites at Langham which are strategic sites (over 150 dwellings) and where there is potential for inset providers to provide wastewater (and water supply infrastructure) outside of the AWS service area.

8.10.2 Wastewater sewer capacity

Is there a risk of sewer outfall discharges increasing?	• The sewer network is largely separated so risk is generally low. • There are no outfalls in the sewer catchment.

8.10.3Catchment risks and opportunities

Allocated sites are located in the Stour (d/s R. Brett) WFD Water body catchment. Surface water runoff from these sites has the potential to influence water quality within this WFD water body. The Langham WRC, which would treat wastewater from these sites, also discharges to this water body.

The water body is failing to meet Good status, in part due to phosphate and dissolved oxygen levels being less than Good Status. Water industry discharges, as well as poor nutrient management in the wider catchment are confirmed reasons for not achieving Good Status.

The underlying Essex Gravels groundwater body also has a Poor overall status, due to Poor chemical status.

This highlights the need for the development site in this growth area to manage surface water through the provision of SuDS with a focus on managing water quality.

There are no identified NBS opportunities for the allocated sites in Langham.

8.10.4 Water Supply

There is no water available for abstraction from surface water or groundwater in any flow condition. Therefore, there is limited scope for development to consider local sources of supply.

The growth area is located within the Essex South WRZ managed by AWS. The WCS has identified that a long term plan is in place to manage the scale of growth proposed within the Local Plan across this WRZ.

Site PP26 north of Boxted Straight Road, and site PP37 north of Park Lane, are large sites (greater than 150 dwellings) and of a scale where water reuse could be considered by developers for supplying non-potable uses to meet an 85l/p/d policy target (or lower).

8.10.5 Growth area specific policy

The following water policy areas are recommended for development for this growth area:

- Development coming forward before 2030 should be required to demonstrate available capacity at the WRC and the associated sewer network with AWS prior to submitting planning applications.
- Development may need to be phased in this catchment until after 2030 when a growth solution can be considered by AWS in the next AMP (AMP9).
- An 85 l/p/d PCC target for new homes in these allocated sites; this will support both sustainable water resource provision as well as assist with short-term capacity issues at Langham WRC.
- Require SuDS built to the updated national SuDS standards to attenuate surface water runoff for flood risk purposes and be expected to manage, and where possible improve water quality, particularly nutrient discharge.

8.11 Layer de-la-Haye

8.11.1Wastewater treatment summary

Is there capacity at the WRC for any new dwellings?	Yes – approximately 400 dwelling capacity.
Is there sufficient capacity for all new homes planned within the WRC catchment?	Yes.

8.11.2Wastewater sewer capacity

Is there a risk of sewer outfall discharges increasing?	There is one sewer outfall in the catchment, which is currently low risk (<10 spills per year).

8.11.3Catchment risks and opportunities

The allocated sites are located in the Roman River WFD Water body catchment. Surface water runoff from these sites has the potential to influence water quality within this WFD water body. The Layer de-la-Haye WRC, which would treat wastewater from these sites, also discharges to this water body.

The water body is failing to meet Good Status, in part due to Phosphate levels being less than Good Status. Continuous sewage discharge, poor nutrient management, and physical modification of the waterbody are confirmed reasons for not achieving Good Status.

The underlying Essex Gravels groundwater body also has a Poor overall status, due to Poor chemical status.

This highlights the need for developments in this growth area to manage surface water through the provision of SuDS with a focus on managing water quality and to avoid development within riparian zones around watercourses.

There are some identified NBS opportunities for the allocated sites in Layer-de-haye relating to runoff attenuation features. Developers should be encouraged to contribute towards NBS opportunities and incorporate similar NBS in their site as part of SuDS delivery. Opportunities for NBS can be seen in the inset Figure 8-8.

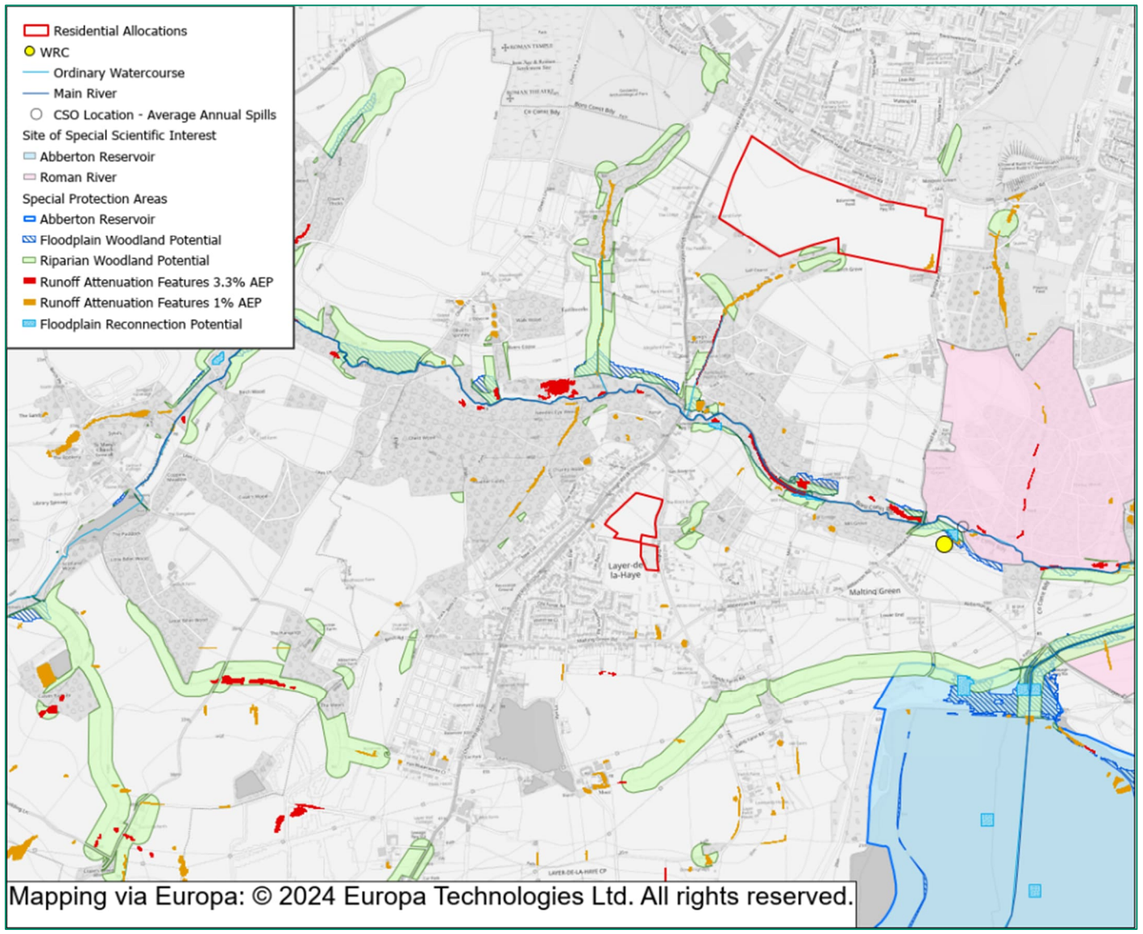


Figure 8-8: Location of water dependent habitats and NBS opportunities relative to sites in the Layer de-le-Haye area

8.11.4Water Supply

There is no water available for abstraction from surface water or groundwater in low flow conditions, and only restricted flows available in average to higher flows. Therefore, there is limited scope for development to consider local sources of supply.

The growth area is located within the Essex South WRZ managed by AWS. The WCS has identified that a long term plan is in place to manage the scale of growth proposed within the Local Plan across this WRZ.

8.11.5Growth area specific policy

The following water policy is recommended for development for this growth area: Require SuDS built to the updated national SuDS standards to attenuate surface water runoff for flood risk purposes and be expected to manage, and where possible improve water quality, particularly nutrient discharge.

8.12 Tiptree

8.12.1 Wastewater treatment summary

Is there capacity at the WRC for any new dwellings?	Yes – approximately 1,400 dwelling capacity.
Is there sufficient capacity for all new homes planned within the WRC catchment?	No – capacity would be exceeded but not until towards the end of the plan period (after 2038).
Is there a WRC solution proposed in the current investment period to 2030?	No – but capacity is not expected to be exceeded until after 2038 (in AMP10).
Is there a medium to long term WRC solution proposed in the AWS Drainage and Wastewater Management Plan	Yes – improvements to the network with a mixed strategy with the main solution of SuDs in the medium term. 50% surface water removal in the 2050 Strategy.
Can a future permit be implemented in the future to protect water quality within Technically Achievable Limits?	Yes – with upgrades which may be significant.

8.12.2 Wastewater sewer capacity

Is there a risk of sewer outfall discharges increasing?	• The sewer network is largely separated; however, the DWMP identifies a very significant risk in the baseline for the planning objective of storm overflows. • There are two outfalls in the sewer catchment, one is medium risk (1-9 spills), the other (at the WRC) is high risk (>10 spills); additional flow to the sewer may limit the efficacy of future spill reduction measures.

8.12.3Catchment risks and opportunities

Allocated sites are located in the Layer Brook WFD Water body catchment. Surface water runoff from these sites has the potential to influence water quality within this WFD water body. The Tiptree WRC which would treat wastewater from these sites, also discharges to this water body.

The water body is failing to meet Good Status, in part due to dissolved oxygen and phosphate levels being less than Good Status. Water industry discharges, as well as poor nutrient management in the wider catchment and physical modification of the waterbody are confirmed reasons for not achieving Good Status. The underlying Essex Gravels groundwater body also has a Poor overall status, due to Poor chemical status.

This highlights the need for developments in this growth area to manage surface water through the provision of SuDS with a focus on managing water quality and to avoid development within riparian zones around watercourses.

There are some limited identified NBS opportunities for the allocated sites in Tiptree including runoff attenuation features. Developers should be encouraged to contribute towards NBS opportunities and incorporate similar NBS in their site as part of SuDS delivery. NBS opportunities relative to the allocated sites is shown in the inset Figure 8-9.

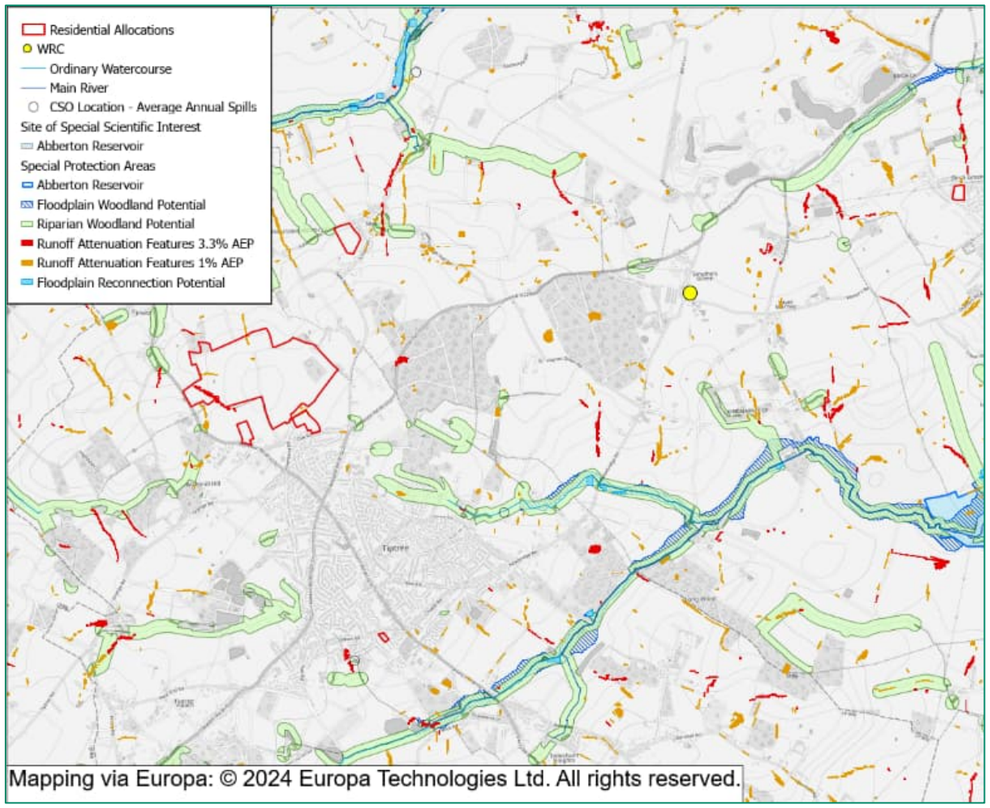


Figure 8-9: Location of water dependent habitats and NBS opportunities relative to allocated sites in Tiptree

8.12.4 Water Supply

There is no water available for abstraction from surface water or groundwater in very low to low flow conditions, and only restricted flows available in average to higher flows. Therefore, there is limited scope for development to consider local sources of supply. The growth area is located within the Essex South WRZ managed by AWS. The WCS has identified that a long term plan is in place to manage the scale of growth proposed within the Local Plan across this WRZ.

Site PP19 at Oak Road, Tiptree is a large site (600 dwellings) where water reuse could be considered for supplying non-potable uses to meet an 85l/p/d policy target (or lower).

8.12.5 Growth area specific policy

The following water policy areas are recommended for development for this growth area:

- An 85 l/p/d PCC target for new homes in these allocated sites; this will support both sustainable water resource provision as well as assist with longer-term capacity issues at Tiptree WRC and limit impacts on sewer spills.
- To enable CSO spills to be managed in the long-term, require all allocated development in these settlements to prevent surface water generated from sites being discharged to the foul sewer network.
- Require SuDS built to the updated national SuDS standards to attenuate surface water runoff for flood risk purposes and be expected to manage, and where possible improve water quality, particularly nutrient discharge.
- Encourage developers to contribute to NBS for the provision of surface water attenuation.

8.13 West Bergholt & Great Horkesley

8.13.1 Wastewater treatment summary

Is there capacity at the WRC for any new dwellings?	No – at capacity.
Is there a WRC solution proposed in the current investment period to 2030?	No – development coming forward before 2030 will need to evidence of agreed capacity with AWS.
Is there a medium to long term WRC solution proposed in the AWS Drainage and Wastewater Management Plan?	Yes – new permit requirement is identified in the medium term for the WRC.
Can a future permit be implemented in the future to protect water quality within Technically Achievable Limits?	Yes – with relatively minor upgrades required.

There is potential for on-site wastewater treatment to reduce the burden on the WRC or if required to accommodate the planned development prior to delivery of future WRC improvement schemes. This is applicable to the site 10691 which is a strategic sites (over 150 dwellings) and where there is potential for inset providers to provide wastewater (and water supply infrastructure) outside of the AWS service area.

8.13.2 Wastewater sewer capacity

Is there a risk of sewer outfall discharges increasing?	• The sewer network is largely separated so risk is generally low • There are two outfalls in the sewer catchment, one is low risk (zero spills), the other (at the WRC) is high risk (>10 spills); additional flow to the sewer may limit the efficacy of future spill reduction measures.

8.13.3 Catchment risks and opportunities

Allocated sites are located in the River Colne (d/s Doe's Corner) WFD Water body catchment. Surface water runoff from these sites has the potential to influence water quality within this WFD water body. The West Bergholt WRC, which would treat wastewater from these sites, also discharges to this water body.

The water body is failing to meet Good status, in part due to Phosphate levels being less than Good Status. Continuous sewage discharge, poor nutrient management in the wider catchment and physical modification are confirmed reasons for not achieving Good status. The underlying Essex Gravels groundwater body also has a Poor overall status, due to Poor chemical status. This highlights the need for developments in this growth area to manage surface water through the provision of SuDS with a focus on managing water quality and to avoid development within riparian zones around watercourses.

There are identified NBS opportunities for the allocated sites in West Bergholt including riparian woodland planting potential. Developers should be encouraged to contribute towards NBS opportunities which are shown in inset Figure 8-10.

8.13.4 Water Supply

There is no water available for abstraction from surface water or groundwater in average to low flow conditions, and only restricted flows available in higher flows. Therefore, there is limited scope for development to consider local sources of supply.

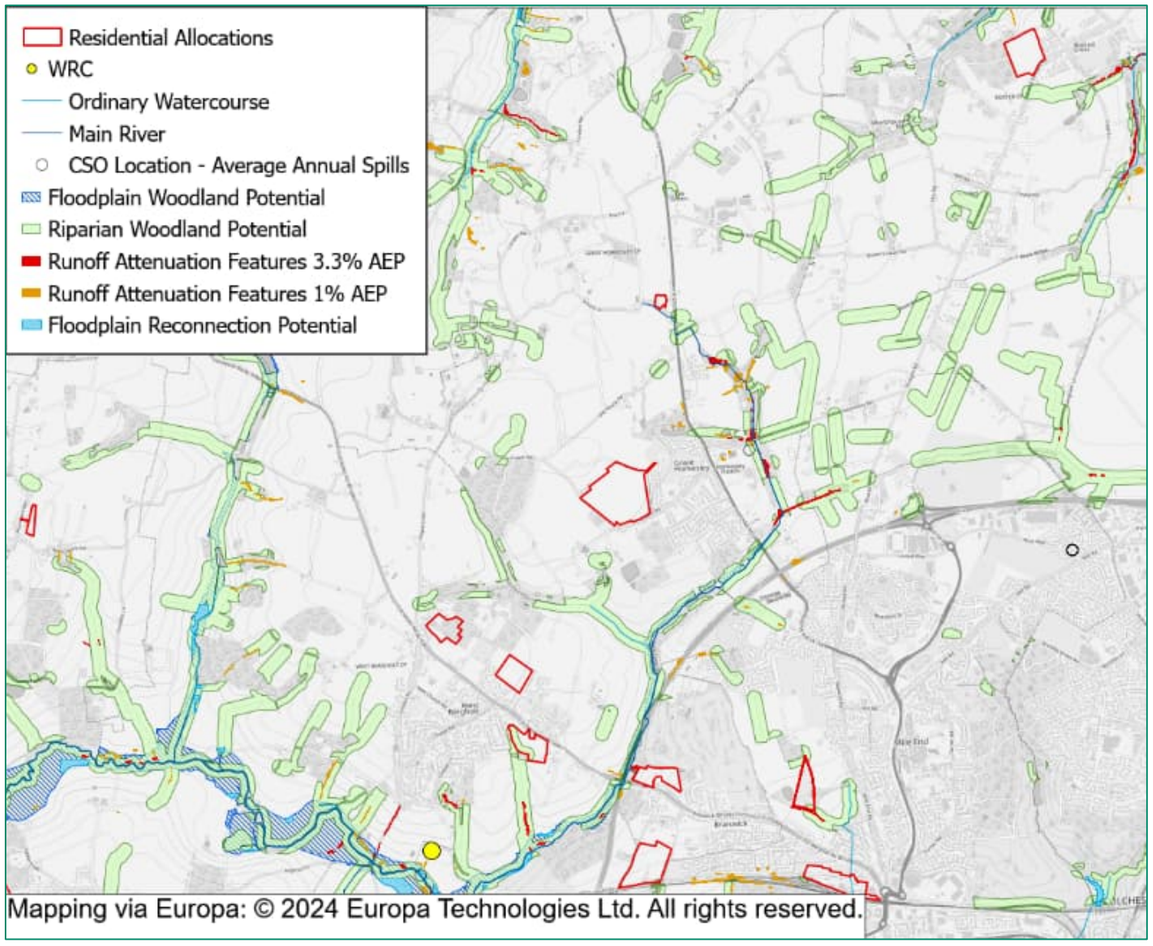


Figure 8-10: Location of NBS opportunities relative to allocated sites in Tiptree

The growth area is located within the Essex South WRZ managed by AWS. The WCS has identified that a long term plan is in place to manage the scale of growth proposed within the Local Plan across this WRZ. Site PP34 at Land North of Coach Road, is a large site (400 dwellings) where water reuse could be considered for supplying non-potable uses to meet an 85l/p/d policy target (or lower).

8.13.5 Growth area specific policy

The following water policy areas are recommended for development for this growth area:

- Development coming forward before 2030 should be required to demonstrate available capacity at the WRC and the associated sewer network with AWS prior to submitting planning applications.
- An 85 l/p/d PCC target for new homes in these allocated sites; this will support both sustainable water resource provision as well as assist with short-term capacity issues at West Bergholt WRC and limit impacts on sewer spills.
- To enable CSO spills to be managed in the long-term, require all allocated development in these settlements to prevent surface water generated from sites being discharged to the foul sewer network.
- Require SuDS built to the updated national SuDS standards to attenuate surface water runoff for flood risk purposes and be expected to manage, and where possible improve water quality, particularly nutrient discharge.
- Encourage developers to contribute to NBS for riparian management and provision of surface water attenuation.

8.14 West Mersea

8.14.1Wastewater treatment summary

Is there capacity at the WRC for any new dwellings?	Yes – approximately 1,800 dwelling capacity.
Is there sufficient capacity for all new homes planned within the WRC catchment?	Yes.

8.14.2Wastewater sewer capacity

Is there a risk of sewer outfall discharges increasing?	• The sewer network is separated within West Mersea • However, the DWMP identifies West Mersea WCS as having a very significant risk related to the planning objective of managing storm overflows, indicating there is a sewer spill risk in the catchment – this may affect bathing water quality

8.14.3Catchment risks and opportunities

The allocated sites are located in area of CCC which eventually drain to the Blackwater Outer WFD Coastal Water Body. Surface water runoff from these sites has the potential to influence water quality within this WFD water body. The West Mersea WRC, which would treat wastewater from these sites, also discharges to this water body.

The water body is failing to meet Good Status, in part due to Nitrogen levels being less than Good Status.

The Essex Gravels groundwater body (which underlies some parts of West Mersea) also has a Poor overall status, due to Poor chemical status.

This highlights the need for developments in this growth area to manage surface water through the provision of SuDS with a focus on managing water quality.

There are limited identified NBS opportunities for the allocated sites in West Mersea. This is demonstrated in inset Figure 8-11.

8.14.4Water Supply

The growth area is located within the Essex South WRZ managed by AWS. The WCS has identified that a long term plan is in place to manage the scale of growth proposed within the Local Plan across this WRZ. Both the allocated sites within West Mersea (see 8.14.2) are large sites (greater than 150 dwellings) and of a scale where water re-use could be considered by developers for supplying non-potable uses to meet an 85l/p/d policy target (or lower):

Site PP23 at Land East of Dawes Lane, is a large site (300 dwellings) and of a scale where water reuse could be considered by developers for supplying non-potable uses to meet an 85l/p/d policy target (or lower).

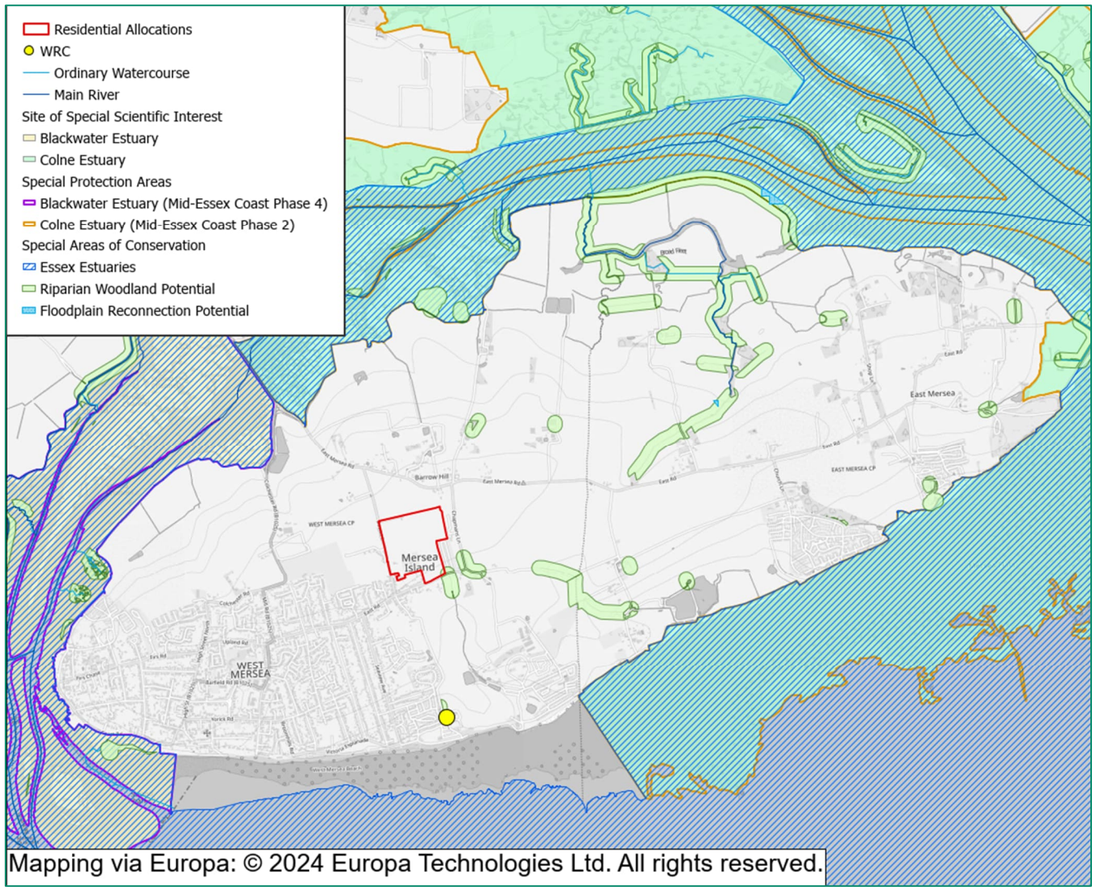


Figure 8-11: Location of water dependent habitat and NBS opportunities relative to allocated sites in Mersea

8.14.5Growth area specific policy

The following water policy areas are recommended for development for this growth area:

- Require SuDS built to the updated national SuDS standards to attenuate surface water runoff for flood risk purposes and be expected to manage, and where possible improve water quality, particularly nutrient discharge.
- To enable CSO spills to be managed in the long-term, require all allocated development in these settlements to prevent surface water generated from sites being discharged to the foul sewer network.

9. Policy recommendations

Based on the assessments completed, the following policy recommendations have been put forward to CCC for consideration as part of the Local Plan development.

9.1.1 Per capita consumption – domestic

The CCC area is classified as water stressed by the Environment Agency, and the AWS supply zone within which CCC is located, is predicted to have a deficit of supply (demand exceeds supply) from 2025, without water resource management intervention. Whilst AWS have identified demand management measures, and new (or changed) water supply options to manage this deficit in the long term, this will require significant investment with uncertainties in the timescale for delivery. Therefore, there is strong evidence that a stricter PCC policy for new development would significantly contribute to managing and maintaining a surplus of supply within the CCC area. This is in keeping with Government plans to address water scarcity in response to the Environment Act 2021.

Additionally, the wastewater assessment has shown that proposed dwellings in most allocations being restricted to a water use of 85 l/p/d would significantly improve the available capacity at WRCs across the CCC area, and in some cases, removing the need for an improvement scheme to be implemented in the plan period.

It is recommended that a policy requiring all dwellings within allocated sites within the Local Plan to meet a PCC target of 85l/p/d. This WCS has set out evidence for why this target is applicable and how it can be achieved.

9.1.2 Confirmation of WRC capacity in key locations

There is no (or limited) baseline wastewater treatment capacity in some WRCs, for which some have no improvement plans proposed in the current 5-year water company investment period (AMP8 – from 2025 to 2030). Development within WRC drainage catchments which have this constraint should be subject to a policy whereby developers must demonstrate they have confirmed with AWS that treatment capacity is available to serve the development at the point of anticipated connection, until such time as a WRC improvement plan is in place. This is to enable AWS to serve developments once occupied without breaching WRC discharge permit conditions and hence protect downstream water quality and connected water dependent habitats.

The WCS recommends this is implemented for development in the following WRC drainage catchments:

- Colchester (until 2028 when the interim monitoring issue should be resolved)
- Dedham;
- Fingringhoe;
- Langham; and
- West Bergholt.

9.1.3 SuDS and surface water management:

All new developments to provide separate surface water drainage systems and incorporate SuDS in accordance with the updated national SUDS standards and good practice guidance. Require SuDS to attenuate surface water runoff for flood risk purposes and be expected to manage, and where possible improve water quality, particularly nutrient discharge.

9.2 Consultation recommendations

Specific areas for further consultation have been identified as follows:

9.2.1 AWS for wastewater

- Further discussion around the implications of the development on existing infrastructure capacity and investment needed to accommodate the development, including any significant local network constraints that might impact on the ability to deliver. To include more detailed understanding of dependence on further investment and the planned timing, and expectations for those catchments where the investment needs have not been defined or highlighted as needing investment in the DWMP. Also to clarify investment expected to be delivered as per the current business plan.
- Discussion around potential opportunities for development to contribute to investment, either through financial contributions or delivery as part of the development to consider how this may feed into policy.
- Discussion around expectations for consultation and involvement as the Local Plan is developed and as developments subsequently come forward to manage future delivery risks, particularly where there are no identified growth solutions in WRC catchments which have limited capacity to 2030.

9.2.2 AWS and AW for water supply

- Details of growth forecasts used in the final WRMP, including timing, and any implications in relation to the numbers and trajectory being considered for the emerging Local Plan.
- Discussion around the implications of the development on existing infrastructure capacity and investment needed to accommodate the development, including any significant local network constraints that might impact on the ability to deliver.
- Discussion around potential opportunities for development to contribute to investment, either through financial contributions or delivery as part of the development to consider how this may feed into policy.

Appendix A - Policy and legislative drivers shaping the WCS

A.1 WFD surface water body status

Status	Description
High	Near natural conditions. No restriction on the beneficial uses of the water body. No impacts on amenity, wildlife or fisheries
Good	Slight change from natural conditions as a result of human activity. No restriction on the beneficial uses of the water body. No impact on amenity or fisheries. Protects all but the most sensitive wildlife.
Moderate	Moderate change from natural conditions as a result of human activity. Some restriction on the beneficial uses of the water body. No impact on amenity. Some impact on wildlife and fisheries.
Poor	Major change from natural conditions as a result of human activity. Some restrictions on the beneficial uses of the waterbody. Some impact on amenity. Moderate impact on wildlife and fisheries.
Bad	Severe change from natural conditions as a result of human activity. Significant restriction on the beneficial uses of the water body. Major impact on amenity. Major impact on wildlife and fisheries with many species not present.

A.2 Relevant Legislation

Directive/Legislation/Guidance	Description
The Conservation of Offshore Marine Habitats and Species Regulations 2017	Provides for the designation of Special Protection Areas.
Building Regulations Approved Document G – sanitation, hot water safety and water efficiency (March 2010)	The current edition covers the standards required for cold water supply, water efficiency, hot water supply and systems, sanitary conveniences and washing facilities, bathrooms and kitchens and food preparation areas.
Environment Act 1995	Sets out the role and responsibility of the Environment Agency.
Environment Act 2021	Provides a legal framework for environmental governance in the UK. Brings in measures for improvement of the environment in relation to waste, resource efficiency, air quality, water, nature and biodiversity, and conservation.
Environmental Protection Act 1990	Integrated Pollution Control (IPC) system for emissions to air, land and water.
Flood & Water Management Act 2010	The Flood and Water Management Act 2010 is the outcome of a thorough review of the responsibilities of regulators, local authorities, water companies and other stakeholders in the management of flood risk and the water industry in the UK. Its key features relevant to this WCS are: 1. To give the Environment Agency an overview of all flood and coastal erosion risk management and unitary and county councils the lead in managing the risk of all local floods. 2. To encourage the uptake of sustainable drainage systems by removing the automatic right to connect to sewers and providing for unitary and county councils to adopt SuDS for new developments and redevelopments. 3. To widen the list of uses of water that water companies can control during periods of water shortage and enable Government to add to and remove uses from the list. 4. To enable water and sewerage companies to operate concessionary schemes for community groups on surface water drainage charges. 5. To make it easier for water and sewerage companies to develop and implement social tariffs where companies consider there is a good cause to do so, and in light of guidance that will be issued by the Secretary of State following a full public consultation.
Future Water, February 2008	Sets the Government's vision for water in England to 2030. The strategy sets out an integrated approach to the sustainable management of all aspects of the water cycle, from rainfall and drainage, through to treatment and discharge, focusing on practical ways to achieve the vision to ensure sustainable use of water. The aim is to ensure sustainable delivery of water supplies and help improve the water environment for future generations.

Directive/Legislation/Guidance	Description
The Groundwater (Water Framework Directive) (England) Direction 2016	To protect groundwater against pollution by 'List 1 and 2' Dangerous Substances.
The Conservation of Habitats and Species Regulations 2017	To conserve the natural habitats and to conserve wild fauna and flora with the main aim to promote the maintenance of biodiversity taking account of social, economic, cultural and regional requirements. In relation to abstractions and discharges, can require changes to these through if they are impacting on designated European Sites. Also, the legislation that provides for the designation of Special Areas of Conservation provides special protection to certain non-avian species and sets out the requirement for Appropriate Assessment of projects and plans likely to have a significant effect on an internationally designated wildlife site.
Land Drainage Act 1991	Sets out the statutory roles and responsibilities of key organisations such as Internal Drainage Boards, local authorities, the Environment Agency and Riparian owners with jurisdiction over watercourses and land drainage infrastructure.
National Planning Policy Framework	Planning policy in the UK is set by the National Planning Policy Framework (NPPF). NPPF advises local authorities and others on planning policy and operation of the planning system. A WCS helps to balance the requirements of various planning policy documents and ensure that land-use planning and water cycle infrastructure provision is sustainable.
Pollution Prevention and Control Act (PPCA) 1999	Implements the IPPC Directive. Replaces IPC with a Pollution Prevention and Control (PPC) system, which is similar but applies to a wider range of installations.
Ramsar Convention	Provides for the designation of wetlands of international importance
Urban Waste Water Treatment Directive (UWWTD)	This Directive concerns the collection, treatment and discharge of urban waste water and the treatment and discharge of waste water from certain industrial sectors. Its aim is to protect the environment from any adverse effects caused by the discharge of such waters.
Water Act 2003	Implements changes to the water abstraction management system and to regulatory arrangements to make water use more sustainable.
The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017	The WFD, combines water quantity and water quality issues together. An integrated approach to the management of all freshwater bodies, groundwaters, estuaries and coastal waters at the river basin level has been adopted. The overall requirement of the directive is that all river basins must achieve 'Good ecological status' by 2015 or by 2027 if there are no grounds for derogation. The Environment Agency is the body responsible for the implementation of the WFD in the UK. The Environment Agency have been supported by UKTAG[32], an advisory body which has proposed water quality, ecology, water abstraction and river flow standards to be adopted in order to ensure that the water bodies in the UK (including groundwater) meet the required status[33]. Standards and waterbody classifications are published via River Management Plans (RBMP) the latest of which were completed in 2015.
Natural Environment & Rural Communities Act 2006	Covering Duties of public bodies – recognises that biodiversity is core to sustainable communities and that Public bodies have a statutory duty that states that "every public authority must, in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity.
Water Resources Act 1991	Protection of the quantity and quality of water resources and aquatic habitats. Parts have been amended by the Water Act 2003.
Wildlife & Countryside Act 1981 (as amended)	Legislation that provides for the protection and designation of SSSIs and specific protection for certain species of animal and plant among other provisions.

A.3 Strategies and plans

Category	Author	Document Name	Publication Date
Flood Risk	AECOM	Colchester City Council Level 1 Strategic Flood Risk Assessment	2024
Flood Risk	ECC	Essex Local Flood Risk Management Strategy	2018
Water Resources	Defra	Storm overflows discharge reduction plan	2023

[32] The UKTAG (UK Technical Advisory Group) is a working group of experts drawn from environment and conservation agencies. It was formed to provide technical advice to the UK's government administrations and its own member agencies. The UKTAG also includes representatives from the Republic of Ireland.
[33] UK Environmental Standards and Conditions (Phase I) Final Report, April 2008, UK Technical Advisory Group on the Water Framework Directive.

Category	Author	Document Name	Publication Date
Water Resources	DEFRA	Integrated Plan for Delivering Clean and Plentiful Water	2023
Water Resources	DEFRA	Environmental Improvement Plan	2023
Water Resources	AWS	Water Resources Management Plan	2024
Water Resources	AW	Water Resources Management Plan	2024
Water Resources	AWS	Drainage and Wastewater Management Plan	2024
Water Resources	WRE	Regional Water Resources Plan for Water Resources East	2023
Water Resources	Essex County Council	Water Strategy for Essex	2024
Water Resources	Essex County Council	Essex Local Nature Recovery Strategy	2024
Water Resources	AWS	Demand Management Preferred Plan	2023
Water Resources / Flood Risk	Environment Agency	Anglian River Basin District River Basin Management Plan	2016

Appendix B – WRC capacity assessment methodologies

B1: Approach overview

An increase in residential and employment growth will have a corresponding increase in the volume and flow of wastewater generated within the study area, therefore it is essential to consider the capacity of each WRC in the study area to accept this additional wastewater flow. WRC capacity is considered in terms of flow capacity and environmental capacity.

WRC flow capacity

The flow (or treatment headroom) capacity of a WRC is defined as the volume of additional flow that a WRC can treat before it would exceed the volume of discharge it is allowed to discharge within the conditions of its discharge permit. The following questions were answered through the assessment:

- Is there sufficient treatment capacity (headroom) within existing WRCs?
- What new infrastructure is required to provide for the additional wastewater treatment?

Environmental capacity

Environmental capacity is defined in this WCS as the water quality needed in the receiving waterbodies to maintain the current (and future required) conditions of aquatic environments. The following objectives are answered through an assessment of environmental capacity using modelling and calculation techniques:

- Could an increase in WRC discharge cause deterioration in water quality?
- Could an increase in WRC discharge cause deterioration in WFD status of any element of a water body? It is a requirement of the WFD to prevent status deterioration.
- Could development alone prevent the receiving water from achieving its Future Target WFD Status or Potential? This is also a requirement of the WFD, which can be separated into the following two objectives:
    - Is the Future Target Status possible now assuming adoption of best available technology? To determine if it is TAL that would prevent the Future Target Status being achieved.
    - Is the Future Target Status technically possible after development and adoption of best available technology? To determine if it is growth that would prevent the Future Target Status being achieved.
- Will development cause deterioration in downstream designated water-dependent sites?

Assumptions and input data

Several key assumptions were used in the assessments as follows:

- The wastewater generation per new household was based on an assumed Occupancy Rate (OR) of 2.07 people per house and an average consumption of 125 l/p/d).
- Employment numbers are uncertain, therefore an allowance for future employment has been based on a 10% increase in water demand per household.
- The dwelling capacity assessment requires an estimate of water which would enter the drainage network via groundwater or water in the soil (called ‘infiltration’) as this uses available treatment capacity. A global assumption has been applied whereby a percentage of the water used by new dwellings would be added to as infiltration once in the sewer network to allow for this aspect. The infiltration percentage was set to 25% of water used.

- The WRC current/measured discharge flows were taken as the Q80 of measured flow to give the Dry Weather Flow (DWF) assumption. Measured flows were provided by AWS in 2024 (using the 3 years of data 2021 to 2023). Future discharge flows at each WRC were calculated by adding the volume of additional wastewater generated by new dwellings and employment (using an OR of 2.07 and a consumption value of 125l/p/d multiplied by 1.35[34]) to the current permitted DWF value.
- Whilst measured DWF estimates (pre growth) generally assume three years of data (2021 to 2023 in this case), the Q_{80} flow value for Colchester WRC was calculated using only the 2021 and 2022 values. This is because AWS' monitored data for 2023 from the WRC is not representative owning to a temporary relocation of the meter which monitors flow.
- WRC current discharge quality was taken as the last three years of permit monitoring data where available for each WRC, or the current permitted limits for each water quality element, allowing for recent AMP 7 improvements in phosphate consents where advised by AWS. Where monitoring data was not available, figures for the mean and standard deviation of each element were calculated based on permit levels using RQP 2.5 software.
- Raw river water quality data for modelling was taken from the Environment Agency WIMS database where available, using the nearest upstream monitoring locations and taking the last three years of data. Where no data was available, the current WFD Status was used, taking Status mid-points for each parameter.
- The WFD 'no deterioration' target for each WRC was the current Status for each water quality element of the receiving water body, based on the latest Status from the Catchment Data Explorer.
- For the purposes of this study, TAL for each determinant are considered to be:
  - 5mg/l for BOD;
  - 1mg/l for Ammoniacal-N; and
  - 0.25mg/l for Phosphate.

B2: Assessment methodology

WRC Flow capacity assessment

This assessment was the first step to determine both flow capacity and which WRC required water quality assessment. It also informed the type and complexity of water quality assessment required.

A WRC flow headroom calculator was developed and used to inform this assessment. The calculator identified which WRC within the study area will receive future growth based on allocation sites and existing commitment site locations.

The permitted flow headroom capacity within an existing permit is assumed to be usable; therefore, the following steps were applied to calculate approximately how much available headroom each WRC has:

1. Determine the quantity of growth within a WRC catchment to determine the additional flow expected at each WRC;
2. Calculate the additional wastewater flow generated at each WRC;
3. Calculate the remaining permitted flow headroom at each WRC;
4. Determine whether the growth can be accommodated within existing headroom (or PE allowance).

Results are presented Appendix C.

[34] 10% for employment, and 25% for infiltration

Environmental capacity – water quality assessment

Water quality assessment was then required whenever levels of growth (and hence wastewater generation) were defined as significant in relation to the available headroom at a WRC or the sensitivity of the watercourse receiving the treated flows; this defined the environmental capacity.

The water quality assessment determines whether significant growth served by a WRC has the potential to result in water quality impacts on receiving watercourse and is a key tool to determine where WRC treatment upgrades, or new treatment solutions may be required. In the context of the WCS aims, significant growth is defined as being when the future wastewater flows would result in:

- a WRC exceeding its permitted headroom and require a new discharge permit; or,
- a WRC having less than 10% remaining headroom when compared to the DWF permit limit.

WRCs which would receive significant growth and where they discharge to a fluvial (freshwater) water body, were identified for water quality modelling using the River Quality Planning tool (RQP). WRCs which would receive growth but where the growth is considered not to be significant (greater than 10% residual headroom after growth) had a simpler load standstill calculation undertaken to consider water quality implications. WRCs which would receive significant growth and which discharge to tidal water bodies also had load standstill calculations undertaken, and not RQP. WRCs which would receive no growth were scoped out of the assessment.

RQP Modelling

Modelling of the quality permits required to meet the two WFD requirements (no deterioration and future target Status) was undertaken, using RQP 2.5 (River Quality Planning). This tool is the Environment Agency's software for calculating permit conditions.

The software is a monte-carlo based statistical tool that determines what statistical quality is required from discharges to meet defined downstream targets, or to determine the impact of a discharge on downstream water quality compliance statistics. Modelling was completed for four tests under two main banners of 'no deterioration' and 'meeting future WFD Status':

Step 1: No deterioration – modelling to determine:

1.1. *Test C1*: the permit required after growth but which would maintain the same river quality at the discharge mixing point as modelled for the current discharge volume. This would ensure no deterioration from the current river condition;

1.2. *Test C2:* the permit required after growth but which would limit deterioration in the river at the mixing point to less than 10% of the current modelled quality; and,

1.3. *Test C3:* the permit required after growth that would ensure no deterioration in WFD status of the waterbody at the mixing point.

Step 2: whether growth would prevent future objective WFD status from being attained.

<u>Step 1 – 'No Deterioration' – Tests C1 to C3</u>

Table B-1 provides detail on each of the modelling steps related to no deterioration and the sequence in which these are performed.

Table B-1: Step 1, no deterioration tests, C1, C2 and C3.

Test Ref	Calculation Name	Calculation Detail	Reason for Calculation
C1	Maintain mixing point quality	No change in current modelled discharge quality at mixing point	To determine if it is technically feasible to ensure no change in current quality as a result of growth

C2	Limit deterioration to 10%	No deterioration from current downstream quality + 10% with future effluent flow	To determine if it is technically feasible to limit deterioration to no more than 10% of the current downstream water quality
C3	No deterioration (Current)	No deterioration from current status with current effluent flow	To calculate what quality condition is currently needed to avoid deterioration in the current status downstream with the current flow

If 'No Deterioration' could be achieved, then a proposed discharge permit standard was calculated which will be needed as soon as the growth causes the WRC flow permit to be exceeded.

Step 2 – Meeting Future 'Good' Status – C4 and C5

For all WRC meeting the requirement for RQP modelling, and where the current downstream quality of the receiving watercourse is less than good, a calculation was undertaken to determine if the receiving watercourse could achieve its future objective status as set out in the online Catchment Data Explorer, with the proposed growth within Technically Achievable Limits (TAL) treatment technology and what permit limits would be required to achieve this.

The assessment of attainment of future status assumed that other measures will be put in place to ensure the target status upstream, so that the modelling assumed upstream water quality is at the midpoint of the target status for each element and set the downstream target as the lower boundary of the target status for each element.

If the target status could be achieved with growth with permits achievable within TAL, then a proposed discharge permit standard which may be needed in the future was determined.

If the modelling showed that the watercourse could not meet future target status with the proposed growth within TAL, then the scenario is rerun with current WRC flows. If the additional run shows that future targets could be met without growth, then it is concluded that growth would be a limiting factor in achieving the future target status and an alternative solution is required. If the modelling shows the future target status could not be achieved either with, or without growth, then the planned growth is concluded not to be a limiting factor in future target status requirements.

Table B-2: Step 2, meeting future 'Good' status, C4 and C5

Test Ref	Calculation Name	Calculation Detail	Reason for Calculation
C4	Achieve target status (Current)	Achieving target status with current effluent flow	To test what effluent quality would be needed to achieve target status with the current flow permit
C5	Achieve target status (Future)	Achieving target status with future effluent flow	To assess whether the future quality permit limits needed to achieve target status will be significantly more onerous and difficult to achieve than those currently needed (calculation 4)

Results are presented in Appendix E.

Load standstill calculations

For WRC where growth was not significant (more than 10% capacity remaining after growth), or where the growth is significant and the discharge is to a tidal water body, load standstill calculations were undertaken using Microsoft Excel. This used estimates of current measured flow at each WRC (Q80) to determine load amounts based on current permitted conditions for each quality parameter. These load amounts were then compared to the load amounts that would occur with the same quality conditions applied but for the calculated WRC flow once growth had been accounted for. The goal seek took in Excel was then used to adjust the future quality conditions required for each parameter to reduce future load amounts back to the load amounts calculated.

Where the quality conditions would need to be less than the TAL, then a new solution was deemed to be required.

Load standstill results are presented in Appendix D.

Appendix C – WRC flow capacity results

Table C1 sets out the results of the WRC headroom capacity assessment for each WRC receiving growth from allocations within the Colchester Local Plan.

Table C1: Headroom capacity assessment summary

Water Recycling Centres	Total dwelling numbers assessed	DWF Permitted flow (m3/d)	Current measured DWF (Q80) (m3/d)	Headroom Capacity pre-growth (m3/d)	Post growth DWF estimate (m3/d)	Headroom Capacity post-growth (m3/d)	Percentage capacity after growth
Birch	17	300	163.7	136	170	130	43%
Colchester	11,138	29,284	26,494	2,789	31,211	-1,927	-7%
Copford	3,460	1,650	1,102	547	2,568	-918	-56%
Dedham	15	610	659.5	-50	666	-56	-9%
Earls Colne	237	934	847.0	87	947	-13	-1%
Eight Ash Green	516	650	441.7	208	660	-10	-2%
Fingringhoe	135	367	374.1	-7	431	-64	-18%
Great Tey	156	142	95.0	47	161	-19	-13%
Langham	1,093	420	483.6	-64	946	-526	-125%
Layer de-la-Haye	140	380	258.5	121	318	62	16%
Tiptree	1,292	2,400	1,938	461	2,486	-86	-4%
West Bergholt	665	1,430	1,498	-69	1,780	-350	-24%
West Mersea	465	2,000	1,429	570	1,626	374	19%

Appendix D – Load standstill results

A summary of the results from the water quality assessment using the load standstill method are included in this section and presented in Table D1.

Table D1: Load standstill results	Birch WRC	Colchester WRC	Fingringhoe WRC	Layer de-la-Haye WRC	West Mersea WRC
Current BOD Technically Achievable Limit (mg/l – 95th percentile)	5	5	5	5	5
Current Ammonia Technically Achievable Limit (mg/l – 95th percentile)	1	1	1	1	1
Current Phosphate Technically Achievable Limit (mg/l - AA)	0.25	0.25	0.25	0.25	0.25
Current DWF Permit (m3/day)	300	29,284	367	380	2,000
Measured flow Q80 (m3 /day)	164	26,495	374	259	1,430
Current DWF capacity (m3 /day)	136	2,789	0	121	570
BOD Permit limits (mg/l - 95% percentile)	15	35	20	30	25
Ammonia Permit Limits (mg/l - 95% percentile)	15	15	-	10	-
Phosphate Permit Limits (mg/l - annual average)	-	-	-	1	-
Future DWF (m3 /day)	171	31,211	431	318	1,626
Discharge Permit required*					
Effluent Quality permit required for BOD (mg/l - 95% percentile)	**14.4**	**29.7**	**17.4**	**24.4**	**20.1**
Effluent Quality permit required for Ammonia (mg/l - 95% percentile)	**14.4**	**12.7**	**-**	**8.1**	**-**
Effluent Quality permit required for Phosphate (mg/l - annual average)	-	-	-	**0.81**	-

* **Colour key**: **Green – no change to permit**; **Amber – change tightening, but within TAL**; **permit required not achievable within TAL.**

Appendix E - RQP assessment results

The results from the water quality assessment using the RQP tool are included in this Appendix. A summary table of results is provided first, followed by an explanation of the findings for each WRC.

	TIPTREE - WRC			GREAT TEY - WRC			Langham - WRC			West Bergholt - WRC		
Parameters considered	Ammonia (mg/l - 95%ile)	BOD (mg/l - 95%ile)	Phosphate (mg/l - mean)	Ammonia (mg/l - 95%ile)	BOD (mg/l - 95%ile)	Phosphate (mg/l - mean)	Ammonia (mg/l - 95%ile)	BOD (mg/l - 95%ile)	Phosphate (mg/l - mean)	Ammonia (mg/l - 95%ile)	BOD (mg/l - 95%ile)	Phosphate (mg/l - mean)
Permit condition	4	10	N/A	No permit condition	30	No permit condition	7	15	1	10	30	0.5
Measured quality of current discharge (taken from RQP output)	3.09	8.16	2.03	Not measured	34.54		4.49	10.99	0.228	6.33	19.46	0.5
Technically achievable limits (TAL)	1	5	0.25	1	5	0.25	1	5	0.25	1	5	0.25
WFD receiving waterbody and WFD Waterbody ID	**Layer Brook Water Body (GB105037034130)**			**Roman River Water Body (GB105037034150)**			**Lower Stour Water Body (GB105036041000)**			**Colne (d/s Doe's Corner) Water Body (GB105037041330)**		
Parameters considered	Ammonia (mgl - 90%ile)	BOD (mgl - 90%ile)	Phosphate (mgl - mean)	Ammonia (mgl - 90%ile)	BOD (mgl - 90%ile)	Phosphate (mgl - mean)	Ammonia (mgl - 90%ile)	BOD (mgl - 90%ile)	Phosphate (mgl - mean)	Ammonia (mgl - 90%ile)	BOD (mgl - 90%ile)	Phosphate (mgl - mean)
Receiving waterbody Quality Element Published Status	**High**	**Moderate**	**Poor**	**Good**	**High**	**Poor**	**HIgh**	**N/A**	**Moderate**	**High**	**High**	**Poor**
Upstream sample point	**No upstream monitoring pt available for Ammonia and BOD. Phosphate data taken from Layer Brook Brook Hall (RR0346)**			**No upstream monitoring pt available. Phosphate data taken from ROMAN RIVER E.W.CO. INTAKE (RR01)**			No upstream monitoring pt available for Ammonia and BOD.			No upstream monitoring pt available for Ammonia and BOD.		
Measured quality upstream of discharge	N/A - no data (Status mid pt used)	N/A - no data (Status mid pt used)	N/A - no data (Status mid pt used)	N/A - no data (Status mid pt used)	N/A - no data (Status mid pt used)	N/A - no data (Status mid pt used)	N/A - no data (Status mid pt used)	N/A - no data (Status mid pt used)	N/A - no data (Status mid pt used)	N/A - no data (Status mid pt used)	N/A - no data (Status mid pt used)	N/A - no data (Status mid pt used)
Quality Element Status based on measured data	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
Test 1 - Maintain Current Quality and limit to 10% deterioration	Ammonia (mg/l)	BOD (mg/l)	Phosphate (mg/l)	Ammonia (mg/l)	BOD (mg/l)	Phosphate (mg/l)	Ammonia (mg/l)	BOD (mg/l)	Phosphate (mg/l)	Ammonia (mg/l)	BOD (mg/l)	Phosphate (mg/l)
Mixing Point Quality with current WRC flow	1.37	6.48	1.68		3.44		0.98		0.44	0.35	2.65	1.09
Modelled status at mixing point with current flow	**Poor**	**Poor**	**Poor**		**HIgh**		**Moderate**		**Poor**	**Good**	**HIgh**	**Poor**
Permit condition required to maintain mixing point quality	2.87	9.31	1.99		23.59		3.19		0.74	5.41	17.1	0.57
river target to limit to 10% deterioration limit	1.51	7.13	1.85	0.00	3.78	0.00	1.08		0.48	0.39	2.92	1.20
Permit condition required to be within 10% deterioration target	3.17	10.28	2.21		27.59		3.53		0.84	6.41	22.25	2.92
Test 2 - WFD Status: no deterioration (waterbody status)	Ammonia (mg/l)	BOD (mg/l)	Phosphate (mg/l)	Ammonia (mg/l)	BOD (mg/l)	Phosphate (mg/l)	Ammonia (mg/l)	BOD (mg/l)	Phosphate (mg/l)	Ammonia (mg/l)	BOD (mg/l)	Phosphate (mg/l)
Threshold at which status deterioration would occur	0.30	6.50	1.029		4.00		0.30		0.228	0.30	4.00	1.111
permit condition required at mixing point - current WRC flow	**0.63**	9.53	1.18		46.27		1.17		**0.22**	4.88	45.76	1
permit condition required at mixing point - after growth	**0.59**	9.34	1.15		30.02		**0.84**		**0.22**	4.19	39.28	1.02
Test 3 - Future WFD Status	Ammonia 90%ile (mg/l)	BOD 90%ile (mg/l)	Phosphate mean (mg/l)	Ammonia 90%ile (mg/l)	BOD 90%ile (mg/l)	Phosphate mean (mg/l)	Ammonia 90%ile (mg/l)	BOD 90%ile (mg/l)	Phosphate mean (mg/l)	Ammonia 90%ile (mg/l)	BOD 90%ile (mg/l)	Phosphate mean (mg/l)
Is future objective /target WFD status higher than the current status?	No - test not required	Yes	Yes	No - test not required	No - test not required		No - test not required		N/A	No - test not required	No - test not required	N/A
Target future status		**Good**	**Good**						**Good**			**Good**
Permit condition required - current WRC flow		7.30	**0.08**						**0.15**			0.69
Permit condition required - after growth	N/A	7.18	**0.08**	N/A	N/A		N/A	N/A	**0.13**	N/A	N/A	0.60
Will Growth prevent future target status?		No - Good status can be achieved with Growth	No - Good Status is not possible with or without Growth						No - Good Status is not possible with or without Growth			No - Good status achievable without a change in permit

	Copford- WRC			Dedham - WRC			Earls Colne - WRC			Eight Ash Green - WRC		
Parameters considered	Ammonia (mg/l - 95%ile)	BOD (mg/l - 95%ile)	Phosphate (mg/l - mean)	Ammonia (mg/l - 95%ile)	BOD (mg/l - 95%ile)	Phosphate (mg/l - mean)	Ammonia (mg/l - 95%ile)	BOD (mg/l - 95%ile)	Phosphate (mg/l - mean)	Ammonia (mg/l - 95%ile)	BOD (mg/l - 95%ile)	Phosphate (mg/l - mean)
Permit condition	3	10		3	15				0.5	20	30	0.8
Measured quality of current discharge (taken from RQP output)	1.1	6.29	0.52	9.13		0.67	7.93	18.35	0.5	10.63	26.79	0.8
Technically achievable limits (TAL)	1	5	0.25	1	5	0.25	1	5	0.25	1	5	0.25
WFD receiving waterbody and WFD Waterbody ID	**Roman River Water Body (GB105037034150)**			**Stour (d/s R. Brett) Water Body (GB105036041000)**			**River Colne Water Body (GB105037041330)**			**River Colne Water Body (GB105037041330)**		
Parameters considered	Ammonia (mgl - 90%ile)	BOD (mgl - 90%ile)	Phosphate (mgl - mean)	Ammonia (mgl - 90%ile)	BOD (mgl - 90%ile)	Phosphate (mgl - mean)	Ammonia (mgl - 90%ile)	BOD (mgl - 90%ile)	Phosphate (mgl - mean)	Ammonia (mgl - 90%ile)	BOD (mgl - 90%ile)	Phosphate (mgl - mean)
Receiving waterbody Quality Element Published Status	**Good**	**High**	**Poor**	**High**	**N/A**	**Moderate**	**High**	**High**	**Poor**	**High**	**High**	**Poor**
Upstream sample point	**AN-RR0160**			**AN-ST0183**			**AN-CL0488**			**AN-CL0488**		
Measured quality upstream of discharge	0.1	3.61	0.08	0.05		0.08	0.12	2.02	0.36	0.12	2.02	0.37
Quality Element Status based on measured data	**High**	**High**	**Good**	**High**		**Good**	**High**	**High**	**Poor**	**High**	**High**	**Poor**
Test 1 - Maintain Current Quality and limit to 10% deterioration	Ammonia (mg/l)	BOD (mg/l)	Phosphate (mg/l)	Ammonia (mg/l)	BOD (mg/l)	Phosphate (mg/l)	Ammonia (mg/l)	BOD (mg/l)	Phosphate (mg/l)	Ammonia (mg/l)	BOD (mg/l)	Phosphate (mg/l)
Mixing Point Quality with current WRC flow	0.2	3.54	0.17	0.10		0.08	0.35	2.40	0.37	0.24	2.20	0.37
Modelled status at mixing point with current flow	**High**	**High**	**Moderate**	**High**		**Good**	**Good**	**High**	**Poor**	**High**	**High**	**Moderate**
Permit condition required to maintain mixing point quality	**0.67**	5.85	0.34	**9.79**		No change from current discharge quality	7.12	17.08	**0.57**	7.54	18.87	0.75
river target to limit to 10% deterioration limit	0.22	3.89	0.19	0.11	0.00	0.09	0.39	2.64	0.41	0.26	2.42	0.41
Permit condition required to be within 10% deterioration target	**0.76**	7.13	0.4	**11.62**		1.87	8.38	24.09	**1.66**	8.9	**33.89**	**2.77**
Test 2 - WFD Status: no deterioration (waterbody status)	Ammonia (mg/l)	BOD (mg/l)	Phosphate (mg/l)	Ammonia (mg/l)	BOD (mg/l)	Phosphate (mg/l)	Ammonia (mg/l)	BOD (mg/l)	Phosphate (mg/l)	Ammonia (mg/l)	BOD (mg/l)	Phosphate (mg/l)
Threshold at which status deterioration would occur	0.60	4.00	1.072	0.30		0.229	0.30	4.00	1.111	0.30	4.00	1.111
permit condition required at mixing point - current WRC flow	**4.34**	9.76	**5.22**	**43.35**		28.36	**6.31**	**66.95**	**23**	16.1	**179.40**	**56.39**
permit condition required at mixing point - after growth	2.52	7.42	**2.95**	**42.96**		28	**5.69**	**60.85**	**20.71**	11.04	**122.33**	**38.28**
Test 3 - Future WFD Status	Ammonia 90%ile (mg/l)	BOD 90%ile (mg/l)	Phosphate mean (mg/l)	Ammonia 90%ile (mg/l)	BOD 90%ile (mg/l)	Phosphate mean (mg/l)	Ammonia 90%ile (mg/l)	BOD 90%ile (mg/l)	Phosphate mean (mg/l)	Ammonia 90%ile (mg/l)	BOD 90%ile (mg/l)	Phosphate mean (mg/l)
Is future objective /target WFD status higher than the current status?	No - test not required	No - test not required	Yes	No - test not required	No - test not required	Yes	No - test not required	No - test not required	Yes	No - test not required	No - test not required	Yes
Target future status	N/A	N/A	**Moderate**	N/A	N/A	**Good**	N/A	N/A	**Good**	N/A	N/A	**Good**
Permit condition required - current WRC flow			0.43			4.00			**0.70**			**1.33**
Permit condition required - after growth			0.30			3.96			**0.64**			**0.92**
Will Growth prevent future target status?			No - Moderate Status can be achieved with future discharge within LCT			No - Good Status can be achieved with future discharge within LCT			No - Good Status can be achieved with future discharge within LCT			No - Good Status can be achieved with future discharge within LCT

E1. RQP outputs for WRCs

Copford WRC assessment

Receiving watercourse

The Roman River (GB105037034150) receives treated effluent from Copford WRC and currently has an overall 2022 waterbody status of Moderate. The 2022 status of the physico-chemical elements considered in this assessment are provided in Table E1. Phosphate is currently at Poor Status but has a future objective of Moderate Status by 2015 which must be considered for future wastewater discharges.

Table E1: WFD Status summary for the Roman River waterbody

Classification Element	Current Status (2022)	Future Objective
Ammonia	**Good**	**Good**
BOD	**High**	**N/A**
Phosphate	**Poor**	**Moderate**

Revised permit conditions – modelling results

The revised discharge permit required by the end of the plan period for each determinant and for each modelled scenario are presented in Table E2.

Table E2: RQP modelled permit quality conditions required for Copford WRC

Determinant	2022 Status	Current permit condition	Maintain current mixing point quality	Limit deterioration to 10%	Ensure no deterioration in WFD element Status at mixing point	Achieve future WFD objective status (if 2022 status less than good)
Ammonia (mg/l 95%ile)	**Good**	3	**0.67**	**0.76**	**2.52**	N/A
BOD (mg/l 95%ile)	**High**	10	**5.85**	**7.13**	**7.42**	N/A
Phosphate (mg/l annual average)	**Poor**	N/A	**0.34**	**0.40**	**2.95**	**0.30**

Based on 2020 to 2023 data, the Copford WRC flow permit would be exceeded once all the growth within its catchment is delivered by the end of the plan period and a new permit would be required.

Water quality modelling has shown that the new permit would require improvements to the permit limits for BOD and phosphate to ensure no change in current quality in the Roman River and these are achievable within TAL. Current Status for BOD and phosphate can also be maintained at the point of mixing with improvements to permit limits which are within TAL.

The modelling shows it would not be possible within TAL to ensure no reduction in quality at the mixing point for ammonia; however, it would be possible to maintain High Status under the WFD at mixing point and the water body as a whole within TAL; therefore, there is a solution which meets legislative requirements.

Modelling has also been undertaken to determine if Moderate status can be achieved for phosphate at the mixing point of the discharge (the current 2022 status is Poor). This modelling shows that it would be possible to achieve this status at this point in the watercourse once growth has been considered within TAL and therefore growth would not affect the future target WFD Status of the Roman River, if the required discharge improvements can be put in place.

Dedham WRC assessment

Receiving watercourse

The Stour (d/s R. Brett) Waterbody (GB105036041000) receives treated effluent from Dedham WRC and currently has an overall 2022 waterbody status of Moderate. The 2022 status of the physico-chemical elements considered in this assessment are provided in Table E3. Phosphate is currently at Moderate Status but has a future objective of Good Status by 2027 which must be considered for future wastewater discharges.

Table E3: WFD Status summary for the Stour (d/s R. Brett) waterbody

Classification Element	Current Status (2022)	Future Objective
Ammonia	**High**	**Good**
Phosphate	**Moderate**	**Good**

Revised permit conditions – modelling results

The revised discharge permit required by the end of the plan period for each determinant and for each modelled scenario are presented in Table E4.

Table E4: RQP modelled permit quality conditions required for Dedham WRC

Determinant	2022 Status	Current permit condition	Maintain current mixing point quality	Limit deterioration to 10%	Ensure no deterioration in WFD element Status at mixing point	Achieve future WFD objective status (if 2022 status less than good)
Ammonia (mg/l 95%ile)	**High**	3	**9.79**	**11.62**	**42.96**	N/A
Phosphate (mg/l annual average)	**Moderate**	N/A	**No change from current discharge quality**	**1.87**	**28**	**3.96**

Based on 2020 to 2023 data, Dedham WRC is currently operating with no flow capacity and a new permit would be required to meet wastewater demands from growth to the end of the plan period. However, assessment from RQP modelling demonstrates increasing the discharge volume because of growth does not have a significant impact on water quality in the River Stour due to the size of the

discharge relative to river flow. No significant changes in water quality conditions would be required to maintain WFD status and current mixing point quality.

Modelling has also been undertaken to determine if Good status can be achieved for phosphate at the mixing point of the discharge (the current 2022 status is Moderate). This modelling shows that it would be possible to achieve this status at this point in the watercourse once growth has been considered within TAL. Growth would therefore not limit attainment of future Good Status.

Earls Colne WRC assessment

Receiving watercourse

The River Colne (d/s Doe's Corner) Water Body (GB105037041330) receives treated effluent from Earls Colne WRC and currently has an overall 2022 waterbody status of Moderate. The 2022 status of the physico-chemical elements considered in this assessment are provided in Table E5. Phosphate is currently at Poor Status but has a future objective of Good Status by 2027 which must be considered for future wastewater discharges.

Table E5: WFD Status summary for the River Colne (d/s of Doe's Corner) waterbody

Classification Element	Current Status (2022)	Future Objective
Ammonia	**High**	**Good**
BOD	**High**	**N/A**
Phosphate	**Poor**	**Good**

Revised permit conditions – modelling results

The revised discharge permit required by the end of the plan period for each determinant and for each modelled scenario are presented in Table E6.

Table E6: RQP modelled permit quality conditions required for Earls Colne WRC

Determinant	2022 Status	Current permit condition	Maintain current mixing point quality	Limit deterioration to 10%	Ensure no deterioration in WFD element Status at mixing point	Achieve future WFD objective status (if 2022 status less than good)
Ammonia (mg/l 95%ile)	**High**	N/A	**7.12**	**8.38**	**5.69**	N/A
BOD (mg/l 95%ile)	**High**	N/A	**17.08**	**24.09**	**60.85**	N/A
Phosphate (mg/l annual average)	**Poor**	0.5	**0.57**	**1.66**	**20.71**	**0.64**

Based on 2020 to 2023 data, the Earls Colne WRC flow permit would be exceeded once all the growth within its catchment is delivered by the end of the plan period and a new permit would be required. Water quality modelling has shown that the new permit conditions may be required for ammonia and BOD to ensure there was no deterioration in the River Colne as a result of the additional treated

discharge. The changes are possible within TAL, and it would be possible to set a new permit that ensures no deterioration in the current quality (and WFD Status) of the Colne as a result of future Earls Colne WRC discharges.

Modelling has also been undertaken to determine if Good status can be achieved for phosphate at the mixing point of the discharge (the current 2022 status is Poor). This modelling shows that it would be possible to achieve this status at this point in the watercourse once growth has been considered within TAL.

Eight Ash Green WRC assessment

Receiving watercourse

The River Colne (d/s Doe's Corner) Water Body (GB105037041330) receives treated effluent from Eight Ash Green WRC and currently has an overall 2022 waterbody status of Moderate. The 2022 status of the physico-chemical elements considered in this assessment are provided in Table E7. Phosphate is currently at Poor Status but has a future objective of Good Status by 2027 which must be considered for future wastewater discharges.

Table E7: WFD Status summary for the River Colne (d/s of Doe's Corner) waterbody

Classification Element	Current Status (2022)	Future Objective
Ammonia	**High**	**Good**
BOD	**High**	**N/A**
Phosphate	**Poor**	**Good**

Revised permit conditions – modelling results

The revised discharge permit required by the end of the plan period for each determinant and for each modelled scenario are presented in Table E8.

Table E8: RQP modelled permit quality conditions required for Eight Ash Green WRC

Determinant	2022 Status	Current permit condition	Maintain current mixing point quality	Limit deterioration to 10%	Ensure no deterioration in WFD element Status at mixing point	Achieve future WFD objective status (if 2022 status less than good)
Ammonia (mg/l 95%ile)	**High**	20	**7.54**	**8.9**	**11.04**	N/A
BOD (mg/l 95%ile)	**High**	30	**18.87**	**33.89**	**122.33**	N/A
Phosphate (mg/l annual average)	**Poor**	0.8	**0.75**	**2.77**	**38.28**	**0.92**

Based on 2020 to 2023 data, the Eight Ash Green WRC flow permit would be exceeded once all the growth within its catchment is delivered by the end of the plan period and a new permit would be required. Water quality modelling has shown that the new permit would require significant improvements

to the permit limits for ammonia and BOD and potentially some minor improvements to phosphate to ensure there was no deterioration in the River Colne as a result of the additional treated discharge. The changes are possible within TAL, and it would be possible to set a new permit that ensures no deterioration in the current quality (or WFD Status) of the Colne as a result of future Eight Ash Green WRC discharges.

Modelling has also been undertaken to determine if Good status can be achieved for phosphate at the mixing point of the discharge (the current 2022 status is Poor). This modelling shows that it would be possible to achieve this status at this point in the watercourse once growth has been considered within TAL.

Great Tey WRC assessment

Receiving watercourse

The Roman River Waterbody (GB105037034150) receives treated effluent from Great Tey WRC and currently has an overall 2022 waterbody status of Moderate. The 2022 status of the physico-chemical elements considered in this assessment are provided in Table E9. Because the current element status is good for Ammonia, the future objective is to remain as Good. BOD is currently at High Status and does not have a future objective. For the purposes of this WCS, the assumption has been made that the future objective is to remain High. Phosphate is currently at Poor Status but has a future objective of Moderate Status by 2027 which must be considered for future wastewater discharges.

Table E9: WFD Status summary for the Roman River waterbody

Classification Element	Current Status (2022)	Future Objective
Ammonia	**Good**	**Good**
BOD	**High**	**N/A**
Phosphate	**Poor**	**Moderate**

Revised permit conditions – modelling results

The revised discharge permit required by the end of the plan period for each determinant and for each modelled scenario are presented in Table E10.

Table E10: RQP modelled permit quality conditions required for Great Tey WRC

Determinant	2022 Status	Current permit condition	Maintain current mixing point quality	Limit deterioration to 10%	Ensure no deterioration in WFD element Status at mixing point	Achieve future WFD objective status (if 2022 status less than good)
Ammonia (mg/l 95%ile)	**Good**	N/A	N/A	N/A	N/A	N/A
BOD (mg/l 95%ile)	**High**	30	**23.59**	**27.59**	**30.02**	N/A
Phosphate (mg/l annual average)	**Poor**	N/A	N/A	N/A	N/A	N/A

Based on 2020 to 2023 data, Great Tey WRC flow permit would be exceeded once all the growth within its catchment is delivered by the end of the plan period and a new permit would be required. Water quality modelling has shown that the new permit would require improvements to the quality standards for BOD (compared to the current permit conditions) to ensure there was no deterioration in the Roman River as a result of the additional treated discharge.

This change is possible within TAL for BOD, and it would be possible to set a new permit that ensures no deterioration in the current quality of the Roman River as a result of future Great Tey WRC discharges. This means there is a solution to ensure that growth at the WRC would not impact on downstream water quality. The analysis also shows that the WFD status of the river would be unlikely to be impacted, even if no changes to the permit quality conditions were implemented.

Langham WRC assessment

Receiving watercourse

The Stour (d/s R. Brett) Waterbody (GB105036041000) receives treated effluent from Langham WRC and currently has an overall 2022 waterbody status of Moderate. The 2022 status of the physico-chemical elements considered in this assessment are provided in Table E11. Phosphate is currently at Moderate Status but has a future objective of Good Status by 2027 which must be considered for future wastewater discharges.

Table E11: WFD Status summary for the Stour (d/s R. Brett) waterbody

Classification Element	Current Status (2022)	Future Objective
Ammonia	**High**	**Good**
Phosphate	**Moderate**	**Good**

Revised permit conditions – modelling results

The revised discharge permit required by the end of the plan period for each determinant and for each modelled scenario are presented in Table E12.

Table E12: RQP modelled permit quality conditions required for Langham WRC

Determinant	2022 Status	Current permit condition	Maintain current mixing point quality	Limit deterioration to 10%	Ensure no deterioration in WFD element Status at mixing point	Achieve future WFD objective status (if 2022 status less than good)
Ammonia (mg/l 95%ile)	**High**	7	**3.19**	**3.53**	**0.84**	N/A
Phosphate (mg/l annual average)	**Moderate**	1	**0.74**	**0.84**	**0.22**	**0.13**

Based on 2020 to 2023 data, Langham WRC is currently operating with no flow capacity and a new permit would be required to meet wastewater demands from growth to the end of the plan period. Water quality modelling has shown that the new permit would require improvements to the permit limits for

ammonia and phosphate to ensure there was no deterioration in the River Stour as a result of the additional treated discharge; these changes would be significant for Ammonia and would likely require significant treatment process upgrades. However, the changes are possible within TAL, and it would be possible to set a new permit that ensures no deterioration in the current quality of the Stour as a result of future Langham WRC discharges. Modelling has shown it would not be possible to maintain current WFD Status at the point of mixing after growth; however, the current mixing point quality tests show that it is possible to ensure to no deterioration from the current mixing point quality which would ensure, at a water body level, there is no WFD current Status deterioration.

Modelling has also been undertaken to determine if Good Status can be achieved for phosphate at the mixing point of the discharge (the current 2022 status is moderate). This modelling shows that it would not be possible to achieve this status at this point in the watercourse once growth has been considered within TAL. However, model runs demonstrate that this would also not be possible with the current volume of discharge (requiring a permit limit of 0.22 mg/l mean) which demonstrates that growth is not a factor in the waterbody not being able to achieve Good Status for phosphate at mixing point.

Tiptree WRC assessment

Receiving watercourse

The Layer Brook Waterbody (GB105037034130) receives treated effluent from Tiptree WRC and currently has an overall 2022 waterbody status of Poor. The 2022 status of the physico-chemical elements considered in this assessment are provided in Table E13. Phosphate is currently at Poor Status and ammonia is at High Status. Both have a future objective of Good Status by 2027 which must be considered for future wastewater discharges.

Table E13 WFD Status summary for the Layer Brook waterbody

Classification Element	Current Status (2022)	Future Objective
Ammonia	**High**	**Good**
Phosphate	**Poor**	**Good**

Revised permit conditions – modelling results

The revised discharge permit required by the end of the plan period for each determinant and for each modelled scenario are presented in Table E14.

Table E14: RQP modelled permit quality conditions required for Tiptree WRC

Determinant	2022 Status	Current permit condition	Maintain current mixing point quality	Limit deterioration to 10%	Ensure no deterioration in WFD element Status at mixing point	Achieve future WFD objective status (if 2022 status less than good)
Ammonia (mg/l 95%ile)	**High**	4	**2.87**	**3.17**	**0.59**	N/A
BOD (mg/l 95%ile)	**Moderate**	10	**9.31**	**10.28**	**9.34**	**7.18**
Phosphate (mg/l annual average)	**Poor**	N/A	**1.99**	**2.21**	**1.15**	**0.08**

Based on 2020 to 2023 data, Tiptree WRC flow permit would be exceeded once all the growth within its catchment is delivered by the end of the plan period and a new permit would be required to meet wastewater demands from growth to the end of the plan period. Assessment from RQP modelling demonstrates some improvements in discharge quality may be required to ensure no deterioration in current mixing point quality in the river and there may be a requirement to include a tighter limit on ammonia and BOD, but these are all within TAL.

If improvements in treatment quality for BOD and phosphate can be secured through required process improvements (if required) at the WRC, there would also be no impact on WFD status of the Layer Brook for these elements. Modelling has shown it would not be possible to maintain current WFD Status at the point of mixing after growth for ammonia; however, the current mixing point quality tests show that it is possible to ensure to no deterioration from the current mixing point quality which would ensure, at a water body level, there is no WFD current Status deterioration for this element.

Modelling has also been undertaken to determine if Good Status can be achieved for phosphate at the mixing point of the discharge (the current 2022 status is Poor). This modelling shows that it would not be possible to achieve this status at this point in the watercourse once growth has been considered within TAL. However, model runs demonstrate that this would also not be possible with the current volume of discharge (requiring a permit limit of 0.08 mg/l mean) which demonstrates that growth is not a factor in the waterbody not being able to achieve Good Status for phosphate at mixing point.

West Bergholt WRC assessment

Receiving watercourse

The Colne (d/s Doe's Corner) Waterbody (GB105037041330) receives treated effluent from West Bergholt WRC and currently has an overall 2022 waterbody status of Moderate. The 2022 status of the physico-chemical elements considered in this assessment are provided in Table E15. Because the current element status' are either High for Ammonia and BOD, the objective for 2027 is to remain as High or Good for these elements. Phosphate is currently at Poor Status but has a future objective of Good Status by 20207 which must be considered for future wastewater discharges.

Table E15 WFD Status summary for the Colne (d/s Doe's Corner) waterbody

Classification Element	Current Status (2022)	Future Objective
Ammonia	**High**	**Good**
BOD	**High**	**N/A**
Phosphate	**Poor**	**Good**

Revised permit conditions – modelling results

The revised discharge permit required by the end of the plan period for each determinant and for each modelled scenario are presented in Table E16.

Table E16: RQP modelled permit quality conditions required for West Bergholt WRC

Determinant	2022 Status	Current permit condition	Maintain current mixing point quality	Limit deterioration to 10%	Ensure no deterioration in WFD element Status at mixing point	Achieve future WFD objective status (if 2022 status less than good)
Ammonia (mg/l 95%ile)	**High**	10	**5.41**	**6.41**	**4.19**	N/A
BOD (mg/l 95%ile)	**High**	30	**17.1**	**22.25**	**39.28**	N/A
Phosphate (mg/l annual average)	**Poor**	0.5	**0.57**	**2.92**	**1.02**	**0.6**

Based on 2020 to 2023 data, West Bergholt WRC is currently operating with no flow capacity and a new permit would be required to meet wastewater demands from growth to the end of the plan period. To ensure no impact at the point of discharge, some potentially significant improvements in discharge quality may be required for BOD and ammonia but these are all within TAL. Some improvements in treatment process are likely to be required to achieve these new BOD and ammonia permit limits; however, phosphate improvements are unlikely to be required

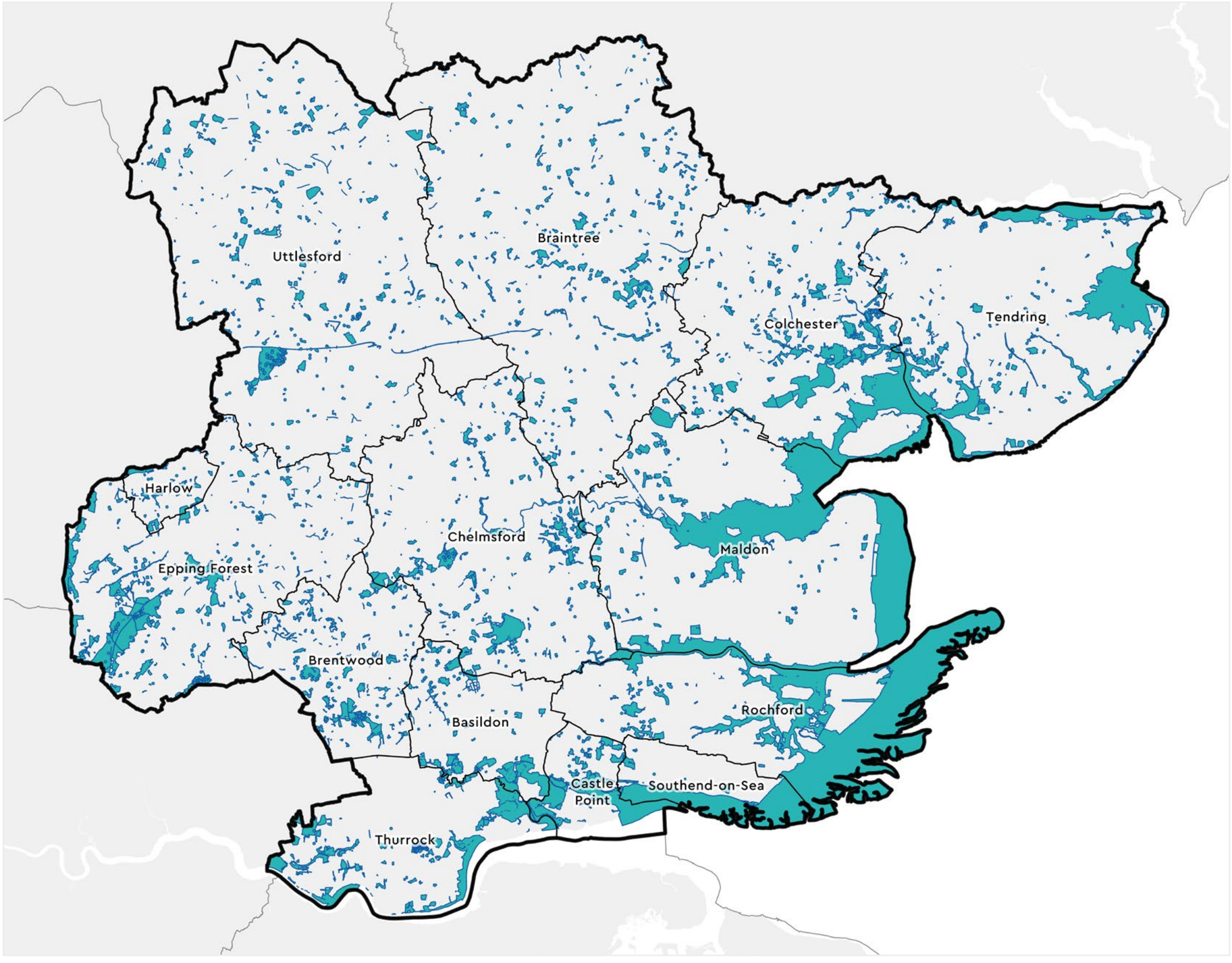
If improvements in treatment quality for ammonia and BOD can be secured through required process improvements (if required) at the WRC, there would also be no impact on the current WFD status of the Colne. The future WFD objective test for phosphate shows that the newly instated[35] phosphate condition is adequate to ensure WFD objectives can be met (now and in the future with growth).

[35] AMP7 improvement scheme

Appendix F - Figures

Appendix G – LNRS Excerpts

5.2 Areas of Particular Importance for Biodiversity (APIBs)

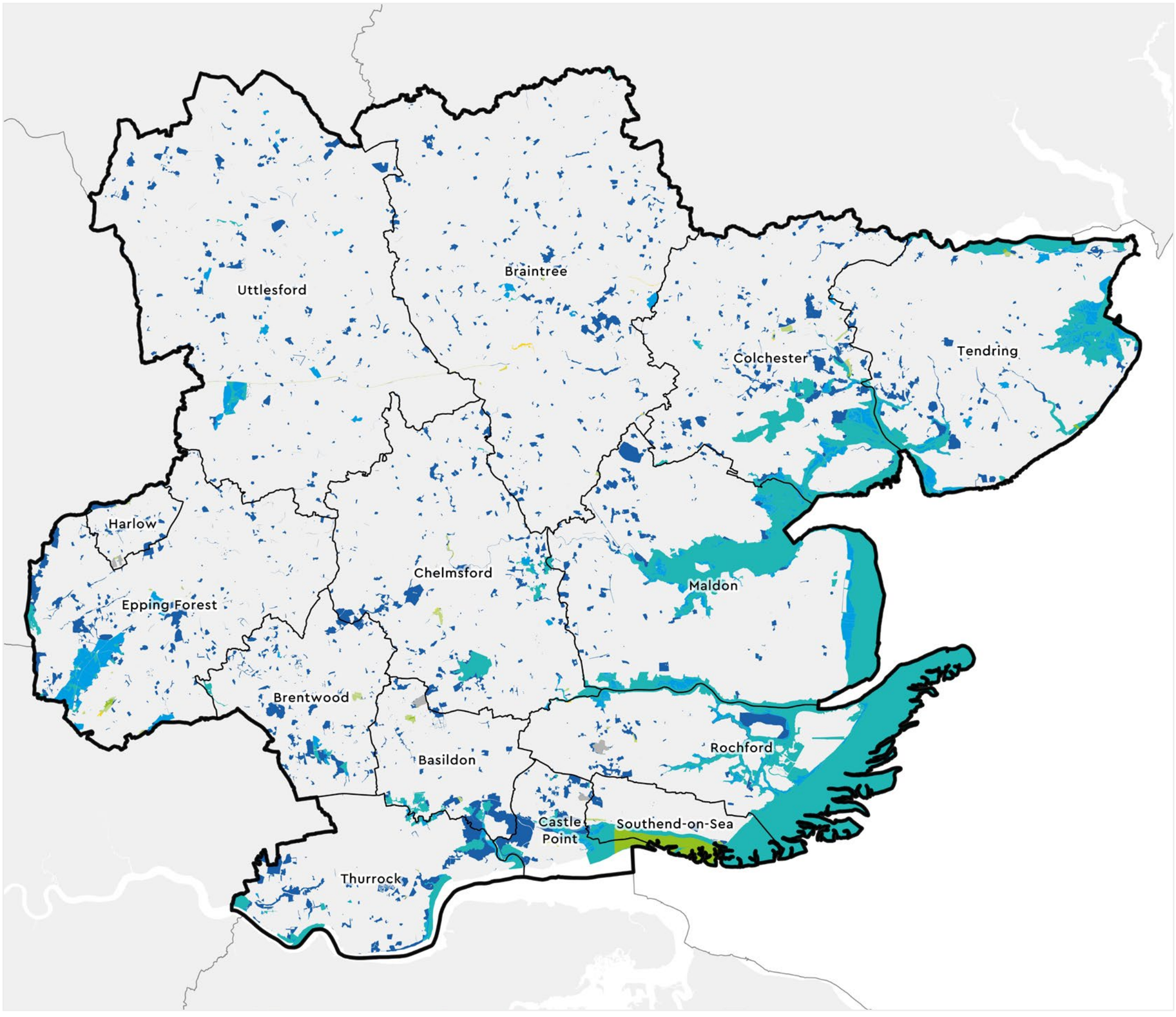


Map 1:
Areas of particular importance for biodiversity (APIBs)

Areas of particular importance for biodiversity (APIBs) include: national conservation sites; local nature reserves; and 'other areas of particular importance for biodiversity'. The APIB map presents the current situation of natural spaces in Greater Essex. APIBs cover 14% of the Greater Essex LNRS region in total. All input datasets correct as of February 2024.

Key

- Area of particular importance for biodiversity



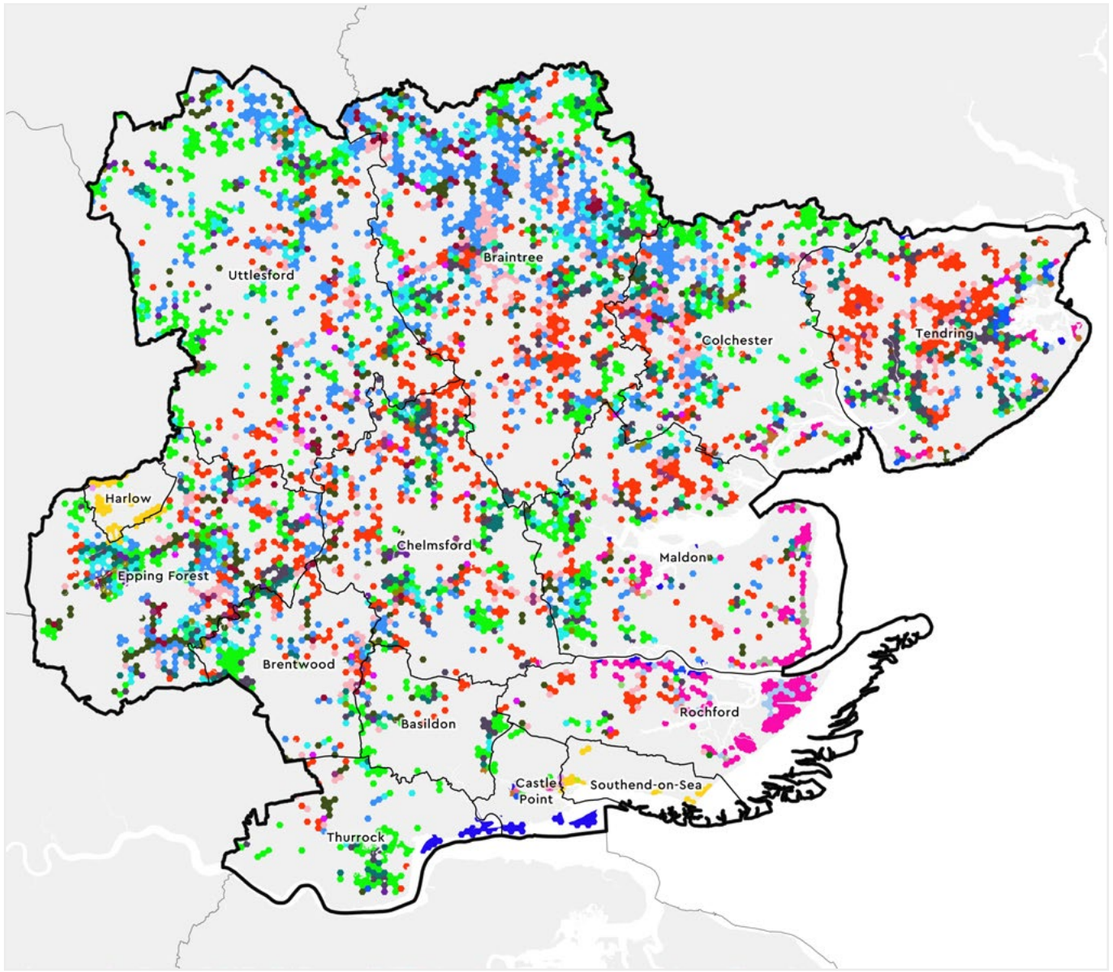
Map 2:
Areas of particular importance for biodiversity (APIBs)

Areas of particular importance for biodiversity (APIBs) include: national conservation sites; local nature reserves; and 'other areas of particular importance for biodiversity'. The APIB map presents the current, designated spaces for nature in Greater Essex. APIBs cover 14% of the Greater Essex LNRS region in total. All input datasets correct as of February 2024.

Key

- National Conservation Site Only
- Local Nature Reserve Only
- Other Area of Particular Importance Only
- National Conservation Site and Local Nature Reserve
- National Conservation Site and Other Area of Particular Importance
- Local Nature Reserve and Other Area of Particular Importance
- National Conservation Site, Local Nature Reserve and Other Area of Particular Importance

5.3 Opportunity maps



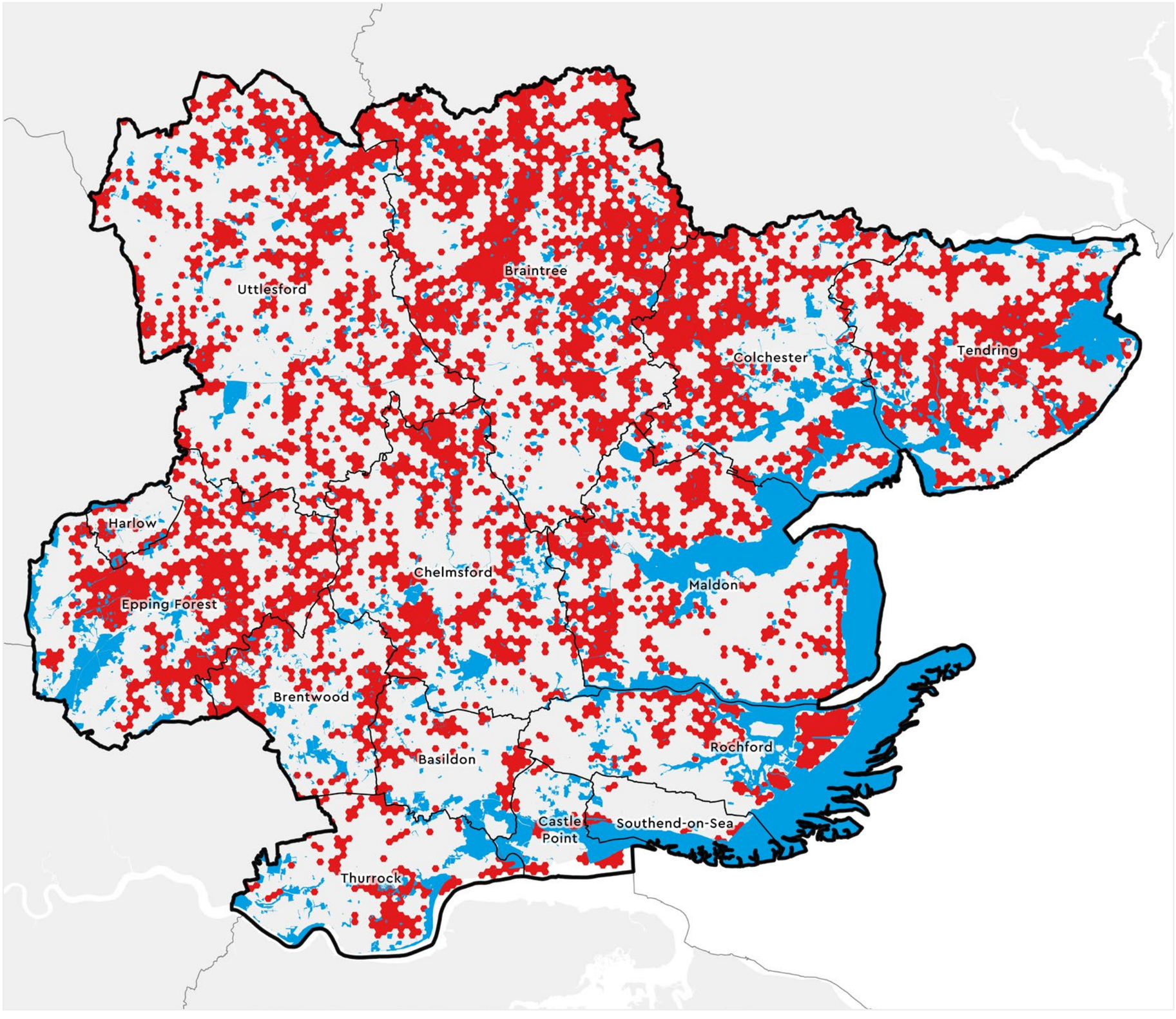
Map 3: **Combined Strategic Creation Opportunities**

Areas that could become of particular importance – 'strategic' combined habitat creation opportunities.

Analysis results presented as a generalised 0.25km² hexagonal grid and categorised by habitat type. All combined 'strategic' habitat creation opportunities cover 30% of the Greater Essex LNRS region. APIBs removed. ABIPS removed from all categories, apart from 'Strategic Sites selected by Local Authority'.

Key

- Woodland Only (1)
- Grassland Only (1)
- Freshwater Standing Water Only (1)
- Freshwater River Buffer Only (1)
- Coast Only (1)
- Marine Only (1)
- Strategic sites selected by Local Authority only (1)
- Woodland and Grassland (2)
- Woodland and Freshwater Standing Water (2)
- Woodland and Freshwater River Buffer (2)
- Woodland and Coast (2)
- Grassland and Freshwater Standing Water (2)
- Grassland and Freshwater River Buffer (2)
- Grassland and Coast (2)
- Grassland and Strategic sites selected by Local Authority (2)
- Freshwater Standing Water and Freshwater River Buffer (2)
- Freshwater Standing Water and Coast (2)
- Freshwater River Buffer and Coast (2)
- Marine and Strategic sites selected by Local Authority
- Woodland, Grassland and Freshwater Standing Water (3)
- Woodland, Grassland and Freshwater River Buffer (3)
- Woodland, Grassland and Coast (3)
- Woodland, Freshwater Standing Water and Freshwater River Buffer (3)
- Woodland, Freshwater Standing Water and Coast (3)
- Grassland, Freshwater Standing Water and Freshwater River Buffer (3)
- Grassland, Freshwater Standing Water and Coast (3)
- Grassland, Freshwater River Buffer and Coast (3)
- Grassland, Coast and Marine (3)
- Freshwater Standing Water, Freshwater River Buffer and Coast (3)
- Woodland, Grassland, Freshwater Standing Water and Freshwater River Buffer (4)
- Woodland, Grassland, Freshwater Standing Water and Coast (4)
- Woodland, Grassland, Freshwater River Buffer and Coast (4)
- Woodland, Freshwater Standing Water, Freshwater River Buffer and Coast (4)
- Grassland, Freshwater Standing Water, Freshwater River Buffer and Coast (4)
- Grassland, Freshwater Standing Water, Freshwater River Buffer and Strategic sites selected by Local Authority (4)
- Woodland, Grassland, Freshwater Standing Water, Freshwater River Buffer and Coast (5)



Map 4:
Combined Strategic Creation Opportunities and Areas of particular importance for biodiversity (APIBs)

Areas of particular importance for biodiversity (APIBs) and areas that could become of particular importance – combined 'strategic' habitat creation opportunities.

Areas of particular importance for biodiversity (APIBs) include national conservation sites; local nature reserves; and 'other areas of particular importance for biodiversity'. APIBs cover 14% of the Greater Essex LNRS region in total. All input datasets correct as of February 2024. Areas that could become of particular importance – combined 'strategic' habitat creation opportunities presented as a generalised 0.25km² hexagonal grid and categorised by habitat type. All combined 'strategic' habitat creation opportunities cover 30% of the Greater Essex LNRS region.

Key

- Area of Particular Importance for Biodiversity
- Strategic Combined Opportunities

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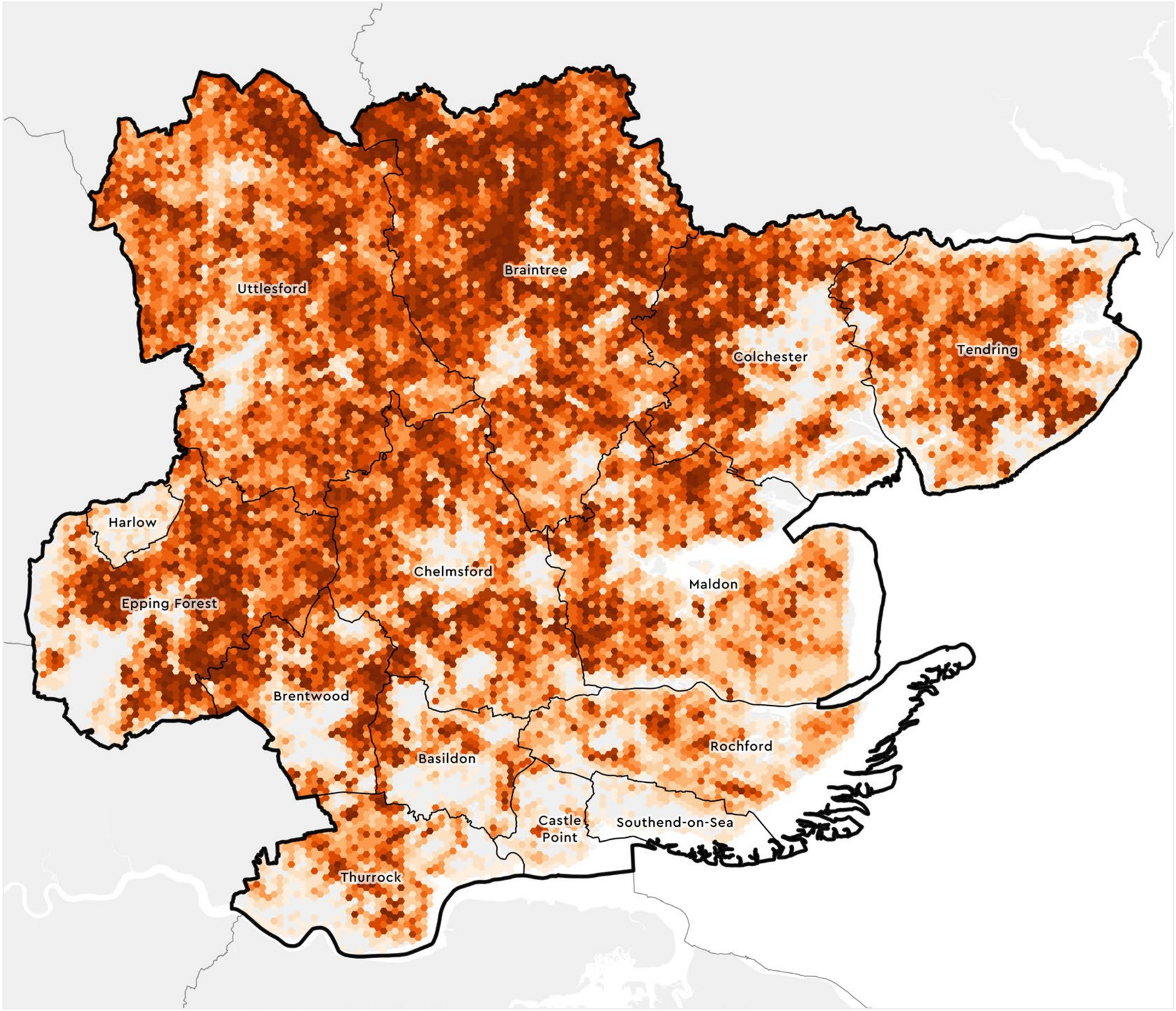
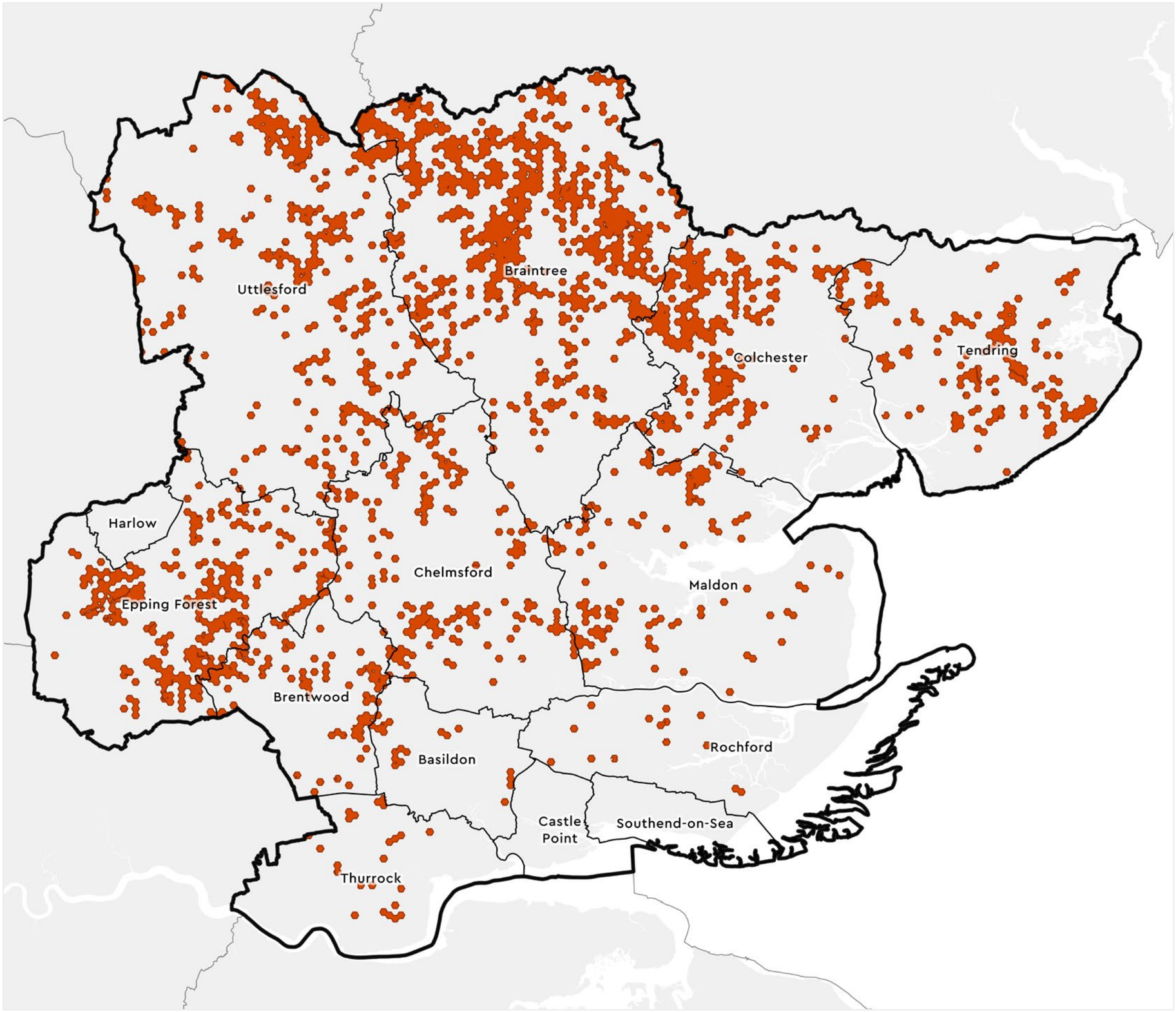


Map 5:
Areas that could become of particular importance – 'all' woodland creation opportunities

All woodland creation opportunities presented as a generalised 0.25km² hexagonal grid and categorised by the 'value' (quality) of opportunity. Darker shades represent 'higher value' (greater quality) opportunities for woodland creation. APIBs not removed.

Key

Increasing value

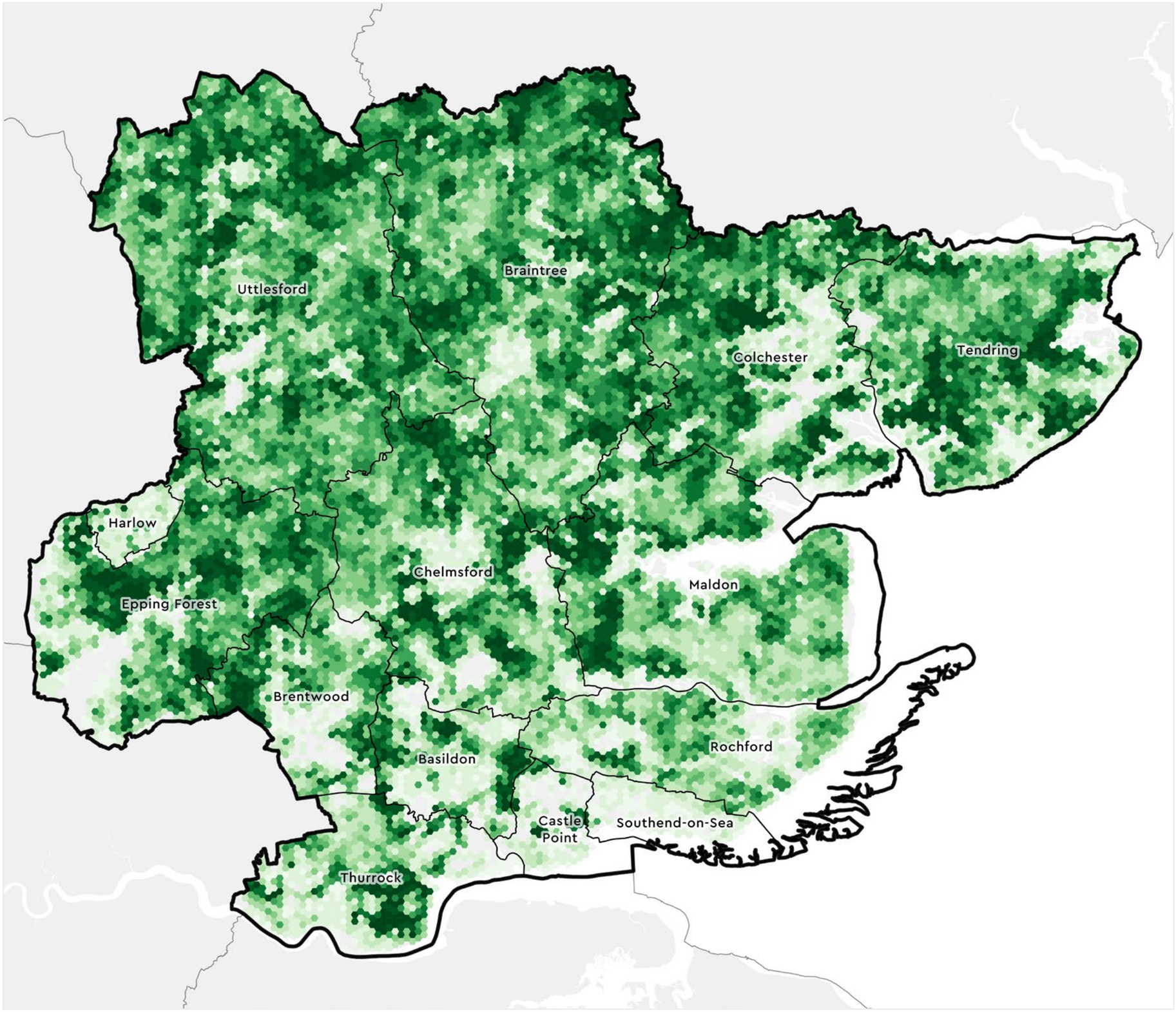


Map 6:
Areas that could become of particular importance for biodiversity – 'strategic' woodland creation opportunities

'Strategic' woodland creation opportunities defined as the 'top' (greatest quality) 15% of 'all' woodland creation opportunities, covering 12.8% of the Greater Essex LNRS region in total. APIBs removed.

Key

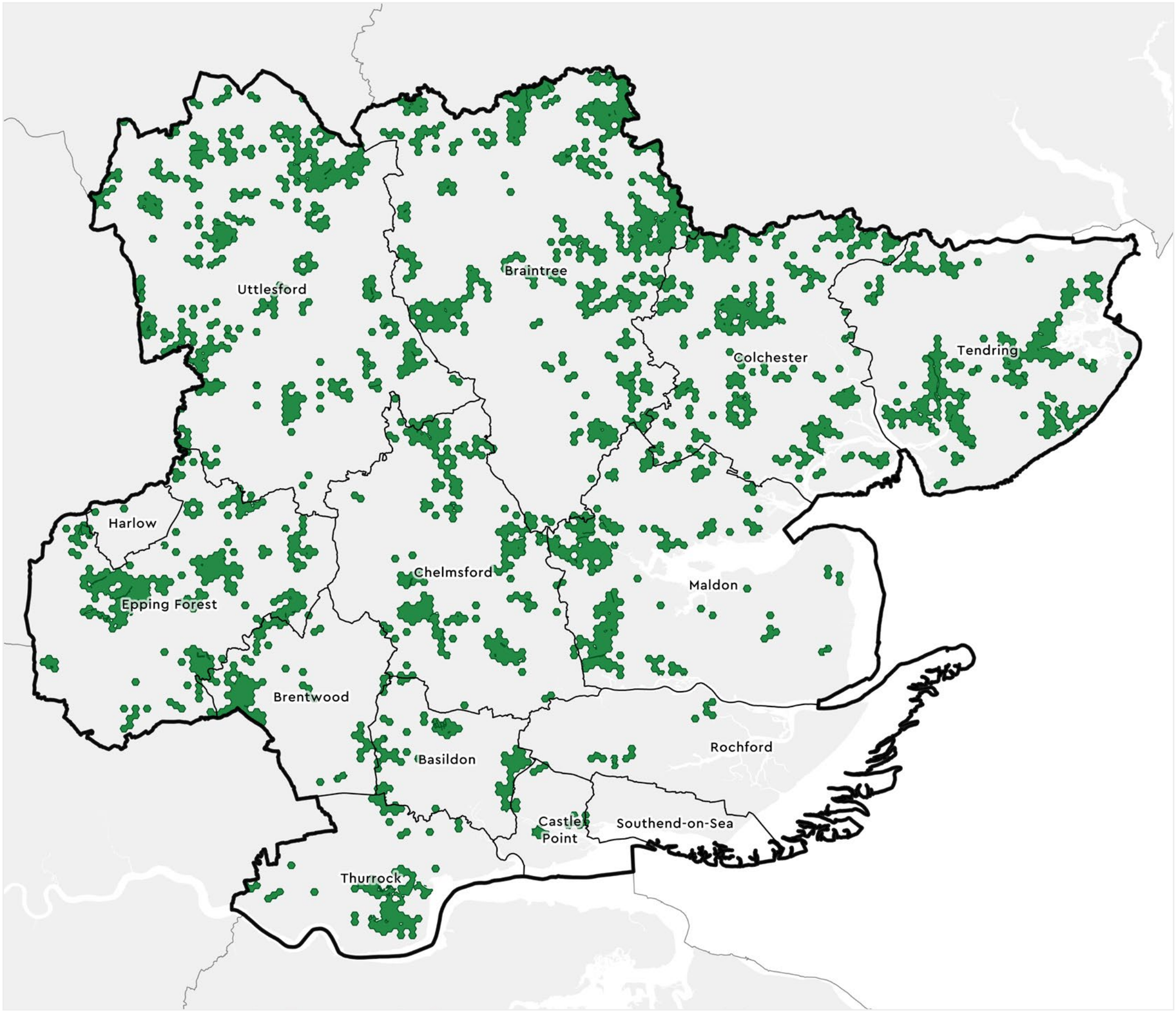
- Strategic Opportunities



Map 7:
Areas that could become of particular importance – 'all' grassland and heathland creation opportunities

All grassland and heathland creation opportunities presented as a generalised 0.25km² hexagonal grid and categorised by the 'value' (quality) of opportunity. Darker shades represent 'higher value' (greater quality) opportunities for grassland and heathland creation. APIBs not removed.

Key

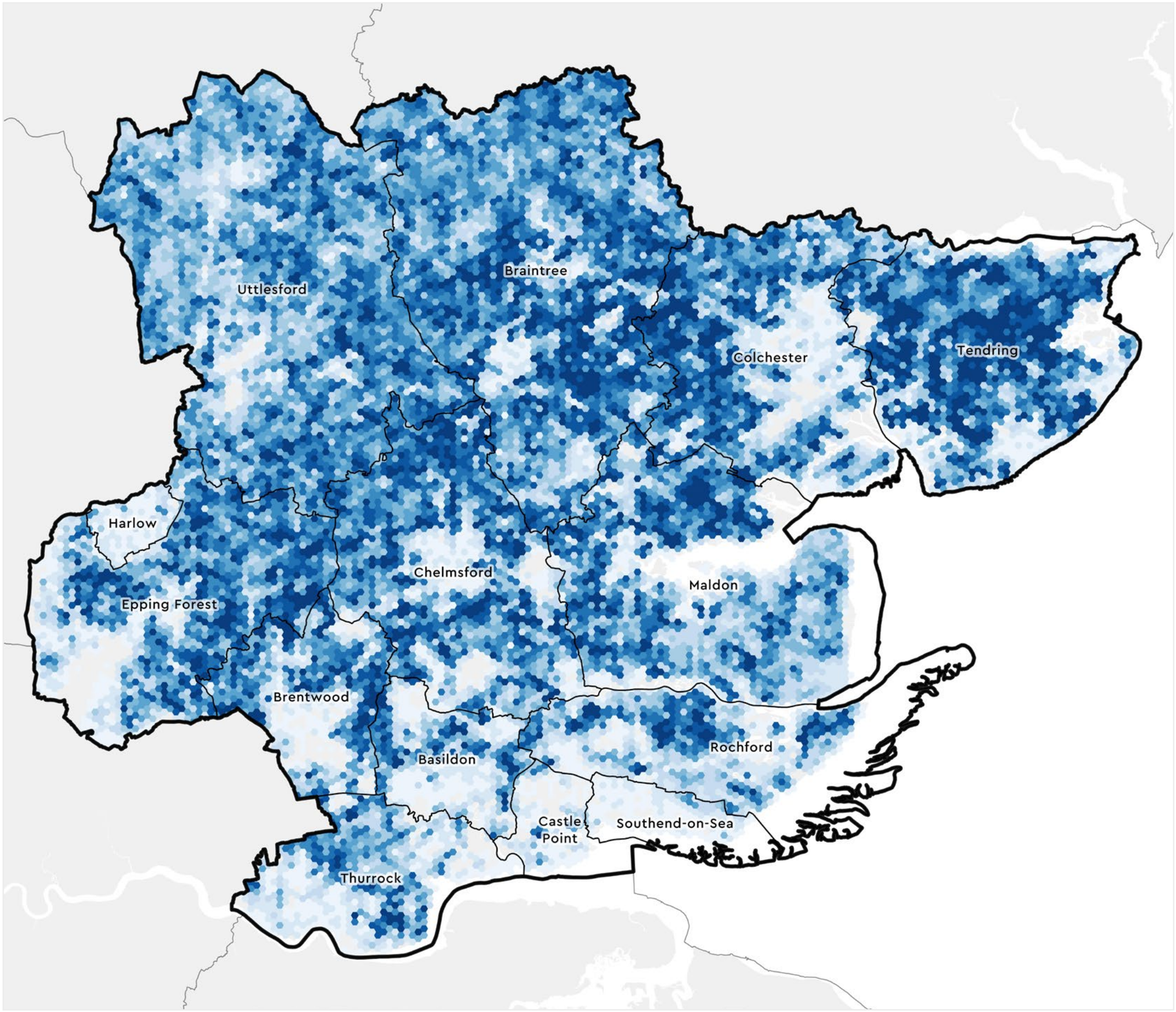


Map 8:
Areas that could become of particular importance for biodiversity – 'strategic' grassland habitat creation opportunities

'Strategic' grassland habitat creation opportunities defined as the 'top' (greatest quality) 15% of 'all' grassland habitat creation opportunities, covering 13.2% of the Greater Essex LNRS region in total. APIBs removed.

Key

Strategic Opportunities

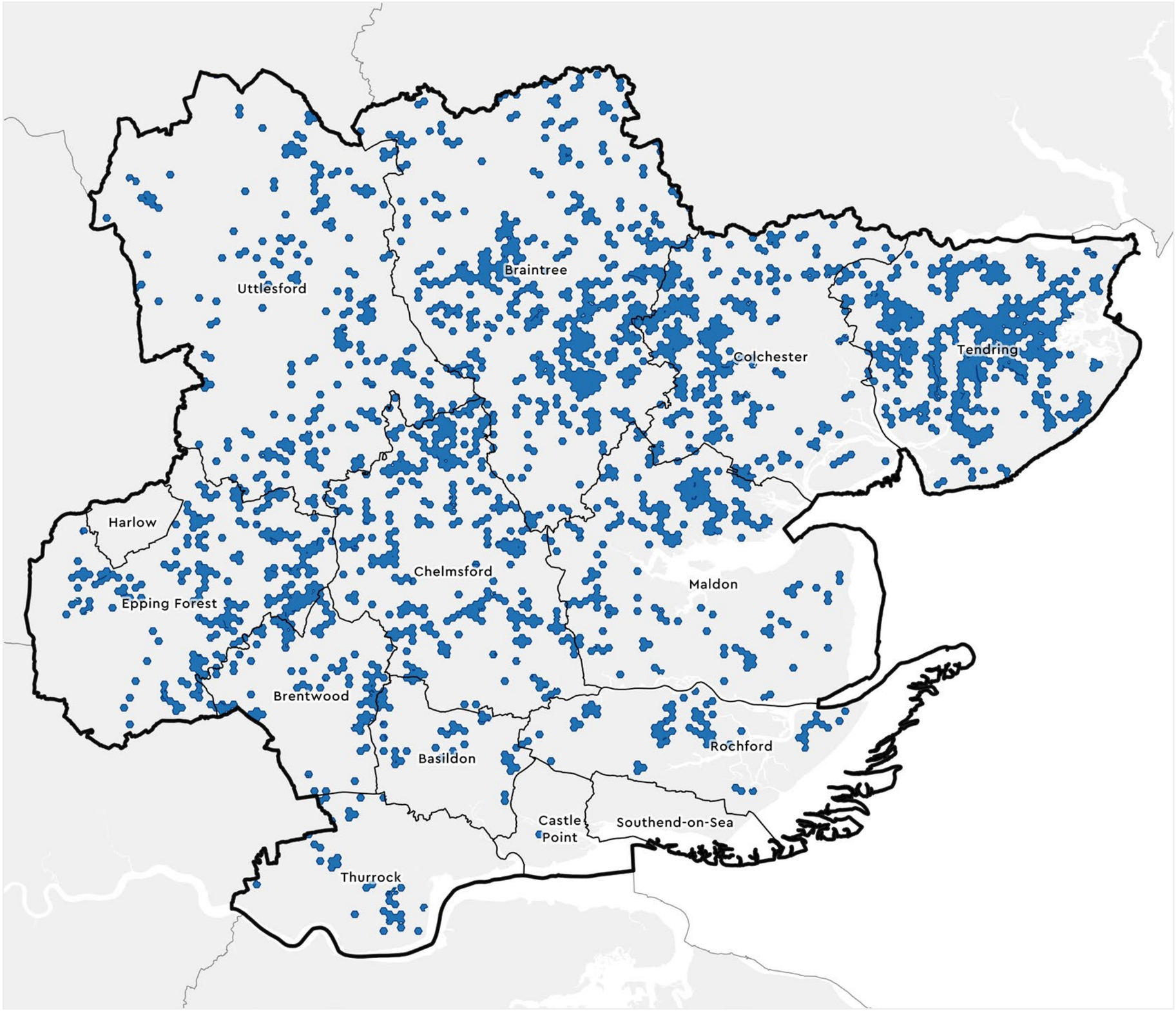


Map 9:
Areas that could become of particular importance – 'all' freshwater standing water creation opportunities

All freshwater standing water creation opportunities presented as a generalised 0.25km² hexagonal grid and categorised by the 'value' (quality) of opportunity. Darker shades represent 'higher value' (greater quality) opportunities for freshwater standing water creation. APIBs not removed.

Key

Increasing value

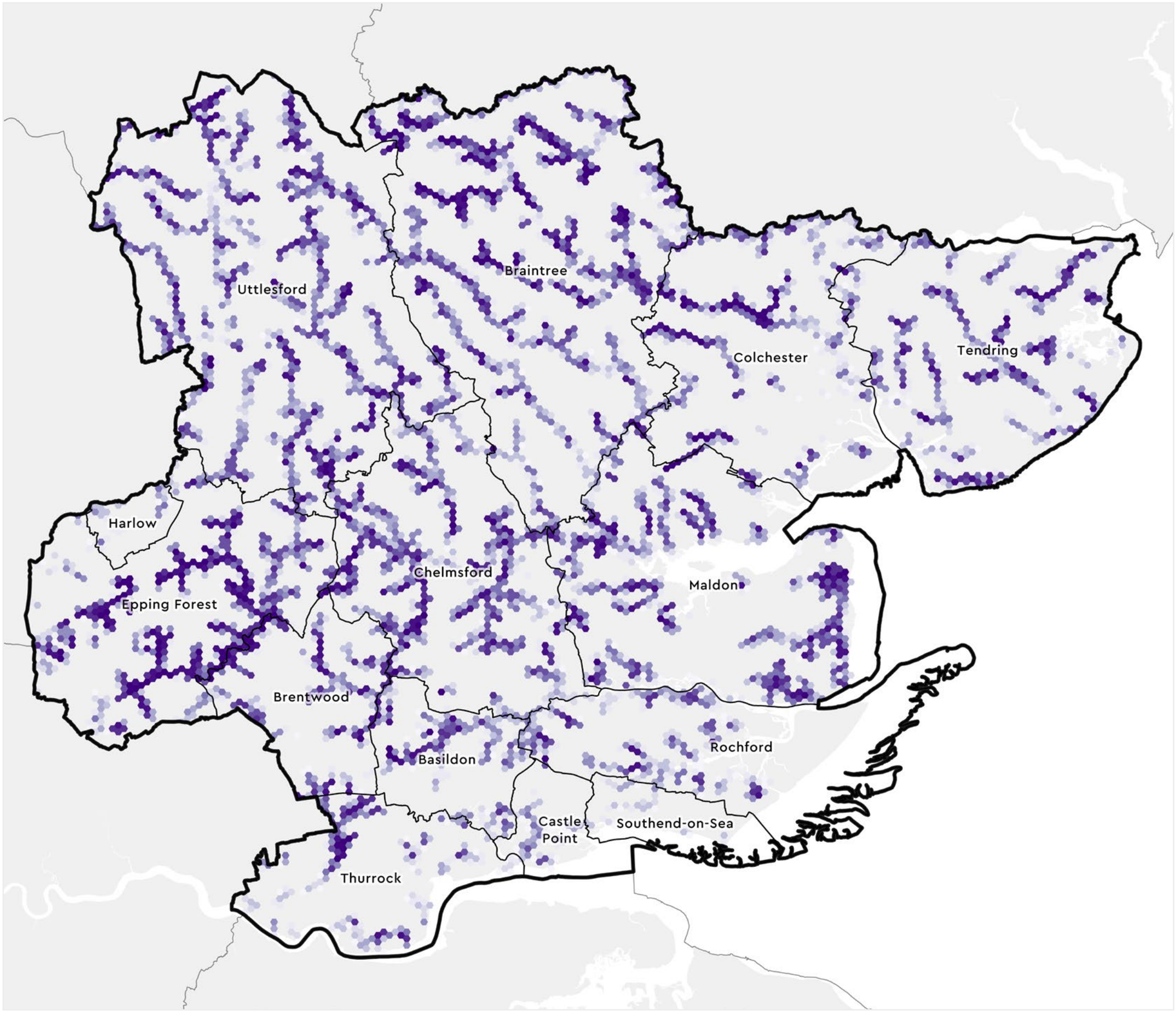


Map 10:
Areas that could become of particular importance – 'strategic' freshwater standing water creation opportunities

'Strategic' freshwater standing water creation opportunities defined as the 'top' (greatest quality) 15% of 'all' freshwater standing water creation opportunities, covering 13.4% of the Greater Essex LNRS region in total. APIBs removed.

Key

- Strategic Opportunities

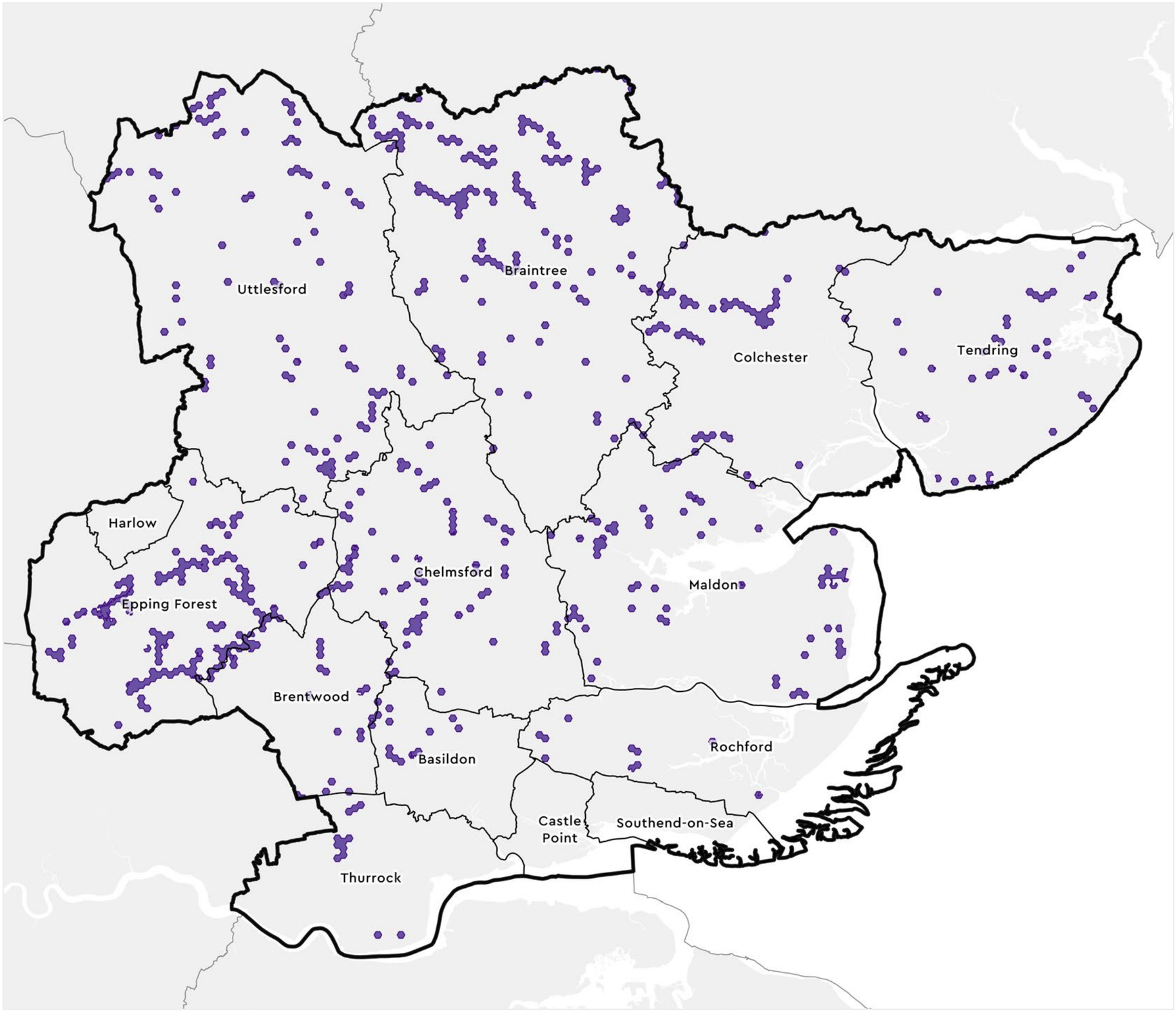


Map 11:
Areas that could become of particular importance – 'all' freshwater river habitat creation opportunities

All freshwater river habitat creation opportunities presented as a generalised 0.25km² hexagonal grid and categorised by the 'value' (quality) of opportunity. Darker shades represent 'higher value' (greater quality) opportunities for freshwater river habitat creation. APIBs not removed.

Key

Increasing value

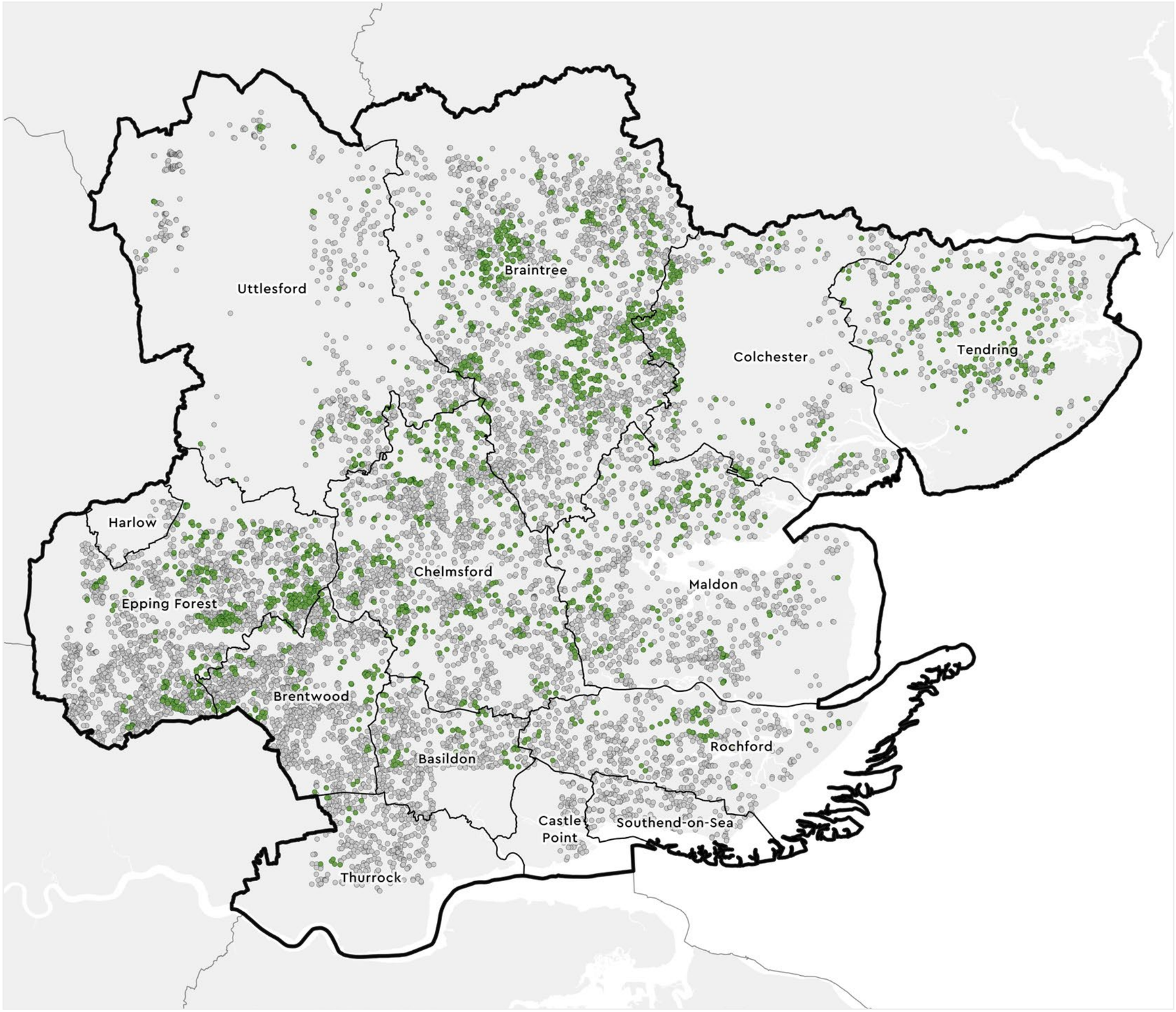


Map 12:
Areas that could become of particular importance – 'strategic' freshwater river habitat creation opportunities

'Strategic' freshwater river habitat creation opportunities defined as the 'top' (greatest quality) 15% of 'all' freshwater river habitat creation opportunities, covering 4% of the Greater Essex LNRS region in total. APIBs removed.

Key

Strategic Opportunities

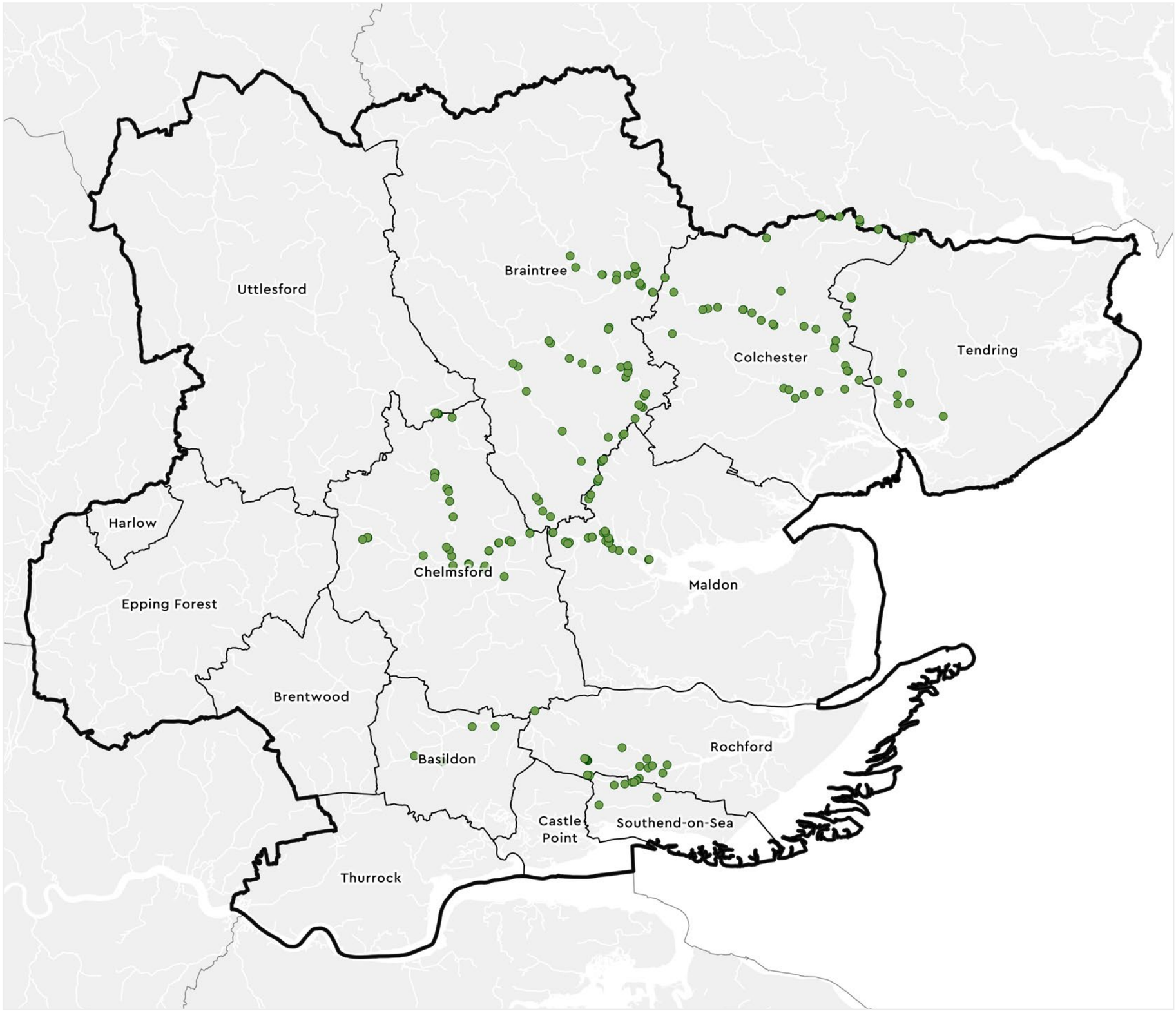


Map 13:
Priority ghost pond restoration/recreation opportunities

Ghost ponds categorised as priority for restoration/recreation based on whether a ghost pond is considered as in poor quality or lost, and which also intersects with the 'strategic' freshwater standing water creation opportunities put forward in this strategy. A count of 2,408 priority ghost ponds in total. Ghost pond data incomplete.

Key

- Priority Ghost Pond Restoration/ Recreation Opportunity
- Non-Priority Ghost Pond Restoration/ Recreation Opportunity

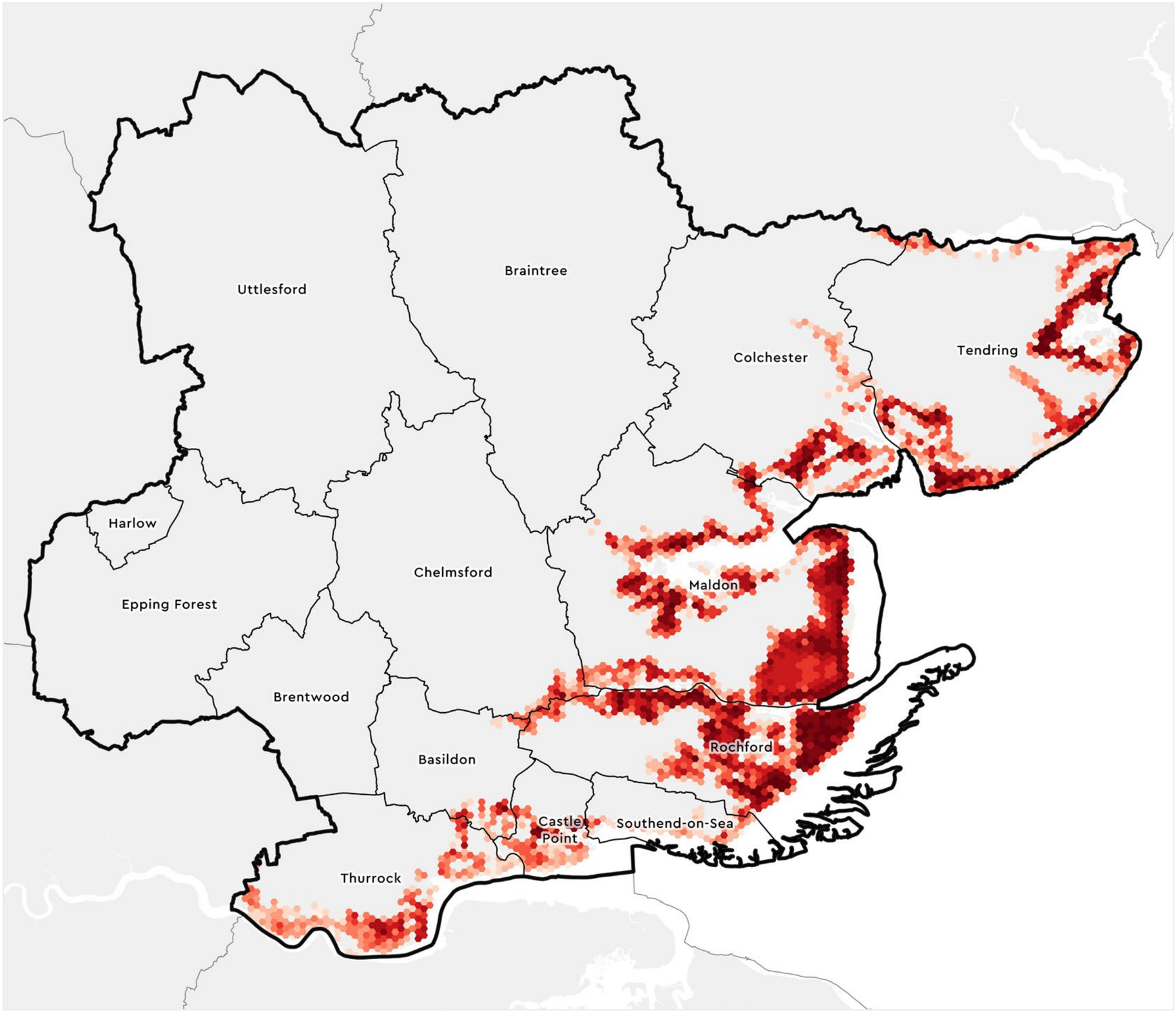


Map 14:
River obstruction clearance opportunities

River obstructions clearance opportunities where clearance will aid overall fish migration. A count of 218 river obstruction clearance opportunities in total.

Key

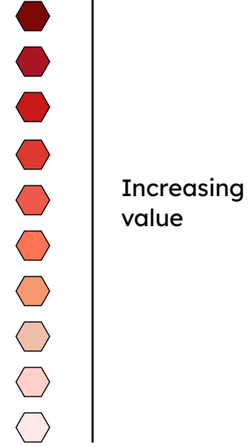
River Obstruction Clearance Opportunity

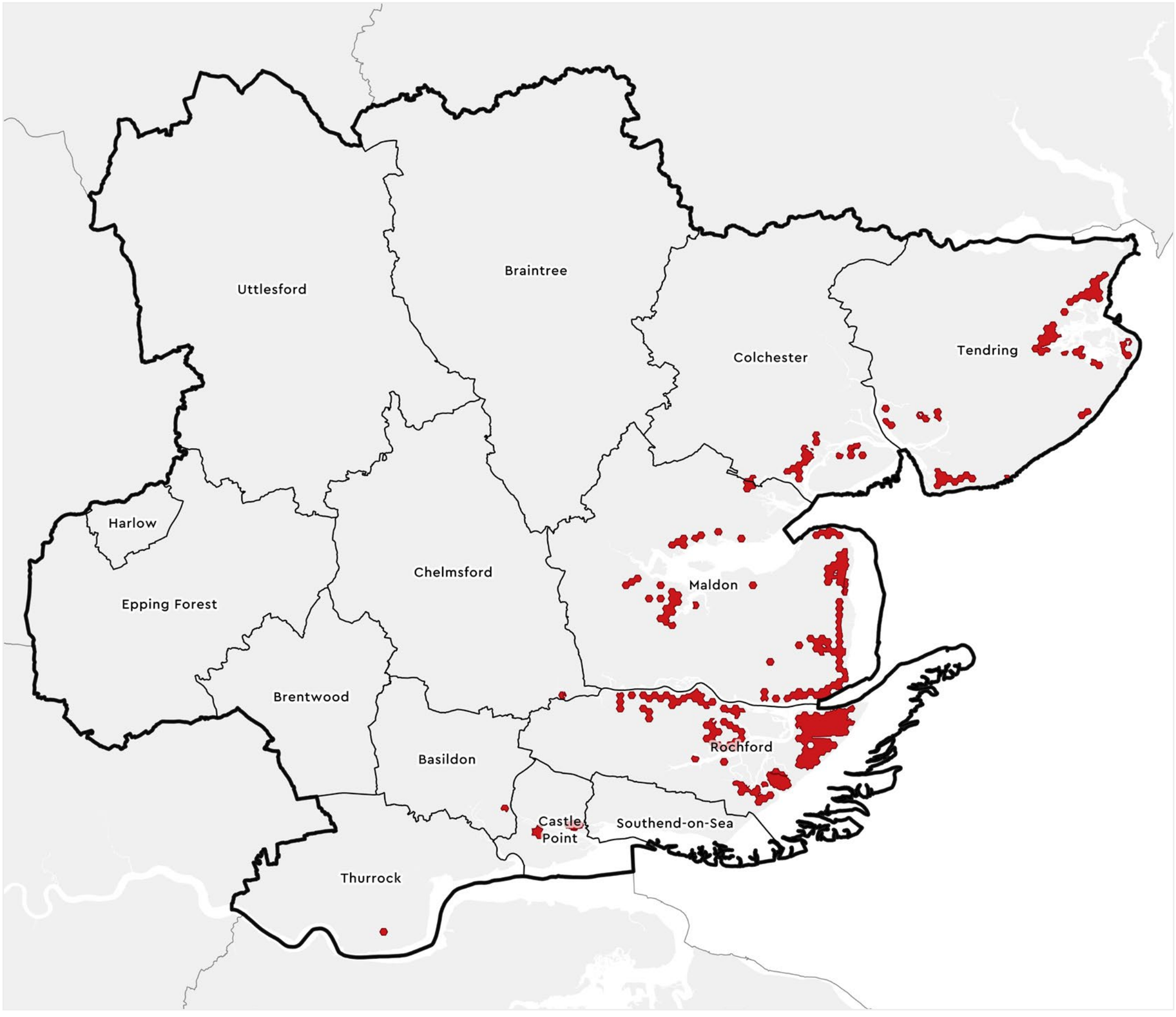


Map 15:
Areas that could become of particular importance – 'all' coastal habitat creation opportunities

All coastal habitat creation opportunities presented as a generalised 0.25km² hexagonal grid and categorised by the 'value' (quality) of opportunity. Darker shades represent 'higher value' (greater quality) opportunities for coastal habitat creation. APIBs not removed.

Key



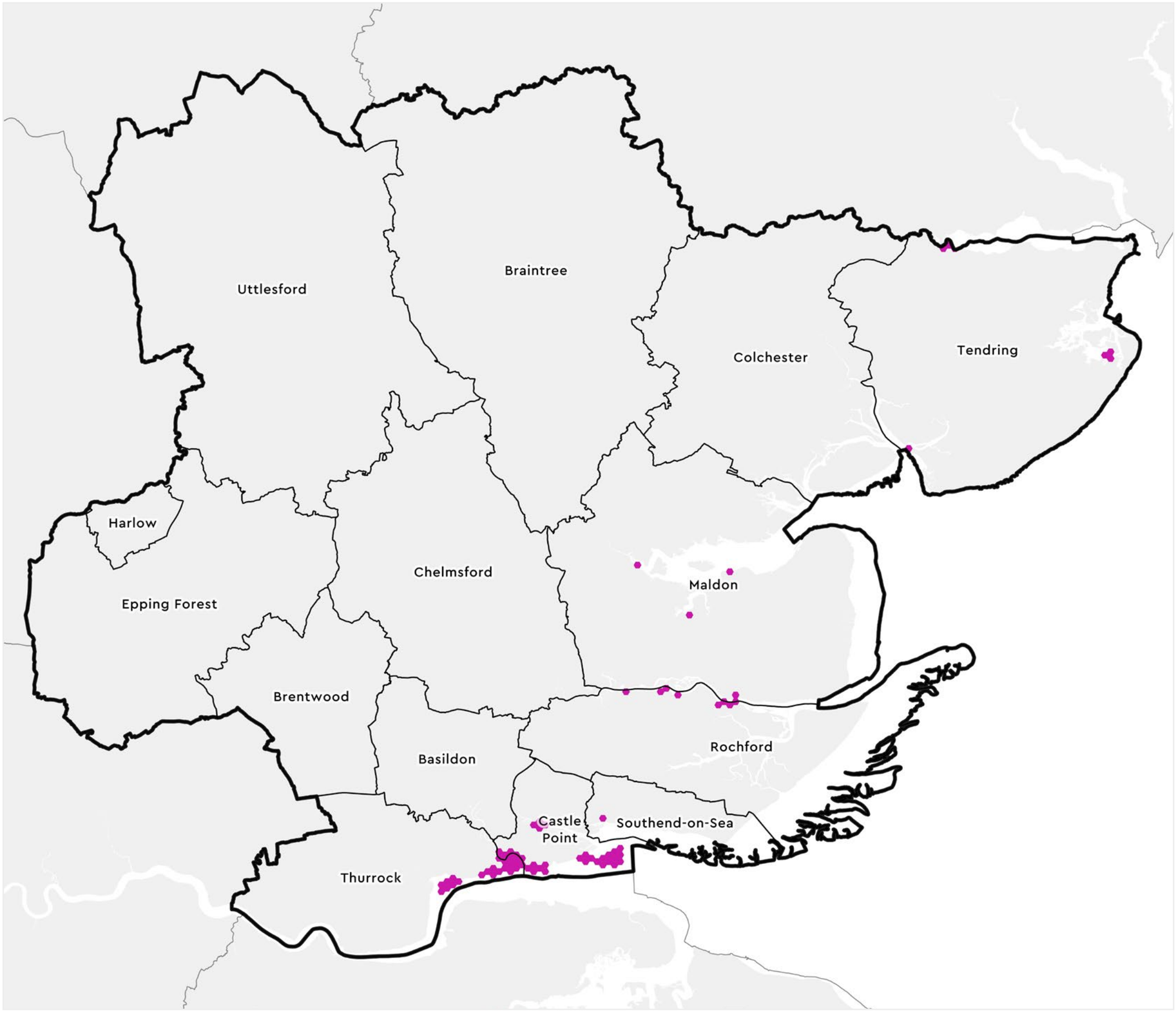


Map 16:
Areas that could become of particular importance – 'strategic' coastal habitat creation opportunities

'Strategic' coastal habitat creation opportunities defined as the 'top' (greatest quality) 15% of 'all' coastal habitat creation opportunities, covering 1.8% of the Greater Essex LNRS region in total. APIBs removed.

Key

Strategic Opportunities



Map 17:
Areas that could become of particular importance – 'all' marine habitat creation opportunities

All marine habitat creation opportunities presented as a generalised 0.25km² hexagonal grid. APIBs not removed.

Key

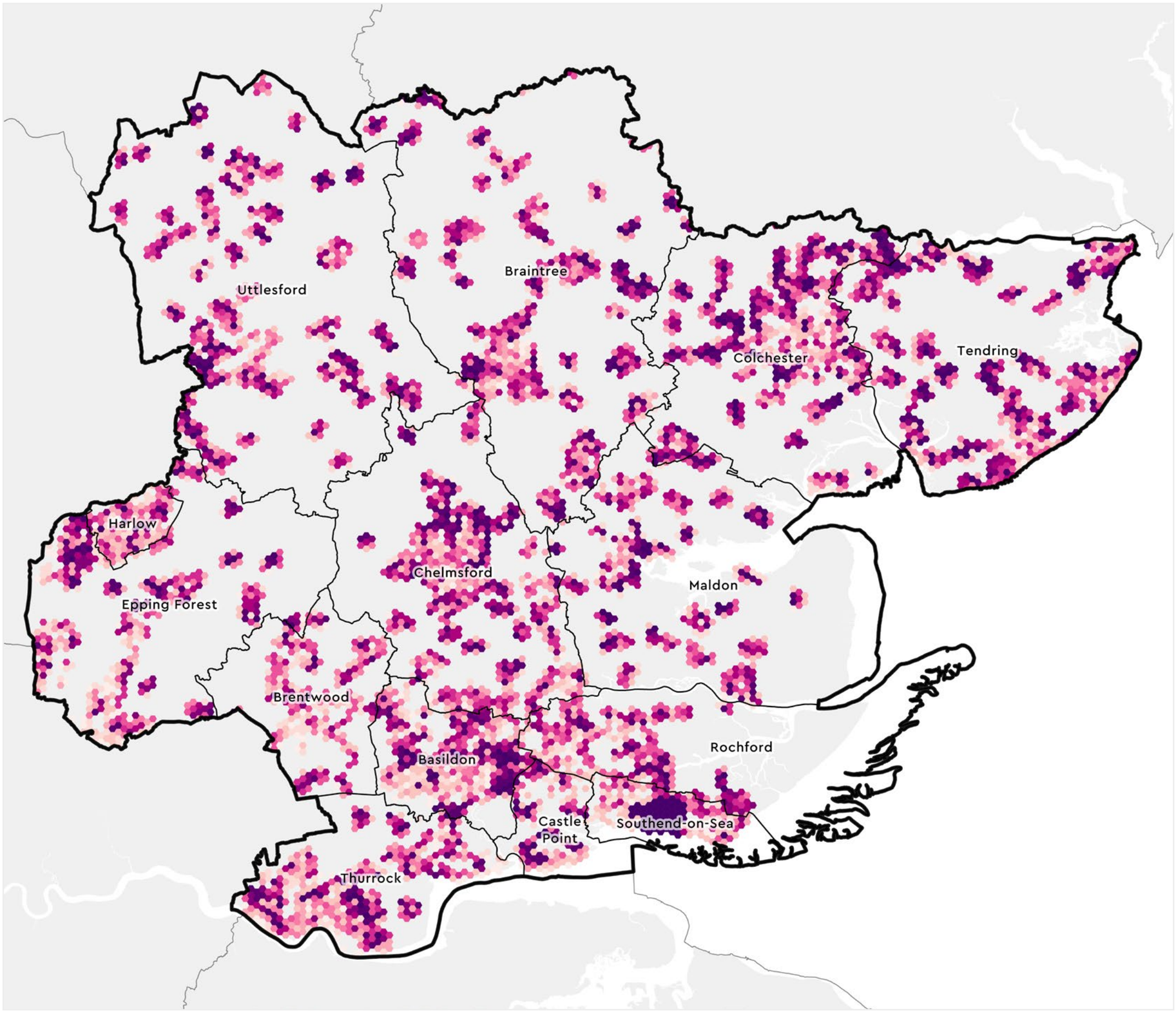
Opportunity

Map 18:
Areas that could become of particular importance – 'strategic' marine habitat creation opportunities

Strategic marine habitat creation opportunities defined as 100% of all marine habitat creation opportunities, covering 0.3% of the Greater Essex LNRS. APIBs removed.

Key

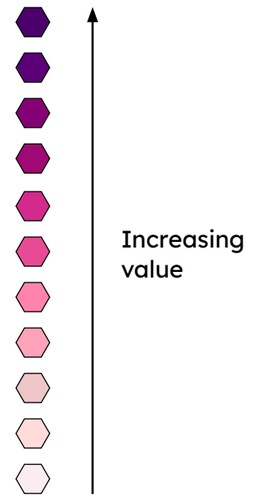
Strategic Opportunities



Map 19:
Areas that could become of particular importance – 'all' urban habitat creation opportunities

All urban habitat creation opportunities presented as a generalised 0.25km² hexagonal grid and categorised by the 'value' (quality) of opportunity. Darker shades represent 'higher value' (greater quality) opportunities for urban habitat creation. APIBs not removed.

Key



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