SES Water dWRMP24

SES Water dWRMP24 SEA Appendices

SES Water

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Appendix A. Review of relevant Plans, Policies and Programmes

A comprehensive review of policies, plans and programmes (PPPs) relevant to the WRSE regional plan was undertaken as part of the WRSE SEA Scoping Report[1] process and a list of PPPs that have been reviewed by the WRSE process is provided below.

This Appendix is focussed on a review of:

- Plans and policies specifically relevant to the SES Water area only (local);
- Plans and Policies that have been amended or adopted since the WRSE Scoping Report was published; or
- Plans and policies that were not reviewed as part of the WRSE SEA scoping Report process.

The plans and policies included in Table B-1 will therefore help determine how the SES Water Drought Plan may be affected by these specific factors.

PPPs reviewed by WRSE

International

- Bern Convention on the Conservation of European Wildlife and Natural Habitats (1979)
- Bonn Convention on the Conservation of Migratory Species of Wild Animals (1983)
- Convention on Biological Diversity (1992)
- Ramsar Convention - The Convention on Wetlands of International Importance (1971)
- UN Framework Convention on Climate Change (1992)
- Kyoto Protocol to the UN Framework Convention on Climate Change (1997)
- Commitments arising from the World Summit on Sustainable Development, Johannesburg (2002)
- Paris Agreement (2015)
- Charter for the Protection and Management of Archaeological Heritage (1990)
- The World Heritage Convention (1972)
- Convention on Access to Information, Public Participation in Decision making and Access to Justice in Environmental Matters (Aarhus Convention) (1998)

European

- Ambient Air Quality Directive (2008/50/EC)
- Thematic Strategy on Air Pollution (2005)
- Establishing measures for the recovery of the stock of European eel 2007 (1100/2007)
- Our life insurance, our natural capital: an EU biodiversity strategy to 2020 (2011)
- Fresh Water Fish Directive (2006/44/EC)
- Directive on the Conservation of Wild Birds (79/409/EEC) (as amended)
- Directive on the Conservation of Natural Habitats and of Wild Flora and Fauna (92/43/EEC)
- Directive on Animal health requirements for aquaculture animals and products thereof, and on the prevention and control of certain diseases in aquatic animals (2006/88/EC)
- Limiting Global Climate Change to 2 degrees Celsius - The way ahead for 2020 and beyond (2007)
- A Clean Planet for all: A European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy (2018)
- Promotion of the use of energy and renewable sources Directive (2009/28/EC)
- Energy Act 2013
- Mainstreaming sustainable development into EU policies: 2009 Review of the European Union Strategy for Sustainable Development

[1] WRSE Regional Plan SEA Scoping Report, Doc Reference 412624-ENV-306, Sept 2020

- European Commission Environmental Liability Directive (2004/35/EC)
- Directive on the assessment of the effects of certain plans and programmes on the environment (2001/42/EC)
- The Convention for the Protection of the Architectural Heritage of Europe (Granada Convention) (1985)
- The European Convention on the Protection of Archaeological Heritage (Valletta Convention) (1992)
- The European Landscape Convention (2006)
- The Environmental Noise Directive (2002/49/EC)
- European Soils Charter (2003)
- Thematic Strategy for Soil Protection (2006)
- The Nitrates Directive (91/676/EEC)
- The Water Framework Directive (WFD) (2000/60/EC)
- Urban Wastewater Treatment Directive (91/271/EEC)
- Drinking Water Directive (1998/83/EC)
- Directive on Bathing Water (76/160/EEC); and Directive 2006/7/EC repealing Directive 76/160/EEC (from 2014)
- Groundwater Directive (2006/118/EC)
- Marine Strategy Framework Directive (2008/56/EEC)
- Directive on the Assessment and Management of Flood Risks (2007/60/EC)
- Blueprint to Safeguard Europe's Water Resources (2012)

National

- The Eels (England & Wales) Regulations 2009 (as amended)
- Salmon and Freshwater Fisheries Act 1975
- UK Post-2010 Biodiversity Framework, JNCC and Defra (2012)
- Making Space for Nature - A review of England's Wildlife Sites and Ecological Network (2010)
- Biodiversity 2020: A strategy for England's wildlife and ecosystem services, Defra (2011)
- The Conservation of Habitats and Species Regulations (2010) (as amended)
- The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations (2019)
- Delivering a healthy natural environment. Ecosystem approach action plan, Defra (2010)
- The Invasive Alien Species (Enforcement and Permitting) Order 2019
- The Great Britain Invasive Non-Native Species Strategy, Defra (2015)
- A narrative for conserving freshwater and wetland habitats in England, Natural England (2016)
- Conservation 21 - Natural England's Conservation Strategy for the 21st Century, Natural England (2016)
- State of Natural Capital Annual Report 2020, Natural Capital Committee (2020)
- Standing Advice on Protected Species, Natural England (2016)
- Climate Change Act 2008
- UK Climate Change Risk Assessment, Defra (2017)
- The National Adaptation Programme and the Third Strategy for Climate Adaptation Reporting, Defra (2018)
- National Planning Policy Framework (NPPF) (2019)
- A Green Future: Our 25 Year Plan to Improve the Environment, UK Government (2018)

- The draft Environment Bill 2020
- Securing the Future – Delivering the UK Sustainable Development Strategy (2005)
- The Natural Choice: Securing the Value of Nature, Defra (2011)
- Marine and Coastal Access Act (2009)
- The Wildlife and Countryside Act 1981 (as amended)
- Environment Protection Act 1990
- Countryside and Rights of Way (CROW) Act
- The Natural Environment and Communities Act 2006 (NERC Act)
- Creating a better place: Our ambition to 2020, Environment Agency (2018)
- UK National Ecosystem Assessment Follow-on (2014)
- National Infrastructure Delivery Plan 2016–2021, Infrastructure and Projects Authority (HM Government) (2016)
- Fixing the foundations: Creating a more prosperous nation, HM Government (2015)
- Environment Act 1995
- The Environmental Damage (Prevention and Remediation) (England) Regulations 2015
- Environmental Assessment of Plans and Programmes Regulations 2004
- Planning (Listed Buildings and Conservation Areas) Act 1990
- The Ancient Monuments and Archaeological Areas Act 1979
- Climate Change and the Historic Environment, English Heritage (2008)
- Strategic Environmental Assessment, Sustainability Appraisal and the Historic Environment, Historic Environment (2016)
- The Setting of Heritage Assets, Historic Environment Good Practice Advice in Planning 3, Historic Environment (2017)
- Ancient Woodland and Veteran Trees: Protecting them from development, Forestry Commission and Natural England (2014)
- Our Waste, Our Resources: A Strategy for England, HM Government (2018)
- Safeguarding our Soils - A strategy for England, Defra (2009)
- Water Resources Act 1991
- Water Industry Act 1991
- Water Act 2003 (as amended)
- Preparing for a drier future: England's water infrastructure needs, National Infrastructure Commission (2018)
- Draft National Policy Statement for Water Resources Infrastructure, Defra (2018)
- Water for Life White Paper, Defra (2011)
- The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003 (as amended)
- Protect groundwater and prevent groundwater pollution, Environment Agency (2017)
- Groundwater protection technical guidance, Environment Agency (2017)
- The Environment Agency’s approach to groundwater protection, Environment Agency (2018)
- Flood and Water Management Act 2010
- Understanding the risks, empowering communities, building resilience: The National Flood and Coastal Erosion Risk Management Strategy for England, Defra and Environment Agency (2014)
- National Flood and Coastal Erosion Risk Management Strategy for England (2020)
- The Water Resources Management Plan Regulations 2007
- Water Resources Planning Framework (2015-2065), Water UK (2016)

- Water Supply (Water Quality) Regulations 2016 (as amended)
- National Policy Statement for Wastewater (2012)
- Climate change approaches in water resources planning – Overview of new methods, Environment Agency (2013)
- Future Water: the Government's water strategy for England, Defra (2008)
- Water Resources Planning Guideline, Environment Agency (2016)
- Managing Water Abstraction, Environment Agency (2016)
- Marine Plans – South East Inshore, South Inshore, South Offshore (Marine Management Organisation)
- UK Marine Policy Statement (2011)

Table A-1 – Plans, Policies and Legislation

Plan, Policy or Legislation	Key Objectives / Targets / Guidance	Implications for the SEA
INTERNATIONAL		
Glasgow Climate Pact (2021)	The agreements reached at the COP26 through the Glasgow Climate Pact include reducing coal emissions by 40% as well as a pledge to phase out fossil fuel subsidies. While no firm dates were set for these goals, the pact also included the goals of ending deforestation and cutting 30% of methane emissions by 2030.	Climatic Factors
EUROPEAN		
Clean Air Programme for Europe 2013	This programme contains measures to ensure that existing targets are met in the short term, and new air quality objectives for the period up to 2030. The package also includes support measures to help cut air pollution, with a focus on improving air quality in cities, supporting research and innovation, and promoting international cooperation. By 2030, and compared to business as usual, the clean air policy package is estimated to: • avoid 58 000 premature deaths across Europe, • save 123 000 km^2 of ecosystems from nitrogen pollution (more than half the area of Romania), • save 56 000 km^2 protected Natura 2000 areas (more than the entire area of Croatia) from nitrogen pollution, save 19 000 km^2 forest ecosystems from acidification.	Air
Birds Directive (2009/147/EC)	Europe is home to more than 500 wild bird species. But at least 32% of the EU's bird species are currently not in a good conservation status. The Birds Directive aims to protect all of the 500 wild bird species naturally occurring in the European Union. Habitat loss and degradation are the most serious threats to the conservation of wild birds. The Directive therefore places great emphasis on the protection of habitats for endangered and migratory species. It establishes a network of Special Protection Areas (SPAs) including all the most suitable territories for these species. Since 1994, all SPAs are included in the Natura 2000 ecological network, set up under the Habitats Directive 92/43/EEC.	Biodiversity
Energy Efficiency Directive (2012/27/EU)	The 2012 Energy Efficiency Directive establishes a set of binding measures to help the EU reach its 20% energy efficiency target by 2020. Under the Directive, all EU countries are required to use energy more efficiently at all stages of the energy chain from its production to its final consumption. On 30 November 2016 the Commission proposed an update to the Energy Efficiency Directive including a new 30% energy efficiency target for 2030, and measures to update the Directive to make sure the new target is met.	Climatic Factors

Plan, Policy or Legislation	Key Objectives / Targets / Guidance	Implications for the SEA
EU Strategy on Adaptation to Climate Change (2021)	The EU strategy on adaptation to climate change aims at making Europe more climate-resilient. Taking a coherent approach by complementing the activities of Member States, it supports action by promoting greater coordination and information-sharing and by ensuring that adaptation considerations are addressed in all relevant EU policies.	Climatic Factors
WHO Guidelines for Community Noise 1999	The World Health Organisation (WHO) publication entitled 'Guidelines for Community Noise' (1999), provides guidance with regard to recommended internal and external noise levels for various building uses, outlining the potential health impacts associated with noise. Specifically, the document recommends internal and external noise levels that would provide an acoustic environment that is conducive to uninterrupted speech and sleep.	Population and Human Health
WHO Night Noise Guidelines for Europe 2009	The World Health Organisation (WHO) Night Noise Guidelines for Europe (NNG) 2009 are health-based guidelines and are to be considered an extension and update to the WHO Guidelines for Community Noise 1999. WHO NNG provides evidence based policy advice to member states in the development of future legislation and policy action in the area of control and surveillance of night noise exposure.	Population and Human Health
Blueprint to Safeguard Europe's Water Resources (2021)	It presents the policy response to the challenges presented in the State of Water Report and its long-term aim is to ensure sufficient availability of good quality water for sustainable and equitable water use. It is closely linked to the Europe 2020 Strategy and the Resource Efficiency Roadmap.	Water
The Europe 2020 Strategy – The Resource Efficiency Roadmap (COM(2011)571)	The Europe 2020 Strategy is the European Union's growth strategy for the next decade and aims at establishing a smart, sustainable and inclusive economy with high levels of employment, productivity and social cohesion. The Resource Efficiency Roadmap is part of the Resource Efficiency Flagship of the Europe 2020 Strategy. The Roadmap outlines how Europe will transform the economy into a sustainable one by 2050. It proposes ways to increase resource productivity and decouple economic growth from resource use and its environmental impact. It illustrates how policies interrelate and build on each other. The Roadmap provides a framework in which future actions can be designed and implemented coherently. It sets out a vision for the structural and technological change needed up to 2050, with milestones to be reached by 2020. These milestones illustrate what will be needed to put Europe on a path to resource efficient and sustainable growth.	Material Assets
Waste Framework Directive (75/442/EEC)	The original aim of the Waste Framework Directive was to lay the basis to turn the EU into a recycling society and contained 5 key steps in the waste hierarchy concept: • Prevention • Reuse • Recycle	Material Assets

Plan, Policy or Legislation	Key Objectives / Targets / Guidance	Implications for the SEA
	• Recovery • Disposal The revised Waste Directive introduces new provisions aimed at boosting waste prevention and recycling as part of the waste hierarchy and clarifies key concepts such as the definition of waste, recovery and disposal.	
NATIONAL		
Environment Act 2021	The Environment Act sets out that the Secretary of State may by regulations set long-term targets in respect of any matter which relates to (a)the natural environment, or (b)people's enjoyment of the natural environment. A long-term target in respect of at least one matter within each of the four priority areas: (a)air quality; (b)water; (c)biodiversity; (d)resource efficiency and waste reduction. The Act specifically requires the Secretary of State to set by future regulation statutory targets for the recovery of the natural world in two priority areas: air quality (PM2.5 air quality target) and biodiversity (species abundance target) and includes an important new target to reverse the decline in species abundance by the end of 2030. The Secretary of State must also prepare an environmental improvement plan for significantly improving the natural environment for a period no shorter than 15 years. The Act will also deliver: • A cycle of environmental monitoring and reporting; • Environmental Principles embedded in domestic policy making; and • Office for Environmental Protection to uphold environmental law. Key relevant provisions: • Biodiversity Net Gain The Act places a statutory requirement for developments to deliver biodiversity improvements and will require all planning permissions in England (subject to exemptions) to be granted subject to a new general pre-commencement condition that requires approval of a biodiversity gain plan. The planning authority can only approve the biodiversity gain plan if the biodiversity value attributable to a development exceeds the pre-development biodiversity value of the onsite habitat by 10% (known as the 'biodiversity gain objective'). The biodiversity plan must set out the steps taken to achieve the 'biodiversity gain objective', which could be through minimising the adverse effects of the development on habitats, the identification of	Cross-cutting

Plan, Policy or Legislation	Key Objectives / Targets / Guidance	Implications for the SEA
	the pre and post development onsite biodiversity value, details of registered offsite biodiversity value allocated to the development and biodiversity credits purchased, and any other information that may be required by regulations. There will be flexible mechanisms available to increase the biodiversity value to demonstrate a 10% biodiversity net gain. Works to enhance habitats can be carried out either onsite or offsite or through the purchase of 'biodiversity credits' from the Secretary of State. However, this flexibility may be removed (subject to regulations) if the onsite habitat is 'irreplaceable'. For such developments, arrangements to minimise their adverse effects and improvements, must be delivered onsite. Both onsite and offsite enhancements must be maintained for at least 30 years after completion of a development (which period may be amended). Onsite enhancements must be secured by planning condition, s106 obligation or a conservation covenant, which is a written agreement that is registrable as a local land charge, between a landowner and a 'responsible body' that binds a landowner and its successors to do/not do something on the land for a conservation purpose. Offsite enhancements must be secured under either a s106 agreement or a conservation covenant and be registered in the new, publicly available, biodiversity gain site register. • Waste and resource efficiency The Act gives wide ranging powers to make regulations about who producer obligations should apply to and which products or materials should be covered. These powers are intended to prevent waste/reduce the amount of a product that becomes waste and increase re-use, redistribution, recovery and recycling. Producers can get ahead of these regulations, and minimise any eventual requirements to pay disposal costs, by designing products with these objectives in mind. Water resources management plans, drought plans and joint proposals The Act requires more collaboration (joint proposals) between water companies on managing supply and demand, resilience and environmental improvements, through their statutory water management plans, • Water quality The Secretary of State may by regulations amend or modify any legislation to which this section applies for the purpose of— • (a)making provision about the substances to be taken into account in assessing the chemical status of surface water or groundwater;	

Plan, Policy or Legislation	Key Objectives / Targets / Guidance	Implications for the SEA
	• (b)specifying standards in relation to those substances or in relation to the chemical status of surface water or groundwater.	
A Green Future: Our 25 Year Plan to Improve the Environment, UK Government (2018)	This 25 Year Environment Plan sets out government action to help the natural world regain and retain good health. It aims to deliver cleaner air and water in our cities and rural landscapes, protect threatened species and provide richer wildlife habitats. Ten key goals are specified: 1. Clean air 2. Clean and plentiful water 3. Thriving plants and wildlife 4. A reduced risk of harm from environmental hazards such as flooding and drought 5. Using resources from nature more sustainably and efficiently 6. Enhanced beauty, heritage and engagement with the natural environment 7. Mitigating and adapting to climate change 8. Minimising waste 9. Managing exposure to chemicals 10. Enhancing biosecurity To deliver on these goals, six areas of action are identified: • Using and managing land sustainably • Recovering nature and enhancing the beauty of landscapes • Connecting people with the environment to improve health and wellbeing • Increasing resource efficiency, and reducing pollution and waste • Securing clean, productive and biologically diverse seas and oceans • Protecting and improving global environment	Cross-cutting
National Planning Policy Framework (NPPF) (2021)	The National Planning Policy Framework which sets out the government's planning policies for England was revised in July 2021. The most relevant changes in the context of the WRMP24 are as follows: Chapter 2: Achieving Sustainable Development now acknowledges that members of the UN have agreed to pursue the 17 Global Goals for Sustainable Development in the period to 2030. Minor edits have been made to phrasing, setting out clearly that the environmental objective is now to protect and enhance, and to improve biodiversity, where before the requirement was simply to contribute to these matters.	Cross-cutting

Plan, Policy or Legislation	Key Objectives / Targets / Guidance	Implications for the SEA
	The purpose of the planning system is to contribute to the achievement of sustainable development. At a very high level, the objective of sustainable development can be summarised as meeting the needs of the present without compromising the ability of future generations to meet their own needs. At a similarly high level, members of the United Nations – including the United Kingdom – have agreed to pursue the 17 Global Goals for Sustainable Development in the period to 2030. These address social progress, economic well-being and environmental protection. Achieving sustainable development means that the planning system has three overarching objectives, which are interdependent and need to be pursued in mutually supportive ways (so that opportunities can be taken to secure net gains across each of the different objectives): a) an economic objective – to help build a strong, responsive and competitive economy, by ensuring that sufficient land of the right types is available in the right places and at the right time to support growth, innovation and improved productivity; and by identifying and coordinating the provision of infrastructure; b) a social objective – to support strong, vibrant and healthy communities, by ensuring that a sufficient number and range of homes can be provided to meet the needs of present and future generations; and by fostering well-designed, beautiful and safe places, with accessible services and open spaces that reflect current and future needs and support communities' health, social and cultural well-being; and c) an environmental objective – to protect and enhance our natural, built and historic environment; including making effective use of land, improving biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy. These objectives should be delivered through the preparation and implementation of plans and the application of the policies in this Framework; they are not criteria against which every decision can or should be judged. Planning policies and decisions should play an active role in guiding development towards sustainable solutions, but in doing so should take local circumstances into account, to reflect the character, needs and opportunities of each area.	
UK Biodiversity Plan (1994)	This document represents the first United Kingdom biodiversity action plan. It contains three sections: • Section 1 – describes the UKs biological resources and their global importance as well as the range of biodiversity within the UK from a historical and geological importance • Section 2- describes the UK's strategy and programmes and examines threats, problems and opportunities of biodiversity. Section 3- draws the components of the action plan together and provides a forward work programme.	Biodiversity
Guidance for Local Authorities on	The guidance is intended to assist local authorities in meeting the Biodiversity Duty. The conservation of biodiversity is highly dependent on the extent to which it is addressed in infrastructure and	Biodiversity

Plan, Policy or Legislation	Key Objectives / Targets / Guidance	Implications for the SEA
Implementing the Biodiversity Duty (2007)	development projects and how well the planning process integrates biodiversity into planning and development control policies. Core Strategies and Local Development Plan Strategies set out the overarching policy framework for the plan area. Strategic objectives and policies should be developed for biodiversity, including objectives for enhancement. Consideration should also be given to how biodiversity enhancement can be used to bring about more sustainable development, through integration with other policy objectives and other land uses, for example housing and economic development, health, education and social inclusion.	
National Forest Inventory	This programme monitors woodland and trees within Great Britain. It includes the most in depth survey carried out on Britain's woodland and trees to date. The NFI provides an extensive and unique record of key information about our forests and woodlands. Woodland surveys and compiled forest inventories have been carried out at 10-15 year intervals since 1924.	Biodiversity
Ancient Woodland Inventory	The AWI is a provisional guide and map based tool to the location of Ancient and long established Woodland. Ancient woodland is defined as land that is currently wooded and has been continually wooded in England at least since 1600. This type of woodland has important biodiversity and cultural values by its virtue of its antiquity.	Biodiversity
National Parks and Access to Countryside Act 2006	The Act established powers to declare National Nature Reserves (NNRs); to notify sites of Sites of Special Scientific Interest (SSSIs) and for local authorities to establish Local Nature Reserves (LNRs). These provisions were strengthened by the Wildlife & Countryside Act 1981. An NNR is an area which is among the best examples of a particular habitat. NNRs are of national importance. They are in many cases owned and managed by the statutory authority, (for example Natural England), but not always. An NNR, unlike an SSSI, has to be managed appropriately to retain its special status.	Biodiversity
Heritage Protection for the 21st Century 2007	The paper sets out a vision of a unified and simpler heritage protection system, which will have more opportunities for public involvement and community engagement. The proposed system will be more open, accountable and transparent. It will offer all those with an interest in the historic environment a clearer record of what is protected and why; it will enable people who own or manage historic buildings and sites to have a better understanding of what features are important; it will streamline the consent procedures and create a more consultative and collaborative protection system. It is predominantly aimed for England and Wales with some UK wide elements.	Cultural Heritage
Climate Change Act 2008 and its 2050 Target Amendment Order, 2019	The Act aims to improve carbon management, helping the transition towards a low-carbon economy in the UK and to demonstrate UK leadership internationally. Key provisions of the Act include: • a legally binding target of at least an 80% cut in greenhouse gas emissions by 2050 and a reduction in emissions of at least 34% by 2020 (both against 1990 baseline). Note the 2050 target has now been amended to Net Zero	Climatic Factors

Plan, Policy or Legislation	Key Objectives / Targets / Guidance	Implications for the SEA
	• a carbon budgeting system that caps emissions over five-year periods; • creation of the Committee on Climate Change; • further measures to reduce emissions, including measures on biofuels; a requirement for the Government to report at least every five years on the risks to the UK of climate change, and to publish a programme setting out how these will be addressed. The Act also introduces powers for Government to require public bodies and statutory undertakers to carry out their own risk assessment and make plans to address those risks	
UK Net Zero Strategy 2021	The UK's new Net Zero Strategy sets out policies and proposals for decarbonising all sectors of the UK economy to meet our net zero target by 2050. It sets out, for the first time, how the UK Government plans to deliver its emissions targets of Net Zero in 2050 and a 78% reduction from 1990 to 2035 (-63% relative to 2019). It puts forward an achievable and affordable vision that will bring net benefits to the UK. It is an ambitious and comprehensive strategy that marks a significant step forward for UK climate policy, setting a globally leading benchmark. Further steps will need to follow quickly to implement the policies and proposals mapped out in the Net Zero Strategy if it is to be a success.	Climatic Factors
Planning Practice Guidance – Climate Change 2015	Advises how planning can identify suitable mitigation and adaptation measures in plan-making and the planning application process to address the potential impacts of climate	Climatic Factors
Clean Growth Strategy 2017	The Clean Growth Strategy deals specifically with the challenge of trying to grow the UKs economy whilst reducing its emissions. This issue is dealt with across multiple strategies, and several sectors have a large role to play. This strategy details the approach of each sector and sets out key policies for each The guiding principles of the Clean Growth Strategy are to, through nurturing low carbon technologies, processes, and systems: • meeting the UK's domestic commitments at the lowest possible net cost to UK taxpayers, consumers, and businesses; and • maximising the social and economic benefits for the UK from this transition. The key policies to achieve this are sorted into the following categories: • accelerating clean growth; • improving business and industry efficiency (25% of emissions); • improving our homes (13% of emissions); • accelerating the shift to low carbon transport (24% of emissions); • delivering clean, smart, flexible power (21% of emissions);	Climatic Factors

Plan, Policy or Legislation	Key Objectives / Targets / Guidance	Implications for the SEA
	• enhancing the benefits and value of our natural resources (15% of emissions); • leading in the public sector (2% of emissions); and government leadership in driving clean growth.	
National Parks and Access to the Countryside Act 1949	This was an act that made provision for National Parks and the establishment of a National Parks Commission. It was also to confer on the Nature Conservancy and local authorities' powers for the establishment and maintenance of nature reserves, it made further provision for the recording, creation, maintenance and improvement of public paths and for securing access to open country and to amend laws relating to rights of way.	Land Use
Health Impact Assessment in Strategic Environmental Assessment (2001)	This is a review of Health Impact Assessment concepts, methods and practices to support the development of a protocol on Strategic Environmental Assessment which adequately covers health impacts. It discusses how decisions taken outside of the health sector can affect the health of individuals and populations by modifying their physical and social environment, and how this in turn affects social and economic development. It describes methods, procedures and practices to carry out health impact assessments of policies, plans and projects, highlighting the similarities with and opportunities for integrating health impact assessment within strategic environmental assessments, and other forms of impact assessment under use. It also draws attention to the opportunities for achieving health benefits and avoiding health costs by considering health impacts early in the planning process. It is aimed at inspiring policy makers to include health considerations early in their planning process by showing how different perspectives can feasibly be incorporated into everyday decisions.	Population and Human Health
Healthy Lives, Healthy People: Our strategy for public health in England (2010)	This white paper sets out the government's long-term vision for the future of public health in England. The aim is to create a 'wellness' service (Public Health England) and to strengthen both national and local leadership. The plans set out put local communities at the heart of public health. It states that central control will end and give local government the freedom, responsibility and funding to innovate and develop their own ways of improving public health in their area. There will also be real financial incentives to reward their progress on improving health and reducing health inequalities, and greater transparency so people can see the results they achieve.	Population and Human Health
Environmental Noise Regulations 2006	The European Environmental Noise Directive (END) is implemented in England by The Environmental Noise (England) Regulations 2006 and seeks to manage the impact of environmental noise through strategic noise mapping and the preparation and implementation of noise Action Plans. Under these regulations, the second round of strategic noise mapping has been undertaken and updated Noise Action Plans have been prepared.	Population and Human health

Plan, Policy or Legislation	Key Objectives / Targets / Guidance	Implications for the SEA
Noise Policy Statement for England 2010	The objectives of the Noise Policy Statement for England (NPSE) sets out three noise levels to be defined by the noise assessor: These are as follows: • NOEL – No Observed Effect Level. This is the level below which no effect can be detected. Below this level there is no detectable effect on health and quality of life due to noise. • LOAEL – Lowest Observed Adverse Effect Level. This is the level above which adverse effects on health and quality of life can be detected. • SOAEL – Significant Observed Adverse Effect Level – This is the level above which significant adverse effects on health and quality of life can occur. The NPSE considers that the noise levels above the SOAEL would be seen to have, by definition, significant adverse effects and would be considered unacceptable. Where the assessed noise levels fall between the LOAEL and the SOAEL noise levels the policy statement requires that: "all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development. This does not mean that such adverse effects cannot occur but that efforts should be focused on minimising such effects" Where noise levels are below the LOAEL it is considered there will be no adverse effect. Once the noise levels are below the NOEL there will be no observable change. For the present guidance a numerical definition of LOAEL is given by the WHO Guidelines for Community Noise and BS8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings.	Population and Human Health
Contaminated Land (England) Regulations 2006	Outlines the regulations on contaminated land in order to prevent new land becoming contaminated by polluting substances whilst also tackling historic contamination of sites as it poses risks to human health and the environment.	Population and Human Health / Land Use
National Review of Waste Policy in England 2011	This document is a review of waste policy in England and is guided by a waste hierarchy which is a guide to sustainable waste management and a legal requirement. Key objectives are the use of more sustainable approaches to the use of materials and to improve the service to householders and businesses in order to deliver environmental benefits and support economic growth. This review covers a range of topics including: • Sustainable use of materials and waste prevention • Regulations and enforcement • Food waste • Energy recovery • Infrastructure and planning Next steps in waste policy.	Material Assets

Plan, Policy or Legislation	Key Objectives / Targets / Guidance	Implications for the SEA
Waste Management Plan for England	This document provides an analysis of the current waste management situation in England and fulfils the mandatory requirements of article 28 of the revised Waste Framework Directive (rWFD). The plan does not introduce new policies or change the landscape of how waste is managed in England. Its core aim is to bring current waste management policies under the umbrella of one national plan.	Material Assets
Waste Prevention Programme for England 2013	This Programme sets out the government's view of the key roles and actions which should be taken to move towards a more resource efficient economy. As well as describing the actions the government is taking to support this move, it also highlights actions businesses, the wider public sector, the civil society and consumers can take to benefit from preventing waste.	Material Assets
Resource Security Action Plan 2012	This document was developed in response to private sector concerns about the availability of some raw materials. It details how the government recognises these issues, provides a framework for business action to address resource risks, and sets out a high level actions to build on the developing partnership between government and businesses to address resource concerns.	Material Assets
Waste (England and Wales) Regulations 2011	These regulations implement the revised EU Waste Framework Directive 2008/98 which sets requirements for the collection, transport, recovery and disposal of waste. It outlines that it is a requirement for businesses to confirm that they have applied the waste management hierarchy when transferring waste and include a declaration to this effect on their waste transfer note or consignment note. The regulations apply to businesses that: • Produce waste • Import or export waste • Carry or transport waste • Keep or store waste • Treat waste • Dispose of waste • Operate as waste brokers or dealers	Material Assets
Air Quality Standards Regulations 2010	These regulations sets legally binding limits for concentrations in outdoor air of major air pollutants that impact public health such as particulate matter (PM_{10} and $PM_{2.5}$) and nitrogen dioxide (NO_2). As well as having direct effects, these pollutants can combine in the atmosphere to form ozone, a harmful air pollutant (and potent greenhouse gas) which can be transported great distances by weather systems. It also incorporates the 4th air quality daughter directive that sets targets for levels in outdoor air of certain toxic heavy metals and polycyclic aromatic hydrocarbons.	Air

Plan, Policy or Legislation	Key Objectives / Targets / Guidance	Implications for the SEA
Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007	This Air Quality Strategy sets out air quality objectives and policy options to further improve air quality in the UK from today into the long term. As well as direct benefits to public health, these options are intended to provide important benefits to quality of life and help to protect our environment.	Air
Clean Air Strategy, 2019	The Clean Air Strategy explains how the UK Government will tackle all sources of air pollution, sets out policy direction, and outlines measures that will drive the move to zero emission transport modes. The strategy links into other national level policies, outlining the same targets and strategies across multiple documents. The strategy includes numerous aims and goals, many drawn from other policy documents, that are collated in brief in the executive summary. These are framed in the following topics: • protecting the nation's health; • protecting the environment; • securing clean growth and innovation; • action to reduce emissions from transport; • action to reduce emissions at home; • action to reduce emissions from farming; • action to reduce emissions from industry; and • leadership at all levels. The Clean Air Strategy effectively summarises government policy with an impact on air quality from multiple different areas. Multiple government initiatives are listed where action has been taken by central government. Of particular importance, and reinforced by the Clean Air Strategy, is the adoption of challenging and enforceable local Air Quality Strategies.	Air
Air Quality Plan for Nitrogen Dioxide in the UK, 2017	Jointly produced by the DfT and DEFRA, this national plan determines an approach for areas with the worst levels of traffic-related air pollution to mitigate the effects. It sets out the framework for Clean Air Zones, allowing for targeted action to improve air quality in the "shortest possible time" as required by legal obligations to meet NO2 concentration thresholds. The document also sets out plans for ending the sale of new, conventional petrol and diesel cars and vans by 2040. The plan argues that NO2 accumulation is a local issue, as the pollutants do not disperse widely like greenhouse gasses. In line with this local approach, the plan sets out support to local authorities, including: • setting up a £255 million Implementation Fund; • establishing a Clean Air Fund; and • providing £100m for retrofitting and new low emission buses.	Air

Plan, Policy or Legislation	Key Objectives / Targets / Guidance	Implications for the SEA
	The plan outlines the introduction of several new funding streams that local authorities can utilise to finance measures to reduce NO2 emissions.	
Landscape Character Framework	This is a project that aims to map and describe the diverse landscape of England at a regional scale. It develops the idea of a landscape as a framework leading to better management of the environment. Key components are: • Regional landscape character and associated descriptions. The key characteristics of each landscape type are described under 'physical landscape', 'biodiversity', 'historic character' and 'perceptual landscape' headings. • Regional landscape character and associated descriptions. Physical landscape UNITS and associated geology, landform, ground type and land cover information upon which the landscape types and areas mapping and descriptions are based.	Landscape
Flood Risk Regulations 2009	The Regulations identify and take action in areas with the most significant flood risks. The purpose of the Act is to: • Introduce the concept of flood risk management and the framework for the delivery of flood and coastal erosion risk management through national and local strategies • Provide new definitions, for example "flood", "surface runoff", "Risk Management Authorities", Lead Local Flood Authority" Establish the roles and responsibilities of the different risk management authorities	Water
Strategic Environmental Assessment and Habitats Regulations Assessment - Guidance for Water Resources Management Plans and Drought Plans	The guidance sets out methods designed to facilitate a consistent approach across the industry, while helping to ensure regulatory compliance. The guidance reviews SEAs and HRAs of plans produced during PR09 and clarifies emerging issues, including potential double counting of impacts, the role of SEA and how its outcomes should be integrated into plans; and the application of HRA at the plan as opposed to project level.	Water
Marine Plans (Marine Management Organisation)	A marine plan: • sets out priorities and directions for future development within the plan area; • informs sustainable use of marine resources; and • helps marine users understand the best locations for their activities, including where new developments may be appropriate. Each of the 11 marine plan areas will have a marine plan with a long-term (20 years) view of activities and will be reviewed every 3 years. There will be 10 marine plans as the North West will have a single plan following requests to have a single process and one plan for these areas.	Water

Plan, Policy or Legislation	Key Objectives / Targets / Guidance	Implications for the SEA
Water Industry Strategic Environmental Requirements (WISER)	The water industry strategic environmental requirements (WISER), written by Natural England and the Environment Agency sets out: • issues and opportunities water companies should consider in meeting their environmental obligations • how water companies should step up their level of ambition. WISER describes the statutory and non-statutory expectations of water companies for price review 2024 (PR24) and expected practice. These are organised around the three objectives that EA and NE expect water companies to achieve: • a thriving natural environment • resilience for the environment and customers • expected performance and compliance WISER requires water companies to take the four water management planning frameworks (river basin management plans, water resource management plans, drainage and wastewater management plans and flood risk management plans) into consideration as well as considering the water industry national environment programme (WINEP).	Water
Water Industry National Environment Programme (WINEP)	The WINEP is the programme of actions water companies need to take to meet statutory environmental obligations, non-statutory environmental requirements or delivery against a water company's statutory functions (as set out in WISER). The Environment Agency and Natural England translate legislation and UK government priorities into WINEP drivers. A WINEP driver links the statutory obligation or the non-statutory requirement to a water company's actions. The drivers are expected to make real changes to the options proposed by water companies to address environmental challenges and increase flexibility.	Water
National Infrastructure Plan (2014)	The National Infrastructure Plan (NIP) 2014 presents an overview of the government's policies, investments and record on infrastructure delivery since 2010. The document identifies that over 2,500 different projects or schemes have been delivered in this Parliament. It also details the government's approach to ensuring that the Top 40 priority investments remain on track to deliver, as well as providing the latest detail on the timing, funding and status of each of them. The plan consolidates and builds on the progress already made by providing the clarity and visibility that industry, the supply chain and investors need going forwards. In addition to the pipeline, the document provides information on the government's ongoing work to improve the planning, performance and delivery of infrastructure and addresses longer term challenges, for example by incorporating analysis of the financing requirements for our infrastructure.	Cumulative Effects

Plan, Policy or Legislation	Key Objectives / Targets / Guidance	Implications for the SEA
Water Resources Planning Guidance (WRPG) (2021)	The guideline is relevant to water companies in England and Wales and those producing regional plans. It is designed to help write plans that complies with all the relevant statutory requirements and government policy. This guideline contains the best practice technical methods for producing WRMPs and regional plans. Topics covered include forming and maintaining a WRMP, developing supply forecast, developing demand forecast, allowing for uncertainty, identifying possible options and complying the best value plan.	Water
Meeting our future water needs: a national framework for water resources	The National Framework explores the long-term needs of all sectors that depend on a secure supply of water. This includes: • public water supplies provided by water companies to customers' homes and businesses; • direct abstraction for agriculture, electricity generation and industry; and • the water needs of the environment. The framework sets out: • the scale of action needed to ensure resilient water supplies are available to meet the needs of all users in the future: and • a greater level of ambition for restoring, protecting and improving the environment that is the source of all our supplies.	Water
Our plan to rebuild : The UK Government COVID19 recovery strategy (2020)	Therefore the Government's aim at the centre of this plan is to, '*return life to as close to normal as possible, for as many people as possible, as fast and fairly as possible in a way that avoids a new epidemic, minimises lives lost and maximises health, economic and social outcomes'.* The three main factors that will be considered are; • Health effect - The Government must consider overall health outcomes, not just those directly caused by COVID-19. • Economic effect - protecting and restoring people's livelihoods and improving people's living standards. • Social effect - the wider effect of the social distancing measures on how the public live their daily lives. The Government recognises that social distancing measures can exacerbate societal challenges, from the negative impacts on people's mental health and feelings of isolation, to the risks of domestic abuse and online fraud.	Population and Human Health
Build Back Better: our plan for growth (2021)	The plan 'takes a transformational approach, tackling long-term problems to deliver growth that creates high-quality jobs across the UK and makes the most of the strengths of the Union'. The three core pillars for growth are: 1. Infrastructure	Material Assets and Population and Human Health

Plan, Policy or Legislation	Key Objectives / Targets / Guidance	Implications for the SEA
	2. Skills 3. Innovation 4. The growth will: • Level up the whole of the UK • Support the transition to Net Zero • Support our vision for Global Britain	
EA2025 “Creating a Better Place”	The plan wants to protect and enhance the environment as a whole and contribute to sustainable development. It sets out 3 long term goals: • A nation resilient to climate change • Healthy air, land and water • Green growth and a sustainable future It is guided by three principles: • Put people and wildlife first: our goal is to create a better place for them. • 80/20: we will focus on the 20% that makes 80% of the difference. • Support local priorities: every place and community has its own needs.	Cross-cutting
Water abstraction plan 2017	The plan sets out how the government will reform water abstraction management over the coming years and how this will protect the environment and improve access to water. The abstraction plan document summarises all the changes that are planned. The plans approach to addressing the current main issues with managing abstractions has three main elements: • making full use of existing regulatory powers and approaches to address unsustainable abstraction and move around 90% of surface water bodies and 77% of groundwater bodies to the required standards by 2021 • developing a stronger catchment focus – bringing together the Environment Agency, abstractors and catchment groups to develop local solutions to existing pressures and to prepare for the future. These local solutions will: - protect the environment by changing licences to better reflect water availability in catchments and reduce the impact of abstraction - improve access to water by introducing more flexible conditions that support water storage, water trading and efficient use	Water

Plan, Policy or Legislation	Key Objectives / Targets / Guidance	Implications for the SEA
	• supporting these reforms by modernising the abstraction service, making sure all significant abstraction is regulated and bringing regulations in line with other environmental permitting regimes	
Water company drought plan guideline	The guideline: • explains the process a water company is expected to follow • what it should include in its drought plan Areas that should be included in a drought plan include: • Drought triggers • Demand management actions • Supply management actions • Extreme drought management actions • Communicating during a drought • Environmental assessment, monitoring and mitigation	Water
REGIONAL / LOCAL		
Local Development Plans	Local Development Plans are the main framework for planning in local authorities. The Plans include policies on key elements - transport, carbon reduction, employment and economic development, the natural environment and housing, etc. The following local authorities fall within the boundary and the Local Plans are relevant: Sevenoaks Elmbridge Epsom and Ewell Guildford Mole Valley Reigate and Banstead Tandridge Crawley Croydon Kingston upon Thames Merton Sutton	Ensure that issues such as carbon reduction, biodiversity, waste reduction and managing natural resources sustainably are addressed via the SEA.

Plan, Policy or Legislation	Key Objectives / Targets / Guidance	Implications for the SEA
River Basin Management Plans (RBMPs), Defra and Environment Agency (2021)	RBMPs set out to provide a strategic framework for managing, protecting and improving the water environment. The Plan area falls within the South East River Basin District. The plans contain the following: Updates to the local environmental objectives that government, the Environment Agency and other public bodies use to make planning decisions, decide on the conditions to include in environmental permits, as well as target action, including informing funding decisions. An assessment of the current condition of each water body and, if it is not in good condition, the reasons why.	Ensure that protection is provided to water bodies to ensure that they can help meet the objectives of the river basin management plans to enhance nature and natural water assets.
Catchment Flood Management Plans (CFMPs), Defra and Environment Agency (2016)	Catchment Flood Management Plans assess all types of inland flooding from rivers, surface water, groundwater and tidal flooding across England and Wales. They do not cover coastal flooding, directly from the sea, which are covered by Shoreline Management Plans. CFMPs are to establish flood risk management policies to assist and deliver sustainable flood risk management for the long term. CFMPs should be used to inform planning and decision making by key stakeholders such as the Environment Agency, regional planning bodies and local authorities, Internal Drainage Boards, water companies and other utilities; transportation planners; landowners, farmers and land managers; and the public and businesses. The CFMPs identify six policy options for flood risk management: • Policy 1- Areas of little or no flood risk where we will continue to monitor and advise. • Policy 2 - Areas of low to moderate flood risk where we can generally reduce existing flood risk management actions. • Policy 3 - Areas of low to moderate flood risk where we are generally managing existing flood risk effectively. • Policy 4 - Areas of low, moderate or high flood risk where we are already managing the flood risk effectively but where we may need to take further actions to keep pace with climate change. • Policy 5 - Areas of moderate to high flood risk where we can generally take further action to reduce flood risk. • Policy 6 - Areas of low to moderate flood risk where we will take action with others to store water or manage run-off in locations that provide overall flood risk reduction or environmental benefits. To select the most appropriate policy, the Catchment Flood Management Plans consider how the social, economic and environmental objectives are affected by flood risk management activities under each policy option.	Ensure that flood and coastal erosion risk is included as an objective within the SEA framework.

Plan, Policy or Legislation	Key Objectives / Targets / Guidance	Implications for the SEA
Catchment Abstraction Management Strategies (CAMS)	The Catchment Abstraction Management Strategy set out how the Environment Agency (EA) will manage water abstraction. The EA is required to ensure there is enough water for people including public, industry and agricultural water supplies. It controls the volume of water taken through a permitting system and grants new licences, where required, and regulates existing licenses. CAMS is a standard approach to assess the amount of water available for further abstraction licensing, taking into account what the environment needs. Each CAMS provides an overview of the catchment area and characteristics, including abstractions, geology, hydrology, hydrometry, water quality and discharges, ecology and conservation, recreation and navigation. The CAMS make information on water resources and licensing practice publicly available and allow the balance between the needs of abstractors, other water users and the aquatic environment to be considered in consultation with the local community and interested parties. CAMS are also the mechanism for managing time limited licences by determining whether they should be renewed and, if so, on what terms.	Ensure that protection of water resources is included as an objective within the SEA framework.
Landscape Character Assessment (LCA)	Landscape Character Assessments is the process of identifying and describing variation in character of the landscape. LCA documents identify the elements and features that make landscapes distinctive by mapping and describing character types and areas.	Ensure that protection of landscape is included as an objective within the SEA framework
Site Improvement Plans for Natura 2000 sites: London & South East, Natural England	Site Improvement Plans (SIPs) have been developed for each Natura 2000 (Special Protected Areas and Special Conservation Areas) site in England. The plans provide an overview of both the current and predicted issues affecting the condition of the site features and sets priority measures required to improve the condition. The SIPs are not legal documents, they are live documents that will be updated to reflect changes in our evidence/knowledge and as actions get underway. In the London and South East region there are 57 SIPs.	Ensure that protection of Natura 2000 sites is included as an objective within the SEA framework
National Character Areas (NCAs)	NCAs are subdivisions in England based on a combination of landscape, biodiversity, geodiversity and economic activity characteristics. They intend to inform local decision making for the natural environment	Ensure that protection of landscape is included as an objective within the SEA framework
AONB Management Plans	Areas of Outstanding Natural Beauty (AONB) are protected to conserve and enhance their natural beauty and distinctiveness. AONB Management Plans highlights the importance and significance of each AONBs special qualities, it presents an integrated vision for the future of each AONB, set policies to help secure the vision, states the condition of each AONB and identifies what needs to be done to achieve these outcomes.	Ensure that protection of landscape is included as an objective within the SEA framework

Plan, Policy or Legislation	Key Objectives / Targets / Guidance	Implications for the SEA
National Park Management Plans	All National Parks are expected to have a Management Plan for their area, to help guide the work of those with responsibilities or an interest in the Park. Government guidance emphasises that the plan should be for the National Park as a place, and not specifically for the National Park Authority or any other particular organisation. However, relevant authorities are required to take the two national park purposes into account in any work that may affect the area (Environment Act, 1995).	Ensure that protection of landscape is included as an objective within the SEA framework
Abstraction licensing strategies (CAMS process)	The Environment Agency controls how much water is taken with a permitting system. The Environment Agency regulate existing licences and grant new ones. The strategies include how much water is available in different areas. The licensing strategies set out how the Environment Agency will manage water resources in the specified catchment.	The DP has been developed within the permitting framework.
WATER COMPANIES – SES Water		
Environment Policy (2019)	The Policy outlines SES Water's commitment to protecting natural resources and recognises the important role they can play in minimising effects. Activities will be managed proactively under the following four core strategies and commitments: • Efficient use of natural resources and controlling activities which affect the natural and built environment • Managing energy use and carbon • Limited waste generation and promoting use and recycling • Managing environmental risk in the supply chain	The SEA will address a range of environmental issues through the series of Objectives outlined.
WRMP 2020-2045 (2019)	The Plan sets out the preferred programme (comprising a range of options) to reduce any deficit through supply and demand options within the SES region over the next 25 years. The majority (approximately 85%) of the SES Water's deployable output is from four main groundwater aquifer resources units (ARUs): North Downs Chalk; Confined Chalk; Mole Valley Chalk; and Lower Greensand.	Note has been made of the WRMP (including the forthcoming WRMP24) as part of the DP development.
Drought Plan (2019)	The Plan outlines the operational actions SES Water will consider in response to drought events of different severities. The aim of the plan is to minimise environmental impacts, but where potential impacts are identified, balance of measures that may include restrictions on customers' use of water is presented.	Note has been made of this Plan as part of the development of the Options etc.
Business Plan 2020-2025	The Plan sets out five key pledges, supported by 25 targets, to improve service to customers. These pledges are as follows: • High quality water all day, every day • Excellent service, whenever and however you need it	The SEA will address a range of environmental issues through the series of Objectives outlined, which

Plan, Policy or Legislation	Key Objectives / Targets / Guidance	Implications for the SEA
	• Fair prices and help when you need it • Support a thriving environment we can all rely upon • A service that is fit now and for the future	are in line with these key pledges.
WATER COMPANIES		
Thames Water WRMP 2020 - 2100	The WRMP is a strategic plan which sets out how Thames Water intend to maintain the balance between supply and demand for water, and provide their customers with safe, reliable water supplies both now and in the future. The WRMP forms part of Thames Water's overall water resources strategy included within their business plan. Their priority is to make the most effective use of water resources and they've proposed ambitious targets to reduce the amount of water lost through leakage, and the promotion of the efficient use of water by our customers.	Consideration of other water companies will be made through the WRSE process.
Affinity Water WRMP 2020-2080	It sets out how Affinity Water plans to provide a reliable, resilient, efficient and affordable water supply to customers from 2020 to 2080, whilst protecting the environment. At the core of this is the need to balance the amount of water available for supply with the demand for water from customers.	Consideration of other water companies will be made through the WRSE process.
Southern Water WRMP 2020-70	The plan sets out how they intend to supply healthy, reliable drinking water to more than one million homes and businesses for the next 50 years. The plan will secure extra water needed by: • Making best use of existing water – by reducing leaks, promoting water efficiency, installing more meters and improving the health of the catchments our water comes from. • Securing new water – through schemes like desalination (seawater), water recycling (treated wastewater) and transferring water from areas where there is spare.	Consideration of other water companies will be made through the WRSE process.
South East Water WRMP 2020 to 2080	The plan sets out how we plan to secure water supplies for customers, from 2020 to 2080. The plan balances the needs of customers and the environment as well as the cost of implementing it. It has been developed with customers, communities, other water providers and stakeholders. They have developed a preferred plan that is resilient to a one in 200 year drought event based on a two dry winter scenario. This means that as a result of this plan we will reduce the risk of customer restrictions and environmental permits being required.	Consideration of other water companies will be made through the WRSE process.
Portsmouth Water WRMP 2019	This Plan presents the supply-demand balance throughout the 25-year planning period (2020/21 to 2044/45). It demonstrates the need for investment to maintain the balance between supply and demand over the planning period. It shows the programme of actions Portsmouth Water plan to undertake to ensure the Company can be resilient to a 1 in 200 year drought and support other water companies in the region.	Consideration of other water companies will be made through the WRSE process.

Plan, Policy or Legislation	Key Objectives / Targets / Guidance	Implications for the SEA
WRSE Regional Plan Strategic Environmental Assessment	WRSE is producing the regional plan to take a long-term view of water management across the region and aims to secure resilient and sustainable water supplies for future generations through a collaborative, regional approach. The plan will seek to: • Ensure there is enough water for a growing population and to support economic growth • Improve the environment by leaving more water in the region's rivers, streams and underground sources • Increase the region's resilience to severe drought and other extreme shocks and stresses • Address the impacts of climate change on demand for water and how much is available	Consideration to be made of the WRSE process and any outputs from the relevant assessments.

Appendix B. Baseline Information

Note all counts are approximate. This analysis is supported by GIS assessment - for clarity, where there are instances of a designated area (such as nature conservation sites) made up of multiple component or composite sites (represented in GIS by separate polygons of the same title and designation type, this is recorded as one site.

Table B-1: Biodiversity

	International / National (UK & England)	Regional (South East Region)	Local (Plan Area)
Special Protection Areas (SPA's)	As of November 2021, there were 86 Classified SPAs in England, covering an area of 1,097,850.40 ha[2]. There is one site crossing the England / Scotland border (135,807 ha), two across the England / Wales border (38,810 ha), one classified as England / Wales / Offshore (252,311 ha) and two classified as England / offshore (745,722 ha). SPAs in England are predominantly located in coastal and estuarine areas, with various sites distributed inland[3].	As of November 2021, there are 25 classified SPAs within the South East region of England - **Dungeness, Romney Marsh and Rye Bay** designated for its tern breeding colonies; - **Upper Nene Valley Gravel Pits** designated as an area for breeding, wintering and migration of rare and vulnerable species of bird; - **Thanet Coast & Sandwich Bay** is designated for supporting populations of Turnstone; - **Benfleet and Southend Marshes** was designated for its internationally important populations of regularly occurring migratory species; - **Blackwater Estuary (Mid-Essex Coast Phase 4)** has been designated for wintering waterbirds. - **New Forest** designated for its breeding colonies; - **Portsmouth Harbour** due to internationally and nationally important numbers of birds and specifically protects the following features: dark-bellied Brent goose; red-breasted merganser; dunlin; and black-tailed godwit;	As of November 2021, within the Plan Area there is 1 classified SPA. • **Thames Basin Heath** – is one of the South East's most important natural assets with the lowland heath supporting important populations of Dartford Warbler, Nightjar and Woodlark - vulnerable ground-nesting birds and is located to the south in the plan area.

[2] Natural England (2021) *Designated Sites View*. Available https://designatedsites.naturalengland.org.uk/ReportConditionSummary.aspx?SiteType=SPA

[3] Joint Nature Conservation Committee JNCC (2020) *Special Protection Areas – overview*. Available https://jncc.gov.uk/our-work/special-protection-areas-overview/

	International / National (UK & England)	Regional (South East Region)	Local (Plan Area)
		- **Chichester and Langstone Harbours** designated as an area for breeding and wintering of species of bird; - **Foulness (Mid-Essex Coast Phase 5)** designated for its breeding and non breeding colonies; - **Crouch & Roach Estuaries (Mid-Essex Coast Phase 3)** designated for the dark-bellied brent goose (Non-breeding); - **Medway Estuary & Marshes** designated for breeding and non-breeding populations and regularly occurring migratory bird species; - **Thames Estuary & Marshes** is designated for its wetland that supports important numbers of wintering waterbirds and migrating birds; - **The Swale** is designated for its non-breeding colonies; - **South West London Waterbodies** - is designated for internationally important numbers of wintering Gadwall and Shoveler; - **Salisbury Plain** - is designated for breeding Stone Curlew populations; - **Arun Valley** - is designated as being of international importance for the breeding, feeding, wintering or the migration of rare and vulnerable species of birds; - **Pagham Harbour** - is designated for populations of Annex I and migratory	

	International / National (UK & England)	Regional (South East Region)	Local (Plan Area)
		bird species and supporting their survival and reproduction; - **Lee Valley** - is designated for its support to breeding bird populations; and - **Porton Down** – is designated for its important breeding populations of Stone-curlew Burhinus oedicnemus, Quail Coturnix coturnix, Hobby Falco subbuteo, and over-wintering Hen harrier Circus cyaneus.	

Explanatory Text and anticipated future trends:

Special Protection Areas (SPAs) are protected areas for birds in the UK. SPAs are classified in accordance with European Council Directive 2009/147/EC on the conservation of wild birds, known as the Birds Directive. SPAs protect rare and vulnerable birds (as listed on Annex I of the Birds Directive), and regularly occurring migratory species. JNCC[4] is responsible for advising the UK Government and Devolved Administrations on aspects of the classification and management of SPAs from a UK perspective, including reporting on the implementation of the UK SPA programme and the status and trends of protected bird species. New potential Special Protection Areas (pSPAs) for classification or updates to existing SPAs are submitted in tranches.

The UK's Statutory Nature Conservation Bodies (SNCBs) are responsible for assessing the condition of SPAs. Approximately 41% of all SPA's in England are classified as being in favourable condition, with 51% classed as unfavourable but recovering. Approximately 2.8% of SPAs are in a declining condition with 0.03% being partially destroyed.

The locations of SPAs within the Plan Area are shown in **Appendix D**.

Anticipated Future Trends[5]:

- The composition of flora and fauna on each Protected Area (PA) will change – high confidence (medium evidence, high agreement)
- Cold adapted species of high latitudes and altitudes will tend to decrease on PAs, whilst warm adapted species will tend to increase – medium confidence (medium evidence, medium agreement)
- PAs in the North of the UK will gain plant species overall, whilst PAs in the south may lose some native plant species. This pattern is reversed for UK breeding birds – low confidence (medium evidence, low agreement)
- Species with lower dispersal capacities and those for which urban and intensive agricultural areas are a barrier to dispersal will be unable to colonize PAs that become climatically suitable – low confidence (limited evidence, medium agreement

[4] Joint Nature Conservation Committee JNCC (2020) *Special Protection Areas – Overview.* Available: https://jncc.gov.uk/our-work/special-protection-areas-overview/

[5] Bournemouth University (2015) *Biodiversity Report Card.* Available: https://nerc.ukri.org/research/partnerships/ride/lwec/report-cards/biodiversity-source04/

	International / National (UK & England)	Regional (South East Region)	Local (Plan Area)
	- Increasing range mismatching of interacting species, such as butterflies and their host plants, might mean that more management is necessary on PAs to preserve species that interact with each other – low confidence (limited evidence, medium agreement). Integrating consideration of climate change into management plans for the PA network is likely to result in more effective (and cost-effective) conservation solutions. In order to facilitate this integration, monitoring of climate change impacts and management actions should be carried out to enable adaptive decision making.		
Special Areas of Conservation (SAC's)	As of November 2021, there were 256 SACs in England, covering an area of 5,748,138 ha[6]. There are no SCI's. There are three SACs crossing the England / Scotland border (112,770 ha) and seven across the England / Wales border (95,182 ha). Additionally, there are three SACs which are classified as England / offshore (3,795,179 ha) and one England / Wales / Offshore (584,989 ha)[7]. SACs are widely distributed throughout England; however, the highest concentrations correspond with the more remote rural and upland locations.	There are 69 classified SACs in the South East Region of England.	As of November 2021, within the Plan Area there is 1 classified SAC. • **Mole Gap to Reigate Escarpment** – one of the most important features is the stand of Box scrub which is unique in the UK. There are also large but fragmented areas of nationally significant calcareous grassland, which support an important assemblage of orchid species. Also nationally significant are the stands of Beech and Yew dominated woodland[8].
	Explanatory Text and anticipated future trends: SACs are strictly protected sites designated under the EC Habitats Directive. Article 3 of the Habitats Directive requires the establishment of a European network of important high-quality conservation sites that will make a significant contribution to conserving the 189 habitat types and 788 species identified in Annexes I and II of the Directive (as amended). The listed habitat types and species are those considered to be most in need of conservation at a European level (excluding birds). Sites of Community Importance (SCIs) are sites that have been adopted by the European Commission but not yet formally designated by the government of each country. Candidate SACs (cSACs) are sites that have been submitted to the European Commission, but not yet formally adopted. JNCC is responsible for advising the UK Government and devolved administrations on aspects of the designation and management of SACs from a UK perspective. SACs are of national and international conservation importance. Approximately 35% of all SACs in England are classified as being in favourable condition, with 58% classed as unfavourable but recovering. Approximately 2% of SACs are in a declining condition with 0.03% being partially destroyed. The locations of SACs within the Plan Area are shown in **Appendix D**.		

[6] Natural England (2021) Designated Sites View. Available: https://designatedsites.naturalengland.org.uk/

[7] Joint Nature Conservation Committee JNCC (2020) Special Areas of Conservation – overview. Available: https://jncc.gov.uk/our-work/special-areas-of-conservation-overview/

[8] https://www.molevalley.gov.uk/sites/default/files/home/building-planning/local-plans/sacguidancefinal.pdf

	International / National (UK & England)	Regional (South East Region)	Local (Plan Area)
	Anticipated Future Trends[9]: See above details that are applicable to all forms of PA.		
Sites of Special Scientific Interest (SSSI) NB. The SSSI information shown includes sites designated for both biological and geological reasons.	There are over 4,100 SSSIs in England, covering about 1,099,505 ha[10]. Some of these sites correspond with other designations, such as SACs, SPAs and NNRs. SSSIs are widespread throughout the whole of England and cover a wide variety of habitats and geological features.	There are 1,189 classified SSSIs in the South East Region of England.	There are 29 classified SSSI's within the Plan Area. • Banstead Downs • Blindley Heath • Bookham Commons • Chipstead Downs • Cowden Meadow • Cowden Pound Pastures • Croham Hurst • Clock House Brickworks • Esher Commons • Hedgecourt • Godstone Ponds • Lingfield Cernes • Leith Hill • Quarry Hangers • Riddlesdown • Staffhurst Wood • Westerham Mines • Titsey Woods • Woldingham & Oxted Downs • Farthing Downs and Happy Valley • Glover's Wood • Vann Lake and Ockley Woods

[9] https://nerc.ukri.org/research/partnerships/ride/lwec/report-cards/biodiversity-source04/
[10] Natural England (2016) *Designated Sites View.* Available: https://designatedsites.naturalengland.org.uk/.

	International / National (UK & England)	Regional (South East Region)	Local (Plan Area)
			• Ockham and Wisley Commons • Auclaye • Epsom and Ashtead Commons • Polebrook Farm • Mole Gap to Reigate Escarpment • Ranmore Common • Reigate Heath These SSSIs are each associated with Impact Risk Zones for a broad range of development proposals including those relevant to the water sector (large infrastructure, waste treatment, proposals to discharge water or liquid waste to ground, landfilling, incineration, development that may lead to air and dust pollution, large non residential developments outside existing settlements).

Explanatory Text and anticipated future trends:

A Site of Special Scientific Interest (SSSI) is a formal conservation designation of national importance. Usually, it describes an area that's of particular interest to science due to the rare species of fauna or flora it contains - or even important geological or physiological features that may lie in its boundaries. SSSIs often contain important habitats such as grasslands, parkland and woodland. Some even contain ancient woodland and ancient trees. In other words, these areas have high conservation value, and need to be protected. Official authorities in each country determine which sites should have SSSI status, for England this is Natural England.

Approximately 39% of all SSSIs in England are classified as being in favourable condition, with 53% classed as unfavourable but recovering. Approximately 3% of SSSIs are in a declining condition with 0.03% being partially destroyed.

Natural England have also developed SSSI Impact Risk Zones (IRZs) which allow for a rapid initial assessment of the potential risks to SSSIs posed by development proposals. They define zones around SSSI which reflect the particular sensitivities of the features for which it is notified and indicate the types of development proposal which could potentially have adverse impacts. IRZs for a broad range of development proposals have been identified within the Plan Area including those relevant to the water sector including large infrastructure projects, waste treatment, proposals to discharge water or liquid waste to ground, landfilling and incineration, development that may lead to air and dust pollution and large non residential developments outside existing settlements).

The locations of SSSIs within the Plan Area are shown in **Appendix D.**

	International / National (UK & England)	Regional (South East Region)	Local (Plan Area)
	Anticipated Future Trends[11]: See above details that are applicable to all forms of PA.		
Ancient Woodland & Veteran trees etc.	The Ancient Woodland Inventory for England identifies over 52,000 ancient woodland sites in England[12], covering 340,000 Ha. Ancient Woodland sites are scattered throughout England, with the densest concentrations being in the south east[13]. Throughout England there are several trees classed as Veteran trees, which are classes as ancient tree, veteran tree and notable tree status. Some of the Veteran trees have been removed over the years and these have been marked as lost trees[14].	Woodland natural capital stocks cover approximately 13.5% of the South East region and consist of several sub habitat types including Broadleaved, mixed and yew woodland, Coniferous woodland, Individual trees/veteran trees and Woodland priority habitats[15].	The Ancient Woodland Inventory for England identifies over 2,000 sites of Ancient Woodland, within the Plan area. Some areas have been continuously wooded since at least 1600AD are scattered across the plan area[16].
	Explanatory Text and anticipated future trends: Ancient woods are areas of woodland that have persisted since 1600 in England and Wales, and 1750 in Scotland. They are relatively undisturbed by human development. As a result, they are unique and complex communities of plants, fungi, insects and other microorganisms. Ancient woodlands can be classified into different categories, including Ancient semi-natural woods (woods that have developed naturally) and plantations on ancient woodland sites (ancient woodlands that have been felled and replanted with non-native species). Ancient woodland is identified using presence or absence of woods from old maps, information about the wood's name, shape, internal boundaries, location relative to other features, ground survey, and aerial photography. The Forestry Commission is responsible for protecting, expanding and promoting the sustainable management of woodlands. Approximately 1,225 ancient woodlands are under threat in the UK due to conifer plantations, overgrazing, infrastructure development and the spread of invasive species. Anticipated Future Events:		

[11] https://nerc.ukri.org/research/partnerships/ride/lwec/report-cards/biodiversity-source04/
[12] Natural England (2016) *Ancient Woodland Inventory (provisional for England – Digital Boundaries.* Available: http://www.gis.naturalengland.org.uk/pubs/gis/tech_aw.htm
[13] Defra (2016) *MAgiC – Ancient Woodland (England).* Available: http://magic.defra.gov.uk/MagicMap.aspx
[14] Tree Search - Ancient Tree Inventory (woodlandtrust.org.uk)
[15] Water Resources South East Scoping Report wrse-regional-plan-strategic-environmental-assessment-scoping-report.pdf
[16] Defra Spatial Data Download

	International / National (UK & England)	Regional (South East Region)	Local (Plan Area)
	See above details that are applicable to all forms of PA. In addition to the threat of climate change, ancient woodlands are at particular threat from major infrastructure projects, including road and rail schemes. Whilst many schemes take part in some form of habitat regeneration (such as replanting), the replacement habitat is not comparable to the ecological value of ancient woodlands that have been preserved since 1600. Once these habitats are removed, they cannot be replaced or regrown.		
Nature Reserves (National and Local)	National Nature Reserves (NNR) As of November 2021, there are 225 NNRs in England, covering over 98,600 Ha of land[17]. Local Nature Reserves (LNR) As of November 2021, there are 1,680 LNRs in England[18].	National Nature Reserves (NNR) In the South East region of England, there are 52 NNR recorded: Local Nature Reserves (LNR) In the South East region of England, there are 623 LNR recorded.	Ashtead Common is the only NNR recorded within the Plan Area. There are 43 LNR recorded in the Plan Area. The largest of which include: • Epsom Common • Esher Common • Banstead Woods and Chipstead Downs
	Explanatory Text and anticipated future trends: National Nature Reserves (NNRs) were established to protect some of our most important habitats, species and geology, and to provide 'outdoor laboratories' for research. Natural England manages approximately two thirds of England's NNRs. The remaining reserves are managed by organisations approved by Natural England, such as the National Trust, Forestry Commission, RSPB, Wildlife Trusts and local authorities. Approximately 53% of all NNRs in England are classified as being in favourable condition, with 39% classed as unfavourable but recovering. Approximately 4.5% of NNRs are in a declining condition with 0% being partially destroyed. Local Nature Reserves (LNRs) are a statutory designation made under Section 21 of the National Parks and Access to the Countryside Act 1949 by principal local authorities. Parish and Town Councils can also declare LNRs, but they must have the powers to do so delegated to them by a principal local authority. LNRs are places with wildlife or geological features that are of special interest locally. They offer people opportunities to study or learn about nature or simply to enjoy it. They range from windswept coastal headlands, ancient woodlands and flower-rich meadows to former inner-city railways, long abandoned landfill sites and industrial areas now re-colonised by wildlife. They are an impressive natural resource which makes an important contribution to England's biodiversity. The locations of NNRs and LNRs within the Plan Area are shown in **Appendix D.** Anticipated Future Trends: See above details that are applicable to all forms of PA.		

[17] https://www.gov.uk/government/collections/national-nature-reserves-in-england
[18] https://designatedsites.naturalengland.org.uk/SiteList.aspx?siteName=&countyCode=&responsiblePerson=&DesignationType=LNR

	International / National (UK & England)	Regional (South East Region)	Local (Plan Area)
Ramsar Sites	As of November 2021, there are 73 Ramsar sites in England, covering an area of 404,248 Ha[19].	There are 21 Ramsar sites in the South East region	There are no Ramsar sites in the Plan Area.
	Explanatory Text and anticipated future trends: Ramsar sites are wetlands of international importance designated under the Ramsar Convention. The initial emphasis was on selecting sites of importance to water birds within the UK, and consequently many Ramsar sites are also Special Protection Areas (SPAs) classified under the Birds Directive. Sites proposed for selection are advised by the UK statutory nature conservation agencies, or the relevant administration in the case of Overseas Territories and Crown Dependencies, co-ordinated through JNCC. Approximately 57% of all Ramsar Site in England are classified as being in favourable condition, with 34% classed as unfavourable but recovering. Approximately 5% of Ramsar Sites are in a declining condition with 0% being partially destroyed. Anticipated Future Trends[20]: See above details that are applicable to all forms of PA.		
RSPB Reserves	The RSPB's latest annual report states that there are 220 RSPB reserves in England, covering 158,725 Ha[21].	There are approximately 37 RSPB Reserves located in the South East Region.	There are no RSPB Reserve identified within the Plan Area.
	Explanatory Text and anticipated future trends: RSPB reserves are nature reserves run by the Royal Society for the Protection of Birds (RSPB); a non-statutory body incorporated by Royal Charter. RSPB reserves cover a broad range of habitat and landscapes, including heathland, estuaries, cliffs. Anticipated Future Trends: See above details that are applicable to all forms of PA.		
Priority Habitat - Woodland - Chalk Rivers	There are 1.87 million hectares of terrestrial and coastal priority habitats recorded in the 2013 priority habitats inventory for England, representing 14% of the total land area of the country, As of October 2021, 39% of total priority habitats in England are	Priority habitats make up 16.6% of the South East region equating to a total of 39,5109ha. Deciduous woodland accounts for the highest percentage of priority habitat in the region[24]. Chalk Rivers in the UK are mostly found in the southern and eastern parts of England as	There is a wide range of Priority Habitat types within the Plan Area. Deciduous woodland makes up 15.5% of the Plan Area equating to a total of 131.3km^2. 373 chalk river segments have been identified within the SES Water Plan area.

[19] Natural England (2021) Designated Sites View. Available: https://designatedsites.naturalengland.org.uk/ReportConditionSummary.aspx?SiteType=RAMSAR
[20] https://nerc.ukri.org/research/partnerships/ride/lwec/report-cards/biodiversity-source04/
[21] https://www.rspb.org.uk/globalassets/downloads/annual-report-2020/rspb-annual-report-2020-interactive-pdf.pdf
[24] Water Resources South East Scoping Report wrse-regional-plan-strategic-environmental-assessment-scoping-report.pdf

	International / National (UK & England)	Regional (South East Region)	Local (Plan Area)
	classified as deciduous woodland[22]. The majority of woodland priority habitats are located in the South East of England. Only 200 chalk rivers are known globally, 85% of which are found in the UK in southern and eastern England[23]. Examples include the rivers Itchen and Avon in Wessex and the river Wensum in Norfolk.	highlighted in the regional commentary section.	

Explanatory Text and anticipated future trends:

Priority habitats can be designated as protected areas called Sites of Special Scientific Interest (SSSIs). They can also be outside of these SSSI protected areas but be under Higher Level Stewardship (HLS) or Countryside Stewardship (CS) agreements or fall within Forestry Commission (FC) 'Managed woodland'. Some priority habitats, however, fall outside of the protection of all these schemes. There are 56 habitats recognised as being of principal importance for the conservation of biological diversity in England under section 41 of the Natural Environment and Rural Communities Act 2006. The majority of the land resource for 18 of the 24 terrestrial and coastal priority habitats designated in England falls within protected areas. Coastal saltmarsh and mudflats have the highest proportion of their resource covered by protected areas. Examples of priority habitats where the majority of the land resource falls outside of the protected areas network include traditional orchards (almost 100%) and deciduous woodland (88%).

Chalk rivers are a type of lowland river characterised by clear water and a diverse flora. All have been modified in some way, usually for milling, fishing, irrigation or watercress beds. Despite pressures (weirs, impoundments and abstractions) the best chalk rivers still support a fine aquatic flora and a diversity of invertebrates and fish.

Anticipated Future Trends:

See above details that are applicable to all forms of PA. Given the overlap with the SSSI outcome, and the different levers available to achieve favourable condition inside and outside SSSIs, it is important to report separately on the condition of SSSI and non-SSSI priority habitat. Some habitats are noted as requiring further work to agree a monitoring methodology, notably in woodland and freshwater habitats.

Many chalk rivers are in poor condition, some run dry in the summer when too much groundwater is drawn (over-abstraction, while largely arable catchments have particular problems with nutrient enrichment. Intensive fisheries management has also resulted in regular weed cutting, stocking and bank stabilisation. River restoration projects focusing on chalk rivers are however underway, and also include restoring adjacent habitats like floodplain grazing marsh.

[22] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/829194/2a_Priority_habitats_2019_rev.pdf
[23] https://www.wildlifetrusts.org/habitats/freshwater/chalk-rivers

Table B-2: Population and Human Health

	National (UK & England)	Regional (South East Region)	Local (Plan Area)
Population and Locations of Major Settlements	In mid- 2020, England had an estimated population of 56,550,138[25]. By 2043, it is expected that the population of England will be approximately 61,744,100; an increase of 9.7%. The proportion of those aged 65 and over is due to increase by 42.2% by 2043, the largest increase for any age category. Meanwhile, the proportion of those aged between 0-29 and between 30-64 will increase by 2.9% and 1.9%, respectively over the same period[26]. The number of households in England is projected to increase by 1.6 million (7.1%) over the next 10 years, from 23.2 million in 2018 to 24.8 million in 2028[27]. Growth in the number of households is fastest where the household reference person (HRP) is of older age; 64% of the total growth in households is accounted for by households where the HRP is aged 75 years or over. The number of people aged 75 years and over living on their own is projected to increase by 461,000 in the 10 years to 2028.	Approximately 19 million people, equating to around 30% of the UK's total population, live within the South East region. Settlements within the region are diverse and range from large population centres such as London to small rural hamlets and seaside towns. Long-term population growth in the region is anticipated to be around four million[28].	Populations of Local Authorities intersecting the Plan Area in 2020 were[29]: **Sevenoaks** population of 121,400 in 2020 and predicted population of: 125,818 in 2030 (predicted increase of 3.6%) 129,442 in 2040 (predicted increase of 6.6%) **Elmbridge** population of 137,200 in 2020 and predicted population of: 137,164 in 2030 (predicted decrease of 0.03%) 136,986 in 2040 (predicted decrease of 0.2%) **Epsom and Ewell** population of 81,000 in 2020 and predicted population of: 82,756 in 2030 (predicted increase of 2.2%) 83,406 in 2040 (predicted increase of 3.0%) **Guildford** population of 150,400 in 2020 and predicted population of: 149,232 in 2030 (predicted decrease of 0.8%) 148,927 in 2040 (predicted decrease of 1.0%)

[25] ONS – *Estimates for the Population for the UK, England, Wales, Scotland and Norther Ireland: Mid-2019 – April 2020 Local Authority District Codes Edition*. Available: https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/datasets/populationestimatesforukenglandandwalesscotlandandnorthernireland
[26] ONS – Population Projections for Local Authorities, Table 2: 2018 Based Edition of this Dataset. Available: https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationprojections/datasets/localauthoritiesinenglandtable2
[27] ONS – Household projections for England: 2018-based. Available: https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationprojections/bulletins/householdprojectionsforengland/2018based#household-type-projections
[28] Water Resources South East Scoping Report wrse-regional-plan-strategic-environmental-assessment-scoping-report.pdf
[29] NOMIS Local Authority Profiles https://www.nomisweb.co.uk/reports/lmp/la/1946157277/report.aspx#tabrespop

	National (UK & England)	Regional (South East Region)	Local (Plan Area)
			Mole Valley population of 87,500 in 2020 and predicted population of: 87,101 in 2030 (predicted decrease of 0.5%) 87,839 in 2040 (predicted increase of 0.04%) **Reigate and Banstead** population of 149,200 in 2020 and predicted population of: 157,050 in 2030 (predicted increase of 5.3%) 161,635 in 2040 (predicted increase of 8.3%) **Tandridge** population of 88,500 in 2020 and predicted population of: 91,427 in 2030 (predicted increase of 3.3%) 93,741 in 2040 (predicted increase of 5.9%) **Crawley** population of 112,500 in 2020 and predicted population of: 116,411 in 2030 (predicted increase of 3.5%) 118,761 in 2040 (predicted increase of 5.6%) **Croydon** population of 388,600 in 2020 and predicted population of: 395,236 in 2030 (predicted increase of 1.7%) 404,867 in 2040 (predicted increase of 4.2%) **Kingston upon Thames** population of 179,100 in 2020 and predicted population of: 183,724 in 2030 (predicted increase of 2.6%) 186,902 in 2040 (predicted increase of 4.4%) **Merton** population of 206,500 in 2020 and predicted population of: 206,979 in 2030 (predicted increase of 0.2%) 210,471 in 2040 (predicted increase of 1.9%) **Sutton** population of 207,700 in 2020 and predicted population of: 214,055 in 2030 (predicted increase of 3.1%)

	National (UK & England)	Regional (South East Region)	Local (Plan Area)
			218,441 in 2040 (predicted increase of 5.2%)
	Latest ONS figures for household projections in England show an indication of the future number of households in England and its regions and local authorities[30]. These are used for planning in areas such as housing and social care. The latest household projections show a continued rise in the number of households in England, at a level closely in line with what was previously projected. There continues to be much variation across age groups, regions and household types. ONS project the majority of household growth over the next 10 years will be because of an increase in older households without dependent children, particularly those where the household reference person is aged 75 years and over. This shows the potential impact of an ageing population on future household formation. The South East Region is expected to see substantial population growth in the coming years, with the proportion of residents of an older age increasing in line with the trend across much of England. Development across the plan area needs to be particular considerate of this group in relation to the design of development and neighbourhoods as well as the accessibility of services and facilities. There will be a need to promote development which ensures the issue of isolation does not become more prevalent given the expected increase in the proportion of single person households among older people. Without a strategic approach to development, it is less likely that these challenges will be comprehensively met.		
General Health	The Health Survey for England notes that in England, between 1993 and 2019, the proportion of adults reporting very good and good general health has stayed at similar levels. In 2019, 43% of adults reported that they had at least one longstanding illness. Among adults 16 and over, 68% of men and 60% of women were overweight or obese and among children, 18% of boys and 13% of girls were obese. 18% of men and 15% of women currently smoke cigarettes[31]. The suicide rate in England in 2020 was recorded at 10.8 per 100,000 people[32].	The percentage of the South East population describe their general health as the following[36]; • General health very good – 47% • General health good – 35% • General health fairly good – 13% • General health bad – 4% • General health very bad – 1% Of note, of the ten local authorities with the highest rates of Good health in England, six were located in the South East region.	Clinical Commissioning Groups intersecting the Plan area are as follows: NHS South West London NHS Kent and Medway NHS Surrey Heartlands NHS West Sussex General health trends expected to be in keeping with that reported at the Regional level. Of the 12 local authorities wholly or partially intersecting all preformed better than England for under 75 mortality rate from all

[30] ONS – Household projections for England: 2018-based. Available: https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationprojections/bulletins/householdprojectionsforengland/2018based#household-type-projections

[31] Health Survey for England 2019 [NS] - NHS Digital

[32] https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/datasets/deathscausedbysuicidebyquarterinengland

[36] Water Resources South East Scoping Report wrse-regional-plan-strategic-environmental-assessment-scoping-report.pdf

	National (UK & England)	Regional (South East Region)	Local (Plan Area)
	Although healthy life expectancy at birth among females in the UK decreased from 63.7 years in 2014 to 2016 to 63.3 years in 2017 to 2019, they continue to report higher HLE than males. HLE at birth for males in the UK in 2017 to 2019 was 62.9 years[33]. In 2017, an estimated 300,000 people in England are dependent on heroin and/or crack[34]. In England some key health statistics for the population are as follows[35]; Under 75 mortality rate from all cardiovascular diseases – 70.4 per 100,000 Under 75 mortality rate from cancer – 129.2 per 100,000 Adults classified as overweight or obese – 62.8%	In South East England some key health statistics for the population are as follows[37]; Under 75 mortality rate from all cardiovascular diseases – 57.1 per 100,000 Under 75 mortality rate from cancer – 121.6 per 100,000 Adults classified as overweight or obese – 61.5%	cardiovascular diseases and all but four preformed better than South East England. In regards to under 75 mortality rate from cancer all local authorities with the exception of Crawley performed better than England and the South East. Nine of the local authorities at a lower rate of overweight or obese adults than South East England.
	Explanatory Text and anticipated future trends: The Health Survey for England monitors trends in the nations health and care, providing survey, interview and medical examination based findings on a range of topics including wight, eating disorders, behaviours (including smoking and alcohol consumption) and health issues (includes diabetes, hypertension and high cholesterol). As a society, people are living longer – life expectancy in England has reached 79.6 years for men and 83.2 for women. Inequalities however persist and the richest areas enjoy 19 more years in good health than those in poorest areas. The death rate for dementia and Alzheimer's disease, already the leading cause of death in women is anticipated to become the leading cause of death in men and the number of people with diabetes is expected to increase by a million – from just under 4 million in 2017 to almost 5 million in 2035[38].		
	Reported at Local level only	Reported at Local level only	The following observation are made in respect of Indices of Multiple Deprivation

[33] https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/healthandlifeexpectancies/bulletins/healthstatelifeexpectanciesuk/2017to2019

[34] https://www.gov.uk/government/publications/alcohol-drugs-and-tobacco-commissioning-support-pack/drugs-commissioning-support-pack-2019-to-20-principles-and-indicators#:~:text=An%20estimated%20300%2C000%20people%20in,image%20and%20performance%2Denhancing%20drugs.

[35] https://fingertips.phe.org.uk/profile/health-profiles/data#page/0/gid/1938132701/pat/6/par/E12000008/ati/201/iid/90366/age/1/sex/1/cat/-1/ctp/-1/yrr/3/cid/4/tbm/1

[37] https://fingertips.phe.org.uk/profile/health-profiles/data#page/0/gid/1938132701/pat/6/par/E12000008/ati/201/iid/90366/age/1/sex/1/cat/-1/ctp/-1/yrr/3/cid/4/tbm/1

38 Current and future state of nation's health revealed - GOV.UK (www.gov.uk)

	National (UK & England)	Regional (South East Region)	Local (Plan Area)
Indices of Multiple Deprivation			Data. Local Authority (LA) data is presented in the first instance, where available however Small Area (SA) measures are also considered: **Income** Of the 12 LAs intersecting the Plan Area, three LA's have an income deprived population of 10% or more. These are Merton, Crawley and Croydon. Croydon has the greatest percentage population that are income deprived (13.6%) and Mole Valley has the lowest (5.4%)[39]. **Employment** 34% of towns in the South East region are in the lower deprivation working group. This trend is also evident within the Plan Area with most towns falling within a Low Deprivation Working Towns classification including Sevenoaks[40] **Education** There is a broad range of relative deprivation within the Plan Area. SAs within towns including Reigate and Banstead are among the least deprived decile in respect of Education however nearby Crawley is among the most deprived[41]. Other areas considered least deprived include Sutton and Mole Valley.

39 https://www.ons.gov.uk/visualisations/dvc1371/#/E07000223

40 https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/articles/understandingtownsinenglandandwalesspatialanalysis/2020-12-07

41 https://mapmaker.cdrc.ac.uk/#/index-of-multiple-deprivation?d=1111010&m=imde19_edu&lon=-0.6276&lat=51.2036&zoom=10.23

	National (UK & England)	Regional (South East Region)	Local (Plan Area)
			Healthcare Generally the study area performs well, with a low number of areas of increased deprivation being identified. Small Areas within Sutton, Croydon, Reigate and Banstead and Mole Valley are among the least deprived urban centres within the Study area. **Crime** In respect of Crime within the Study Area, in most urban areas there is at least one Small Area considered among the most deprived. Although a relatively varied picture, small areas within the Study area are predominately considered among the least deprived. **Housing** Housing deprivation is a prevalent issue across the Plan Area, with most LAs containing a number of SAs that fall under a classification of Most Deprived. There are however a number of urban areas that perform more favourably, Reigate and Banstead is among the areas that contain less deprived Small Areas (SA's)[42].
	Explanatory Text and anticipated future trends: The English indices of deprivation measure relative deprivation in small areas in England called lower-layer super output areas. The index of multiple deprivation is the most widely used of these indices. There are seven distinct domains of deprivation; Income, Employment, Health and Disability, Education and Skill Training, Crime, Barriers to Housing and Services and Living Environment. There are 32,844 Small Areas		

42 CDRC Mapmaker: Deprivation Indices (IMD) (E19 Housing domain)

	National (UK & England)	Regional (South East Region)	Local (Plan Area)
	in England and deprivation is ranked relatively from 1st (most deprived SA) to 32844TH (least deprived). Deprivation is however dispersed across England and 61% of local authority districts contain at least one of the most deprived neighbourhoods in England[43].		
Community Features	Reported at Local level only	Reported at Local level only	Within the Plan Area the following areas of greenspace have been identified: • 131 no. Allotments; • 49 no. Bowling Greens; • 39 no. Cemeteries; • 1 no. Country Park; • 48 no. Golf Courses; • 0 no. National Parks; and • 1 no. National Trail.
	Explanatory Text and anticipated future trends: There is increasing evidence that provision of areas of greenspace contribute to mental and physical wellbeing however access varies greatly depending on where people live. The most economically deprived areas often have less available public greenspace, meaning people in those communities have fewer opportunities to benefit. The Committee on Climate Change found that the total proportion of urban greenspace in England declined by 8 percentage points between 2001 and 2018. The Governments 25 Year Environmental Plan however acknowledges the essential role the natural environment and greenspace play in peoples physical and mental health and aims to improve population health and wellbeing by improving access to greenspace and delivering more good quality green infrastructure.		

43 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/835115/IoD2019_Statistical_Release.pdf

Table B-3: Material Assets

	National (UK & England)	Regional (South East Region)	Local (Plan Area)
Water Treatment Works and Sewage Treatment Works	Reported at Local level only	Reported at Local level only	Each day SES Water supplies on average 160 million litres of treated water to more than 735,000 customers across 322 square miles, covering parts of Kent, West Sussex, Surrey and South London. The company draws 85% of its water from underground sources and 15% from its reservoir. Water is treated at one of the company's eight treatment works[44]. It should be noted that SES Water are not the Sewerage Undertakers and therefore, do not deal with Sewerage and Wastewater.
	Explanatory Text and anticipated future trends: Development in the Plan Area Region will need to respond to capacity issues in terms of these types of infrastructure. In some instances, development may need to support the delivery of new infrastructure where capacity issues emerge. Without a strategic approach to development, capacity issues in the region may prove more difficult to address in manner which benefits the highest number of residents in the plan area. Water companies are developing Drainage and Wastewater Management Plans which will set out how they maintain, improve, and increase capacity of their drainage network and wastewater services over the next 25 years. For the first time these plans will pu the planning of drainage and wastewater services on a level footing with the planning they undertake for water resources		
Authorised and Historic Landfill Sites	Reported at Local level only	Reported at Local level only	There are approximately 150 historic landfill sites and 13 authorised landfill sites within the Plan Area.
	Explanatory Text and anticipated future trends: The amount of waste sent to landfill across England has remained relatively stable since 2009 although peaks in 2019 for the South East and East of England demonstrate demand continues to be high. While the South East is a region of significant landfill capacity (c. 27 million		

44 ses-water-annual-report-2021.pdf (seswater.co.uk)

	National (UK & England)	Regional (South East Region)	Local (Plan Area)
	m3 of inert waste and 24 million m3 of non-hazardous waste)[45] the number of non-hazardous landfill facilities is declining across the South East and a lack of new capacity being allocated in Local Plans is noted[46].		
Major Utilities (major gas mains, overhead lines etc.)	There are currently eight gas terminals operating across the UK, seven of these are located in England and Wales along the west and east coast. National Grid is responsible for the transmission of gas across England. Currently there are four gas distribution networks across the UK[47].	N/A	The gas distribution operator in the Plan Area is SGN and the electricity distribution operator is the UK Power Networks[48]. According to the National Grid Network Map, the Plan Area is only intersected by cables and overhead powerlines towards its most northern extents[49]. There are no gas terminals within the Plan Area. An area to the east of the Plan Area is intersected by a gas pipe[50].
	Explanatory Text and anticipated future trends: There are currently no gas terminals in the South East Region. There are areas of the South East Region within which gas pipelines and overhead power lines are present to facilitate supply. Without a strategic approach to development, it is less likely that development and new infrastructure is provided to complement the existing distribution of this infrastructure.		
Navigational Waterways	There are 5000 miles of navigable waterway in England and Wales. 2,700 miles of UK canals and rivers are connected up to form a waterways network. UK Canal Map - Inland Waterways	Reported at local level only	A check of the UK Canal Map did not identify any Navigational Waterways within the Plan Area.
	Explanatory Text and anticipated future trends:		
Other Material assets	Reported at Local level only	Reported at Local level only	Within the Plan Area the following assets have been identified: 85 no. Open access areas

45 https://www.letsrecycle.com/news/waste-to-landfill-in-england-jumps-4-in-2019/

46 https://info.westberks.gov.uk/CHttpHandler.ashx?id=49719&p=0

47 Energy Network Association, Gas Transmission Map. Available: https://www.energynetworks.org/operating-the-networks/whos-my-network-operator

48 https://www.energynetworks.org/operating-the-networks/whos-my-network-operator

49 https://www.nationalgrid.com/uk/electricity-transmission/network-and-infrastructure/network-route-maps

50 https://www.nationalgrid.com/uk/gas-transmission/land-and-assets/network-route-maps

	National (UK & England)	Regional (South East Region)	Local (Plan Area)
			150 no. Other sports facilities 300 no. Play Space 212 no. Playing Field 132 no. Public Park or Garden 118 no. Registered Common Land 183 no. Religious Grounds 421 no. Religious Buildings 301 no. Schools 147 no. Tennis Courts 22 no. Transport Routes (Major Roads) 4 no. National designated cycle routes There are a number of railway tracks within the plan area connecting areas such as Redhill and Horley, Leatherhead and Dorking and Oxted and Edenbridge.
	Explanatory Text and anticipated future trends: As expected given the size of the Plan Area, it contains a wide range of material assets including recreational amenities, services, facilities and major infrastructure including road, rail, airports and ports, many of which concentrate or interact with the urban centres across the Plan Area.		
Open Green Space	The NPPF[51] puts the onus on local planning authorities to prepare an authority-wide, evidence-based greenspace strategy that includes an assessment of current greenspace provision. It also suggests LPAs use Local Green Space (LGS) as a designation to provide special protection against development for green areas of particular importance.	There are over 20,000 Open Green spaces within the South East region, with the main typologies as follows: • Natural and Semi-natural Greenspace • Outdoor Sports Facilities • Parks and Gardens • Amenity Greenspace	There are approximately 1,390 Open Green spaces within the Plan area with the main typologies reflecting the regional typologies: • Natural and Semi-natural Greenspace • Outdoor Sports Facilities • Parks and Gardens • Amenity Greenspace

51 MHCLG (2014) Open space, sports and recreation facilities, public rights of way and local green space. Available: https://www.gov.uk/guidance/open-space-sports-and-recreation-facilities-public-rights-of-way-and-local-green-space

	National (UK & England)	Regional (South East Region)	Local (Plan Area)
		• Educational and Community Grounds	• Educational and Community Grounds

Explanatory Text and anticipated future trends:

Open space, which includes all open space of public value, can take many forms, from formal sports pitches to open areas within a development, linear corridors and country parks. It can provide health and recreation benefits to people living and working nearby; have an ecological value and contribute to green infrastructure, as well as being an important part of the landscape and setting of built development, and an important component in the achievement of sustainable development[52].

Local authorities play a vital role in[53]:

- providing new, good quality greenspace that is inclusive and equitable
- improving, maintaining and protecting existing greenspace
- increasing green infrastructure within public spaces and promoting healthy streets
- improving transport links, pathways and other means of access to greenspace, and providing imaginative routes linking areas of greenspace for active travel

Without a co-ordinated strategic approach to development and infrastructure, there is increased potential for planning decisions to result in inappropriate development, which could fragment existing networks of open space thereby reducing connectivity.

[52] MHCLG (2014) *Open space, sports and recreation facilities, public rights of way and local green space*. Available: https://www.gov.uk/guidance/open-space-sports-and-recreation-facilities-public-rights-of-way-and-local-green-space

53 Public Health England (2020) Improving access to greenspace – A new review for 2020. Available:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/904439/Improving_access_to_greenspace_2020_review.pdf

Table B-4: Water Quality and Resources and Flood Risk

	National (UK & England)	Regional (South East Region)	Local (Plan Area)
Water Framework Directive (WFD)	In England, the quality status of water bodies assessed under the WFD in 2020 were[54]: Lakes: • High – 10% • Good – 22% • Moderate – 55% • Poor – 11% • Bad – 1% Rivers and Canals: • High – 3% • Good – 30% • Moderate – 49% • Poor – 16% • Bad – 3% Estuaries and Coastal: • High – 21% • Good – 55% • Moderate – 23% • Poor – 1% • Bad – 1%	In line with the WFD, River Basin Management Plans (RBMPs) are relevant for the South East Region and the status of waterbodies. Local government is involved in regulating, operating, influencing and undertaking projects in the river basin district (RBD) of the associated RBMP. The river basin districts which make up the South East region are Thames and the South East [55]. As of 2015, the status of surface and groundwater water bodies in the RBDs are as follows: *Surface Waters (including lakes, coastal, estuarine and rivers, canals and surface water transfers) ecological status,* • Thames Water RBD totalling 498: - High – 0 - Good – 29 - Moderate – 320 - Poor – 112 - Bad – 27 • South East RBD totalling 282: - High – 0 - Good – 43 - Moderate – 169 - Poor – 60	The Plan Area falls predominately within the Thames Water River Basin, with areas in the west falling within the South East River Basin[56]. The status of surface and groundwater water bodies in the RBDs are as outlined at regional level. There are no coastal areas and as such no designations such as Shellfish Water Protected Areas in the plan area. Aquifer Designation (Bedrock)[57] The British Geological Society Aquifer Designation Map (Bedrock) lists the 'Principal aquifer' designation across much of the north of the plan area and areas of Unproductive designation towards the centre. Secondary A designation to a much lesser extent is also present predominately towards the south.

54 Joint Nature Conservation Committee (2021) UK Biodiversity Indicators 2020 – B7. Surface water status. Available: https://hub.jncc.gov.uk/assets/b6dbbc22-235a-4664-8192-3a178d32ffde

55 Water Resources South East Scoping Report wrse-regional-plan-strategic-environmental-assessment-scoping-report.pdf

56 https://environment.data.gov.uk/catchment-planning/

57 https://magic.defra.gov.uk/MagicMap.aspx

	National (UK & England)	Regional (South East Region)	Local (Plan Area)
		- Bad – 10 *Groundwaters (Chemical Status),* • Thames Water RBD totalling 47: - Good – 25 - Poor – 22 • South East RBD totalling 33: - Good – 17 - Poor – 16	
	Explanatory Text and anticipated future trends: The EU WFD is transposed into UK law through the following regulations: The Water Environment (WFD) (England and Wales) Regulations 2017 for England and Wales; the Water Environment and Water Services (Scotland) Act 2003 (WEWS Act) and The Water Environment (WFD) Regulations (Northern Ireland) 2003) for Northern Ireland. The purpose of the Directive is to establish a framework for the protection of inland surface waters (rivers and lakes), transitional waters (estuaries), coastal waters and groundwater. Groundwater is an important natural resource that supports river flows as well as ecological diversity in rivers, lakes and wetlands. It is also available for use, across the United Kingdom, for water supply by abstraction from boreholes, wells and springs. The number of waterbodies assessed each year varies and has decreased from 10,761 in 2009 to 9,301 in 2019. There was a small decrease in the overall number of water bodies awarded high or good surface water status between 2009 and 2018. In 2019, 36% of surface water bodies assessed under the WFD in the UK were in high or good status. This this is the same as the 36% of surface water bodies assessed in 2009 and one percent higher than the 35% in 2014[58]. RBMPs are prepared in line with the WFD to protect and improve the quality of our water environment. The RBMPs support the government's framework for the 25-year environment plan and will allow local communities to find more cost-effective ways to take action to further improve our water environment[59]. As with most water bodies in England, there are a range of significant water management issues manifested in the South East and Thames Water RBDs, with pollution from towns, cities and transport noted as being an issue for 9% and 17% of water bodies in the respective RBD's. This includes Rainwater draining from roofs, roads and pavements carries pollutants, including grit, bacteria, oils, metals, vehicle emissions, detergent and road salt drains to surface water, including estuaries and coastal		

58 Joint Nature Conservation Committee (2020) Surface Water Status – Datasheet. Available: http://jncc.defra.gov.uk/docs/UKBI2015_DS_B7_Final2.xlsx

59 DEFRA and Environment Agency (2019) River basin management plans: 2015. Available: https://www.gov.uk/government/collections/river-basin-management-plans-2015

	National (UK & England)	Regional (South East Region)	Local (Plan Area)
	waters. Many homes and workplaces have 'misconnected' drains, meaning that dirty water often enters surface waters and groundwater rather than foul sewer drains. New development may result in physical modifications to water bodies – an issue affecting 43% of water bodies in the South East RBD and 44% in the Thames Water RBD. **Without a coordinated approach to development and infrastructure there is increased potential for pollution to result at water bodies in the South East Region**.		
Drinking Water Safeguard Zones **Source Protection Areas**	Drinking Water Safeguard Zones (DWSZs) are designated in England for any raw water sources that are 'at risk' of deterioration which would result in the need for additional treatment. These zones are areas where the land use is causing pollution of the raw water. Similarly, parts of the country at which there is increased risk of contamination to groundwater supplied from activities which might cause pollution are covered by Source Protection Zones (SPZs). The EA split SPZs into 3 main zones: inner (SPZ1), outer (SPZ2) and total catchment (SPZ3). A fourth zone (special interest) can sometimes also be applied (further detail provided in the explanatory text below).	32 DWSZ falls entirely or partially within the South East Region. There are several SPZs within the South East Region, predominately located across the centre and towards the south: SPZ 1 – 774 SPZ 1c – 117 SPZ 2 – 462 SPZ 2c – 114 SPZ 3 – 158 SPZ 3c – 1 SPZ 4 – 11	5 Surface DWSZ falls entirely or partially within the Plan Area[60]. There are also 11 Groundwater DWSZ within the Plan Area. There are several SPZs within the Plan Area, predominately located across the centre and towards the north[61]: 1 – 28 1c – 14 2 – 16 2c – 12 3 – 5 3c – 1 4 – 4
	Explanatory Text and anticipated future trends: DWSZs are designated by the Environment Agency for areas in which action is needed to address pollution so that extra treatment of raw water can be avoided. Furthermore, groundwater provides around a third of drinking water in England and		

60 https://environment.data.gov.uk/portalstg/home/item.html?id=f7056505deee407ca6cdccfa1494e24f

61 https://environment.data.gov.uk/DefraDataDownload/?mapService=EA/SourceProtectionZonesMerged&Mode=spatial

	National (UK & England)	Regional (South East Region)	Local (Plan Area)
	maintains the flow in many of the waterbodies in the country. SPZs are also designated by the Environment Agency. These designations cover groundwater sources such as wells, boreholes and springs which are used for public drinking water supply. Groundwater supplies a third of our drinking water. In some areas of southern England, up to 80% of the water you get from your taps is from groundwater[62]. Inner Zone (**SPZ1**) - This zone is 50 day travel time of pollutant to source with a 50 metres default minimum radius. Outer zone (**SPZ2**) - This zone is 400 day travel time of pollutant to source. This has a 250 or 500 metres minimum radius around the source depending on the amount of water taken. Total catchment (**SPZ3**) - This is the area around a supply source within which all the groundwater ends up at the abstraction point. This is the point from where the water is taken. This could extend some distance from the source point. Extended zones beneath protective cover (**1c, 2c and 3c**) - Areas where there is protective geology cover, such as clay. This is because activities below the surface, such as deep drilling, could create pathways for pollutants to enter the groundwater. Zone of special interest (**SPZ4**) - This zone is where local conditions require additional protection. **Without a coordinated approach to development and infrastructure there is increased potential for pollution to occur in areas where there is a risk of contamination of drinking water resulting**. The location of Source Protection Zones and Drinking Water Safeguard Zones within the Plan Area are shown in **Appendix D**.		
Bathing Water Quality	As of 2019, in England, the quality status of bathing water areas assessed under the Bathing Waters Directive were[63]: • Poor – 8; • Sufficient – 21; • Good – 92; • Excellent – 300; and • Closed – 1. *Classifications were not made for the 2020 season due to the impact of the COVID-19*	N/A	There are no bathing water areas within the Plan Area[64].

62 Groundwater source protection zones (SPZs) - GOV.UK (www.gov.uk)

63 Environment Agency, Bathing Water Data. Available: http://environment.data.gov.uk/bwq/profiles/data.html?country=England

64 https://environment.data.gov.uk/bwq/profiles/

	National (UK & England)	Regional (South East Region)	Local (Plan Area)
	pandemic on the sampling programme.		
	Explanatory Text and anticipated future trends: Water quality at designated bathing water sites in England is assessed by the Environment Agency. From May to September, weekly assessments measure current water quality, and at a number of sites daily pollution risk forecasts are issued. Annual ratings classify each site as excellent, good, sufficient or poor based on measurements taken over a period of up to four years[65].		

65 Environment Agency, Bathing Water Data. Available: http://environment.data.gov.uk/bwq/profiles/data.html?country=England

Table B-5: Flood Risk

	National (UK & England)	Regional (South East Region)	Local (Plan Area)
Location of Flood Zones	The National Flood and Coastal Erosion Risk Management Strategy for England identifies that approximately 5.2 million, or one in six residential properties are located in areas at risk of flooding from rivers, the sea and surface water[66]. Flood Zones 2 and 3 and located across the whole of England associated with river and coastal areas. Lowland areas are of particular risk as a consequence of floodplains being associated with the lower reaches of rivers[67].	The Thames river basin district has over 227,000 people at high risk of surface water flooding and over 107,000 people are at high risk of flooding from rivers and the sea. It contains two primary flood risk areas (FRAs), the London and Medway, which are areas with higher risk of surface water flooding. There is also one partial flood risk area, South Essex, which is partly within the Thames river basin district. The South East river basin district consists of one primary flood risk area, Brighton and Hove, and there are over 31,000 people at high risk of surface water flooding and over 36,000 people at high risk of flooding from rivers and the sea. There has been notable and severe flooding occurring across the basin in recent years which resulted in significant impacts on communities, businesses and the natural environment[68].	Flood Zones 2 and 3 are located across the Plan Area. There are approximately 880 flood defences within the plan area including natural defences, channel maintenance, bank protection, natural bank and engineered channels.
	Explanatory Text and anticipated future trends: In England, the flood risk (river and tidal) is categorised into three zones[69] for planning purposes (noting that the NPPF further subdivides flood zone 3 into 3a and Functional Floodplain 3b (land where water has to flow or be stored in times of flood): • Flood Zone 1 – Land unlikely to be affected by flooding, with a less than 0.1% (less than 1 in 1000) chance of flooding each year. • Flood Zone 2 – Land likely to be affected by a major flood, with up to a 0.1% (1 in 1000) chance of occurring each year. • Flood Zone 3 – Land likely to be affected by flooding from the sea by a flood that has a 0.5% (1 in 200) or greater chance of happening each year, or from a river by a flood that has a 1 per cent (1 in 100) or greater chance of happening each year. The risk of surface water flooding also needs to be considered:		

66 Environment Agency (2009) Flooding in England: A National Assessment of Flood Risk. Available: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/292928/geho0609bqds-e-e.pdf

67 Environment Agency (2017) Flood Map for Planning (Rivers and Sea). Available: http://apps.environment-agency.gov.uk/wiyby/37837.aspx

68 Water Resources South East Scoping Report wrse-regional-plan-strategic-environmental-assessment-scoping-report.pdf

69 Environment Agency (2013) Flood Map for Planning. Available: http://apps.environment-agency.gov.uk/wiyby/37837.aspx

	National (UK & England)	Regional (South East Region)	Local (Plan Area)
	• Very low risk area (less than 0.1% (1:1000)) chance of flooding. • Low risk area (0.1% to 1% (1:1000 – 1:100)) chance of flooding. • Medium risk area (1% to 3.3% (1:100 – 1:30)) chance of flooding. • High risk area (3.3% (1:30)) or greater chance of flooding. Estimates of flood risk from different sources across the UK vary, but it is known that the level of risk is substantial – England has approximately 5.2million properties at risk[70] While new development is expected to occur in the plan area making use of a sequential approach, **without a strategic approach, there is increased potential for the inappropriate siting of new development which may aggravate existing flood risk**. Flood Zones in the Plan Area are shown on **Appendix D**.		

70 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/292928/geho0609bqds-e-e.pdf

Table B-6: Soils, Geology and Land-use

	National (UK & England)	Regional (South East Region)	Local (Plan Area)
Agricultural Land Classifications	The Agricultural Land Classification system classifies land into five grades, with Grade 3 subdivided into Sub-grades 3a and 3b. The best and most versatile agricultural land is defined as Grades 1, 2 and 3a of the Agricultural Land Classification (ALC) system. As of 2012 it is estimated that of the farmland in England,[71] Grades 1 and 2 together form about 21% of soils. The subgrade 3a also covers about 21% of farmland in England.	The Agricultural Land Classification of the region is predominately of Grade 2, Grade 3 and Grade 4 with pockets of urban and non-agricultural land. There are some areas with Grade 1, particularly around the south and south east coast. The number of allocated areas within each of the classifications are as follows:	The Plan Area is predominately Grade 3, 4 and Urban with areas of non-agricultural land and small pockets of Grade 1 and Grade 2. The east of the Plan Area is predominately Grade 3 land and the north is predominately Urban. Towards the west of the Plan Area is a mix of all land types.
	Explanatory Text and anticipated future trends: ALC uses a grading system to assess and compare the quality of agricultural land at national, regional and local levels. It assesses the potential for land to support different agricultural uses, such as growing crops for food. It does not consider the land's current use and intensity of use. Natural England has a statutory role in advising local planning authorities about land quality issues. A combination of climate, site and soil characteristics and their unique interaction determines the limitation and grade of the land. These affect the: • range of crops that can be grown; • yield of crop; • consistency of yield; and • cost of producing the crop. When considering development proposals that affect agricultural land, developers and LPAs should aim to protect the best and most versatile (BMV) agricultural land and soils in England from significant, inappropriate or unsustainable development proposals. BMV agricultural land is graded 1 to 3a. The highest grade goes to land that[72]: • gives the highest yield or output; • has the widest range and versatility of use; • produces the most consistent yield from a narrower range of crops; and • requires less input.		

71 Natural England (2012) Agricultural Land Classification: protecting the best and most versatile agricultural land (TIN049). Available: http://publications.naturalengland.org.uk/publication/35012

72 Natural England (2018) Guide to assessing development proposals on agricultural land. Available: https://www.gov.uk/government/publications/agricultural-land-assess-proposals-for-development/guide-to-assessing-development-proposals-on-agricultural-land

	National (UK & England)	Regional (South East Region)	Local (Plan Area)
	There is **increased potential for development to occur in areas which would affect higher value agricultural land without a co-ordinated strategic approach to development and infrastructure in the region.**		
Geological SSSIs and RIGS	There are over 4,100 SSSIs in England, covering about 1,099,505 ha[73]. Of the total area covered 90.4% are in favourable or unfavourable recovering condition[74]. As of June 2011, there were more than 1,200 SSSIs notified for geological interest in England and 300 in Wales. At that time, 72% of geological features were judged to be in favourable condition[75].	Around 1189 Sites of Special Scientific Interest can be found in the South East region, this includes sites designated for both biological and geological reasons.	There are 29 classified SSSI's within the Plan Area. A number of these are designated as Geological SSSI's including Auclaye and Clock House Brickworks SSSI's[76].
	Explanatory Text and anticipated future trends: SSSIs represent the principal national designation for places of importance for biodiversity and geodiversity in the UK. The designation of areas as SSSIs attaches certain legal requirements to the management of these sites. In addition to designating areas as SSSIs when the land's wildlife is of special interest, Natural England will select and notify an area as a new SSSI when it believes the geology or landform is of special interest[77]. At a national level the majority of SSSIs are in favourable or unfavourable recovering condition. In the South East Region the majority of SSSIs in favourable or unfavourable recovering condition. However, 9.3% of sites contain units that are in unfavourable condition which are reported to have not improved or are in decline from when previously reported on[78]. Geology in the South East is likely to face threats from development; human activities such as pollution, roads, disturbance, farming practices; loss of habitat; loss of food sources and a changing climate. Without a co-ordinated strategic approach to development and infrastructure is likely to increase the potential for inappropriate greenfield development to occur which could increase pressures on SSSIs designated for their geological importance.		
Contaminated Land	As of 2020[79], there are 54 special sites of contaminated land in England. These are sites that due to specific land uses, past activities or water pollution are passed from	Reporting/mapping is not freely available at this level however EA Special Sites are present within the South East Region. There are also anticipated to be a large	Reporting/mapping is not freely available at this level.

73 Natural England (2016) Designated Sites View. Available: https://designatedsites.naturalengland.org.uk/.

74 Natural England (2016) Designated Sites View. Available: https://designatedsites.naturalengland.org.uk/

75 Defra (2011) Benefits of Sites of Special Scientific Interest

76 https://designatedsites.naturalengland.org.uk/sitelist.aspx?SiteCode=S1002946&SiteName=&countyCode=41&responsiblePerson=&unitId=&SeaArea=&IFCAArea=

77 Natural England (2020) Sites of special scientific interest. Available: https://www.gov.uk/guidance/protected-areas-sites-of-special-scientific-interest

78 Natural England (2016) Designated Sites View. Available: https://designatedsites.naturalengland.org.uk/

79 Environment Agency (2020) Contaminated Land Special Sites. Available: https://data.gov.uk/dataset/e3770885-fc05-4813-9e60-42b03ec411cf/contaminated-land-special-sites

	National (UK & England)	Regional (South East Region)	Local (Plan Area)
	the local council to the Environment Agency to regulate. The National Planning Policy Framework places the onus with the developer and/or landowner for securing a safe land/development.	number of brownfield sites. Such sites are likely to present a potential risk in respect of contaminated land.	With the exception of EA Special Sites, it is anticipated that there are a number of brownfield sites within the Plan Area which are also potentially contaminated.
	Explanatory Text and anticipated future trends: Land is legally defined as 'contaminated land' where substances are causing or could cause: • Significant harm to people, property or protected species; • Significant pollution of surface waters (for example lakes and rivers) or groundwater; and • Harm to people as a result of radioactivity. Land may be contaminated by various substances including: • Heavy metals such as arsenic, cadmium and lead; • Oils and tars; • Chemical substances and preparations, like solvents; • Gases; • Asbestos; and • Radioactive substances. Some types of contaminated land are classed as 'special sites', which are then regulated by the Environment Agency in England once a local council has decided that an area is a special site[80]. The National Planning Policy Framework requires a risk assessment of land potentially affected by contamination and expects all investigations to be undertaken in accordance with established practices such as BS10175 (2002) 'Code of Practice for the Investigation of Potentially Contaminated Sites'.		

80 Environment Agency (2020) Contaminated land. Available at: https://www.gov.uk/contaminated-land

Table B-6: Air Quality

	National (UK & England)	Regional (South East Region)	Local (Plan Area)
Air Quality Management Areas	As of September 2020, there were 532 AQMAs in England[81]. AQMAs are distributed throughout England, although they are principally located in areas of high population. The largest AQMAs are within major cities, including London, Birmingham, Manchester, Liverpool, Sheffield and Bristol. A significant amount of AQMAs are designated along major trunk roads and are generally associated with areas of high congestion.	There is approximately 118 AQMAs declared within the South East Region. A high proportion of the local authorities which fall within the South East region contain at least one AQMA and are predominately designated for Nitrogen dioxide (NO_2) and Particulate Matter (PM_{10})[82].	13 AQMAs have been declared within the plan area (either in their entirety or partially): • AQMA No 11 (Reigate and Banstead) • AQMA No 12 (Reigate and Banstead) • AQMA No.1 (M25) (Reigate and Banstead) • AQMA No 10 (Reigate and Banstead) • AQMA No 3 (Reigate and Banstead) • AQMA No 6 (Reigate and Banstead) • AQMA No 8 (Reigate and Banstead) • AQMA No 9 (Reigate and Banstead) • Croydon AQMA • Ewell AQMA • Hooley AQMA • Kingstone upon Thames AQMA • Sutton AQMA
	Explanatory Text and anticipated future trends: Since December 1997 each local authority in the UK must review and assess air quality in their area to determine performance against national air quality objectives. Where air quality objectives are not likely to be achieved an AQMA must be declared. AQMAs are typically associated with vehicle emissions, principally oxides of nitrogen (NOx), oxides of sulphur (SO_2) and particulates (PM10). As such, AQMAs are predominantly associated with urban areas and the road network[83]).		

81 Department for Environment and Rural Affairs (2016) AQMAs interactive map. Available: https://uk-air.defra.gov.uk/aqma/maps

82 Water Resources South East Scoping Report wrse-regional-plan-strategic-environmental-assessment-scoping-report.pdf

83 Department for Environment and Rural Affairs (2016) Current AQMAs by Source. Available: https://uk-air.defra.gov.uk/aqma/summary

	The quality of our air in the UK has improved considerably over the last decade. Road transport is a key source of many air pollutants, particularly in urban areas. There are two main trends in the transport sector working in opposite directions: new vehicles are becoming individually cleaner in response to European emission standards legislation, but total vehicle kilometres are increasing. Overall emissions of key air pollutants from road transport have fallen by about 50% over the last decade, despite increases in traffic, and are expected to reduce by a further 25% over the next decade. This is mainly a result of progressively tighter vehicle emission and fuel standards agreed at European level and set in UK regulations[84]. **118 AQMAs have been declared in the South East region**. Note that there is also increasing recognition of the role solid fuel use in domestic properties plays in poor air quality, with wood burning making a significant contribution toward wintertime PM_{10} concentrations in many towns and cities. PM_{10} attributable to wood burning tends to peak during wintertime evenings and weekends. This suggests that wood is used principally as a secondary or 'lifestyle' fuel, rather than a primary source of heating. It also suggests that the majority of current air quality impacts are linked to simpler appliances such as open fires and stoves, rather than more complex appliances such as biomass boilers and Combined Heat and Power systems. Local authorities have experienced a number of gross pollution and nuisance cases linked to solid fuel appliances, and the frequency of these cases may be increasing. In many cases these problems occur when appliances are poorly installed, misused and/or inappropriate fuels are used[85].		
Noise Action Important Areas	In England, it has been estimated that the number of people immediately associated with the Important Areas (noise 'hotspots') identified for the major roads outside agglomerations* is around 57,000[86]. It has been estimated that the number of people immediately associated with the Important Areas (noise 'hotspots') identified for the major railways outside agglomerations is around 5,000[87]. It has been estimated that the approximate number of people immediately associated with the Important Areas identified for the 65 agglomerations, with respect to road and rail	There are approximately 2,473 Noise Action Important Areas within the South East Region of England.	180 Noise Action Important Areas have been identified within the plan area. The source of noise in these areas is predominately roads, with the exception a small number in which the source is rail.

84 Department for Environment and Rural Affairs (2011) The Air Quality Strategy for England. Scotland, Wales and Northern Ireland - Volume 1. Available: https://www.gov.uk/government/publications/the-air-quality-strategy-for-england-scotland-wales-and-northern-ireland-volume-1

85 Solid Fuel and Air Quality: An update for Local Authorities, 2013 https://www.environmental-protection.org.uk/wp-content/uploads/2013/07/Solid-Fuel-and-Air-Quality-Update-for-LAs-final-060413.pdf

86 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/813666/noise-action-plan-2019-roads.pdf

87 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/813664/noise-action-plan-2019-railways.pdf

noise, is around 130,000 and 13,000 respectively[88]. Within the 65 agglomerations identified in DEFRAs Noise Action Plan 2019,DEFRA notes that, with respect to road and rail noise, there are around 130,000 and 13,000 people directly associated with Important Areas[89].		

Explanatory Text and anticipated future trends:

Noise Action Plans are required by the Environmental Noise Directive. Noise Important Areas identify 'hotspot' locations where the highest 1% of noise levels at residential locations can be found and therefore highlight where further investigation should be directed.

*DEFRA defines an agglomeration as an area having a population in excess of 100,000 persons and a population density equal to or greater than 500 people per km2 and which is considered to be urbanised.

88 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/813663/noise-action-plan-2019-agglomerations.pdf

89 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/813663/noise-action-plan-2019-agglomerations.pdf

Table B-7: Climate Change

	National (UK & England)	Regional (South East Region)	Local (Plan Area)
Climate Change Distribution of GHG emissions	As of 2019[90], greenhouse gas (GHG) emissions for the UK totalled 455 $MtCO_2e$, of this 365 $MtCO_2e$ was CO_2 emissions. This was a reduction of 40% compared to the figures recorded for 1990. Please note more recent datasets are not currently available.	Based on the local authorities which fall within the South East region, the total carbon dioxide (CO_2) emissions for 2018 across all sectors is estimated at 95,371 kilo tonnes ($ktCO_2$) (not including Land use, land-use change, and forestry (LULUCF))[91].	The following presents total carbon dioxide emissions in 2018 for each of the Local Authorities that intersect the Plan Area. Croydon is identified as having the highest emissions of all relevant LAs. This is attributed to many residents in the borough being employed in carbon-intensive industries like freight transport and civil engineering [92]. Elmbridge: 673.9 $ktCO_2$ Epsom and Ewell: 245.8 $ktCO_2$ Mole Valley: 521.2 $ktCO_2$ Reigate and Banstead: 737.3 $ktCO_2$ Tandridge: 616.9 $ktCO_2$ Guildford: 753.5 $ktCO_2$ Crawley: 588.4 $ktCO_2$ Croydon: 1,047.0 $ktCO_2$ Sutton: 558.5 $ktCO_2$ Kingston upon Thames: 575.5 $ktCO_2$ Merton: 595.1 $ktCO_2$ Sevenoaks: 808.9 $ktCO_2$ **Total: 7,722 $ktCO_2$** [93]
	Explanatory Text and anticipated future trends:		

90 Department for Business, Energy & Industrial Strategy (2021) 2019 UK GHG Emissions, Final Figures. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/957887/2019_Final_greenhouse_gas_emissions_statistical_release.pdf

91 Water Resources South East Scoping Report wrse-regional-plan-strategic-environmental-assessment-scoping-report.pdf

92 Microsoft Word - Croydon Climate Crisis Commission Recommendations Final.docx (neweconomics.org)

93 2005-18-uk-local-regional-co2-emissions.xlsx (live.com)

	National (UK & England)	Regional (South East Region)	Local (Plan Area)
	The UK's yearly publication[94] on GHG emissions provides the latest estimates of 1990-2019 UK territorial greenhouse gas emissions, which are presented in carbon dioxide equivalent units (CO2e). They show greenhouse gas emissions occurring within the UK's borders and cover the Kyoto "basket" of seven greenhouse gases: carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), hydrofluorocarbons (HFC), perfluorocarbons (PFC), sulphur hexafluoride (SF6) and nitrogen trifluoride (NF3). The UK has domestic targets for reducing greenhouse gas emissions under the Climate Change Act 2008 (CCA). The CCA established a long-term legally binding framework to reduce emissions, initially committing the UK to reducing emissions by at least 80% below 1990/95 baselines by 2050. In June 2019, following the IPCC's Special Report on Global Warming of 1.5°C and advice from the independent Committee on Climate Change, the CCA was amended to commit the UK to achieving a 100% reduction in emissions (to net zero) by 2050. The CCA also introduced carbon budgets, which set legally binding limits on the total amount of greenhouse gas emissions the UK can emit for a given five-year period. The first carbon budget ran from 2008-12. In 2014, the UK confirmed that it had met the budget, with emissions 36 $MtCO_2e$ below the cap of 3,018 $MtCO_2e$. The second carbon budget ran from 2013-17. In 2019, the UK confirmed that it had met the budget, with emissions 384 $MtCO_2e$ below the cap of 2,782 $MtCO_2e$. <u>Anticipated Future Trends:</u> Recent trends illustrate that GHG emissions are primarily being reduced in the energy sector due to the change in fuel mix for electricity generation, in particular a reduction in the use of goal and gas. It is expected that this will continue over the next few years and decades in favour of more renewable and low-carbon sources. It can also be expected that GHG emissions in the transportation sector are likely to decrease with the increasing availability and feasibility of electric vehicles and business fleets.		
Climate Change Contribution of sectors to GHG emissions	As of 2019, Transport was the largest emitting sector of UK GHG emissions in 2019, with 27%, followed by the Energy Supply sector at 23%. The remaining sectors contributed to UK GHG emissions as follows: Business (17%), Residential (15%), Agriculture (10%), and Other (10%). The Energy supply sector delivered the largest reduction in emissions from 2018 to 2019, with an 8% reduction.	The transport sector contributed the highest proportion of emissions to the total in 2018 at 40% followed by the domestic and industrial sector at 31% and 29% respectively. The LULUCF sector is estimated to be responsible for the removal of 2,406$ktCO_2$ equating to a 3% reduction in the total CO2 emissions[95].	The following presents total transport sector related emissions for each of the LAs intersecting the Plan Area. Sevenoaks is identified as emitting the most in respect of transport. Aims to reduce emissions through a suite of actions including electrification, increasing charge points and development of a Mass Rapid Transit network are recorded in Climate Emergency Action Plan for which a number of councils within the Plan Area have declared[9697]:

94 Department for Business, Energy & Industrial Strategy (2020) 2018 UK GHG Emissions, Final Figures. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/862887/2018_Final_greenhouse_gas_emissions_statistical_release.pdf

95 Water Resources South East Scoping Report wrse-regional-plan-strategic-environmental-assessment-scoping-report.pdf

96 Climate change | Local Government Association

97 Map of Local Council Declarations | Declare a Climate Emergency

	National (UK & England)	Regional (South East Region)	Local (Plan Area)
			Guildford: 423.3 $ktCO_2$ Elmbridge: 297.4 $ktCO_2$ Epsom and Ewell: 78.3 $ktCO_2$ Mole Valley: 275.6 $ktCO_2$ Reigate and Banstead: 347.0 $ktCO_2$ Tandridge: 407.7 $ktCO_2$ Crawley: 248.6 $ktCO_2$ Croydon: 263.7 $ktCO_2$ Sutton: 136.8 $ktCO_2$ Kingston upon Thames: 206.8 $ktCO_2$ Merton: 132.6 $ktCO_2$ Sevenoaks: 541.9 $ktCO_2$
	Explanatory Text and anticipated future trends: The UK's yearly publication[98] on GHG emissions provides the latest estimates of 1990-2019 UK territorial greenhouse gas emissions, which are presented in carbon dioxide equivalent units (CO2e). They show greenhouse gas emissions occurring within the UK's borders and cover the Kyoto "basket" of seven greenhouse gases: carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), hydrofluorocarbons (HFC), perfluorocarbons (PFC), sulphur hexafluoride (SF6) and nitrogen trifluoride (NF3). The UK has domestic targets for reducing greenhouse gas emissions under the Climate Change Act 2008 (CCA). The CCA established a long-term legally binding framework to reduce emissions, initially committing the UK to reducing emissions by at least 80% below 1990/95 baselines by 2050. In June 2019, following the IPCC's Special Report on Global Warming of 1.5°C and advice from the independent Committee on Climate Change, the CCA was amended to commit the UK to achieving a 100% reduction in emissions (to net zero) by 2050. The CCA also introduced carbon budgets, which set legally binding limits on the total amount of greenhouse gas emissions the UK can emit for a given five-year period. The first carbon budget ran from 2008-12. In 2014, the UK confirmed that it had met the budget, with emissions 36 $MtCO_2e$ below the cap of 3,018 $MtCO_2e$. The second carbon budget ran from 2013-17. In 2019, the UK confirmed that it had met the budget, with emissions 384 $MtCO_2e$ below the cap of 2,782 $MtCO_2e$. The UK has so far outperformed its budgets. But progress is slowing, and the country is not on track to meet its future budgets or the overall reduction target, according to the 2021 Progress Report to Parliament by the Committee on Climate Change.		

98 Department for Business, Energy & Industrial Strategy (2020) 2018 UK GHG Emissions, Final Figures. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/862887/2018_Final_greenhouse_gas_emissions_statistical_release.pdf

	National (UK & England)	Regional (South East Region)	Local (Plan Area)
	UK five-year carbon budgets **Budgetary Period** / **Carbon Budget ($MtCO_2e$)** 1st carbon budget (2008 to 2012) — 3,018 2nd carbon budget (2013 to 2017) — 2,782 3rd carbon budget (2018 to 2022) — 2,544 4th carbon budget (2023 to 2027) — 1,950 5th carbon budget (2028 to 2032) — 1,725 6th carbon budget (2033 to 2037) — 965 Source: Climate Change Committee Anticipated Future Trends: Recent trends illustrate that GHG emissions are primarily being reduced in the energy sector due to the change in fuel mix for electricity generation, in particular a reduction in the use of goal and gas. It is expected that this will continue over the next few years and decades in favour of more renewable and low-carbon sources. It can also be expected that GHG emissions in the transportation sector are likely to decrease with the increasing availability and feasibility of electric vehicles and business fleets. Action Plans produced by councils within the Plan Area in response to declarations of Climate Emergencies also target reducing transport emissions as a key objective.		
Climate Change Predicted changes to temperature and weather patterns	As of November 2018[99], the following climate change impacts are predicted for England: - More frequent hotter, drier summers; - More frequent milder, wetter winters; - Rising sea levels; and - More extreme weather events, such as flooding and drought. In the last decade sea levels around the UK rose on average by over 3mm a year.	The projected changes in temperature and precipitation for the south east of England by the 2050s (2040-2069), under the RCP8.5 scenario (high emissions scenario) are as follows; • Annual mean temperatures are projected to increase by 2.0°C. Summer temperatures are projected to see the largest increase by 2.6°C and winter temperatures by 1.7°C • Annual mean precipitation is projected to decrease by 1.1%. Seasonal variability	The projected changes in temperature and precipitation by the 2050s are anticipated to be in line with that reported at a Regional level.

99 Environment Agency (2018) Climate Change Impacts and Adaptation. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/758983/Climate_change_impacts_and_adaptation.pdf

	National (UK & England)	Regional (South East Region)	Local (Plan Area)
		is projected with a 22.9% decrease in precipitation during summer months and an increase of 11.5% during winter months.	

Explanatory Text and anticipated future trends:

In December 2015, climate change issues were highlighted during the UN Conference of the Parties (COP) 21. At COP21, 189 parties ratified The Paris Agreement. The Paris Agreement's long-term temperature goal is to keep the increase in global average temperature to well below 2 °C above pre-industrial levels; and to pursue efforts to limit the increase to 1.5 °C, recognising that this would substantially reduce the risks and impacts of climate change globally. It also aims to increase the ability of parties to adapt to the adverse impacts of climate change and make "finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development."

Under the Paris Agreement, each country must determine, plan, and regularly report on the contribution that it undertakes to mitigate global warming. No mechanism forces a country to set a specific emissions target by a specific date, but each target should go beyond previously set targets.

Table B-8: Historic Environment

	National (UK & England)	Regional (South East Region)	Local (Plan Area)
World Heritage Sites	There are 17 World Heritage Sites in England[100] with 31 distributed across the entirety of the United Kingdom. The sites in England are: • Blenheim Palace • Canterbury Cathedral, St Augustine's Abbey, and St Martin's Church • City of Bath • Cornwall and West Devon Mining Landscape • Derwent Valley Mills • Dorset and East Devon Coast • Durham Castle and Cathedral • Frontiers of the Roman Empire • Ironbridge Gorge • Lake District • Maritime Greenwich • Palace of Westminster and Westminster Abbey, including Saint Margaret's Church • Royal Botanic Gardens, Kew • Saltaire • Stonehenge, Avebury and Associated Sites • Studley Royal Park including the Ruins of Fountains Abbey • Tower of London To be included on the World Heritage List, sites must be of "Outstanding Universal	There are 8 World Heritage Sites in the South East Region: • Blenheim Palace • Tower of London • Canterbury Cathedral, St. Augustine's Abbey and St. Martin's Church • Palace of Westminster, Westminster Abbey and St. Margaret's Church • Maritime Greenwich • Stonehenge, Avebury and Associated Sites • Royal Botanic Gardens, Kew • City of Bath	There are no World Heritage Sites within the Plan Area.

100 UNESCO (2017) World Heritage Convention - United Kingdom of Great Britain and Northern Ireland. Available: http://whc.unesco.org/en/statesparties/gb

	National (UK & England)	Regional (South East Region)	Local (Plan Area)
	Value". This is demonstrated by meeting one of the ten selection criteria. These criteria are divided between those of cultural and natural importance. Within England the majority of sites (17) have been notified for their cultural value, with only one site (Dorset and East Devon Coast) notified for its natural value[101].		

Explanatory Text and anticipated future trends:

World Heritage Sites are designated to meet the UK's commitments under the World Heritage Convention and the sites are designated for their globally important cultural or natural interest and require appropriate management and protection measures[102].

The first World Heritage Sites within the UK were designated in 1986. Sites can continue to be nominated, with the last site on the UK mainland being the Forth Rail Bridge, designated in 2015[103]. Sites are inscribed by the United Nations Educational, Scientific and Cultural Organisation (UNESCO). In England the Department for (DCMS) acts as the UK 'State Party' which is responsible for nominating new sites. The DCMS receives advice from Historic England in this regard[104]. The Outstanding Universal Value of a World Heritage Site indicates its importance as a heritage asset of the highest significance. This is to be taken into account by the relevant authorities in plan-making and determining planning applications[105].

Of the sites in England, none have been placed on the List of World Heritage in Danger. The list presently comprises 52 sites in total worldwide. These are sites at which conditions are present to threaten the characteristics for which a site was placed on the World Heritage List[106].

Additional housing development in the South East Region may be **inappropriately located or designated to pose a risk to the** W**orld Heritage Sites as well as their settings**. Without a co-ordinated strategic approach to development and infrastructure there is an increased potential for this risk to result.

101 UNESCO (2020) About World Heritage: United Kingdom of Great Britain and Northern Ireland. Available: https://whc.unesco.org/en/statesparties/gb

102 UNESCO (2017) World Heritage Convention - United Kingdom of Great Britain and Northern Ireland. Available: http://whc.unesco.org/en/statesparties/gb

103 UNESCO (2017) World Heritage Convention - United Kingdom of Great Britain and Northern Ireland. Available: http://whc.unesco.org/en/statesparties/gb

104 Historic England (2020) World Heritage. Available: https://historicengland.org.uk/advice/planning/international/world-heritage

105 MHCLG (2019) Planning practice guidance. Further guidance on World Heritage Sites. Paragraph: 028 Reference ID: 18a-028-20190723. Available: https://www.gov.uk/guidance/conserving-and-enhancing-the-historic-environment#World-Heritage-Sites

106 UNESCO (2020) List of World Heritage in Danger. Available at: https://whc.unesco.org/en/danger

	National (UK & England)	Regional (South East Region)	Local (Plan Area)
Scheduled Monuments	As of 2020, there are almost 20,000 Scheduled Monuments located throughout England[107]. The criteria for determining whether Scheduled Monuments are of national importance are guided by the Principles of Selection laid down by the Secretary of State for Digital, Culture, Media and Sport, covering the basic characteristics of monuments[108]. They are: • Period • Rarity • Documentation/Finds • Group value • Survival/condition • Fragility/vulnerability • Diversity • Potential	There are 5,207 Scheduled Monuments in the South East Region.	There are 91 scheduled monuments in the Plan Area.
	Explanatory Text and anticipated future trends: Scheduling is the selection of nationally important archaeological sites which are legally protected. The monitoring and identification of sites is undertaken by Historic England. Scheduled Monuments cover the whole range of archaeological sites and are not always visible or above ground sites. The condition of Scheduled Monuments is monitored as part of Historic England's 'Heritage at Risk' programme. Local government archaeological services, plus independent national and local heritage organisations and community groups, can also play important roles in their curation, plus that of non-scheduled but nationally important monuments[109]. Additional housing development in the South East Region may be **inappropriately located or designated to pose a risk to scheduled monuments and their setting**s. Without a co-ordinated strategic approach to development and infrastructure there is an increased potential for this risk to result.		

107 Historic England (2020) Scheduled Monuments. Available: https://www.historicengland.org.uk/listing/what-is-designation/scheduled-monuments/

108 Department for Culture, Media and Sport (2013) https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/249695/SM_policy_statement_10-2013__2_.pdf

109 Department for Culture, Media and Sport (2013) https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/249695/SM_policy_statement_10-2013__2_.pdf

	National (UK & England)	Regional (South East Region)	Local (Plan Area)
	The locations of Scheduled Monuments are shown in **Appendix D**.		
Listed Buildings and Conservation Areas	As noted by Historic England[110], the total number of listed buildings is unknown, but is estimated to be around 500,000 in England. Conservation Areas are designated for their special architectural and historic interested and were first designated in 1967 with over 10,000 in England as of 2021[111].	There are 118,344 listed buildings in the South East Region, these are graded as follows: - Grade I – 2,859 - Grade II – 108,709 - Grade II* – 6,776 There are approximately 3,330 Conservation Areas in the South East Region.	There are 2,834 listed buildings in the Plan Area, which are graded as follows: Grade I – 42 Grade II – 2,617 Grade II* – 175 The Plan Area has 81 Conservation Areas with the first areas were designated in 1968 and the most recent being 2010[112].
	Explanatory Text and anticipated future trends: Listing of buildings is concerned with recognising the buildings special architectural and historic interest, with a view to protecting the building, under the planning system for future generations to enjoy. All buildings built before 1700 which survive in anything like their original condition are listed, as are most of those built between 1700 and 1840. Particularly careful selection is required for buildings from the period after 1945. Usually a building has to be over 30 years old to be eligible for listing[113]. Buildings are considered by the Secretary of State (for Digital, Culture, Media and Sport) and where they are deemed to be of special architectural or historic interest they can be included on the list. The Planning (Listed Buildings and Conservation Areas) Act 1990 sets out the designation regime[114]. There are three categories of listed building: • Grade I buildings are of exceptional interest, only 2.5% of listed buildings are Grade I • Grade II* buildings are particularly important buildings of more than special interest; 5.8% of listed buildings are Grade II* • Grade II buildings are of special interest; 91.7% of all listed buildings are in this class and it is the most likely grade of listing for a homeowner. Local authorities have a positive legal duty to designate conservation areas where parts of their own area are of special architectural or historic interest. In exceptional circumstances, where the local authority has not done so, the Secretary of State (for Digital, Culture, Media		

110 Historic England (2020) Listed Buildings. Available: https://historicengland.org.uk/listing/what-is-designation/listed-buildings/

111 Historic England (2020) Conservation Areas. Available : https://historicengland.org.uk/listing/what-is-designation/local/conservation-areas/

112 https://historicengland.org.uk/listing/the-list/data-downloads/

113 Historic England (2020) Listed Buildings. Available: https://historicengland.org.uk/listing/what-is-designation/listed-buildings/

114 Historic England (2020) Listed Buildings Identification and Extent. Available: https://historicengland.org.uk/advice/hpg/has/listed-buildings/

	National (UK & England)	Regional (South East Region)	Local (Plan Area)
	and Sport) may designate a conservation area anywhere in England. The Planning (Listed Buildings and Conservation Areas) Act 1990 also sets out the requirement for local authority's proposals for the preservation and enhancement of conservation areas. Additional housing development in the South East Region may be **inappropriately located or designed to pose a risk to listed building and conservation areas and their setting**s. Without a co-ordinated strategic approach to development and infrastructure there is an increased potential for this risk to result. The locations of listed buildings and conservation areas in the plan area are shown in **Appendix D.**		
Historic Battlefields	As of 2021, there are 47 Historic Battlefields in England[115]. Of these, three battlefields are on the Heritage at Risk Register[116]. The purpose of the Register of Historic Battlefields in England is to provide protection through the planning system and to promote a better understanding of the significance and public enjoyment of these sites. If the site of a battle is to merit registration it has to have been an engagement of national significance, and to be capable of close definition on the ground.	The South East region contains 17 Registered Battlefields: • Battle of Barnet 1471 • Battle of Chalgrove 1643 • Battle of Cheriton 1644 • Battle of Cropredy Bridge 1644 • Battle of Edgehill 1642 • Battle of Evesham 1265 • Battle of Hastings 1066 • Battle of Lewes 1264 • Battle of Maldon 991 • Battle of Naseby 1645 • Battle of Newbury 1643 • Battle of Northampton 1460 • Battle of Roundway Down 1643 • Battle of Stow (-on-the-Wold) 1646 • Battle of Tewkesbury 1471 • Battle of Worcester 1651 with Powick Bridge 1642 • Battle of Edgcote 1469	There are no Historic Battlefields in the Plan Area.

115 Historic England (2020) The List [Search criteria – Battlefields]. Available: https://historicengland.org.uk/listing/the-list/advanced-search-results

116 Historic England (2020) Heritage at Risk Register [Search criteria – Battlefields]. Available: https://historicengland.org.uk/advice/heritage-at-risk/search-register/results/?advsearch=1&at=Battlefield&searchtype=harsearch

	National (UK & England)	Regional (South East Region)	Local (Plan Area)
	Explanatory Text and anticipated future trends: Historic battlefields are designated by Historic England as conferred under the Historic Buildings and Ancient Monuments Act, 1983 (as amended).		
Parks and Gardens	As of 2020, there are 1,670 Registered Historic Parks and Gardens within England[117], which represents an increase of 64 since 2010 (see Historic England heritage indicators 2020). There are 103 registered parks and gardens on the Heritage at Risk (HAR) Register, representing 6.2% of the total number of registered parks and gardens in England[118]	There are 786 Registered Parks and Gardens within the South East Region. These are graded as follows; - Grade I – 84 - Grade II - 487 - Grade II* – 215	There are 17 registered Historic Parks and Gardens in the Plan Area: - Grade I – 3 - Grade II - 11 - Grade II* – 3
	Explanatory Text and anticipated future trends: The purpose of Registers of Historic Parks and Gardens in England is to encourage the protection of gardens, grounds and other open spaces which are of historic importance. The majority of sites registered are, or started life as, the grounds of private houses, but public parks and cemeteries form important categories too. The emphasis of the Register is on 'designed' landscapes, rather than on planting or botanical importance. The various types of designed landscape included on the Register are designated in the following four themes: • Rural Landscapes • Urban Landscapes • Landscapes of Remembrance • Institutional Landscapes There are also numerous unregistered parks and gardens within the plan area. Whilst they are non-statutory designations, they remain relevant considerations for local planning and developments. The plan area contains numerous heritage assets some of which are on Historic England's Heritage at Risk Register. This includes a small number of Registered Parks and Gardens. **New development within the plan area may result in pressure on areas of importance for their cultural heritage and aesthetic quality and there is a requirement for them to be preserved and enhanced**. Locations of Parks and Gardens are shown in Appendix D.		

[117] Historic England (2020) *Heritage Indicators 2020*. Available: https://historicengland.org.uk/content/heritage-counts/pub/2020/heritage-indicators-2020/
118 Historic England (2021) Registered Parks and Gardens at Risk. Available: https://historicengland.org.uk/advice/heritage-at-risk/landscapes/registered-parks-and-gardens-at-risk/

	National (UK & England)	Regional (South East Region)	Local (Plan Area)
Protected Wrecks	There are 54 Protected Wrecks within England.	One Protected Wreck has been identified within the South East Region. It is called 'Grace Dieu and the possible site of the Holigost'.	There are no coastal waters in the Plan area and as such no Protected Wrecks have been identified.
	The Protection of Wrecks Act (1973) allows the Government to designate a wreck to prevent uncontrolled interference. Designated sites are identified as being likely to contain the remains of a vessel, or its contents, which are of historical, artistic, or archaeological importance[119].		

119 Water Resources South East Scoping Report wrse-regional-plan-strategic-environmental-assessment-scoping-report.pdf

Table B-9: Landscape

	National (UK & England)	Regional (South East Region)	Local (Plan Area)
National Parks	There are 10 National Parks in England[120]: • Broads • Dartmoor • Exmoor • Lake District • New Forest • Northumberland • North York Moors • Peak District • South Downs • Yorkshire Dales	New Forest and South Downs National Parks are within the South East Region. New Forest became designated in 2005 and South Downs in 2010. New Forest National Park covers an area of 566km^2 and is made up of ancient woodland, open heathlands and coastline. South Downs National Park is designated for its rolling hills, picturesque towns and villages, and dramatic cliffs[121].	There are no national parks in the Plan Area
	Explanatory Text and anticipated future trends: In England and Wales, the purpose of National Parks is to conserve and enhance landscapes within the countryside whilst promoting public enjoyment of them and having regard for the social and economic well-being of those living within them. The National Parks and Access to the Countryside Act 1949 established the National Park designation in England and Wales. In addition, the Environment Act 1995 requires relevant authorities to have regard for nature conservation. The designation of National Parks is an ongoing process with two being added in England since 2008 (South Downs and Broads).		
Areas of Outstanding Natural Beauty	There are 34 AONBs located within England[122]: • Arnside & Silverdale • Blackdown Hills • Cannock Chase • Chichester Harbour • Chilterns • Cornwall • Cotswolds	There are nine AONB within the South East region: • Kent Downs • High Weald • Surrey Hills • Chichester Harbour • Isle of Wight • Chilterns • North Wessex Downs • Cotswolds	There is one designated Areas of Outstanding Natural Beauty (AONB) in the Plan Area - Surrey Hills AONB. The Surrey Hills was one of the first landscapes in the country to be designated an AONB in 1958. The Surrey Hills AONB stretches across Surrey's North Downs, from Farnham in the west to Oxted in the east of the county. It also includes the Greensand Hills which rise in Haslemere and stretch eastwards to Leith Hill, the highest point in

120 National Parks (2016) National Parks – Britain's Breathing Space. Available: http://www.nationalparks.gov.uk/quick-guide-to-the-uks-national-parks

121 Water Resources South East Scoping Report wrse-regional-plan-strategic-environmental-assessment-scoping-report.pdf

122 The National Association of Areas of Outstanding Natural Beauty (2017) Areas of Outstanding Natural Beauty. Available: http://www.landscapesforlife.org.uk/

	National (UK & England)	Regional (South East Region)	Local (Plan Area)
	• Cranborne Chase and West Wiltshire Downs • Dedham Vale • Dorset • East Devon • Forest of Bowland • Howardian Hills • High Weald • Isle of Wight • Isles of Scilly • Kent Downs • Lincolnshire Wolds • Malvern Hills • Mendip Hills • Norfolk Coast • North Devon • North Pennines • North Wessex Downs • Nidderdale • Northumberland Coast • Quantock Hills • Shropshire Hills • Solway Coast • South Devon • Suffolk Coast and Heaths • Surrey Hills • Tamar Valley • Wye Valley (England and Wales)[123]	• Cranborne Chase and West Wiltshire Downs	Southern England. The Hills stretch across the chalk North Downs that run from Farnham in the west, above Guildford, Dorking and Reigate, to Oxted in the east. They contain a mosaic of woodland, scrub and open downland with coombs, spring lines, chalk pits, quarries and striking cliffs. To the south are the Greensand Hills that include Black Down, the Devil's Punch Bowl and Leith Hill, with ancient sunken lanes and geometric fields that have been enclosed from heaths and wooded commons. In between are the valleys of the Wey, Tillingbourne and Mole rivers, and the heaths of Frensham, Thursley and Blackheath. The Low Weald forms the southern fringe of the AONB, with its extensive woodlands and small irregular fields, hedgerows and wooded shaws[124].
	Explanatory Text and anticipated future trends:		

123 The Wye Valley takes in land within both England and Wales.

124 Surrey-Hills-Management-Plan-Web-72-SP-1.pdf

	National (UK & England)	Regional (South East Region)	Local (Plan Area)
	In England, the primary purpose of the AONB designation is to conserve natural beauty – which by statute includes wildlife, physiographic features and cultural heritage as well as the more conventional concepts of landscape and scenery. Account is taken of the need to safeguard agriculture, forestry and other rural industries and the economic and social needs of local communities. Particular regard should be paid to promoting sustainable forms of social and economic development, that in themselves conserve and enhance the environment. These areas have equivalent status to National Parks as far as conservation is concerned. AONBs are designated under the National Parks and Access to the Countryside Act 1949, amended in the Environment Act 1995. The Countryside and Rights of Way Act 2000 clarifies the procedure and purpose of designating AONBs. There is a need to **protect landscape character (including that of the AONBs) from potential threats. This includes issues such as inappropriate development, lack of appropriate management and climate change**. Without a co-ordinated strategic approach to development and infrastructure degradation of the special qualities of the AONBs within the region is more likely to result. Locations of AONB in the Plan Area are shown in Appendix D.		
Landscape Character Areas	Natural England has produced National Character Area (NCAs) Profiles [125] which divide England into 159 distinct natural areas. Each is defined by a unique combination of landscape, biodiversity, geodiversity, history, and cultural and economic activity. Their boundaries follow natural lines in the landscape rather than administrative boundaries. They can be used for planning and development.	There are 40 NCAs within the South East Region.	There are 6 NCAs within the Plan Area. • Wealden Greensand • Thames Basin Lowlands • Thames Basin Heaths • North Downs • Low Weald • High Weald
	Explanatory Text and anticipated future trends: Landscape Character Areas or Landscape Character Assessments encompass various aspects of landscape, biodiversity, heritage, cultural and geological features. These are non-statutory and used as an aid in the planning process and for decision making. Each LCA profile produced by Natural England includes a description of the natural and cultural features that shape our landscapes, how the landscape has changed over time, the current key drivers for ongoing change, and a broad analysis of each area's characteristics and ecosystem services. Statements of Environmental Opportunity (SEOs) are suggested, which draw on this integrated information. The SEOs offer guidance on the critical issues, which could help to achieve sustainable growth and a more secure environmental future. There is a need to protect landscape character from potential threats. This includes issues such as inappropriate development, lack of appropriate management and climate change. Without a co-ordinated strategic approach to development and infrastructure degradation of the special qualities of the AONBs within the region is more likely to result.		

125 Natural England (2014) National Character Area profiles: data for local decision making. Available: https://www.gov.uk/government/publications/national-character-area-profiles-data-for-local-decision-making

	National (UK & England)	Regional (South East Region)	Local (Plan Area)
Green Belt	As of 2021 the extent of land designated as Green Belt in England was estimated at 1,614,000 hectares, around 12.4% of the land area of England[126]. Land designated as Green Belt in England is distributed around the following 16 urban cores (listed by largest area to smallest area): • London; • Merseyside and Greater Manchester; • South and West Yorkshire; • Birmingham; • Tyne and Wear; • Bath and Bristol; • Derby and Nottingham; • Stoke-on-Trent; • Bournemouth, Christchurch and Poole; • Oxford; • York; • Cambridge; • Cheltenham and Gloucester; • Blackpool; • Camforth, Lancaster and Morecambe; and • Burton-upon-Trent and Swadlincote.	Within the South East Region there is over 80 areas designated as Green Belts. The Green Belt around London is an important aspect of the South East region landscape which exists to prevent urban sprawl[127].	There are 10 areas designated as Green Belts in the Plan Area, covering the majority of the region[128].
	Explanatory Text and anticipated future trends:		

126 MHCLG (2020) Local Authority Green Belt: England 2020-21. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1020886/Green_Belt_statistics_for_England_2020-21_-_Factsheet.pdf

127 Water Resources South East Scoping Report wrse-regional-plan-strategic-environmental-assessment-scoping-report.pdf

128 English Local Authority Green Belt Dataset - data.gov.uk

	National (UK & England)	Regional (South East Region)	Local (Plan Area)
	The National Planning Policy Framework attaches great importance to Green Belts. The fundamental aim of Green Belt policy is to prevent urban sprawl by keeping land permanently open; the essential characteristics of Green Belts are their openness and their permanence[129]. In 2021, 180 out of 314 local authorities have some land designated as Green Belt. Green Belt serves five purposes: • to check the unrestricted sprawl of large built-up areas; • to prevent neighbouring towns merging into one another; • to assist in safeguarding the countryside from encroachment; • to preserve the setting and special character of historic towns; and • to assist in urban regeneration, by encouraging the recycling of derelict and other urban land. Once Green Belts have been defined, local planning authorities should plan positively to enhance their beneficial use, such as looking for opportunities to provide access; to provide opportunities for outdoor sport and recreation; to retain and enhance landscapes, visual amenity and biodiversity; or to improve damaged and derelict land. Across England between March 2020 and March 2021 there was a decrease of 3,220 hectares (0.1%) in the area of land designated as Green Belt. In spite of its strong protection through national planning policy Green Belt may come under pressure as areas are targeted for potential release and development in inappropriate locations as housing needs increase. There is **increased potential for Green Belt land that has not been identified as suitable for strategic growth to be subject to development without a co-ordinated strategic planning approach.**		
Woodland Priority Habitat	As of October 2021, 39% of total priority habitats in England are classified as deciduous woodland[130]. The majority of woodland priority habitats are located in the South East of England.	Priority habitats make up 16.6% of the South East region equating to a total of 39,5109ha. Deciduous woodland accounts for the highest percentage of priority habitat in the region[131].	Deciduous woodland makes up 15.5% of the Plan Area equating to a total of 131.3km^2.

Explanatory Text and anticipated future trends:

Priority habitats can be designated as protected areas called Sites of Special Scientific Interest (SSSIs). They can also be outside of these SSSI protected areas but be under Higher Level Stewardship (HLS) or Countryside Stewardship (CS) agreements or fall within Forestry Commission (FC) 'Managed woodland'. Some priority habitats, however, fall outside of the protection of all these schemes.

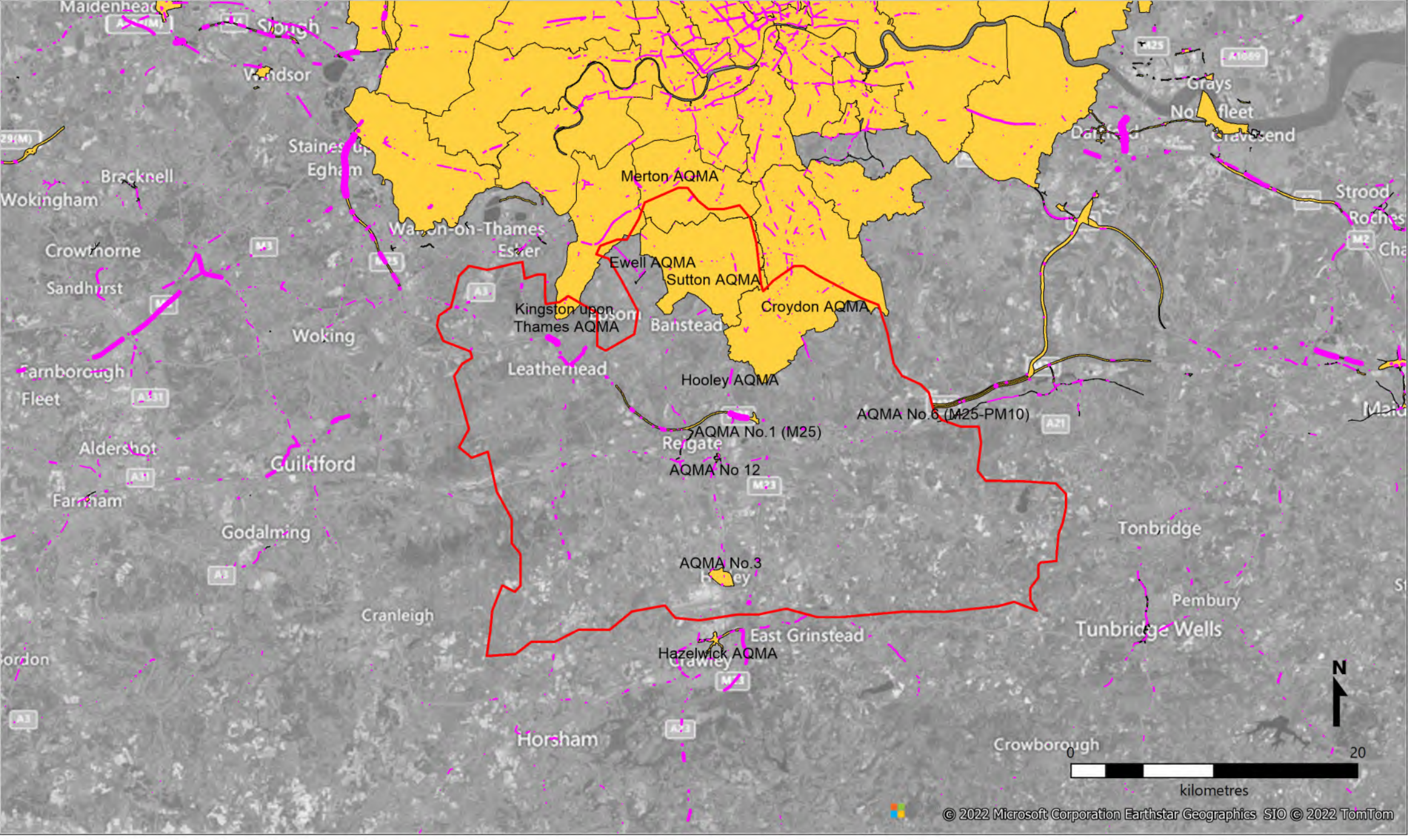
129 MHCLG (2020) Local Authority Green Belt: England 2019-20. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/916232/England_Green_Belt_Statistics_2019-20.pdf

130 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/829194/2a_Priority_habitats_2019_rev.pdf

131 Water Resources South East Scoping Report wrse-regional-plan-strategic-environmental-assessment-scoping-report.pdf

	National (UK & England)	Regional (South East Region)	Local (Plan Area)
Anticipated Future Trends: See above details that are applicable to all forms of PA.			

Appendix C. Baseline Figures



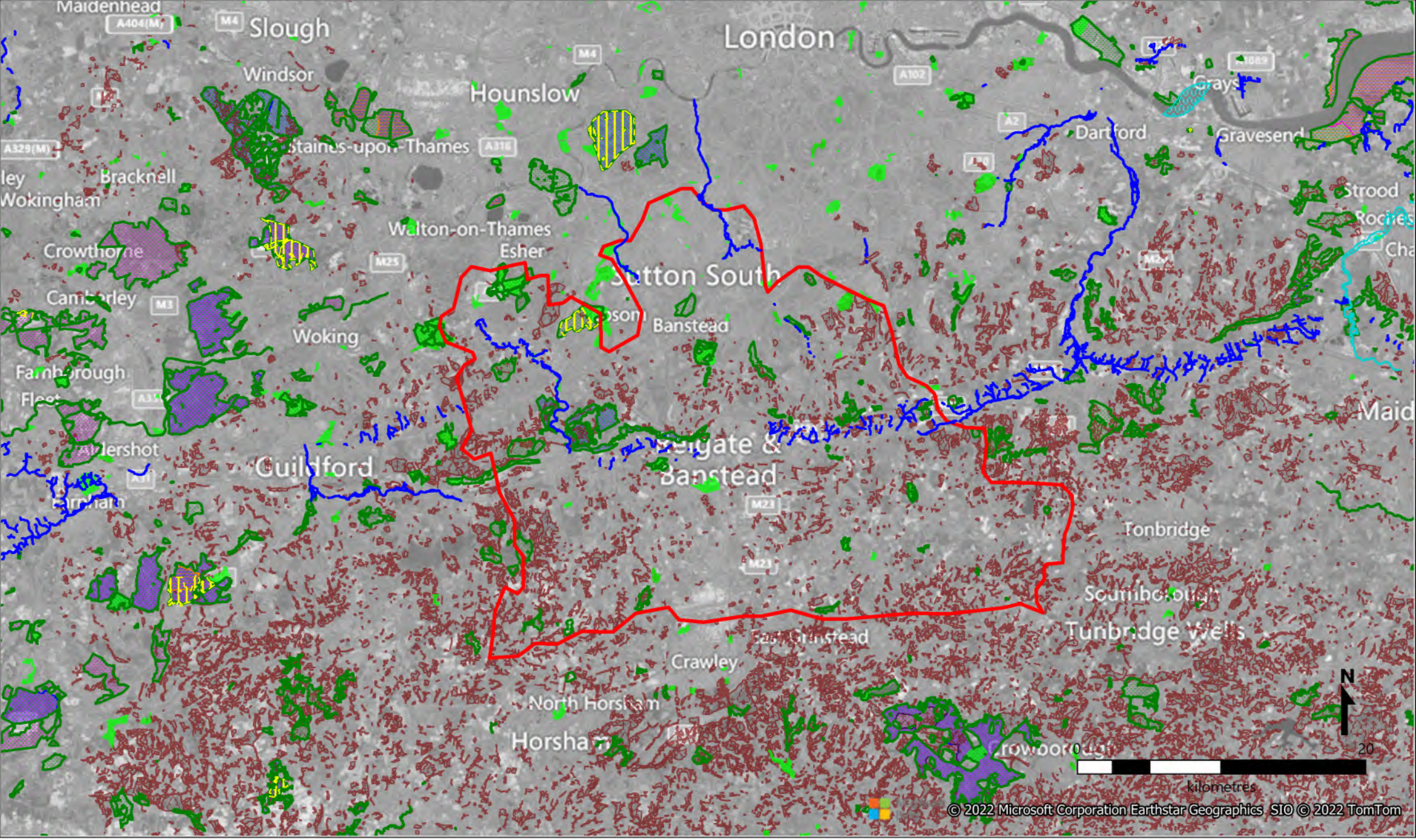
SES Water

Air Quality Map

SES Plan Area

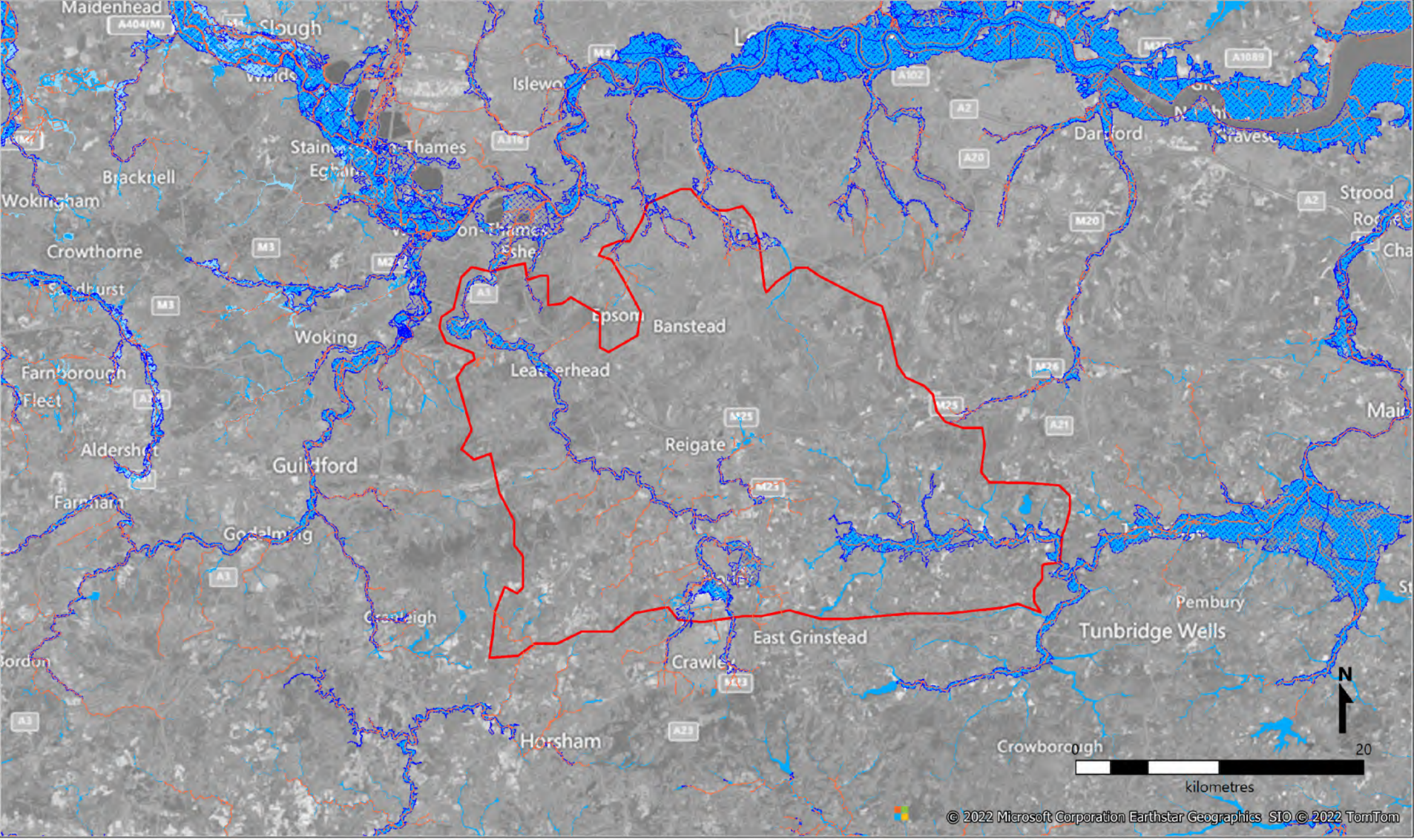
Air Quality Management Areas

Noise Action Planning Important Areas



SES Water
Biodiversity Map

- SES Plan Area
- Special Protection Areas
- Special Areas of Conservation
- Ramsar
- Sites of Special Scientific Interest
- National Nature Reserves
- Local Nature Reserves
- Marine Conservation Zones
- Ancient Woodland
- Chalk Rivers



SES Water

Flood Risk Map

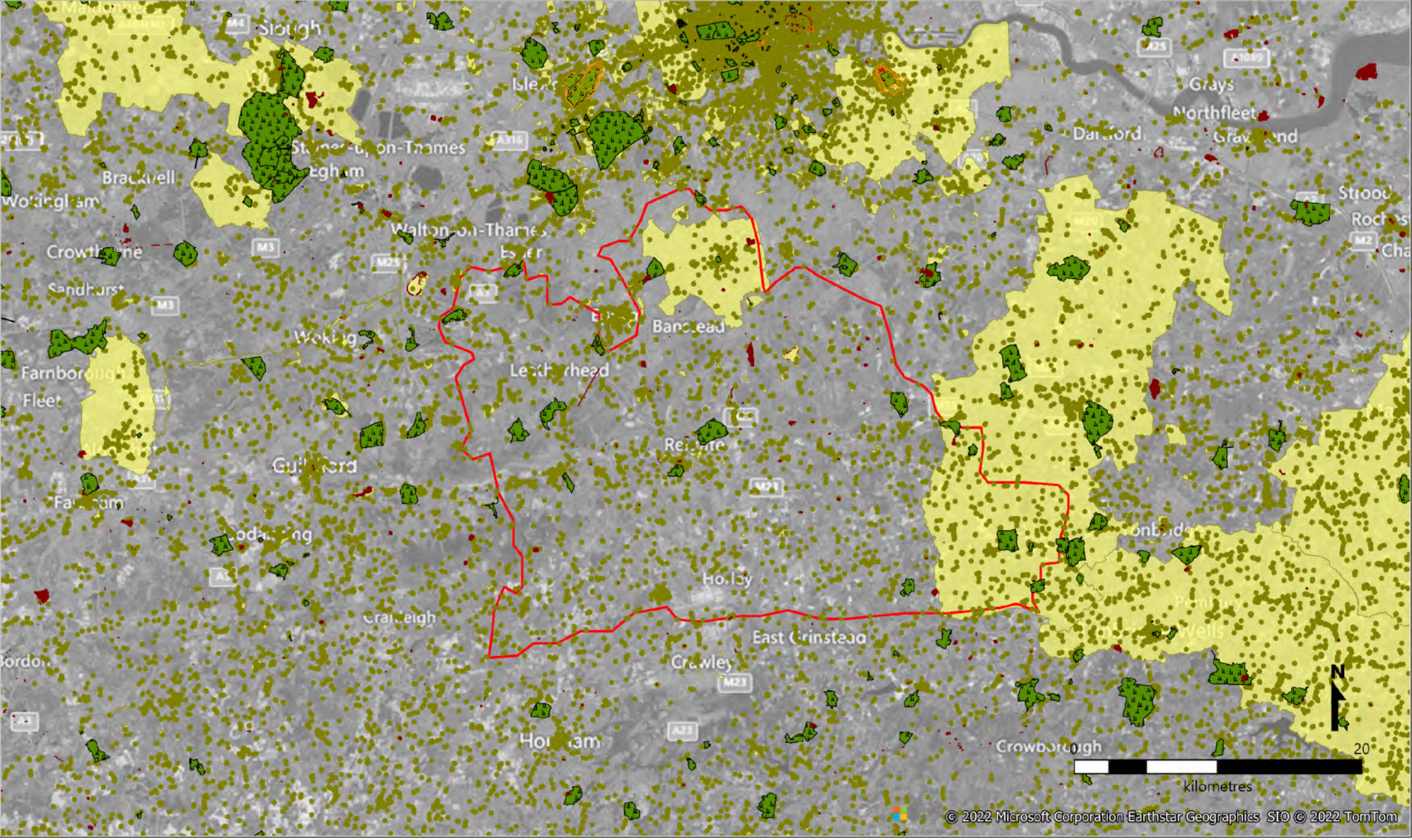
SES Plan Area

Flood Zone 2

Flood Zone 3

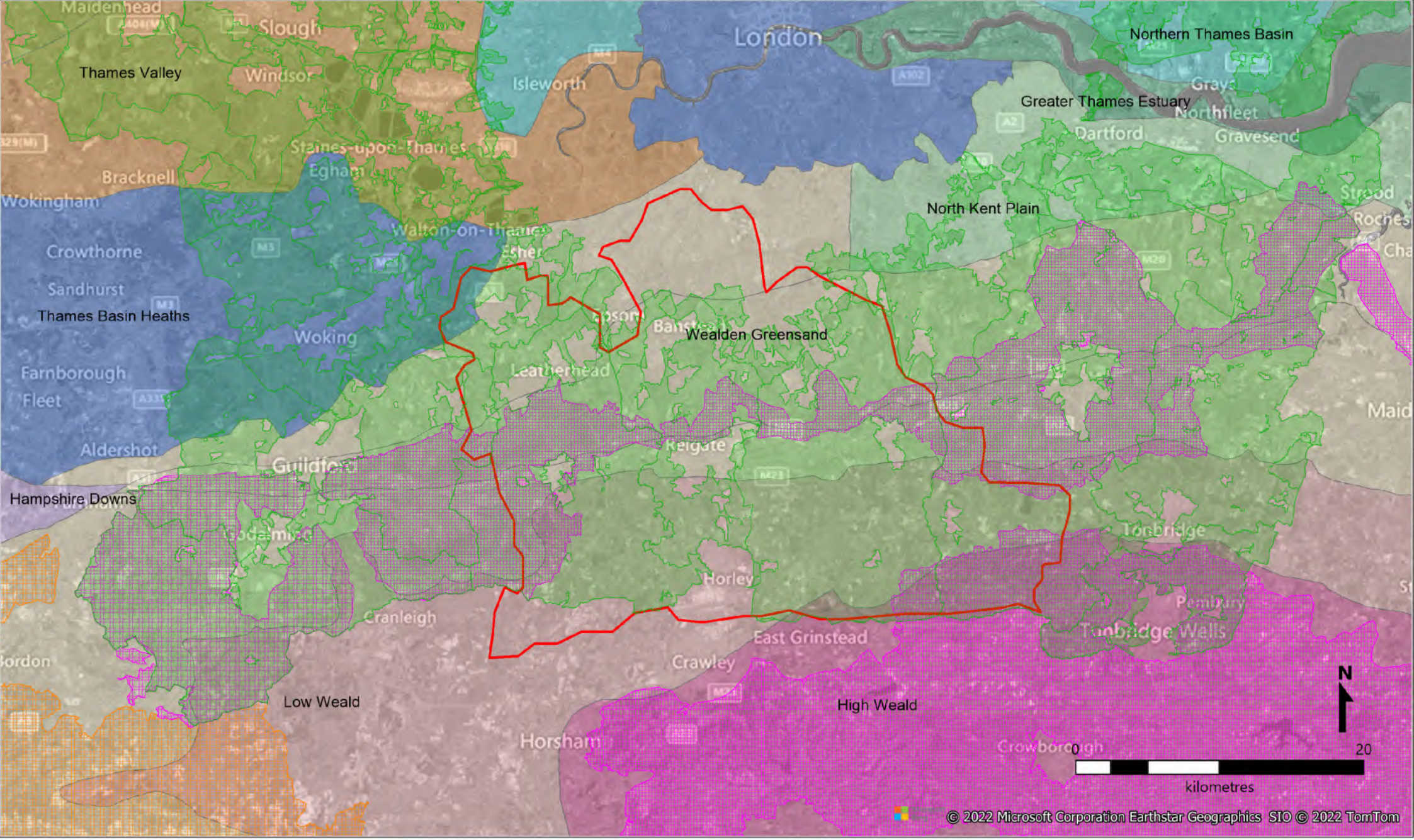
Flood Warning Areas

Flood Defences



SES Water Heritage Map

- SES Plan Area
- World Heritage Sites
- Scheduled Monuments
- Registered Parks And Gardens
- Registered Battlefields
- Listed Buildings
- Conservation Areas



SES Water Landscape Map

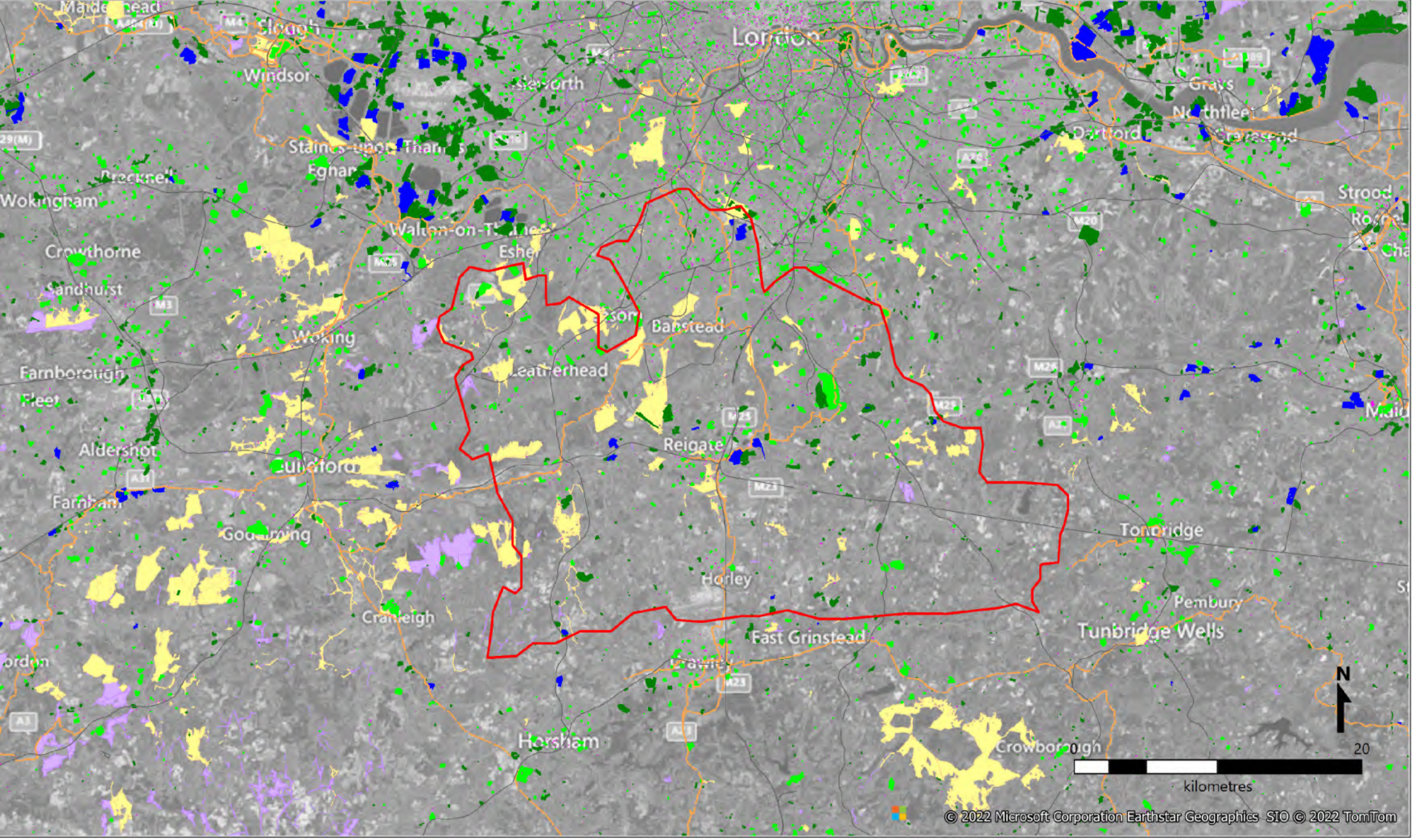
SES Plan Area

National Character Areas (as labelled)

South Downs National Park

High Weald Area of Outstanding Natural Beauty

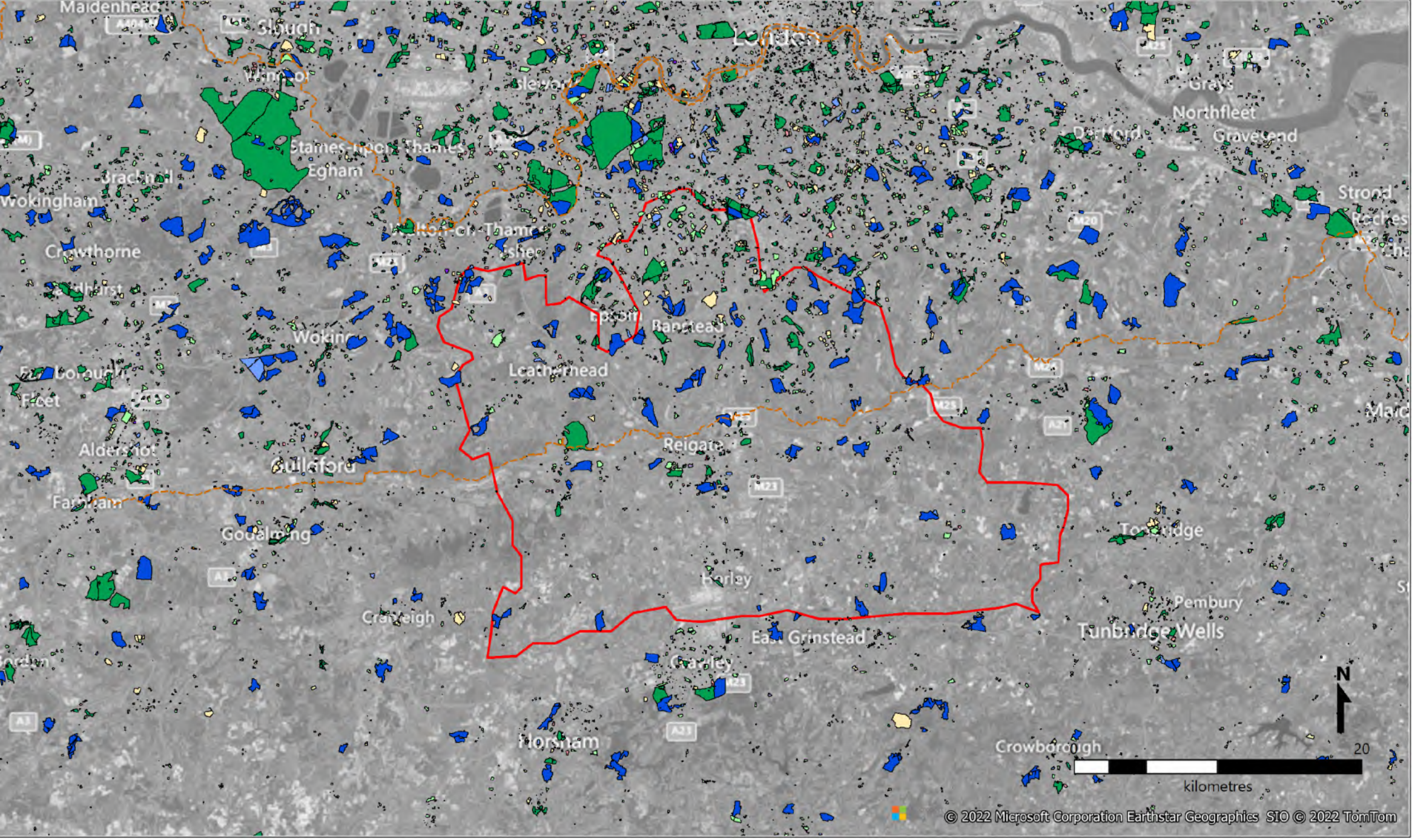
Green Belt



SES Water

Material Assets Map

- SES Plan Area
- Education
- Religious Buildings
- Railway Tracks
- National Cycle Network
- Open Access Land
- Registered Common Land
- Authorised Landfill Sites
- Historic Landfill Sites



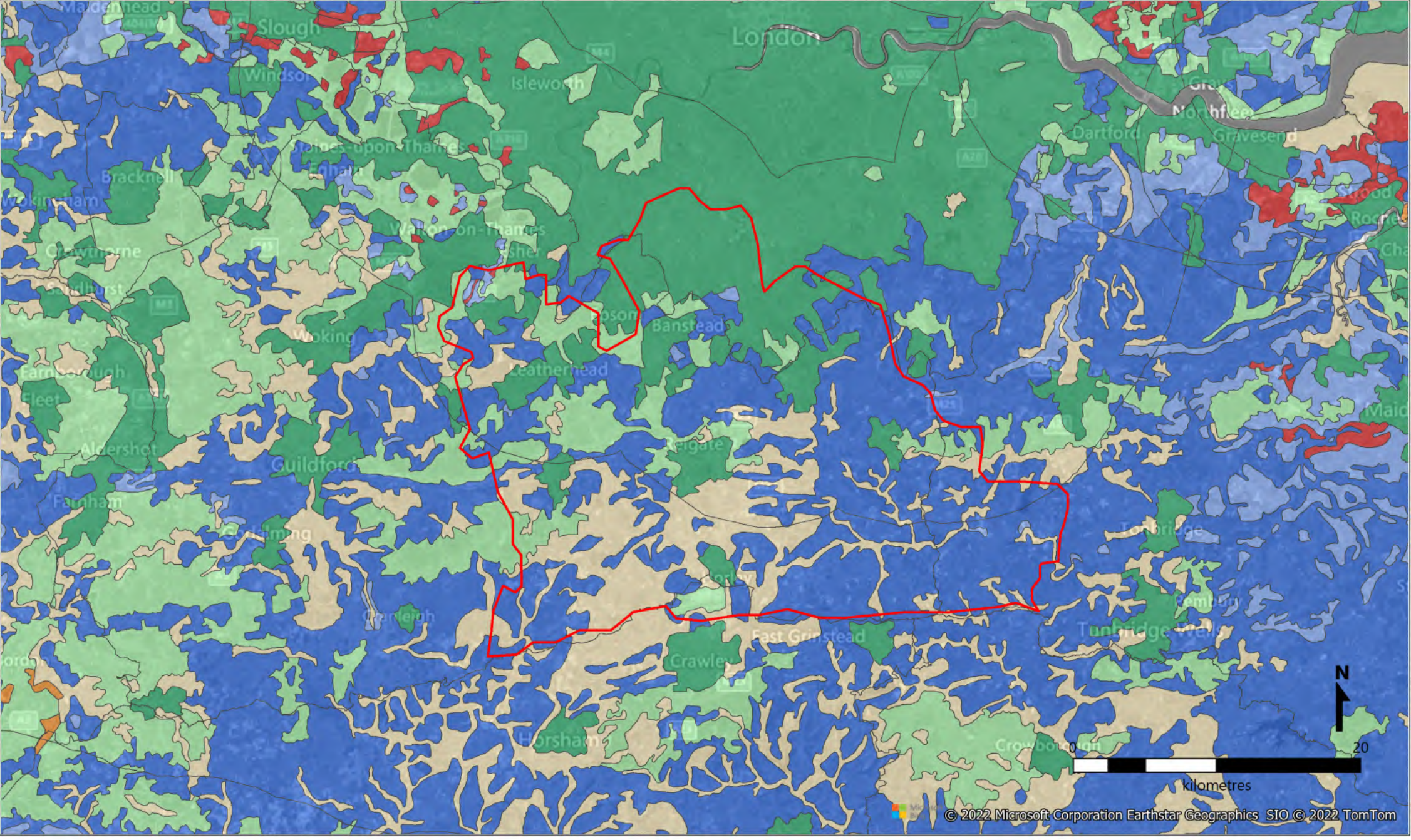
SES Water

Population and Human health Map

SES Plan Area

Greenspace Sites

- Allotments Or Community Growing Spaces
- Bowling Green
- Cemetery
- Golf Course
- Other Sports Facility
- Play Space
- Playing Field
- Public Park Or Garden
- Religious Grounds
- Tennis Court
- National Trails

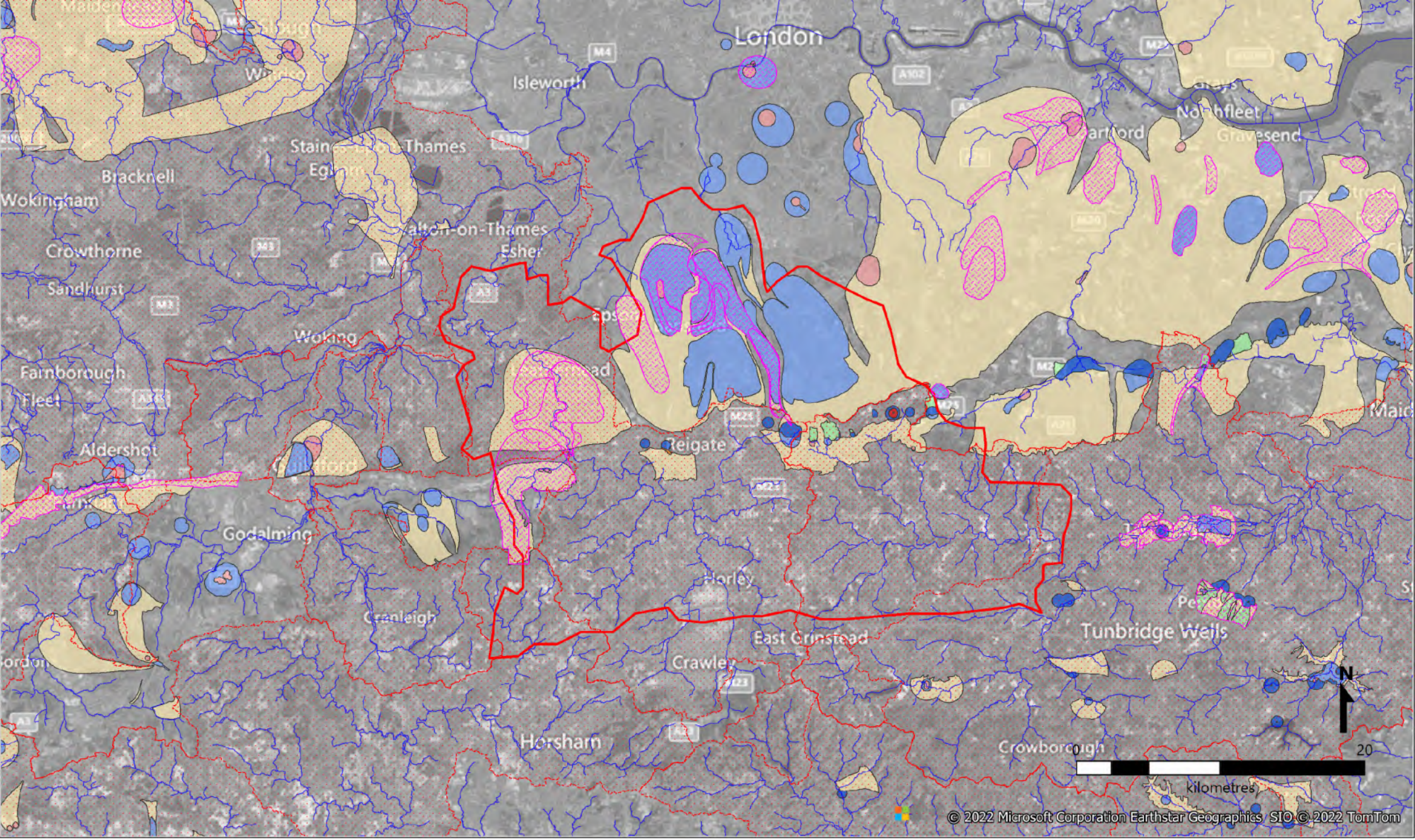


SES Water
Soils Map

SES Plan Area

Agricultural Land Classification

- Exclusion
- Grade 1
- Grade 2
- Grade 3
- Grade 4
- Grade 5
- Non Agricultural
- Urban



SES Water
Water Environment Map

SES Plan Area

Watercourse

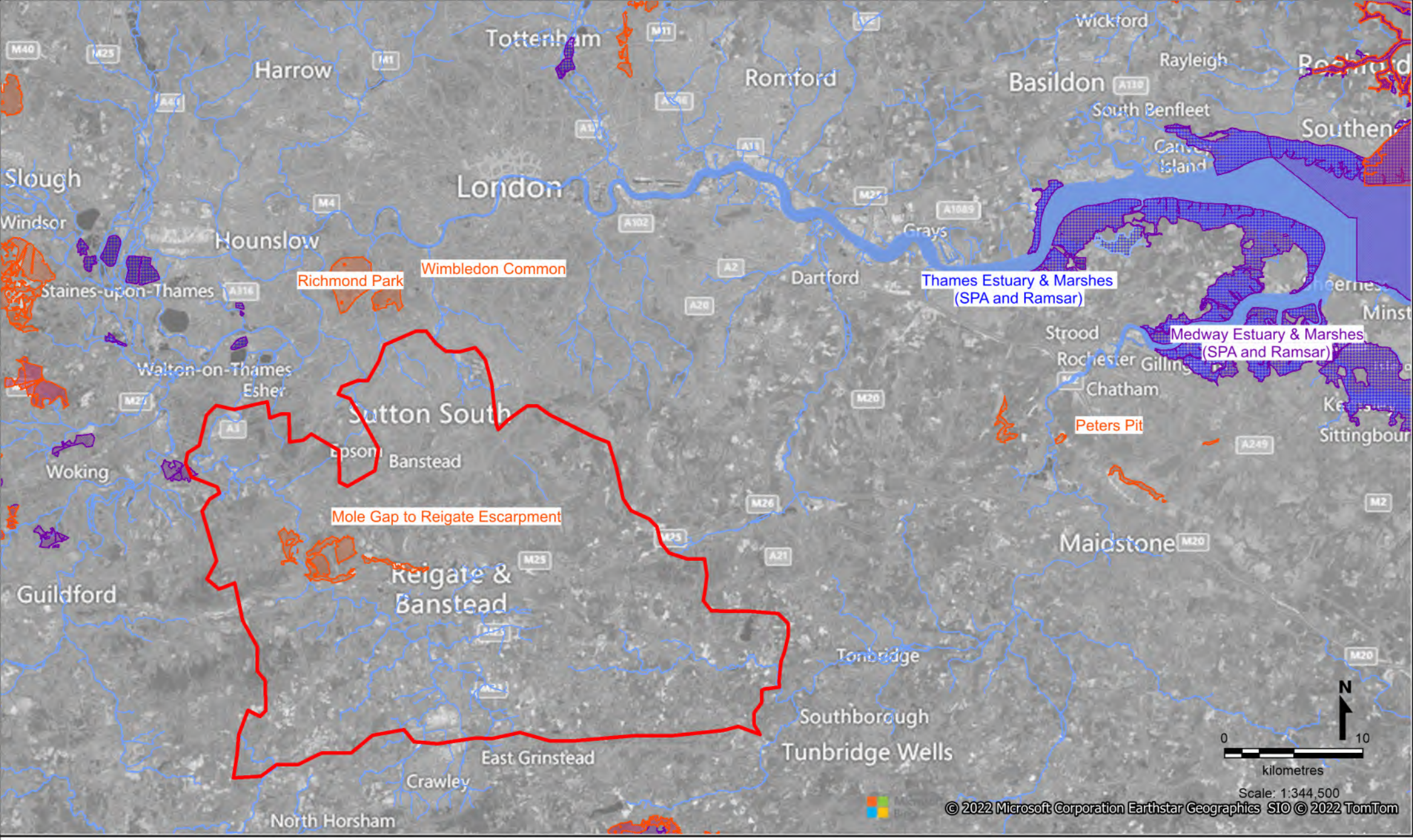
Source Protection Zones

1 2 3 4

1c 2c 3c

Drinking Water Surface Water Safeguard Zone

Drinking Water Safeguard Zones Groundwater



SES Water
Natura 2000 Sites

- SES Water Plan Area
- Special Areas of Conservation
- Special Protection Areas
- Ramsar
- Main Rivers
- Transitional and Coastal Waterbodies

Appendix D. Assessment Tables

D. 1: BVP Preferred Plan Supply Options

D.1.1: Hackbridge drought permit

D.1.2: SES Kenley and Purley drought permit

D.1.3: SES Demand: Gov-led B Hybrid

D.1.4: Demand Basket Medium

D.1.5: Non-Essential Use Ban (NEUB)

D.1.6: Temporary Use Ban (TUB)

D.1.7: Outwood Lane

D.1.8: Raising of Bough Beech reservoir

D. 2: Alternative Plan Supply Options

D.2.7: Outwood Lane drought permit

D.2.8: River Eden May drought permit

D.2.9: River Eden Summer drought permit

D.2.10: Secombe Centre UV

D. 3: SEA Objective Assessment Rationale

D.1: BVP Preferred Plan Supply Options

Table D-1: Hackbridge Drought Permit

Option ID	SES_SES_RE-DRP_REP_ALL_hackbridge-dp	
Option Name	Hackbridge Drought Permit	
Option Description	The Hackbridge licence is complicated due to the recharge component, which determines how much water can be abstracted in the following summer, and the aggregation with Wandle Laundry. It is proposed that the drought option decouples abstraction from the volume recharged and allows abstraction to be maximised (19 Ml/d) regardless of the volume recharged in the preceding winter. On the assumption that typically 250-350 Ml/d is recharged, which permits a 15 Ml/d abstraction in the following summer, this permit would generate 4 Ml/d benefit. A condition of this permit could be a commitment that a minimum volume is recharged in the preceding and following winter, subject to the drought not continuing into a multi-year drought (in which scenario the water may not be available for recharge). The Hackbridge Group licence comprises three sources in the confined Chalk: Hackbridge (two operational boreholes), Goatbridge (one operational borehole) and Bishopsford Road. As a condition of the licence, outflow from Carshalton Ponds (as measured at the Grove on the River Wandle, also referred to as the Carshalton Gauging Station (GS)) has to be maintained at greater than 4.5 Ml/d before abstraction can take place at the Hackbridge Group boreholes along with a number of SES Water's other unconfined Chalk sources. To achieve this, SES Water operates an augmentation scheme whereby river water is drawn from the River Wandle at the Goatbridge intake and pumped back up to Carshalton Ponds. It is also possible to use the water from Goatbridge borehole which normally pumps into supply if required, although this option has never been required. The scheme essentially re-circulates the flow in the upper stretches of the Carshalton branch when the natural spring flow into the Ponds is less than 4.5 l/d. The drought permit could potentially start at any time of the year, although the implementation of it is most likely to begin in during typical hydrological recession months (April to September). Should indicators of future water resource availability within the SES Water supply area return to sufficient levels to provide confidence that water supply can be maintained by normal licensed abstraction, the drought permit would be suspended.	
Embedded Mitigation	SES Water provide alternative supplies for the duration of the impact Cessation rules if water quality parameters fall below pre-agreed levels. Ensure Carshalton augmentation scheme operates as normal for duration of permit Agile mitigation. Options could include fish rescue, aeration devices, flushing flows and creation of refugia through localised modification of bed levels (temporary pools). Identification of need through catchment walkovers Development of a plan for monitoring of fish stress and fish rescue/recovery implementation should it be required	

SEA Topic	SEA Objective	Construction		Operational		Comment	Mitigation	Residual Construction		Residual Operational		
		Positive Effects	Negative Effects	Positive Effects	Negative Effects			Positive Effects	Negative Effects	Positive Effects	Negative Effects	
Climate Factors	To reduce vulnerability of built infrastructure to climate change risks and hazards	N/A	N/A	++	-	The Drought Permit is in itself a response to prolonged dry weather events which are anticipated to be exacerbated by climate change. With the body of evidence and forward planning set out in the EAR and Drought Permit, the implementation of this measure will increase resilience to climate change. Climate change may exacerbate drought conditions within the river and therefore increase pressure on remaining water resources.	None identified	N/A	N/A	++	-	
								Characterisation of effects				
								N/A	N/A	Medium	Medium	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	High	High	**Certainty**
	To reduce or manage flood risk, taking climate change into account	N/A	N/A	0	0	No significant effects anticipated for flood risk.	None identified	N/A	N/A	0	0	

								Characterisation of effects				
								N/A	N/A	Medium	Medium	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	High	High	**Certainty**

Water	To protect and enhance the quantity and quality of surface, groundwater, estuarine, coastal waterbodies and water dependent habitats	**N/A**	**N/A**	**++**	-	The geology of the study area consists of a conformable sequence of gently north dipping Chalk formations (comprising the 'North Downs') overlying the sandstone and mudstone of the Upper Greensand and Gault Formations which outcrop at the foot of the scarp slope to the south. For much of the area, the Chalk outcrops at the surface but towards the north the Chalk is overlain unconformably by the sands, silts and clays of the Thanet Formation, Lambeth Group and London Clay Formation. Much of the bedrock geology is overlain by superficial deposits: Alluvium, Sand and Gravels and River Terrace Deposits typically follow low lying river valleys; 'residual' weathered deposits (e.g. Clay-with-Flints) are typically located in upland areas and valley sides. Additionally, some isolated outliers of bedrock geology occur on the interfluves where they have not been eroded away (e.g. Thanet Formation outlier in the vicinity of Burgh Heath). The Chalk is classified as a Principal aquifer. In the northern portion of the study area the north dipping Chalk is confined by the generally lower permeability Thanet Formation, Lambeth Group and London Clay Formation. The Thanet Formation is a secondary aquifer and is believed to be in hydraulic continuity with both the underlying Chalk aquifer and overlying Upnor Formation (the lowermost unit of the Lambeth Group). To the south, the Chalk aquifer is unconfined. The area is part of the Epsom North Downs Chalk WFD groundwater body. The water body is graded as 'Poor' for both quantitative and chemical components. There are no permanent watercourses across much of the	None identified	**N/A**	**N/A**	**++**	**-**	
								Characterisation of effects				

						unconfined Chalk aquifer, with one river of relevance, River Wandle, primarily traversing across the Tertiary deposits onto the confined portion of the aquifer. For groundwater abstractions, the residual impact of a drought permit could extend beyond the six-month operational period of the drought permit depending on the local hydrogeology of the area and the scale of the abstraction. During drought situations, where there is limited recharge to the aquifer system, the abstraction may mainly be at the expense of groundwater storage in the aquifer. This can, in the long run, delay groundwater level recovery and have a knock-on effect on baseflow contributions to watercourses and water dependent habitats. Consequently, river flows could be reduced for longer than the six-month period during which the drought permit could be implemented and, as such, will be considered in the hydrological/hydrogeological assessment. This Option, as part of the wider Drought Plan will help ensure reliability and resilience of the water supply during extreme or prolonged dry periods.		N/A	N/A	Medium	Medium	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	High	Medium	**Certainty**

Biodiversity	To protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	N/A	N/A	0	-	Wilderness Island Local Nature Reserve is a 2.73 ha site composed of woodland, river pond and meadow. It is bounded by both the Carshalton and Beddington Branches. The likely impact for this designated site is assessed to be Low and therefore the impacts of the drought permit operation will be Minor. Wandle Valley Wetland LNR is a 0.63 ha wetland/wet woodland located adjacent to the Lower branch. Spencer Road Wetlands LNR is a 1.05 ha wetland with mixed wetland vegetation and pond located adjacent to the Wandle branch. The likely impact for these designated sites are assessed to as not impacted and therefore the impacts of the drought permit operation will be Negligible. In relation to priority habitats the Carshalton branch of the River Wandle is identified as priority river habitat due to its naturalness as assessed using local regulatory organisational knowledge. The Priority Species of European eel has been identified in Carshalton, Beddington and Lower Branch with Brown Trout also being identified in Carshalton and Lower Branch. Surveys at the seven sites on the Beddington branch have yielded a total of 10 species. With the exception of brown trout and bullhead, all species recorded are tolerant to environmental disturbance. The likely impact for fish is assessed to be Medium and the impacts of the drought permit operation will be Minor. Surveys at the four sites on the Carshalton branch have yielded a total of nine species. Surveys on the Lower branch have yielded a total of 18 species which is considered likely to reflect the increased size in watercourse, greater depth provision and more varied flow character. With the	None identified	N/A	N/A	0	-	

						exception of brown trout, bullhead and chub, all other species recorded are tolerant to environmental disturbance. The likely impact for fish at Carshalton and Lower Branch are assessed to be Low and therefore the impacts of the drought permit operation will be Minor. The main issue to consider in relation to INNS would be the creation of new pathways for INNS to spread, for example, through a new transfer pipeline. The proposed drought permit does not include the creation of any new pathways through which INNS could spread. It is considered unlikely that the drought permit will increase the risk of spreading INNS. New Zealand mud snail (Potamopyrgus antipodarum), Freshwater amphipod shrimp species (Crangonyx pseudogracilis/floridanus) and Mollusc – bladder snail (Physella acuta) are non-native species established in all three branches. The Drought Permit is not considered to pose a risk of increasing their proliferation within the wider system or at a branch scale. Lesser duckweed, Himalayan balsam, floating pennywort and Nuttall's waterweed distribution is unlikely to be influenced by flow changes arising from Drought Permit operation and whilst ruffe are likely to relocate to downstream habitats, they are not likely to be favoured in term of recruitment potential as a result of the Drought Permit. Goldfish are not considered likely to present an invasive risk due to the very low numbers associated with their unsolicited introduction.		**Characterisation of effects**				
								N/A	N/A	Medium	Medium	**Magnitude**
								N/A	N/A	Regional	Regional	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	High	High	**Certainty**

Soil	To Protect and enhance the functionality, quantity and quality of soils	**N/A**	**N/A**	**0**	**-**	The zone of influence potentially affected by geomorphological change has been determined to extend from both the headwater branches in the south (Carshalton and Beddington) and along the River Wandle to the confluence with the Beddington STW discharge. The STW discharge provides a significant output of flow (approximately 290% during average flows) at which point the Wandle is less likely to be affected from the drought permit. The proposed drought permit action is to decouple the maximum abstraction from the volume recharged in the preceding winter. This will allow an additional 4 Ml/d abstraction over a six-month (180 day) period. However, it is uncertain how this equates to the surface water flows but is likely to result in some reduction even if small. The proposed permit may be in place over a maximum period of six months, potentially pro-longing the period of low flows which would otherwise occur under the existing licensed conditions. This could increase (fine) sediment deposition and/or result in an increased exposure of the bed features (albeit these are limited according to the baseline) during the summer months, allowing vegetation to take hold making the deposits more permanent and therefore less mobile. This may be more pronounced upstream of impoundments where sediment deposition is more likely to be accumulate. Most banks are likely to be modified or fortified in some way and are therefore less vulnerable to instability. The 'likely impact' of the drought permit on the geomorphology of the River Wandle and headwaters is Low impact – the hydrological changes are expected to result in only short-term impacts on sediment dynamics, the river channel and/or the river bank,	None identified	**N/A**	**N/A**	**0**	**-**	
								Characterisation of effects				
								N/A	N/A	Small	Small	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	High	High	**Certainty**

						which are unlikely to lead to significant changes in wetted areas or the integrity of river function. Whilst lower flows may occur for longer periods than normal during drought permit operations, the impacts are likely to be minimal and limited to the Beddington branch headwater. Elsewhere, such as the Carshalton branch and along the River Wandle, the lowest flows are unlikely to be affected by the permit. Flushing flows, important to the overall sediment dynamics, are unlikely to occur in the drought permit period and more likely over the wetter autumn or winter periods.						
Air Quality	To reduce and minimise air and noise emissions	**N/A**	**N/A**	**+**	**-**	The drought permit has the potential to reduce the need for more resource intensive external transfers and abstractions which would result in more significant noise and air quality impacts. With the exception of additional pumping and treatment requirements which may lead to minor adverse effects during operation, no additional impacts anticipated.	None identified	**N/A**	**N/A**	**+**	**-**	
								Characterisation of effects				
								N/A	N/A	Small	Small	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	High	High	**Certainty**
Greenhouse Gas Emissions	To achieve SES target of reducing operational carbon emissions and contribute to national target of Net Zero by 2050	**N/A**	**N/A**	**+**	**--**	Abstracting additional water from Hackbridge will increase operational carbon emissions. While abstractions already take place this option would increase this abstraction thereby introducing additional pumping requirements and operational carbon emission The drought permit has the potential to reduce the need for more resource intensive external transfers and abstractions which would result in greater embodied and operational carbon emissions.	None identified	**N/A**	**N/A**	**+**	**--**	
								Characterisation of effects				
								N/A	N/A	Low	Low	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	Medium	Medium	**Certainty**

Landscape	To conserve, protect and enhance landscape, townscape and seascape character and visual amenity	**N/A**	**N/A**	**0**	**-**	Though they have no environmental designation, the Waddon Ponds are an important feature for recreational use in the area, especially for walkers. A visual eyesore would be created should these ponds dry up which may adversely impact walkers. Whilst this may be a likely situation during an extreme drought, it is not anticipated as an outcome from the drought permit; no discernible impact is predicted on the groundwater levels feeding the pond. However, it is possible that the drought permit may delay recovery to springflow and thereby extend the duration of drought impacts on the pond.	None identified	**N/A**	**N/A**	**0**	**-**	
								Characterisation of effects				
								N/A	N/A	Small	Small	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	High	High	**Certainty**
Cultural Heritage	To conserve, protect and enhance the historic environment and assets, including archaeology	**N/A**	**N/A**	**0**	**0**	There are two scheduled monuments (Dovecote, Beddington Park and Roman Villa E of Beddington Park), no world heritage sites, and a number of listed buildings (grade 1 to 3). Despite this, there are no known heritage sites in the vicinity of the surface water bodies or groundwater abstraction point that may be adversely impacted by the drought permit.	None identified	**N/A**	**N/A**	**0**	**0**	
								Characterisation of effects				
								N/A	N/A	Small	Small	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	High	High	**Certainty**
Population and human health	To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	**N/A**	**N/A**	**++**	**-**	Waddon Ponds are an important feature for recreational use in the area, especially for walkers. A visual eyesore would be created should these ponds dry up which may adversely impact walkers. Whilst this may be a likely situation during an extreme drought, it is not anticipated as an outcome from the drought permit; no discernible impact is predicted on the groundwater levels feeding the pond. However, it is possible that the drought permit may delay recovery to springflow and thereby extend the duration of drought impacts on the pond. The drought permit is anticipated to result in beneficial impacts on	None identified	**N/A**	**N/A**	**++**	**-**	
								Characterisation of effects				
								N/A	N/A	Medium	Medium	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**

						health and wellbeing owing to its capacity to ensure provision of water during periods of drought.		N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	High	High	**Certainty**
	To maintain and enhance tourism and recreation	**N/A**	**N/A**	**0**	**-**	Because utilisation of the new drought permit would occur under severe drought conditions and after other demand management restrictions have been implemented, it is assumed that recreational activities such as angling/boating would have already been adversely affected by natural water drawdown. However, it is possible that the drought permit may delay recovery to springflow and prolong consequent adverse effects on water based recreation.	None identified	**N/A**	**N/A**	**0**	**-**	
								Characterisation of effects				
								N/A	N/A	Medium	Medium	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	High	High	**Certainty**
Material assets	To minimise resource use and waste production	**N/A**	**N/A**	**++**	**0**	The drought permit has the potential to reduce the need for more resource intensive external transfers and abstractions.	None identified	**N/A**	**N/A**	**++**	**0**	
								Characterisation of effects				
								N/A	N/A	Medium	Medium	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	Medium	Medium	**Certainty**
	To avoid negative effects on built assets / infrastructure	**N/A**	**N/A**	**+**	**0**	Should the drought permit act to alleviate demand restrictions which have the potential to impact on built assets and infrastructure (by enforcing cleaning and maintenance restrictions), beneficial effects are anticipated.	None identified	**N/A**	**N/A**	**+**	**0**	
								Characterisation of effects				
								N/A	N/A	Small	Small	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	Low	Low	**Certainty**

Table D-2: Kenley and Purley Drought Permit

Option ID	SES_SES_RE-DRP_REP_ALL_ken-pur-dp										
Option Name	Kenley and Purley Drought Permit										
Option Description	Kenley and Purley are licence constrained at MDO (22.79 Ml/d). The PDO (41.28 Ml/d) which is almost double that of the MDO, is constrained by pump capacity. Therefore, there is the potential for a drought option to increase the annual average licence such that the PDO could be sustained, generating up to 18.5 Ml/d. The capacity at the WTW and pump capacity limits the potential to increase PDO further. Previous drought plans also included a drought option at Kenley and Purley. The option sought to increase the annual licence to allow the pumping at the then PDO rate of 24.9 Ml/d. The PDO has now significantly changed; in WRMP19 the PDO increased from 24.9 Ml/d to 41.28 Ml/d and has since been confirmed in WRMP24. There is therefore the potential for a larger drought option at Kenley and Purley than previously identified. However, this is not currently believed to be required. Whilst the results of the current round of water resource modelling are not yet available to clearly demonstrate this, initial modelling does not indicate larger deficits would be encountered than in previous plans. Therefore, it is assumed the volume of water provided by the previous drought permit/orders (9 Ml/d) remains sufficient, and consequently no adjustment to Kenley and Purley option is required. The drought permit could potentially start at any time of the year, although the implementation of it is most likely to begin in during typical hydrological recession months (April to September). Should indicators of future water resource availability within the SES Water supply area return to sufficient levels to provide confidence that water supply can be maintained by normal licensed abstraction, the drought permit would be suspended.										
Embedded Mitigation	SES Water provide alternative supplies for the duration of the impact Flow level monitoring during droughts and fluvial audit to improve assessment confidence for geomorphology Monitoring of OP, total ammonia, DO and parameters causing WFD failures (in respective waterbodies) before, during and after the drought permit is in operation. Data collected should be routinely reviewed by a water quality expert and triggers which indicate the need for further action should be agreed. Monitoring of surface water flows before, during and after the drought permit is in operation Development of a plan for monitoring of fish stress and fish rescue/recovery implementation should it be required. Agile mitigation. Options could include fish rescue, aeration devices, flushing flows and creation of refugia through localised modification of bed levels (temporary pools) Ensure Carshalton augmentation flow is maintained. Cessation rules if water quality parameters fall below pre-agreed levels										

SEA Topic	**SEA Objective**	**Construction**		**Operational**		**Comment**	**Mitigation**	**Residual Construction**		**Residual Operational**		
		Positive Effects	Negative Effects	Positive Effects	Negative Effects			Positive Effects	Negative Effects	Positive Effects	Negative Effects	
Climate Factors	To reduce vulnerability of built infrastructure to climate change risks and hazards	**N/A**	**N/A**	**++**	**-**	The Drought Permit is in itself a response to prolonged dry weather events which are anticipated to be exacerbated by climate change. With the body of evidence and forward planning set out in the EAR and Drought Permit, the implementation of this measure will increase resilience to climate change. Climate change may exacerbate drought conditions within the river and therefore increase pressure on remaining water resources.	None identified	**N/A**	**N/A**	**++**	**-**	
								Characterisation of effects				
								N/A	N/A	Medium	Medium	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	High	High	**Certainty**
	To reduce or manage flood risk, taking climate change into account	**N/A**	**N/A**	**0**	**0**	No significant effects anticipated for flood risk.	None identified	**N/A**	**N/A**	**0**	**0**	
								Characterisation of effects				

								N/A	N/A	Medium	Medium	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	High	High	**Certainty**

Water	To protect and enhance the quantity and quality of surface, groundwater, estuarine, coastal waterbodies and water dependent habitats	N/A	N/A	++	--	The area is part of the Epsom North Downs Chalk WFD groundwater body. The water body is graded as 'Poor' for both quantitative and chemical components. The drought permit would result in an increase in the annual licence limit to support a 2.1 Ml/d increase in groundwater abstraction for a maximum duration of six months. While groundwater levels could typically take between one to three months to recover within normal ranges following a drought the drought permit is not expected to affect the status of the groundwater body. Given the aquifer properties of the area, the additional impacts arising from the drought permit are unlikely to significantly prolong the recovery to normal conditions. There are no permanent watercourses across much of the unconfined Chalk aquifer. The EAR defines three reaches as relevant to hydrological impact assessment: • The Beddington Branch • The Carshalton Branch • Lower Branch (River Wandle from confluence between Beddington and Carshalton branches to the Beddington STW). And two WFD surface waterbodies in the refined study area: • Wandle (Carshalton branch at Carshalton) • Wandle (Croydon to Wandsworth) and the Graveney The Environment Agency has classified the overall status of the Wandle (Carshalton branch at Carshalton) WFD waterbody as 'Bad'. Of note a 'Fail' Chemical status is driven by a failure of PBDE. Excluding the Carshalton branch, the River Wandle is graded as moderate for both	None identified	N/A	N/A	++	--	**Characterisation of effects**	
								N/A	N/A	Medium	Medium	**Magnitude**

						ecological and chemical components. The Caterham Bourne is an ephemeral stream that flows, on average, once every seven years. The EAR notes it is reasonable to assume that during drought conditions, as well as most normal conditions, there would be no flow in the stream. The EAR notes in summary that the drought permit may create an interference drawdown with SES and Thames Water groundwater sources however it is not anticipated that there will be any discernible drawdown in other neighbouring dry valleys or beneath the headwaters of the River Wandle. For further information see the Kenley and Purley Drought Permit EAR. This Option, as part of the wider Drought Plan will help ensure reliability and resilience of the water supply during extreme or prolonged dry periods.		N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	Low	Low	**Certainty**

Biodiversity	To protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	N/A	N/A	0	-	During drought situations, where there is limited recharge to the aquifer system, the abstraction may mainly be at the expense of groundwater storage in the aquifer. This can, in the long run, delay groundwater level recovery and have a knock-on effect on baseflow contributions to watercourses and water dependent habitats. Wilderness Island Local Nature Reserve is a 2.73 ha site composed of woodland, river pond and meadow. It is bounded by both the Carshalton and Beddington Branches. The likely impact for this designated site is assessed to be Low and therefore the impacts of the drought permit operation will be Minor. Wandle Valley Wetland LNR is a 0.63 ha wetland/wet woodland located adjacent to the Lower branch. Spencer Road Wetlands LNR is a 1.05 ha wetland with mixed wetland vegetation and pond located adjacent to the Wandle branch. It has been assessed that there will be no impacts for these designated sites and therefore the impacts of the drought permit operation will be Negligible. In relation to priority habitats the Carshalton branch of the River Wandle is identified as priority river habitat due to its naturalness as assessed using local regulatory organisational knowledge. The Priority Species of European eel has been identified in Carshalton, Beddington and Lower Branch with Brown Trout also being identified in Carshalton and Lower Branch. Surveys at the seven sites on the Beddington branch have yielded a total of 10 species. With the exception of brown trout and bullhead, all species recorded are tolerant to environmental disturbance. The likely impact for fish is assessed to be Medium	None identified	N/A	N/A	0	-	

						and the impacts of the drought permit operation will be Minor. Surveys at the four sites on the Carshalton branch have yielded a total of nine species. Surveys on the Lower branch have yielded a total of 18 species which is considered likely to reflect the increased size in watercourse, greater depth provision and more varied flow character. With the exception of brown trout, bullhead and chub, all other species recorded are tolerant to environmental disturbance. The likely impacts for fish at Carshalton and Lower Branch are assessed to be Low and therefore the impacts of the drought permit operation will be Minor. The main issue to consider in relation to INNS would be the creation of new pathways for INNS to spread, for example, through a new transfer pipeline. The proposed drought permit does not include the creation of any new pathways through which INNS could spread. It is considered unlikely that the drought permit will increase the risk of spreading INNS. New Zealand mud snail (Potamopyrgus antipodarum), Freshwater amphipod shrimp species (Crangonyx pseudogracilis/floridanus) and Mollusc – bladder snail (Physella acuta) are non-native species established in all three branches. The drought permit is not considered to pose a risk of increasing their proliferation within the wider system or at a branch scale. Lesser duckweed, Himalayan balsam, floating pennywort and Nuttall's waterweed distribution is unlikely to be influenced by flow changes arising from drought permit operation and whilst ruffe are likely to relocate to downstream habitats, they are not likely to be favoured in term of recruitment potential as a result of		**Characterisation of effects**				
								N/A	N/A	Medium	Medium	**Magnitude**
								N/A	N/A	Regional	Regional	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	High	High	**Certainty**

						the drought permit. Goldfish are not considered likely to present an invasive risk due to the very low numbers associated with their unsolicited introduction.						
Soil	To Protect and enhance the functionality, quantity and quality of soils	N/A	N/A	0	-	The zone of influence, potentially affected by geomorphological change, has been determined to extend from both the headwater branches in the south (Carshalton and Beddington) and along the River Wandle to the confluence with the Beddington STW discharge. The STW discharge provides a significant output of flow (approximately 290% during average flows) at which point the Wandle is less likely to be affected from the drought permit. The proposed drought permit action is to abstract a further 2.1 Ml/d above the existing license from the Kenley and Purley boreholes, resulting in an additional groundwater drawdown in the Chalk aquifer and therefore potentially affecting (reducing) flows in the River Wandle headwaters. This would occur during a drought for the maximum duration of six months (180 days). 2.1 Ml/d equates to a 9% increase n MDO from the Kenley-Purley group. However, it is uncertain how this equates to the surface water flows but is likely to result in some reduction even if small. The proposed permit may be in place over a maximum period of six months, potentially pro-longing the period of low flows which would otherwise occur under the existing licensed conditions. This could increase (fine) sediment deposition and/or result in an increased exposure of the bed features (albeit these are limited according to the baseline) during the summer months, allowing vegetation to take hold making the deposits more permanent and therefore less mobile. This may be more pronounced upstream of	None identified	**N/A**	**N/A**	**0**	**-**	
								Characterisation of effects				
								N/A	N/A	Medium	Medium	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	High	High	**Certainty**

						impoundments where sediment deposition is more likely to be accumulate. Most banks are likely to be modified or fortified in some way and are therefore less vulnerable to instability. The 'likely impact' of the drought permit on the geomorphology of the River Wandle and headwaters is Low impact – the hydrological changes are expected to result in only short-term impacts on sediment dynamics, the river channel and/or the river bank, which are unlikely to lead to significant changes in wetted areas or the integrity of river function. Whilst lower flows may occur for longer periods than normal during drought permit operations, the impacts are likely to be minimal and limited to the Beddington branch headwater. Elsewhere, such as the Carshalton branch and along the River Wandle, the lowest flows are unlikely to be affected by the permit. Flushing flows, important to the overall sediment dynamics, are unlikely to occur in the drought permit period and more likely over the wetter autumn or winter periods.					
Air Quality	To reduce and minimise air and noise emissions	**N/A**	**N/A**	**+**	**-**	The drought permit has the potential to reduce the need for more resource intensive external transfers and abstractions which would result in more significant noise and air quality impacts. With the exception of additional pumping and treatment requirements which may lead to minor adverse effects during operation, no additional impacts anticipated.	None identified	**N/A**	**N/A**	**+**	**-**	
								Characterisation of effects				
								N/A	N/A	Small	Small	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	High	High	**Certainty**
Greenhouse Gas Emissions	To achieve SES target of reducing operational carbon emissions and contribute to national	**N/A**	**N/A**	**+**	**--**	There would be an increase in pumping requirements and operational carbon emissions associated with the increase in abstraction.	None identified	**N/A**	**N/A**	**+**	**--**	

	target of Net Zero by 2050					The Drought Permit has the potential to reduce the need for more resource intensive external transfers and abstractions which would result in greater embodied and operational carbon emissions.		**Characterisation of effects**				
								N/A	N/A	Low	Low	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	Medium	Medium	**Certainty**
Landscape	To conserve, protect and enhance landscape, townscape and seascape character and visual amenity	**N/A**	**N/A**	**0**	**-**	Though they have no environmental designation, the Waddon Ponds are an important feature for recreational use in the area, especially for walkers. A visual eyesore would be created should these ponds dry up which may adversely impact walkers. Whilst this may be a likely situation during an extreme drought, it is not anticipated as an outcome from the drought permit; no discernible impact is predicted on the groundwater levels feeding the pond. However, it is possible that the drought permit may delay recovery to springflow and thereby extend the duration of drought impacts on the pond.	None identified	**N/A**	**N/A**	**0**	**-**	
								Characterisation of effects				
								N/A	N/A	Small	Small	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	High	High	**Certainty**
Cultural Heritage	To conserve, protect and enhance the historic environment and assets, including archaeology	**N/A**	**N/A**	**0**	**0**	There are two scheduled monuments (Dovecote, Beddington Park and Roman Villa E of Beddington Park), no world heritage sites, and a number of listed buildings (grade 1 to 3). Despite this, there are no known heritage sites in the vicinity of the surface water bodies or groundwater abstraction point that may be adversely impacted by the drought permit.	None identified	**N/A**	**N/A**	**0**	**0**	
								Characterisation of effects				
								N/A	N/A	Small	Small	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	High	High	**Certainty**

Population and human health	To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	N/A	N/A	++	-	Waddon Ponds are an important feature for recreational use in the area, especially for walkers. A visual eyesore would be created should these ponds dry up which may adversely impact walkers. Whilst this may be a likely situation during an extreme drought, it is not anticipated as an outcome from the drought permit; no discernible impact is predicted on the groundwater levels feeding the pond. However, it is possible that the drought permit may delay recovery to springflow and thereby extend the duration of drought impacts on the pond. The drought permit is anticipated to result in beneficial impacts on health and wellbeing owing to its capacity to ensure provision of drinking water during periods of drought.	None identified	**N/A**	**N/A**	**++**	**-**	
								Characterisation of effects				
								N/A	N/A	Medium	Medium	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	High	High	**Certainty**
	To maintain and enhance tourism and recreation	N/A	N/A	0	-	Because utilisation of the new drought permit would occur under severe drought conditions and after other demand management restrictions have been implemented, it is assumed that recreational activities such as angling/boating would have already been adversely affected by natural water drawdown. However, it is possible that the drought permit may delay recovery to springflow and prolong consequent adverse effects on water based recreation.	None identified	**N/A**	**N/A**	**0**	**-**	N/A
								Characterisation of effects				
								N/A	N/A	Medium	Medium	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	High	High	**Certainty**
Material assets	To minimise resource use and waste production	N/A	N/A	++	0	The drought permit has the potential to reduce the need for more resource intensive external transfers and abstractions.	None identified	**N/A**	**N/A**	**++**	**0**	
								Characterisation of effects				
								N/A	N/A	Medium	Medium	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	Medium	Medium	**Certainty**

	To avoid negative effects on built assets / infrastructure	N/A	N/A	+	0	Should the drought permit act to alleviate demand restrictions which have the potential to impact on built assets and infrastructure (by enforcing cleaning and maintenance restrictions), beneficial effects are anticipated.	None identified	**N/A**	**N/A**	**+**	**0**	
								Characterisation of effects				
								N/A	N/A	Small	Small	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	Low	Low	**Certainty**

Table D-3: Company Demand: Gov-led B Hybrid

Option ID	Not identified										
Option Name	Company Demand: Gov-led B Hybrid										
Option Description	Involves the water efficient labelling that has already been announced by DEFRA, the potential for minimum standards in water using goods, plus enhanced support on new developments that could be introduced in the future to support national targets. Of note, water efficient labelling systems (WELS) were identified in the Water UK 'Pathways to Long-Term PCC Reduction' report as the most significant and cost beneficial approach to demand management.										
Embedded Mitigation	None Identified										
SEA Topic	**SEA Objective**	**Construction**		**Operational**		**Comment**	**Mitigation**	**Residual Construction**		**Residual Operational**	
		Positive Effects	Negative Effects	Positive Effects	Negative Effects			Positive Effects	Negative Effects	Positive Effects	Negative Effects
Climate Factors	To reduce vulnerability of built infrastructure to climate change risks and hazards	**N/A**	**N/A**	**+**	**0**	Positive effects upon operation due to the more efficient use of water and water being kept within the environment.	None identified	**N/A**	**N/A**	**+**	**0**
								Characterisation of effects			
								N/A	N/A	Small	Small
								N/A	N/A	Regional	Regional
								N/A	N/A	Long term	Long term
								N/A	N/A	Permanent	Permanent
								N/A	N/A	Medium	Medium
	To reduce or manage flood risk, taking climate change into account	**N/A**	**N/A**	**0**	**0**	Strategy is not expected to increase flood risk.	None identified	**N/A**	**N/A**	**0**	**0**
								Characterisation of effects			
								N/A	N/A	Small	Small
								N/A	N/A	Regional	Regional
								N/A	N/A	Long term	Long term
								N/A	N/A	Permanent	Permanent
								N/A	N/A	Medium	Medium
Water	To protect and enhance the quantity and quality of surface, groundwater, estuarine, coastal waterbodies and water dependent habitats	**N/A**	**N/A**	**++**	**0**	Moderate positive effects upon operation due to water being kept within the environment, the protection of water resources, reduced pressures on water supplies and improved efficiency.	None identified	**N/A**	**N/A**	**++**	**0**
								Characterisation of effects			
								N/A	N/A	Small	Small
								N/A	N/A	Regional	Regional
								N/A	N/A	Long term	Long term

								N/A	N/A	Permanent	Permanent	**Permanence**
								N/A	N/A	Medium	Medium	**Certainty**
Biodiversity	To protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	**N/A**	**N/A**	**+**	**0**	Minor positive effects upon operation water being kept within the environment. reduced resource pressures, protection of water resources which may increase availability for water dependant habitat and species.	None identified	**N/A**	**N/A**	**+**	**0**	
								Characterisation of effects				
								N/A	N/A	Medium	Small	**Magnitude**
								N/A	N/A	Regional	Regional	**Scale**
								N/A	N/A	Long term	Long term	**Duration**
								N/A	N/A	Permanent	Permanent	**Permanence**
								N/A	N/A	Medium	Medium	**Certainty**
Soil	To Protect and enhance the functionality, quantity and quality of soils	**N/A**	**N/A**	**0**	**0**	Strategy is not expected to affect soils.	None identified	**N/A**	**N/A**	**0**	**0**	
								Characterisation of effects				
								N/A	N/A	Small	Small	**Magnitude**
								N/A	N/A	Regional	Regional	**Scale**
								N/A	N/A	Long term	Long term	**Duration**
								N/A	N/A	Permanent	Permanent	**Permanence**
								N/A	N/A	Medium	Medium	**Certainty**
Air Quality	To reduce and minimise air and noise emissions	**N/A**	**N/A**	**+**	**0**	Where water demand is reduced there may be some positive effects from a reduction in air and noise emissions associated with water supply/treatment; however, this is not anticipated to be significant.	None identified	**N/A**	**N/A**	**+**	**0**	
								Characterisation of effects				
								N/A	N/A	Small	Small	**Magnitude**
								N/A	N/A	Regional	Regional	**Scale**
								N/A	N/A	Long term	Long term	**Duration**
								N/A	N/A	Permanent	Permanent	**Permanence**
								N/A	N/A	Medium	Medium	**Certainty**
Greenhouse Gas Emissions	To achieve SES target of reducing operational carbon emissions and contribute to national target of Net Zero by 2050	**N/A**	**N/A**	**+**	**0**	Reduced operational carbon linked with reduced water demand and more efficient use.	None identified	**N/A**	**N/A**	**+**	**0**	
								Characterisation of effects				

							N/A	N/A	Small	Small	**Magnitude**	
							N/A	N/A	Regional	Regional	**Scale**	
							N/A	N/A	Long term	Long term	**Duration**	
							N/A	N/A	Permanent	Permanent	**Permanence**	
							N/A	N/A	Medium	Medium	**Certainty**	
Landscape	To conserve, protect and enhance landscape, townscape and seascape character and visual amenity	**N/A**	**N/A**	**0**	**0**	Strategy is not expected to affect landscape.	None identified	**N/A**	**N/A**	**0**	**0**	
								Characterisation of effects				
								N/A	N/A	Small	Small	**Magnitude**
								N/A	N/A	Regional	Regional	**Scale**
								N/A	N/A	Long term	Long term	**Duration**
								N/A	N/A	Permanent	Permanent	**Permanence**
								N/A	N/A	Medium	Medium	**Certainty**
Cultural Heritage	To conserve, protect and enhance the historic environment and assets, including archaeology	**N/A**	**N/A**	**0**	**0**	Strategy is not expected to affect cultural heritage.	None identified	**N/A**	**N/A**	**0**	**0**	
								Characterisation of effects				
								N/A	N/A	Small	Small	**Magnitude**
								N/A	N/A	Regional	Regional	**Scale**
								N/A	N/A	Long term	Long term	**Duration**
								N/A	N/A	Permanent	Permanent	**Permanence**
								N/A	N/A	Medium	Medium	**Certainty**
Population and human health	To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	**N/A**	**N/A**	**+**	**0**	Positive operational effects identified for increasing awareness through labelling anticipated to result in improved health and wellbeing where the measures reduce need for more disruptive action.	None identified	**N/A**	**N/A**	**+**	**0**	
								Characterisation of effects				
								N/A	N/A	Small	Small	**Magnitude**
								N/A	N/A	Regional	Regional	**Scale**
								N/A	N/A	Long term	Long term	**Duration**
								N/A	N/A	Permanent	Permanent	**Permanence**
								N/A	N/A	Medium	Medium	**Certainty**
	To maintain and enhance tourism and recreation	**N/A**	**N/A**	**0**	**0**	No effects identified.	None identified	**N/A**	**N/A**	**0**	**0**	
								Characterisation of effects				
								N/A	N/A	Small	Small	**Magnitude**

								N/A	N/A	Regional	Regional	**Scale**
								N/A	N/A	Long term	Long term	**Duration**
								N/A	N/A	Permanent	Permanent	**Permanence**
								N/A	N/A	Medium	Medium	**Certainty**
Material assets	To minimise resource use and waste production	**N/A**	**N/A**	**+**	**0**	Operational benefits associated with increased awareness through labelling which acts to minimise resource use and waste production	None identified.	**N/A**	**N/A**	**+**	**0**	
								Characterisation of effects				
								N/A	N/A	Small	Small	**Magnitude**
								N/A	N/A	Regional	Regional	**Scale**
								N/A	N/A	Long term	Long term	**Duration**
								N/A	N/A	Permanent	Permanent	**Permanence**
								N/A	N/A	Medium	Medium	**Certainty**
	To avoid negative effects on built assets / infrastructure	**N/A**	**N/A**	**0**	**0**	No effects identified.	None identified	**N/A**	**N/A**	**0**	**0**	
								Characterisation of effects				
								N/A	N/A	Small	Small	**Magnitude**
								N/A	N/A	Regional	Regional	**Scale**
								N/A	N/A	Long term	Long term	**Duration**
								N/A	N/A	Permanent	Permanent	**Permanence**
								N/A	N/A	Medium	Medium	**Certainty**

Table D-4: Demand Basket Medium

Option ID	Not identified	
Option Name	Demand Basket Medium	
Option Description	Compulsory metering – Household AMI / Smart metering	

		Enhanced metering – Household Optant metering Water use audit and inspection – Household and non-household water efficiency Awareness campaigns – Targeted water conservation information (advice on appliance water usage) Promotion of water saving devices – Retrofitting (new or subsidised) Reduction in other consumption Leakage reduction - trunk mains and service reservoir leakage reduction Leakage reduction - Pressure reduction programmes Customer supply pipe leakage reduction (non-metering options) Leakage reduction - Customer engagement / education / incentives Leakage reduction - Active Leakage Control									
Embedded Mitigation		None identified										
SEA Topic	**SEA Objective**	**Construction**		**Operational**		**Comment**	**Mitigation**	**Residual Construction**		**Residual Operational**		
		Positive Effects	Negative Effects	Positive Effects	Negative Effects			Positive Effects	Negative Effects	Positive Effects	Negative Effects	
Climate Factors	To reduce vulnerability of built infrastructure to climate change risks and hazards	0	-	+	0	Positive effects upon operation due to awareness campaigns, retrofitting and leakage reduction works resulting in water being kept within the environment. Minor adverse construction effects associated with repair works.	None identified	0	-	+	0	
								Characterisation of effects				
								Small	Small	Small	Small	**Magnitude**
								Local	Local	Local	Local	**Scale**
								Short term	Short term	Long term	Long term	**Duration**
								Temporary	Temporary	Permanent	Permanent	**Permanence**
								Medium	Medium	Medium	Medium	**Certainty**
	To reduce or manage flood risk, taking climate change into account	0	0	+	0	Specific locations are unknown, however the strategy is not expected to increase flood risk. Additionally, there may be minor beneficial effects with respect to reduced flood risk where network improvements reduce bust/leaks.	Measures to reduce the impact on flooding during the construction phase (leakage reduction works) should still be implemented.	0	0	+	0	
								Characterisation of effects				
								Small	Small	Small	Small	**Magnitude**
								Local	Local	Local	Local	**Scale**
								Short term	Short term	Long term	Long term	**Duration**
								Temporary	Temporary	Permanent	Permanent	**Permanence**
								Medium	Medium	Medium	Medium	**Certainty**
Water	To protect and enhance the quantity and quality of surface, groundwater, estuarine, coastal waterbodies and water dependent habitats	0	-	+++	0	Specific locations are unknown, however there is potential for minor adverse effects on the quality of water resources during construction (leakage reduction works). Major positive effects	None identified	0	-	+++	0	
								Characterisation of effects				

						upon operation due to awareness campaigns, retrofitting, metering and leakage reduction works resulting in water being kept within the environment, the protection of water resources, reduced pressures on water supplies and improved efficiency.		Small	Small	Medium	Medium	**Magnitude**
								Local	Local	Local	Local	**Scale**
								Short term	Short term	Long term	Long term	**Duration**
								Temporary	Temporary	Permanent	Permanent	**Permanence**
								Medium	Medium	Medium	Medium	**Certainty**
Biodiversity	To protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	**0**	**-**	**++**	**0**	Specific locations are unknown, however there is potential for minor adverse effects during construction (leakage reduction works) on biodiversity and priority habitats. Moderate positive effects upon operation due to awareness campaigns, retrofitting, metering and leakage reduction works resulting in water being kept within the environment. reduced resource pressures, protection of water resources and increasing availability for water dependant habitat and species.	Ensure best practicable means to prevent loss of habitat during construction. Use of access shafts (or similar) for leakage works would be used to avoid ecologically sensitive locations.	**0**	**-**	**++**	**0**		
								Characterisation of effects					
								Small	Small	Medium	Medium	**Magnitude**
								Local	Local	Local	Local	**Scale**
								Short term	Short term	Long term	Long term	**Duration**
								Temporary	Temporary	Permanent	Permanent	**Permanence**
								Medium	Medium	Medium	Medium	**Certainty**
Soil	To Protect and enhance the functionality, quantity and quality of soils	**0**	**0**	**0**	**0**	There is potential to disturb contaminated material during construction (leakage reduction works) due to digging. However, as works are on land which has previously been disturbed, the effect is negligible.	Land reinstated upon completion of leakage works. Best practice construction measures to be implemented.	**0**	**0**	**0**	**0**		
								Characterisation of effects					
								Small	Small	Small	Small	**Magnitude**
								Local	Local	Local	Local	**Scale**
								Short term	Short term	Long term	Long term	**Duration**
								Temporary	Temporary	Permanent	Permanent	**Permanence**
								Medium	Medium	Medium	Medium	**Certainty**
Air Quality	To reduce and minimise air and noise emissions	**0**	**-**	**+**	**0**	Specific locations are unknown, however construction (leakage reduction works) is likely to have minor and temporary adverse impacts. Minor adverse impacts on air and noise emissions may be associated with the use of vans for retrofitting, home visits and meter installation. There may be some positive effects from a reduction in air and noise emissions associated with water supply/treatment; however, this is not anticipated to be significant.	Best practice mitigation measures implemented during construction. Consider use of electric vehicles to complete retrofitting, home visits and meter instillation.	**0**	**-**	**+**	**0**		
								Characterisation of effects					
								Small	Small	Small	Small	**Magnitude**
								Local	Local	Local	Local	**Scale**
								Short term	Short term	Long term	Long term	**Duration**
								Temporary	Temporary	Permanent	Permanent	**Permanence**
								Medium	Medium	Medium	Medium	**Certainty**

Greenhouse Gas Emissions	To achieve SES target of reducing operational carbon emissions and contribute to national target of Net Zero by 2050	0	-	+	0	Carbon will be generated from materials used to manufacture infrastructure associated with retrofitting and meters (embodied carbon) and construction (leakage reduction works) activities. Carbon savings will result through the installation of more efficient infrastructure. Reduced operational carbon linked with reduced need for water and reduced leakage owing to more efficient use and reduced loss of treated water. Minor adverse construction effects associated with repair works.	Investigate use of renewables during construction.	0	-	+	0	
								Characterisation of effects				
								Small	Small	Small	Small	**Magnitude**
								Local	Local	Local	Local	**Scale**
								Short term	Short term	Long term	Long term	**Duration**
								Temporary	Temporary	Permanent	Permanent	**Permanence**
								Medium	Medium	Medium	Medium	**Certainty**
Landscape	To conserve, protect and enhance landscape, townscape and seascape character and visual amenity	0	-	+	0	Specific locations are unknown, however there is potential for minor negative effects on landscape during construction (leakage reduction works. Minor positive effects upon operation due to water efficient sub-categories and leakage works resulting in water being kept within the environment.	Best practice measures will likely be implemented to minimise effects during construction (leakage reduction works), however minor and temporary impacts may remain.	0	-	+	0	
								Characterisation of effects				
								Small	Small	Small	Small	**Magnitude**
								Local	Local	Local	Local	**Scale**
								Short term	Short term	Long term	Long term	**Duration**
								Temporary	Temporary	Permanent	Permanent	**Permanence**
								Medium	Medium	Medium	Medium	**Certainty**
Cultural Heritage	To conserve, protect and enhance the historic environment and assets, including archaeology	0	-	0	0	Specific locations are unknown, however there is potential for negative effects on the historic environment during construction (leakage reduction works). Potential for discovery of previously unknown heritage features.	Best practice measures will likely be implemented to minimise effects during construction (leakage reduction works), however minor and temporary impacts may remain.	0	-	0	0	
								Characterisation of effects				
								Small	Small	Small	Small	**Magnitude**
								Local	Local	Local	Local	**Scale**
								Short term	Short term	Long term	Long term	**Duration**
								Temporary	Temporary	Permanent	Permanent	**Permanence**
								Medium	Medium	Medium	Medium	**Certainty**
Population and human health	To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	0	-	+	0	Specific locations are unknown, however there is potential for negative effects on the health and wellbeing of community during construction (leakage reduction works) which give rise to disturbance (noise, vibration, air quality). Retrofitting may cause disruption however this will have neutral effects. Positive operational effects identified for	Best practice mitigation measures e.g. noise management to be implemented to minimise effects during construction (leakage reduction works). However, minor and temporary effects are likely to still occur.	0	-	+	0	
								Characterisation of effects				
								Small	Small	Small	Small	**Magnitude**
								Local	Local	Local	Local	**Scale**

						increasing awareness through retrofitting, metering and campaigns. Increased awareness and action to conserve water anticipated to result in improved health and wellbeing where the measures reduce need for more disruptive action.		Short term	Short term	Long term	Long term	**Duration**
								Temporary	Temporary	Permanent	Permanent	**Permanence**
								Medium	Medium	Medium	Medium	**Certainty**
	To maintain and enhance tourism and recreation	**0**	**0**	**0**	**0**	Specific locations are unknown, however negative effects during construction (leakage works) on tourism and recreation are considered negligible due to use of access shafts (or similar) and implementation of appropriate diversions.	None identified	**0**	**0**	**0**	**0**	
								Characterisation of effects				
								Small	Small	Small	Small	**Magnitude**
								Local	Local	Local	Local	**Scale**
								Short term	Short term	Long term	Long term	**Duration**
								Temporary	Temporary	Permanent	Permanent	**Permanence**
								Medium	Medium	Medium	Medium	**Certainty**
Material assets	To minimise resource use and waste production	**0**	**-**	**+**	**0**	Potential for minor temporary negative effects during construction associated with the production of materials such as new pipes, bedding material and road surfacing materials for retrofitting, awareness campaigns and meters and associated waste production. Operational benefits associated with increased awareness, action to conserve water and reduced leakage which acts to minimise resource use and waste production	None identified	**0**	**-**	**+**	**0**	
								Characterisation of effects				
								Small	Small	Medium	Medium	**Magnitude**
								Local	Local	Local	Local	**Scale**
								Short term	Short term	Long term	Long term	**Duration**
								Temporary	Temporary	Permanent	Permanent	**Permanence**
								Medium	Medium	Medium	Medium	**Certainty**
	To avoid negative effects on built assets / infrastructure	**0**	**-**	**+**	**0**	Specific locations are unknown, however there is potential for temporary negative effects during construction (leakage reduction works) on built assets and infrastructure such as road surfacing. Operational benefits associated with reduced leakage within the network.	Best practice measures including a Traffic Management Plan to be implemented to minimise disturbance during construction (leakage reduction works). However, minor and temporary effects are likely to still occur.	**0**	**-**	**+**	**0**	
								Characterisation of effects				
								Small	Small	Medium	Medium	**Magnitude**
								Local	Local	Local	Local	**Scale**
								Short term	Short term	Long term	Long term	**Duration**
								Temporary	Temporary	Permanent	Permanent	**Permanence**
								Medium	Medium	Medium	Medium	**Certainty**

Table D-5: Non-essential use bans

Option ID	PRT_PRT_RE-DRO_ALL_ALL_neubs	
Option Name	Non-essential use bans	
Option Description	This option follows the implementation of TUBs where drought conditions continue to worsen. NEUBs target non-domestic users and may only be implemented following approval of an Ordinary Drought Order by the Secretary of State. The potential timescales for introducing restrictions by recourse to a Drought Order are significantly longer than those for TUBs. A decision on approval is normally made within 28 days assuming no objections. NEUBs include: - Watering outdoor plants on commercial premises - Filling or maintaining a non-domestic swimming or paddling pool - Filling or maintaining a pond	

	- Operating a mechanical vehicle-washer - Cleaning any vehicle, boat, aircraft or railway rolling stock; - Cleaning non-domestic premises - Cleaning a window of a non-domestic building - Cleaning industrial plant - Suppressing dust - Operating cisterns It is estimated that an additional demand saving of approximately 8.5% could be expected from a full NEUB, over and above savings achieved by the temporary water use restrictions.										
Embedded Mitigation	None identified										
SEA Topic	**SEA Objective**	**Construction**		**Operational**		**Comment**	**Mitigation**	**Residual Construction**		**Residual Operational**	
		Positive Effects	Negative Effects	Positive Effects	Negative Effects			Positive Effects	Negative Effects	Positive Effects	Negative Effects
Climate Factors	To reduce vulnerability of built infrastructure to climate change risks and hazards	**N/A**	**N/A**	**+**	**0**	The option involves restricting water use to between specific times. By reducing demand and potentially reducing abstraction, the option may help increase the resilience of water environments to climate change. However, given this is only to be implemented in drought conditions, it will not result in the long term resilience of the local environment.	None identified	**N/A**	**N/A**	**+**	**0**
								Characterisation of effects			
								N/A	N/A	Small	Small	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	High	High	**Certainty**
	To reduce or manage flood risk, taking climate change into account	**N/A**	**N/A**	**0**	**0**	The option is a non-essential use ban and is therefore not likely to affect or be affected by flood risk.	None identified	**N/A**	**N/A**	**0**	**0**
								Characterisation of effects			
								N/A	N/A	Small	Small	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	High	High	**Certainty**
Water	To protect and enhance the quantity and quality of surface, groundwater, estuarine, coastal waterbodies and water dependent habitats	**N/A**	**N/A**	**+**	**0**	The option is temporary and only to be implemented in drought conditions. The option aims to reduce the water required for supply, therefore resulting in a reduction in abstraction which will help maintain river flows and protect ground water and surface water bodies. By reducing demand through non-essential use ban, the	None identified	**N/A**	**N/A**	**+**	**0**
								Characterisation of effects			
								N/A	N/A	Medium	Medium	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**

						option maintains resilience of water for essential services.		N/A	N/A	High	High	**Certainty**
Biodiversity	To protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	**N/A**	**N/A**	**+**	**0**	Non-essential use bans may help protect biodiversity, GWDTE and priority habitat by conserving water in the environment, however the restrictions on watering plants and using hosepipes may have minor adverse effects on pollinators, insects, fish (domestic ponds) and birds (bird baths) where gardens are found to support such biodiversity. The HRA concluded no significant effects anticipated on Natura 2000 sites. There may be an increased risk of INNS transfer where cleaning of boats and industrial plant is not permitted.	Risk of INNS to be considered when banning washing of water craft. Consider mandating of visual inspections to ensure no transfer of INNS	**N/A**	**N/A**	**+**	**-**	
								Characterisation of effects				
								N/A	N/A	Small	Small	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	Medium	Medium	**Certainty**
Soil	To Protect and enhance the functionality, quantity and quality of soils	**N/A**	**N/A**	**0**	**-**	A non-essential use ban may marginally impact soil quality in some areas due to increased dust related erosion; however as it a temporary solution the effects are not anticipated to be significant.	None identified	**N/A**	**N/A**	**0**	**-**	
								Characterisation of effects				
								N/A	N/A	Small	Small	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	Medium	Medium	**Certainty**
Air Quality	To reduce and minimise air and noise emissions	**N/A**	**N/A**	**+**	**0**	This option is only to be implemented during drought conditions. There may be some positive effects from a reduction in air and noise emissions associated with water supply / treatment, and with the activities banned under the option; however this is not anticipated to be significant.	None identified	**N/A**	**N/A**	**+**	**0**	
								Characterisation of effects				
								N/A	N/A	Small	Small	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	Medium	Medium	**Certainty**
Greenhouse Gas Emissions	To achieve SES target of reducing operational carbon emissions and contribute to national target of Net Zero by 2050	**N/A**	**N/A**	**+**	**0**	While significance is uncertain, it is anticipated that a demand saving of 8.5 % in addition to carbon emission savings associated with activities banned under the option, would	None identified	**N/A**	**N/A**	**+**	**0**	
								Characterisation of effects				
								N/A	N/A	Small	Small	**Magnitude**
								N/A	N/A	Local	Local	**Scale**

						represent a reduced operational carbon emissions benefit.		N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	Medium	Medium	**Certainty**
Landscape	To conserve, protect and enhance landscape, townscape and seascape character and visual amenity	**N/A**	**N/A**	**0**	**-**	The option may have some minor temporary effects on visual amenity as watering of private gardens, washing of domestic and commercial premises and use of ornamental fountains etc will be restricted.	None identified	**N/A**	**N/A**	**0**	**-**	
								Characterisation of effects				
								N/A	N/A	Small	Small	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	Medium	Medium	**Certainty**
Cultural Heritage	To conserve, protect and enhance the historic environment and assets, including archaeology	**N/A**	**N/A**	**0**	**0**	The option is a non-essential use ban and is therefore not likely to have a significant effect on the historic environment.	None identified	**N/A**	**N/A**	**0**	**0**	
								Characterisation of effects				
								N/A	N/A	Small	Small	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	Medium	Medium	**Certainty**
Population and human health	To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	**N/A**	**N/A**	**0**	**-**	Non-essential use ban is likely to have minor negative effects on the community and social well-being as there will be restrictions on irrigation of gardens and allotments and use of water for recreational purposes. There may also be a small increased risk of fires in allotments as vegetation dries out. Risk to human health and wellbeing may be increased where dust suppression measures cannot be implemented and cleaning of paths and other infrastructure restricted. This may increase health and safety risks.	Allowing allotments limited supplies of water and ensuring high levels of communication before, during and following the implementation of these measures will mitigate these effects. Consider exemptions where dust suppression would alleviate impacts on particularly vulnerable groups e.g. construction works near hospitals, schools, nursery and care homes.	**N/A**	**N/A**	**0**	**-**	
								Characterisation of effects				
								N/A	N/A	Medium	Medium	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	Medium	Medium	**Certainty**
	To maintain and enhance tourism and recreation	**N/A**	**N/A**	**0**	**-**	Assuming commercial properties including gardens are exempt from bans and restrictions there is likely to be	None identified	**N/A**	**N/A**	**0**	**-**	
								Characterisation of effects				

						only a minor effect on tourism and recreation. Non-commercial tourism sites may be affected.		N/A	N/A	Medium	Medium	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	Medium	Medium	**Certainty**
Material assets	To minimise resource use and waste production	**N/A**	**N/A**	**+**	**0**	The option is a non-essential use ban therefore unlikely to have a negative effect on waste production or resource use but will act to conserve resource use for the period in which it is operational.	None identified	**N/A**	**N/A**	**+**	**0**	
								Characterisation of effects				
								N/A	N/A	Medium	Medium	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	High	High	**Certainty**
	To avoid negative effects on built assets / infrastructure	**N/A**	**N/A**	**0**	**-**	While temporary, the option is likely to impact on the maintenance of buildings and industrial plant.	None identified	**N/A**	**N/A**	**0**	**-**	
								Characterisation of effects				
								N/A	N/A	Medium	Medium	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	High	High	**Certainty**

Table D-6: Temporary Use Bans

Option ID	PRT_PRT_RE-DRO_ALL_ALL_tubs
Option Name	Temporary Use Bans
Option Description	These restrictions cover the outdoor use of water for household purposes. TUBs can be introduced quickly – seven days after an advert has been placed in newspapers in the area. SES Water can grant exceptions from these restrictions for customers and businesses. These exceptions aim to minimise the impact on vulnerable customers and the economy. Two phases would be brought in, in sequence if necessary, as follows: Phase 1 - Watering a garden using a hosepipe

	Phase 2 - Cleaning a private motor-vehicle using a hosepipe - Watering plants on domestic or other non-commercial premises using a hosepipe - Cleaning a private leisure boat using a hosepipe - Filling or maintaining a domestic swimming or paddling pool - Drawing water, using a hosepipe, for domestic recreational use - Filling or maintaining a domestic pond using a hosepipe - Filling or maintaining an ornamental fountain - Cleaning walls, or windows, of domestic premises using a hosepipe - Cleaning paths or patios using a hosepipe Savings based on a dry year of up to 1.5% at average and 3.5% during peak periods could be expected. A full (Phase 2) hosepipe ban may be anticipated to result in a saving of up to 4% at average and 6% at peak.											
Embedded Mitigation	None identified											
SEA Topic	**SEA Objective**	**Construction**		**Operational**		**Comment**	**Mitigation**	**Residual Construction**		**Residual Operational**		
		Positive Effects	Negative Effects	Positive Effects	Negative Effects			Positive Effects	Negative Effects	Positive Effects	Negative Effects	
Climate Factors	To reduce vulnerability of built infrastructure to climate change risks and hazards	**N/A**	**N/A**	**+**	**0**	By reducing demand and potentially reducing abstraction the option may help reduce vulnerability to climate change by conserving water environments. However, given this is only to be implemented in drought conditions, it will not result in the long term resilience of the local environment.	None identified	**N/A**	**N/A**	**+**	**0**	
								Characterisation of effects				
								N/A	N/A	Small	Small	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	High	High	**Certainty**
	To reduce or manage flood risk, taking climate change into account	**N/A**	**N/A**	**0**	**0**	The option is a temporary use ban and is therefore not likely to affect or be affected by flood risk.	None identified	**N/A**	**N/A**	**0**	**0**	
								Characterisation of effects				
								N/A	N/A	Small	Small	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	High	High	**Certainty**
Water	To protect and enhance the quantity and quality of surface, groundwater, estuarine, coastal	**N/A**	**N/A**	**+**	**0**	The option is temporary and only implemented in drought conditions. The option aims to reduce the water required for	None identified	**N/A**	**N/A**	**+**	**0**	

	waterbodies and water dependent habitats					supply, therefore resulting in a reduction in abstraction which will help maintain river flows and protect ground water and surface water bodies. By reducing demand through temporary use ban, option maintains resilience of water for essential services.		**Characterisation of effects**				
								N/A	N/A	Medium	Medium	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	High	High	**Certainty**
Biodiversity	To protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	**N/A**	**N/A**	**+**	**-**	Temporary use bans may help protect biodiversity, GWDTE and priority habitat by conserving water in the natural environment however the restrictions on watering plants and using hosepipes may have minor adverse effects on pollinators, insects, fish (domestic ponds) and birds (bird baths) where gardens are found to support such biodiversity. The HRA concluded no significant effects anticipated on Natura 2000 sites. No risk of INNS transfer associated with this option.	None identified	**N/A**	**N/A**	**+**	**-**	
								Characterisation of effects				
								N/A	N/A	Small	Small	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	Medium	Medium	**Certainty**
Soil	To Protect and enhance the functionality, quantity and quality of soils	**N/A**	**N/A**	**0**	**-**	A temporary use ban may marginally impact soil quality through increased dust related erosion; however, as it a temporary solution the effects are not anticipated to be significant.	None identified	**N/A**	**N/A**	**0**	**-**	
								Characterisation of effects				
								N/A	N/A	Small	Small	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	Medium	Medium	**Certainty**
Air Quality	To reduce and minimise air and noise emissions	**N/A**	**N/A**	**+**	**0**	This option is only to be implemented during drought conditions. There may be some positive effects from a reduction in air and noise emissions associated with water supply / treatment, however this is not anticipated to be significant.	None identified	**N/A**	**N/A**	**+**	**0**	
								Characterisation of effects				
								N/A	N/A	Small	Small	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	Medium	Medium	**Certainty**

Greenhouse Gas Emissions	To achieve SES target of reducing operational carbon emissions and contribute to national target of Net Zero by 2050	N/A	N/A	+	0	This option has the potential to reduce the need for water, therefore reducing operational carbon emissions.	None identified	**N/A**	**N/A**	**+**	**0**	
								Characterisation of effects				
								N/A	N/A	Small	Small	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	High	High	**Certainty**
Landscape	To conserve, protect and enhance landscape, townscape and seascape character and visual amenity	N/A	N/A	0	-	The option may have some minor temporary local effects on visual amenity as watering of private gardens, and use of ornamental fountains etc will be restricted.	None identified	**N/A**	**N/A**	**0**	**-**	
								Characterisation of effects				
								N/A	N/A	Small	Small	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	Medium	Medium	**Certainty**
Cultural Heritage	To conserve, protect and enhance the historic environment and assets, including archaeology	N/A	N/A	0	0	The option is a temporary use ban and is therefore not likely to have a significant effect on the historic environment.	None identified	**N/A**	**N/A**	**0**	**0**	
								Characterisation of effects				
								N/A	N/A	Small	Small	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	Medium	Medium	**Certainty**
Population and human health	To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	N/A	N/A	0	-	A temporary use ban is likely to have minor negative effects on the community and social well-being as there will be restrictions on irrigation of gardens and allotments and use of water for recreational purposes. There may also be a small increased risk of fires in allotments as vegetation dries out. Wellbeing impacts associated with reduced water based recreational activities which improve tolerance and capacity to enjoy higher temperatures.	Allowing allotments limited supplies of water and ensuring high levels of communication before, during and following the implementation of these measures.	**N/A**	**N/A**	**0**	**-**	
								Characterisation of effects				
								N/A	N/A	Medium	Medium	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	High	High	**Certainty**

	To maintain and enhance tourism and recreation	N/A	N/A	0	-	Assuming commercial properties including gardens are exempt from bans and restrictions there is likely to be only a minor effect on tourism and recreation. Non-commercial tourism sites may be affected.	None identified	N/A	N/A	0	-	
								Characterisation of effects				
								N/A	N/A	Medium	Medium	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	High	High	**Certainty**
Material assets	To minimise resource use and waste production	N/A	N/A	+	0	A temporary use ban will be unlikely to have a negative effect on waste production or resource use but the option will act to conserve resource use for the period in which it is operational.	None identified	N/A	N/A	+	0	
								Characterisation of effects				
								N/A	N/A	Medium	Medium	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	High	High	**Certainty**
	To avoid negative effects on built assets / infrastructure	N/A	N/A	0	-	With the exception of residential/domestic gardens and other private assets which may not be washed/cleaned the operation of this option is unlikely to have effects on built assets and infrastructure.	None identified	N/A	N/A	0	-	
								Characterisation of effects				
								N/A	N/A	Small	Small	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	Medium	Medium	**Certainty**

Table D-7: Outwood Lane

Option ID	SES_SES_HI-GRW_RE2_ALL_r22						
Option Name	Outwood Lane						
Option Description	This scheme seeks an increase in daily licence from 3Ml/d to 8 Ml/d and requires an equivalent increase in pump capacity. The hydraulic capacity of the source has been proved during previous test pumping. The increase in PDO associated with the scheme would be 5 Ml/d. Potential for an ADO scheme has been considered by comparing the Woodmansterne group daily average licence limit with abstraction returns for the group from 2010-2016. The group licence offers an average headroom of 3.4 Ml/d if the borehole can be made to yield it.						
Embedded Mitigation	None identified						
SEA Topic	**SEA Objective**	**Construction**	**Operational**	**Comment**	**Mitigation**	**Residual Construction**	**Residual Operational**

		Positive Effects	Negative Effects	Positive Effects	Negative Effects			Positive Effects	Negative Effects	Positive Effects	Negative Effects	
Climate Factors	To reduce vulnerability of built infrastructure to climate change risks and hazards	0	0	+	-	The option may increase the resilience of the surface water environment to climate change as using alternative source, however resilience of the groundwater environment to climate change likely to be affected.	Monitor groundwater levels.	0	0	+	-	
								Characterisation of effects				
								Medium	Medium	Medium	Medium	**Magnitude**
								Local	Local	Local	Local	**Scale**
								Short term	Short term	Long term	Long term	**Duration**
								Temporary	Temporary	Permanent	Permanent	**Permanence**
								Medium	Medium	Medium	Medium	**Certainty**
	To reduce or manage flood risk, taking climate change into account	0	0	0	0	Works are not located within Flood Zones 2 or 3. The closest area of increased flood risk are 3.7km south. Significant infrastructure is not required as part of the option, there will be an increase in pump capacity, however no effects are anticipated.	None identified	0	0	0	0	
								Characterisation of effects				
								Low	Low	Low	Low	**Magnitude**
								Local	Local	Local	Local	**Scale**
								Short term	Short term	Long term	Long term	**Duration**
								Temporary	Temporary	Permanent	Permanent	**Permanence**
								Medium	Medium	Medium	Medium	**Certainty**
Water	To protect and enhance the quantity and quality of surface, groundwater, estuarine, coastal waterbodies and water dependent habitats	0	0	+	--	The option is 2km north of a Drinking Water Safeguard Zone (DWSZ) for surface water and is 2.2km from a groundwater DWSZ. The option is within a Source Protection Zone and is over 5km from the nearest main river (WFD River Redhill Brook). Option will increase licenced rates with potential to result in deterioration of water quality, groundwater levels and GWDTE. WFD Assessment identifies two relevant waterbodies which are 'Wandle (Croydon to Wandsworth) and the Graveney' (River) and Epsom North Downs Chalk (Ground waterbody). Of these only Epsom North Downs Chalk was deemed necessary for Level 2 assessment which finds significant adverse effects cannot be ruled from the	Monitor groundwater levels at Epsom North Downs Chalk to ensure over abstraction is avoided and no deterioration in water quality. WFD Mitigation as follows: • Operational controls and monitoring of groundwater levels and associated surface water bodies. • Further assessment required re sustainability of GW licence amendment likely required by EA. • Abstraction licensing to be undertaken in accordance with EA legislation including S32 consent and water	0	0	+	--	
								Characterisation of effects				
								Low	Medium	Low	Low	**Magnitude**
								Local	Local	Local	Local	**Scale**
								Short term	Short term	Long term	Long term	**Duration**
								Temporary	Temporary	Permanent	Permanent	**Permanence**
								Medium	Medium	Medium	Low	**Certainty**

						increased abstraction during operation. Works will supply water on completion and therefore reduce pressure on other sources. Construction associated with increased pumping requirements are not anticipated to result in effects on the water environment.	features surveys as applicable					
Biodiversity	To protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	0	0	0	--	The option is 5.3km north of the nearest N2K site (Mole Gap to Reigate Escarpment SAC). The closest SPA and Ramsar site is South West London Waterbodies located 18km north west. The HRA identified no likely significant effects for Mole Gap to Reigate Escarpment SAC. There are no effect pathways between the option and the N2k site qualifying species. No new infrastructure required for the scheme and unlikely to significantly effect ground-water availability to the ground-water dependent qualifying habitats on the N2k site considering the distance. The nearest NNR is 8.3km east (Ashtead Common) and the option is within Banstead Woods and Chipstead Downs LNR. The nearest SSSI is Chipstead SSSI / GWDTE (0.3km north, south and west) (56.86% favourable, 43.14% unfavourable - recovering). This SSSI may be adversely affected by increased abstraction during the operational phase. Of note the option falls within respective SSSI Impact Risk Zones for infrastructure (pipelines) and air. The nearest RSPB Reserve is Rowlands Wood, 28km south. The option is within 200m of Priority Habitat including deciduous woodland, traditional orchard and lowland calcareous grassland and areas of Ancient Woodland are within 500m. No	Best practicable means to prevent change in GWDTE habitat as a result of changes in water levels/quality. This includes further investigation in respect of potential hydrogeological connection with chalk rivers	0	0	0	-	Characterisation of effects

						direct effects are anticipated effects as significant infrastructure is not required. The option does not fall within a National Priority Focus Areas, the closest is Surrey Hills (1.3km south). Chalk streams have not been identified within 5km of the site. While no hydrological connection has been identified, the potential for hydrogeological connection cannot be ruled out. No INNS risk, due to the nature of the option.		Medium Local Short term Temporary High	Medium Local Short term Temporary High	Medium Local Long term Permanent High	Medium Local Long term Permanent Low	**Magnitude** **Scale** **Duration** **Permanence** **Certainty**
Soil	To Protect and enhance the functionality, quantity and quality of soils	**0**	**0**	**0**	**0**	Natural Englands Open Mosaic Habitat records one area of previously developed land 2.3km north east of the option. John Laing Construction Ltd is a permitted waste site situated 4.4km south. Ruffets Wood historic landfill is 1.5km south of the option. Option located in non-agricultural land. Significant infrastructure is not required as part of the option, there will be an increase in pump capacity, however no effects are anticipated.	None identified	**0**	**0**	**0**	**0**	
								Characterisation of effects			
								Small Local Short term Temporary Low	Small Local Short term Temporary High	Small Local Long term Permanent High	Small Local Long term Permanent Low	**Magnitude** **Scale** **Duration** **Permanence** **Certainty**
Air Quality	To reduce and minimise air and noise emissions	**0**	**0**	**0**	**-**	Croydon Air Quality Management Area is 1.4km east of the scheme. Hooley AQMA is also 1.7km south east of the scheme. A Noise Action Planning Important Area (road) is 1.7km east. Not anticipated to result in a significant deterioration of air quality during construction or operation as there is not anticipated to be major infrastructure required. Minor adverse effects associated with increased pumping requirements.	Consider the use of renewable energy in pumping which would reduce emissions/adverse impacts on air quality.	**0**	**0**	**0**	**-**	
								Characterisation of effects			
								Small Local Short term Temporary High	Small Local Short term Temporary High	Small Local Long term Permanent High	Small Local Long term Permanent Medium	**Magnitude** **Scale** **Duration** **Permanence** **Certainty**
Greenhouse Gas Emissions	To achieve SES target of reducing operational carbon emissions and contribute to national target of Net Zero by 2050	**0**	**-**	**0**	**-**	Carbon will be generated from materials used to construct the new infrastructure (embodied carbon), construction activities and from operation. The relative carbon scale identified that the	Investigate use of renewables during construction and operation for energy supply and use of materials with lower	**0**	**-**	**0**	**-**	

						option has minor construction and operation carbon emissions (relative to other WRSE Regional Plan options).	embodied carbon. Carbon footprint study could help identify areas for carbon savings or alternative materials. As the electricity grid is decarbonised, greener energy will be available.	**Characterisation of effects**			
								Small	Small	Small	Small	**Magnitude**
								Local	Local	Local	Local	**Scale**
								Short term	Short term	Long term	Long term	**Duration**
								Temporary	Temporary	Permanent	Permanent	**Permanence**
								High	Medium	High	Medium	**Certainty**
Landscape	To conserve, protect and enhance landscape, townscape and seascape character and visual amenity	0	0	0	0	The South Downs National Park is 39km south. The option is within the North Downs NCA and intersects the Surrey Hills AONB is 1.3km south. The option is within the London Greenbelt. Significant infrastructure is not required as part of the option, there will be an increase in pump capacity, however no effects are anticipated.	None identified	0	0	0	0	
								Characterisation of effects				
								Small	Small	Small	Small	**Magnitude**
								Local	Local	Local	Local	**Scale**
								Short term	Short term	Long term	Long term	**Duration**
								Temporary	Temporary	Permanent	Permanent	**Permanence**
								High	High	High	High	**Certainty**
Cultural Heritage	To conserve, protect and enhance the historic environment and assets, including archaeology	0	0	0	0	Rumbold Castle Cottage (Grade II) and Ivy Cottage (Grade II) listed buildings are within 200m of the option. There are two other listed buildings within 500m. The option is 3.8km north of the nearest Registered Park and Garden (Lower Gatton Park Grade II). The option is 15km from an identified Roman Road. The option is 40km from the nearest Registered Battlefield. The option is 0.5km west of Elmore Road, Chipstead Conservation Area. High Road, Chipstead Conservation Area is also within 1km. The nearest Scheduled Monument (Earthworks of Surrey Iron Railway) is 2.3km south east of the option. Significant infrastructure is not required as part of the option, there will be an increase in pump capacity, however no effects are anticipated.	None identified	0	0	0	0	
								Characterisation of effects				
								Small	Small	Small	Small	**Magnitude**
								Local	Local	Local	Local	**Scale**
								Short term	Short term	Long term	Long term	**Duration**
								Temporary	Temporary	Permanent	Permanent	**Permanence**
								Medium	Medium	Medium	Medium	**Certainty**

Population and human health	To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	0	0	0	0	The nearest national trail is the North Downs Way, situated approximately 3.9km south. The option falls within NHS Surrey Heartlands CCG. The nearest medical care site is Winscombe Nursing Home, situated 2.4km west. Horton Country Park is 9.2km north west of the option. South Downs Golf Club is 0.4km south west of the option. No other community facilities were identified within 500m. Significant infrastructure is not required as part of the option, there will be an increase in pump capacity, however no effects are anticipated.	None identified.	0	0	0	0	
								Characterisation of effects				
								Small	Small	Small	Small	**Magnitude**
								Local	Local	Local	Local	**Scale**
								Short term	Short term	Long term	Long term	**Duration**
								Temporary	Temporary	Permanent	Permanent	**Permanence**
								Medium	Medium	Medium	Medium	**Certainty**
	To maintain and enhance tourism and recreation	0	0	0	0	Unlikely to be impacts on recreation given significant infrastructure is not required.	None identified.	0	0	0	0	
								Characterisation of effects				
								Small	Small	Small	Small	**Magnitude**
								Local	Local	Local	Local	**Scale**
								Short term	Short term	Long term	Long term	**Duration**
								Temporary	Temporary	Permanent	Permanent	**Permanence**
								Medium	Medium	Medium	Medium	**Certainty**
Material assets	To minimise resource use and waste production	0	-	0	0	An increase in pump capacity is required which will require some material consumption though effects are not significant.	None identified.	0	-	0	0	
								Characterisation of effects				
								Small	Small	Small	Small	**Magnitude**
								Local	Local	Local	Local	**Scale**
								Short term	Short term	Long term	Long term	**Duration**
								Temporary	Temporary	Permanent	Permanent	**Permanence**
								Medium	Medium	Medium	Medium	**Certainty**

	To avoid negative effects on built assets / infrastructure	0	0	0	0	The nearest school is 1.9km north east (Chipstead Valley Primary School). A National Cycle Network 3km east of the option option. No Community Rights of Way are intersected by the option. Vincents Green CROW Conclusive Registered Common Land is 0.7km east of the option. The nearest gas main is 13km east and the nearest overhead electricity line (high voltage) is 9km north. The nearest substation is 9km north east. Dunton Green gas site is over 23km east of the option. A railway is 50m south of the option and the nearest major road noted is over 2km away. Significant infrastructure is not required therefore no effects anticipated.	None identified.	0	0	0	0	
								Characterisation of effects			
								Small	Small	Small	Small	**Magnitude**
								Local	Local	Local	Local	**Scale**
								Short term	Short term	Long term	Long term	**Duration**
								Temporary	Temporary	Permanent	Permanent	**Permanence**
								Medium	Medium	Medium	Medium	**Certainty**

Table D-8: Raising of Bough Beech reservoir

Option ID	SES_SES_HI-ROC_RE2_ALL_r1
Option Name	Raising of Bough Beech reservoir
Option Description	Raising the Bough Beech reservoir embankment would increase the volume of stored water, which would provide an increase in the average yield from the reservoir. This option has been included to demonstrate the costs and likely increases in average yield from such a scheme. Based on available drawings of the earth dam alignment, a 3m raising of the embankment would appear to be feasible. It is likely that some realignment of the embankment locally to the small housing development on the north side of the embankment would be required. A detailed study would be necessary to confirm the viability of this scheme. A 3m raising of the embankment would increase the storage volume of the reservoir by approximately 3,600Ml. The Aquator model of the Bough Beech reservoir system was used to estimate the additional yield created by the dam raising. It is estimated that the scheme would provide an additional annual average yield of 5.5Ml/d, but no increase in peak output which is constrained by the WTW capacity.
Embedded Mitigation	None identified.

SEA Topic	SEA Objective	Construction		Operational		Comment	Mitigation	Residual Construction		Residual Operational		
		Positive Effects	Negative Effects	Positive Effects	Negative Effects			Positive Effects	Negative Effects	Positive Effects	Negative Effects	
Climate Factors	To reduce vulnerability of built infrastructure to climate change risks and hazards	0	0	++	0	By storing more water, the reservoir is anticipated to increase resilience to drought events which are expected to be exacerbated by climate change.	None identified.	0	0	++	0	
								Characterisation of effects				
								Medium	Medium	Medium	Medium	**Magnitude**
								Local	Local	Local	Local	**Scale**
								Short term	Short term	Long term	Long term	**Duration**
								Temporary	Temporary	Permanent	Permanent	**Permanence**
								Medium	Medium	Medium	Medium	**Certainty**
	To reduce or manage flood risk, taking climate change into account	0	-	0	0	The Bough Beech reservoir is largely designated as FZ2 and FZ3. Construction works may increase risk of pollution incidents due to flooding. No operational effects have been identified.	Measures to reduce the impact on flooding during the construction phase may include a robust CEMP which outlines construction methods and measures such as the consideration of storm water runoff and dewatering operations to reduce risk of pollution incidents.	0	-	0	0	
								Characterisation of effects				
								Low	Low	Low	Low	**Magnitude**
								Local	Local	Local	Local	**Scale**
								Short term	Short term	Long term	Long term	**Duration**
								Temporary	Temporary	Permanent	Permanent	**Permanence**
								Medium	Medium	Medium	Medium	**Certainty**
Water	To protect and enhance the quantity and quality of surface, groundwater, estuarine, coastal waterbodies and water dependent habitats	0	-	+	--	The option falls within a Drinking Water Safeguard Zone (DWSZ) for surface water and is 6.7km from a groundwater DWSZ. The option is 2.3km from the nearest Source Protection Zone and is 0.2km from the Lower Eden (WFD River).	Best practicable means to prevent impacts to surface water receptors such as the Lower Eden River. CEMP which outlines construction methods and measures to reduce risk of	0	-	+	--	
								Characterisation of effects				
								Low	Medium	Low	Low	**Magnitude**

						Option requires construction works in proximity to existing surface water receptor with potential to result in deterioration of water quality/flow. WFD Assessment identifies two relevant waterbodies which are 'Lower Eden' (River) and Bough Beech Reservoir (Lake). Of these both were deemed necessary for Level 2 assessment which finds significant adverse effects cannot be ruled from the modification of an existing reservoir. No direct impact on water supply but will facilitate increased water storage.	pollution incidents and works in proximity to water.	Local Short term Temporary Medium	Local Short term Temporary Medium	Local Long term Permanent Medium	Local Long term Permanent Low	**Scale** **Duration** **Permanence** **Certainty**
Biodiversity	To protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	0	--	+	0	The HRA identified no likely significant effects for Ashdown Forest SAC (14km south) and Ashdown Forest SPA (14km south). There are no effect pathways due to the distance. The nearest NNR is over 30km north west (Ashtead Common) and the nearest LNR is Dryhill Park (6km north). The option is 1.2km west of Polebrook Farm SSSI /GWTDE (100% favourable). No direct effects but there may be disturbance effects during the construction phase and potential effects on protected species. The option is entirely within SSSI Impact Risk Zones for infrastructure (pipelines), air pollution and water supply. The nearest RSPB Reserve is Tudeley Woods, 12.5km south east. The option falls partially within two National Priority Focus Areas (Woods and Parks and Kent Downs). There are areas of Ancient Woodland and Priority Habitat including deciduous woodland immediately adjacent to the option, with potential for damage or loss of habitat during construction. Potential permanent loss of Ancient Woodland is	Best practice methods to be implemented to minimise disturbance effects and habitat loss including designing embankment to avoid loss of woodland habitat, in particular Ancient Woodland. Habitat to be reinstated on completion, or if unavoidable compensatory habitat to be considered to replace damaged or lost habitat. Future design will need to undertake ecology surveys. Integrate biodiversity improvement opportunities as part of works. This may be achieved through enhanced planting, wildflower banks, improved connectivity with woodland or integration of National Priority Focus Area objectives of Woods and Parks and Kent Downs.	0	-	++	0	
								Characterisation of effects			
								Medium	Medium	Medium	Medium	**Magnitude**

						unlikely as the option concerns the raising of an existing embankment. The closest chalk river is 6.6km north and no hydrological connections were identified. The works may give rise to opportunities to improve on existing habitat within the immediate area. No additional INNS risk during operation, due to the nature of the option. Low-level construction phase INNS risk only, which should be easily mitigated.		Local Short term Temporary Medium	Local Short term Temporary Medium	Local Long term Permanent Medium	Local Long term Permanent Low	**Scale** **Duration** **Permanence** **Certainty**
Soil	To Protect and enhance the functionality, quantity and quality of soils	0	-	0	0	Natural Englands Open Mosaic Habitat records one area of previously developed land 5.7km north east of the option. St Julians Quarry (R Marchant & Sons Ltd) is a permitted waste site situated 6.1km north east. Hydes Forest historic landfills is 3.2km north of the option. Option located within Grade 3 agricultural land and associated works pass through Grade 2 agricultural land. There is potential for disturbance to these soils during the construction phase however limited owing to the nature of the scheme.	Land reinstated upon completion. Care of topsoil for future reuse.**Error! Not a valid link.**	0 **Characterisation of effects** Small Local Short term Temporary Low	0 Small Local Short term Temporary High	0 Small Local Long term Permanent High	0 Small Local Long term Permanent Low	**Magnitude** **Scale** **Duration** **Permanence** **Certainty**
Air Quality	To reduce and minimise air and noise emissions	0	-	0	0	AQMA No.10 (Sevenoaks High Street) is 6.4km north east of the scheme. The closest Noise Action Planning Important Area (road) is 6.3km east of the option. Potential for temporary deterioration in air and noise environment during construction. Operational effects are not anticipated.	Best practice mitigation measures to be implemented during construction e.g. ensuring all plant and machinery are well maintained and not emitting excessive fumes. Consideration of air and noise quality in CEMP.	0 **Characterisation of effects** Small Local Short term Temporary High	- Small Local Short term Temporary High	0 Small Local Long term Permanent High	0 Small Local Long term Permanent Medium	**Magnitude** **Scale** **Duration** **Permanence** **Certainty**
Greenhouse Gas Emissions	To achieve SES target of reducing operational carbon emissions and contribute to national target of Net Zero by 2050	0	-	0	-	Carbon will be generated from materials used to construct the new infrastructure (embodied carbon), construction activities and from operation. The relative carbon scale identified that the	Investigate use of renewables during construction and operation for energy supply and use of materials with lower	0	-	0	-	

						option has minor construction and operation carbon emissions (relative to other WRSE Regional Plan options).	embodied carbon. Carbon footprint study could help identify areas for carbon savings or alternative materials. As the electricity grid is decarbonised, greener energy will be available.	**Characterisation of effects**				
								Small	Small	Small	Small	**Magnitude**
								Local	Local	Local	Local	**Scale**
								Short term	Short term	Long term	Long term	**Duration**
								Temporary	Temporary	Permanent	Permanent	**Permanence**
								High	Medium	High	Medium	**Certainty**
Landscape	To conserve, protect and enhance landscape, townscape and seascape character and visual amenity	0	-	0	-	The option is partially within the Kent Downs AONB and is 1.2km north of the High Weald AONB. The South Downs National Park is over 30km south. The option is within the Low Weald NCA. It also lies within the London Area Greenbelt. Potentially minor effects on landscape character and visual amenity as a result of raising an existing embankment. Effects will continue through operation though reducing as planting and landscaping/reinstatement becomes established.	Best practice measures to be implemented to minimise effects during construction and operation although effects may remain. CEMP to ensure that the character and quality of landscapes and townscapes are maintained as far as practical during construction.	0	-	0	-		
								Characterisation of effects				
								Small	Small	Small	Small	**Magnitude**
								Local	Local	Local	Local	**Scale**
								Short term	Short term	Long term	Long term	**Duration**
								Temporary	Temporary	Permanent	Permanent	**Permanence**
								High	High	High	High	**Certainty**
Cultural Heritage	To conserve, protect and enhance the historic environment and assets, including archaeology	0	-	0	-	Three listed buildings (Barn to North West of Hilders, Hilders Farm house and Barn to North East of Hilders Farmhouse) are within 200m of the option and there are over fifteen within 1km of the route. The option is 1.4km north of the nearest Registered Park and Garden (Hever Castle Grade I). The option is 5km from an identified Roman Road. The option is over 40km from the nearest Registered Battlefield. The option is within an area where data for Conservation Areas is currently unavailable. The nearest Scheduled Monument is approximately 4.4km south east of the option. There is potential that the construction and operational phase will impact the setting of these assets. There is potential for impacts on buried archaeology if present should any excavation work be required.	Best practicable means to minimise disruption to heritage assets such as listed buildings during construction. Given there is potential to impact buried archaeology, an Archaeology Watching Brief may be required during the construction phase. Reinstatement of land once operational in order to minimise setting impacts on nearby heritage assets.	0	-	0	-		
								Characterisation of effects				
								Small	Small	Small	Small	**Magnitude**
								Local	Local	Local	Local	**Scale**
								Short term	Short term	Long term	Long term	**Duration**
								Temporary	Temporary	Permanent	Permanent	**Permanence**
								Medium	Medium	Medium	Medium	**Certainty**

Population and human health	To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	0	--	0	0	The nearest national trail is the North Downs Way, situated approximately 8.6km north. The option falls within NHS Kent and Medway CCG. The nearest medical care site is Edenbridge And District War Memorial Hospital, situated 4.8km north west. Haysden Country Park is 7km south east of the option. There are no community facilities within 500m though the option is in close proximity to properties on Lakeside Close. The closest identified is allotments 1km east. The construction phase will likely lead to disturbance effects on the local community who use the area for recreation.	Engagement with local residents of proposed works and key activities, any disruption anticipated and alternative arrangements (e.g. access). Best practice mitigation measures e.g. noise management to be implemented to minimise effects during construction. This should be addressed in a CEMP.	0	-	0	0	
								Characterisation of effects			
								Small	Small	Small	Small	**Magnitude**
								Local	Local	Local	Local	**Scale**
								Short term	Short term	Long term	Long term	**Duration**
								Temporary	Temporary	Permanent	Permanent	**Permanence**
								Medium	Medium	Medium	Medium	**Certainty**
	To maintain and enhance tourism and recreation	0	-	0	0	The reservoir itself is used for recreation therefore there may be some minor and temporary effects on recreation, angling and other water based recreation during the construction phase. There may be minimal and temporary disturbance on users of footpaths and other public rights of way during the construction phase.	Best practice mitigation measures e.g. noise management to be implemented to minimise effects during construction and land will be reinstated.	0	-	0	0	
								Characterisation of effects				
								Small	Small	Small	Small	**Magnitude**
								Local	Local	Local	Local	**Scale**
								Short term	Short term	Long term	Long term	**Duration**
								Temporary	Temporary	Permanent	Permanent	**Permanence**
								Medium	Medium	Medium	Medium	**Certainty**
Material assets	To minimise resource use and waste production	0	-	0	0	The option will require new infrastructure which will use materials. The option will also generate waste, including excavated material.	Seek opportunity to implement sustainable design measures, such as reuse and recycling of materials, including reuse of excavated material to reduce the impact, however it is likely that minor negative effects will remain. This may involve a Site Waste Management Plan and consideration of the waste hierarchy.**Error! Not a valid link.**	0	-	0	0	
								Characterisation of effects				
								Small	Small	Small	Small	**Magnitude**
								Local	Local	Local	Local	**Scale**
								Short term	Short term	Long term	Long term	**Duration**
								Temporary	Temporary	Permanent	Permanent	**Permanence**
								Medium	Medium	Medium	Medium	**Certainty**

	To avoid negative effects on built assets / infrastructure	0	-	0	0	The nearest school is 1.8km west (Four Elms Primary School). A National Cycle Network is 5.6km south east of the option. No Community Rights of Way are intersected by the route. 'Four pieces of land in the Parish of Sevenoaks Weald Common' CROW Conclusive Registered Common Land is 2.7km north east of the scheme. The nearest gas main is 8.9km north and the nearest overhead electricity line (high voltage) is over 13km north. The nearest substation is over 17km north west. Dunton Green gas site is 9.7km north of the option. There are likely to be impacts on the local road network during the construction phase from traffic disruption, importing of materials and machinery however effects are not thought to be significant. The closest major road (A21) is 5.8km east.	Best practice measures including a Traffic Management Plan to be implemented to minimise disturbance during construction.	0	-	0	0	
							Characterisation of effects				
							Small	Small	Small	Small	**Magnitude**
							Local	Local	Local	Local	**Scale**
							Short term	Short term	Long term	Long term	**Duration**
							Temporary	Temporary	Permanent	Permanent	**Permanence**
							Medium	Medium	Medium	Medium	**Certainty**

D.2: Alternative Plan Supply Options

Table D-9: Outwood Lane Drought Permit

Option ID	SES_SES_RE-DRP_REP_ALL_outwood-dp									
Option Name	Outwood Lane Drought Permit									
Option Description	The purpose of this drought permit is to allow for increased abstraction at Outwood Lane. It is proposed that the current daily licence limit is increased from 3.02 to 5 Ml/d, equivalent to the Outwood Lane pump capacity. The permit also allows for a proportional increase in the Woodmansterne group annual licence limit to avoid output from the other sources in the group from being curtailed. This drought option would therefore be to increase both the annual licence at Outwood Lane and the Woodmansterne Group to allow an additional 2 Ml/d pumping from Outwood Lane for a maximum 6-month duration. The drought permit could potentially start at any time of the year, although the implementation of it is most likely to begin in during typical hydrological recession months (April to September). Should indicators of future water resource availability within the SES Water supply area return to sufficient levels to provide confidence that water supply can be maintained by normal licensed abstraction, the drought permit would be suspended.									
Embedded Mitigation	SES Water provide alternative supplies for the duration of the impact Flow level monitoring during droughts and fluvial audit to improve assessment confidence for geomorphology. Monitoring of OP, total ammonia, DO and parameters causing WFD failures (in respective waterbodies) before, during and after the drought permit is in operation. Data collected should be routinely reviewed by a water quality expert and triggers which indicate the need for further action should be agreed. Monitoring of surface water flows before, during and after the drought permit is in operation. Development of a plan for monitoring of fish stress and fish rescue/recovery implementation should it be required. Agile mitigation. Options could include fish rescue, aeration devices, flushing flows and creation of refugia through localised modification of bed levels (temporary pools) Ensure Carshalton augmentation flow is maintained. Cessation rules if water quality parameters fall below pre-agreed levels									
SEA Topic	**SEA Objective**	**Construction**		**Operational**		**Comment**	**Mitigation**	**Residual Construction**		**Residual Operational**	
		Positive Effects	Negative Effects	Positive Effects	Negative Effects			Positive Effects	Negative Effects	Positive Effects	Negative Effects
Climate Factors	To reduce vulnerability of built infrastructure to climate change risks and hazards	**N/A**	**N/A**	**++**	**-**	The Drought Permit is in itself a response to prolonged dry weather events which are anticipated to be exacerbated by climate change. With the body of evidence and forward planning set out in the EAR and Drought Permit, the implementation of this measure will increase resilience to climate change.	None identified	**N/A**	**N/A**	**++**	**-**
								Characterisation of effects			
								N/A	N/A	Medium	Medium	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	High	High	**Certainty**
	To reduce or manage flood risk, taking climate change into account	**N/A**	**N/A**	**0**	**-**	Climate change may exacerbate drought conditions within the river and therefore increase pressure on remaining water resources.	None identified	**N/A**	**N/A**	**0**	**-**
								Characterisation of effects			
								N/A	N/A	Low	Low	**Magnitude**
								N/A	N/A	Local	Local	**Scale**

								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	Medium	Medium	**Certainty**
Water	To protect and enhance the quantity and quality of surface, groundwater, estuarine, coastal waterbodies and water dependent habitats					The geology of the study area consists of a conformable sequence of gently north dipping Chalk formations (comprising the 'North Downs') overlying the sandstone and mudstone of the Upper Greensand and Gault Formations which outcrop at the foot of the scarp slope to the south. For much of the area, the Chalk outcrops at the surface but towards the north the Chalk is overlain unconformably by the sands, silts and clays of the Thanet Formation, Lambeth Group and London Clay Formation. Much of the bedrock geology is overlain by superficial deposits: Alluvium, Sand and Gravels and River Terrace Deposits typically follow low lying river valleys; 'residual' weathered deposits (e.g. Clay-with-Flints) are typically located in upland areas and valley sides. Additionally, some isolated outliers of bedrock geology occur on the interfluves where they have not been eroded away (e.g. Thanet Formation outlier in the vicinity of Burgh Heath). The Chalk is classified as a Principal aquifer. For much of the area, including Outwood Lane, the Chalk aquifer is unconfined. As the Chalk dips north, the aquifer becomes confined by the generally lower permeability Thanet Formation, Lambeth Group and London Clay Formation. The Thanet Formation is a secondary aquifer and is believed to be in hydraulic continuity with both the underlying Chalk aquifer and overlying Upnor Formation (the lowermost unit of the Lambeth Group). The area is part of the Epsom North Downs Chalk WFD groundwater body. The water body is graded as 'Poor' for both	None identified	**N/A**	**N/A**	**++**	**-**	
								Characterisation of effects				
								N/A	N/A	Medium	Medium	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
		N/A	**N/A**	**++**	**-**			N/A	N/A	High	High	**Certainty**

						quantitative and chemical components. There are no permanent watercourses across much of the unconfined Chalk aquifer. The two watercourses of relevance are: • River Wandle • The Hogsmill • The Caterham Bourne For groundwater abstractions, the residual impact of a drought permit could extend beyond the six-month operational period of the drought permit depending on the local hydrogeology of the area and the scale of the abstraction. During drought situations, where there is limited recharge to the aquifer system, the abstraction may mainly be at the expense of groundwater storage in the aquifer. This can, in the long run, delay groundwater level recovery and have a knock-on effect on baseflow contributions to watercourses and water dependent habitats. This Option, as part of the wider Drought Plan, will help ensure reliability and resilience of the water supply during extreme or prolonged dry periods.						

Biodiversity	To protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	N/A	N/A	0	-	During drought situations, where there is limited recharge to the aquifer system, the abstraction may mainly be at the expense of groundwater storage in the aquifer. This can, in the long run, delay groundwater level recovery and have a knock-on effect on baseflow contributions to watercourses and water dependent habitats. Wilderness Island Local Nature Reserve is a 2.73 ha site composed of woodland, river pond and meadow. It is bounded by both the Carshalton and Beddington Branches. The likely impact for this designated site is assessed to be Low and therefore the impacts of the drought permit operation will be Minor. Wandle Valley Wetland LNR is a 0.63 ha wetland/wet woodland located adjacent to the Lower branch. Spencer Road Wetlands LNR is a 1.05 ha wetland with mixed wetland vegetation and pond located adjacent to the Wandle branch. The likely impact for these designated sites are assessed to as not impacted and therefore the impacts of the drought permit operation will be Negligible. In relation to priority habitats the Carshalton branch of the River Wandle is identified as priority river habitat due to its naturalness as assessed using local regulatory organisational knowledge. The Priority Species of European eel has been identified in Carshalton, Beddington and Lower Branch with Brown Trout also being identified in Carshalton and Lower Branch. Surveys at the seven sites on the Beddington branch have yielded a total of 10 species. With the exception of brown trout and bullhead, all species recorded are tolerant to environmental disturbance. The likely impact for fish is assessed to be Medium	None identified	N/A	N/A	0	-	
								Characterisation of effects				
								N/A	N/A	Medium	Medium	**Magnitude**
								N/A	N/A	Regional	Regional	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	High	High	**Certainty**

						and the impacts of the drought permit operation will be Minor. Surveys at the four sites on the Carshalton branch have yielded a total of nine species. Surveys on the Lower branch have yielded a total of 18 species which is considered likely to reflect the increased size in watercourse, greater depth provision and more varied flow character. With the exception of brown trout, bullhead and chub, all other species recorded are tolerant to environmental disturbance. The likely impact for fish at Carshalton and Lower Branch are assessed to be Low and therefore the impacts of the drought permit operation will be Minor. The main issue to consider in relation to INNS would be the creation of new pathways for INNS to spread, for example, through a new transfer pipeline. The proposed drought permit does not include the creation of any new pathways through which INNS could spread. It is considered unlikely that the drought permit will increase the risk of spreading INNS. New Zealand mud snail (Potamopyrgus antipodarum), Freshwater amphipod shrimp species (Crangonyx pseudogracilis/floridanus) and Mollusc – bladder snail (Physella acuta) are non-native species established in all three branches. The Drought Permit is not considered to pose a risk of increasing their proliferation within the wider system or at a branch scale. Lesser duckweed, Himalayan balsam, floating pennywort and Nuttall's waterweed distribution is unlikely to be influenced by flow changes arising from Drought Permit operation and whilst ruffe are likely to relocate to downstream habitats, they are not likely to be favoured in term of recruitment potential as a result of						

						the Drought Permit. Goldfish are not considered likely to present an invasive risk due to the very low numbers associated with their unsolicited introduction.						
Soil	To Protect and enhance the functionality, quantity and quality of soils	N/A	N/A	0	-	The zone of influence potentially affected by geomorphological change has been determined to extend from both the headwater branches in the south (Carshalton and Beddington) and along the River Wandle to the confluence with the Beddington STW discharge. The STW discharge provides a significant output of flow (approximately 290% during average flows) at which point the Wandle is less likely to be affected from the drought permit. The proposed drought permit is to abstract a further 2 Ml/d above the existing license from the Outwood Lane borehole, resulting in an additional groundwater level drawdown in the Chalk aquifer and therefore potentially affecting (reducing) flows in the River Wandle headwaters. This would occur during a drought for the maximum duration of six months (180 days). As stated in Section 3.1.2, 2 Ml/d equates to a 7% increase in the 1 in 500 year MDO from the Woodmansterne Group. However, it is uncertain how this equates to the surface water flows but is likely to result in some reduction even if small. The proposed permit may be in place over a maximum period of six months, potentially prolonging the period of low flows which would otherwise occur under the existing licensed conditions. This could increase (fine) sediment deposition and/or result in an increased exposure of the bed features (albeit these are limited according to the baseline) during the summer months, allowing vegetation to take hold making the deposits more permanent and therefore less mobile. This may be more pronounced upstream of impoundments where sediment	None identified	**N/A**	**N/A**	**0**	**-**	
								Characterisation of effects				
								N/A	N/A	Medium	Medium	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	High	High	**Certainty**

						deposition is more likely to accumulate. Most banks are likely to be modified or fortified in some way and are therefore less vulnerable to instability. The 'likely impact' of the drought permit on the geomorphology of the River Wandle and headwaters is Low impact – the hydrological changes are expected to result in only short-term impacts on sediment dynamics, the river channel and/or the river bank, which are unlikely to lead to significant changes in wetted areas or the integrity of river function. Whilst lower flows may occur for longer periods than normal during drought permit operations, the impacts are likely to be minimal and limited to the Beddington branch headwater. Elsewhere, such as the Carshalton branch and along the River Wandle, the lowest flows are unlikely to be affected by the permit. Flushing flows, important to the overall sediment dynamics, are unlikely to occur in the drought permit period and more likely over the wetter autumn or winter periods.						
Air Quality	To reduce and minimise air and noise emissions	**N/A**	**N/A**	**+**	**-**	The drought permit has the potential to reduce the need for more resource intensive external transfers and abstractions which would result in more significant noise and air quality impacts. With the exception of additional pumping and treatment requirements which may lead to minor adverse effects during operation, no additional impacts anticipated.	None identified	**N/A**	**N/A**	**+**	**-**	
								Characterisation of effects				
								N/A	N/A	Small	Small	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	High	High	**Certainty**
Greenhouse Gas Emissions	To achieve SES target of reducing operational carbon emissions and contribute to national target of Net Zero by 2050	**N/A**	**N/A**	**+**	**--**	There would be an increase in pumping requirements and operational carbon emissions associated with the increase in abstraction. The Drought Permit has the potential to reduce the need for	None identified	**N/A**	**N/A**	**+**	**--**	
								Characterisation of effects				

						more resource intensive external transfers and abstractions which would result in greater embodied and operational carbon emissions.		N/A	N/A	Low	Low	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	Medium	Medium	**Certainty**
Landscape	To conserve, protect and enhance landscape, townscape and seascape character and visual amenity	**N/A**	**N/A**	**0**	**-**	Though they have no environmental designation, the Waddon Ponds are an important feature for recreational use in the area, especially for walkers. A visual eyesore would be created should these ponds dry up which may adversely impact walkers. Whilst this may be a likely situation during an extreme drought, it is not anticipated as an outcome from the drought permit; no discernible impact is predicted on the groundwater levels feeding the pond. However, it is possible that the drought permit may delay recovery to springflow and thereby extend the duration of drought impacts on the pond.	None identified	**N/A**	**N/A**	**0**	**-**	
								Characterisation of effects				
								N/A	N/A	Small	Small	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	High	High	**Certainty**
Cultural Heritage	To conserve, protect and enhance the historic environment and assets, including archaeology	**N/A**	**N/A**	**0**	**0**	There are two scheduled monuments (Dovecote, Beddington Park and Roman Villa E of Beddington Park), no world heritage sites, and a number of listed buildings (grade 1 to 3). Despite this, there are no known heritage sites in the vicinity of the surface water bodies or groundwater abstraction point that may be adversely impacted by the drought permit.	None identified	**N/A**	**N/A**	**0**	**0**	
								Characterisation of effects				
								N/A	N/A	Small	Small	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	High	High	**Certainty**
Population and human health	To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	**N/A**	**N/A**	**++**	**-**	Waddon Ponds are an important feature for recreational use in the area, especially for walkers. A visual eyesore would be created should these ponds dry up which may adversely impact walkers. Whilst this may be a likely situation during an extreme drought, it is not anticipated as an outcome from the drought permit; no discernible impact is predicted	None identified	**N/A**	**N/A**	**++**	**-**	
								Characterisation of effects				
								N/A	N/A	Medium	Medium	**Magnitude**
								N/A	N/A	Local	Local	**Scale**

						on the groundwater levels feeding the pond. However, it is possible that the drought permit may delay recovery to springflow and thereby extend the duration of drought impacts on the pond. The drought permit is anticipated to result in beneficial impacts on health and wellbeing owing to its capacity to ensure provision of drinking water during periods of drought.		N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	High	High	**Certainty**
	To maintain and enhance tourism and recreation	**N/A**	**N/A**	**+**	**-**	The drought permit is anticipated to alleviate pressures on water availability in the short term, thereby facilitating some tourism and recreation functions e.g. provision of water for major consumers such as hotels. It may however lead to increased pressures on fisheries/angling and other water based recreational activities.	Monitoring of surface water flows	**N/A**	**N/A**	**+**	**-**	
								Characterisation of effects				
								N/A	N/A	Medium	Medium	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	Medium	Medium	**Certainty**
Material assets	To minimise resource use and waste production	**N/A**	**N/A**	**++**	**0**	The drought permit has the potential to reduce the need for more resource intensive external transfers and abstractions.	None identified	**N/A**	**N/A**	**++**	**0**	
								Characterisation of effects				
								N/A	N/A	Medium	Medium	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	Medium	Medium	**Certainty**
	To avoid negative effects on built assets / infrastructure	**N/A**	**N/A**	**+**	**0**	Should the drought permit act to alleviate demand restrictions which have the potential to impact on built assets and infrastructure (by enforcing cleaning and maintenance restrictions), beneficial effects are anticipated.	None identified	**N/A**	**N/A**	**+**	**0**	
								Characterisation of effects				
								N/A	N/A	Small	Small	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**

								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	Low	Low	**Certainty**

Table D-10: River Eden May Drought Permit

Option ID	SES_SES_RE-DRP_REP_ALL_river-eden-maydp
Option Name	River Eden Drought Permit May Abstraction
Option Description	Bough Beech reservoir is refilled primarily via an abstraction from the River Eden which normally operates during the autumn/winter. A drought permit to enable the winter abstraction from the River Eden to continue for an additional period of time; historically this has been into May, so this permit is often termed the May drought permit. The benefit of the proposed drought permit abstraction would be up to 272.2Ml/d of refill volume to the reservoir during May subject to a Minimum Residual Flow (MRF) in the River Eden. A MRF of 22Ml/d would apply and the annual abstraction limit of 29,000Ml/d would apply (it is assumed that the cap would extend from the preceding September through to the end of May). **No construction would be required in order to facilitate the increased abstraction associated with the drought permit**. Due to operational practice and infrastructure constraints, the abstraction would cease well before natural flows in the river reduce to 22Ml/d and when flows are recovering would not start until flows are much higher than 22Ml/d.
Embedded Mitigation	Walkover surveys are therefore proposed to look for evidence of distress and to observe potential changes in the habitat characteristics of the impacted reach. Plan for fish rescue if required. Macrophyte, fish and macroinvertebrate samples should be used to identify the presence and distribution of INNS Implementation of Drought monitoring Plan (See Drought Permit EAR for further details). Weed cutting if necessary around the two continuous water quality monitoring sites to ensure monitoring results are representative of the conditions in the River Eden channel Production of a monitoring and environmental impact report following the period of the drought permit. This will review the impacts associated with the drought permit, based on evidence collected as part of the monitoring regime and mitigation actions, together with data provided by the Environment Agency as part of their ongoing monitoring programme. River Habitat Surveys to be completed along three 500m reaches of the River Eden downstream of the abstraction by an accredited RHS surveyor and following the approved methodology. This will set the baseline going into the drought. The survey will be repeated if the drought continues in a second year (if there have not been flushing flows) to record the effect of the low flows. Dissolved oxygen will be used as a trigger for a cessation clause.

SEA Topic	SEA Objective	Construction		Operational		Comment	Mitigation	Residual Construction		Residual Operational		
		Positive Effects	Negative Effects	Positive Effects	Negative Effects			Positive Effects	Negative Effects	Positive Effects	Negative Effects	
Climate Factors	To reduce vulnerability of built infrastructure to climate change risks and hazards	N/A	N/A	++	-	The Drought Permit is in itself a response to prolonged dry weather events which are anticipated to be exacerbated by climate change. With the body of evidence and forward planning set out in the EAR and Drought Permit, the implementation of this measure will increase resilience to climate change. Climate change may exacerbate drought conditions within the river and therefore increase pressure on remaining water resources. Protections are however afforded to the River Eden by the MRF, operational practice and infrastructure constraints. The abstraction would cease well before natural flows in the river reduce to 22 Ml/d and when flows are recovering would not start until flows are much higher than 22 Ml/d.	None Identified	N/A	N/A	++	-	
								Characterisation of effects				
								N/A	N/A	Medium	Medium	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	High	High	**Certainty**

	To reduce or manage flood risk, taking climate change into account	N/A	N/A	0	0	No impacts identified	None Identified	**N/A**	**N/A**	**0**	**0**	
								Characterisation of effects				
								N/A	N/A	Low	Low	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	Medium	Medium	**Certainty**
Water	To protect and enhance the quantity and quality of surface, groundwater, estuarine, coastal waterbodies and water dependent habitats	N/A	N/A	++	-	No wastewater treatment works are located on the reach from Bough Beech abstraction point to the confluence with the River Medway. It was noted that the nearest site with an active discharge consent upstream of the Bough Beech abstraction point on the River Eden was Edenbridge WwTWs, located 4.1km upstream and with a consented DWF of 2.24Ml/d. Given the sizeable distance of this discharge upstream and relatively insignificant discharge volume, it was determined that this would not place additional water quality pressures on the system. Overall, the waterbody is of Moderate Ecological Potential and the 'macrophyte and phytobenthos combined' biological quality element is at Moderate status. The proposed drought action should not impact on the macrophyte biological quality element and there is no mechanism for it to affect the supporting elements assessment for the waterbody. Its Chemical status is classified as Fail on the basis of mercury (Hg) and its compounds, perfluorooctane sulphonate (PFOS) and polybrominated diphenyl ethers (PBDE); however PFOS, mercury and PBDE assessments reported in the EAR indicate that application of	None identified	**N/A**	**N/A**	**++**	**-**	
								Characterisation of effects				
								N/A	N/A	Medium	Medium	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	High	High	**Certainty**

						drought permit abstractions are unlikely to affect concentrations. Water quality monitoring data during a drought permit abstraction was only available in May 2012. It was assumed that, from a water quality perspective, the River Eden would respond to future drought permit abstraction in a similar way as in May 2012. Future drought permit abstraction during May is expected to have a Minor 'overall category of impact' on the water quality in the River Eden (from Bough Beech abstraction point to confluence with River Medway). In addition to the protection afforded to the River Eden by the MRF, due to operational practice and infrastructure constraints, the abstraction would cease well before natural flows in the river reduce to 22 Ml/d and when flows are recovering would not start until flows are much higher than 22 Ml/d. The pump setup at the abstraction means that a minimum of 12 Ml/d can be abstracted (to protect the asset) - small quantities cannot be abstracted. This Option, as part of the wider Drought Plan will help ensure reliability and resilience of the water supply during extreme or prolonged dry periods.						

Biodiversity	To protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	**N/A**	**N/A**	**0**	**-**	There are no internationally designated sites within the River Eden catchment downstream of the Chiddingstone abstraction point. Bough Beech Reservoir is not internationally designated and there are no sites downstream of the reservoir to the confluence with the Eden. On the River Medway, the following internationally designated sites are present: • Peter's Pit Special Area of Conservation (SAC), which lies outside of the Medway floodplain and for which there is no mechanism for impact. There are no internationally designated sites within the River Eden catchment downstream of the Chiddingstone abstraction point. Bough Beech Reservoir is not internationally designated and there are no sites downstream of the reservoir to the confluence with the Eden. On the River Medway, the following internationally designated sites are present: • Peter's Pit Special Area of Conservation (SAC), which lies outside of the Medway floodplain and for which there is no mechanism for impact. • Medway Estuary and Marshes Special Protection Area (SPA). The Medway Estuary and Marshes SPA is a significant distance downstream of the abstraction point (in excess of 25km). In addition, the Lower Eden Waterbody does not have Protected Area Status for designated sites. The assessments of hydrological effects and predicted water quality impacts did not identify any observed or predicted effects in the River Medway, even at its confluence with the Eden.	Mitigations linked to hydrology and water quality are considered relevant for the purpose of aquatic protected species and locally designated sites.	**N/A**	**N/A**	**0**	**-**	
										Characterisation of effects		
								N/A	N/A	Medium	Medium	**Magnitude**
								N/A	N/A	Regional	Regional	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	High	High	**Certainty**

						Consequently, it can be concluded that designated sites on the Medway can be excluded from the assessment as the drought action will have No Likely Significant Effect are predicted on the Medway Estuary and Marshes SPA. There are no other SPA, SAC, possible SAC or potential SPA that require consideration. There are no nationally designated sites within the River Eden catchment downstream of the Chiddingstone abstraction point. Bough Beech Reservoir is not nationally designated and there are no sites downstream of the reservoir to the confluence with the Eden. The internationally designated sites listed above are also nationally designated. There are further nationally designated sites on the Medway: • River Beult Site of Special Scientific Interest (SSSI), which is more than 25km downstream of the abstraction. Its confluence is in the navigable reach of the River Medway. • Holborough to Burham Marshes SSSI, to the east of Snodland. The designated site includes a tidal reach of the River Medway, reedbeds, fen and neutral grassland. The absence of hydrological and water quality impacts on the River Medway means that we can conclude that there will be no impacts on water dependent SSSI from the proposed drought actions. The River Eden from Edenbridge to its confluence with the River Medway is a Local Wildlife Site (LWS). It is noted for its varied aquatic and marginal habitats and, in particular, the dragonfly community it supports. Bough Beech Reservoir and its environs are also designated as LWS. Much of the River Medway, its					

						floodplains and adjacent aquatic systems are designated as LWS. The following LWS are within 25km of the abstraction point: • River Medway South of Leigh • East Tonbridge Copses and Dykes • East Peckham Ponds • Hale Street Ponds and Pasture Reflecting the distance from the location of the proposed drought action to the LWS on the River Medway, no impacts are predicted from the drought action. In the reach of the River Eden downstream of the Chiddingstone abstraction, there are multiple areas of Priority Habitat identified in the vicinity of the river. There is an area of semi-improved grassland to the east of Hampkins Hill and an area of traditional orchard to the southwest of The Glebe. There are further areas of deciduous woodland that are also identified by Natural England as Priority Habitats. In the vicinity of Bough Beech Reservoir, the only areas of Priority Habitats identified are deciduous woodland. No Priority Habitats are identified in the watercourse downstream of Bough Beech Reservoir. Formally recorded protected species in the area are Anguilla anguilla (European eel), Austropotamobius pallipes (white-clawed crayfish) and Cottus gobio (bullhead). No significant impacts on protected species are anticipated. Predicted impacts on priority habitats and protected species are also not considered significant. The main issue to consider in relation to INNS would be the creation of new pathways for INNS to spread, for example, through a new transfer pipeline. The proposed drought permit						

						does not include the creation of any new pathways through which INNS could spread. It is considered unlikely that the drought permit will increase the risk of spreading INNS						
Soil	To Protect and enhance the functionality, quantity and quality of soils	**N/A**	**N/A**	**0**	**-**	The greatest threat to geomorphology during operation of a drought permit is from deposition: lower flows result in the river having less energy to carry sediment; thus, it could be deposited. The dominant process in the impacted reach of the River Eden is tending towards deposition. The key influences on the annual sediment budget are storm events during the winter months and Hever Castle Lake. The 'likely impact' of the drought permit on the geomorphology of the River Eden is Low – the hydrological changes are expected to result in only short term impacts on sediment dynamics, the river channel and/or the river bank, which are unlikely to lead to significant changes in wetted areas or the integrity of river function. Whilst lower flows are likely to occur for longer than normal during periods of drought permit operation, the lowest flows are not affected by the permit as they are protected by the MRF, and the flushing flows that are an important to the overall sediment dynamics of the river are unlikely to occur in the drought permit period, more likely occurring over the autumn or winter period.	None Identified	**N/A**	**N/A**	**0**	**-**	
								Characterisation of effects				
								N/A	N/A	Small	Small	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	High	High	**Certainty**
Air Quality	To reduce and minimise air and noise emissions	N/A	N/A	**+**	**-**	The drought permit has the potential to reduce the need for more resource intensive external transfers and abstractions which would result in more significant noise and air quality impacts. With the exception of additional pumping and treatment requirements which may lead to minor adverse effects during	None Identified	N/A	N/A	**+**	**-**	
								Characterisation of effects				
								N/A	N/A	Small	Small	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**

						operation, no additional impacts anticipated.		N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	High	High	**Certainty**
Greenhouse Gas Emissions	To achieve SES target of reducing operational carbon emissions and contribute to national target of Net Zero by 2050	**N/A**	**N/A**	**+**	**--**	Abstracting additional water from the River Eden to supplement Bough Beech Reservoir supply will increase operational carbon emissions. While abstractions already take place over winter months (September to April) this option would extend this abstraction through the month of May thereby introducing additional pumping requirements and operational carbon emissions. The drought permit has the potential to reduce the need for more resource intensive external transfers and abstractions which would result in greater embodied and operational carbon emissions.	None Identified	**N/A**	**N/A**	**+**	**--**	
								Characterisation of effects				
								N/A	N/A	Low	Low	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	Medium	Medium	**Certainty**
Landscape	To conserve, protect and enhance landscape, townscape and seascape character and visual amenity	**N/A**	**N/A**	**0**	**0**	The drought permit would not result in flows lower than would be experienced in the system and so visually it is considered that the drought permit would not result in a significant change (i.e. it would not be changed as a result of the drought permit to an extent that would differ than that which would typically occur throughout the summer).	None Identified	**N/A**	**N/A**	**0**	**0**	
								Characterisation of effects				
								N/A	N/A	Medium	Medium	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	High	High	**Certainty**
Cultural Heritage	To conserve, protect and enhance the historic environment and assets, including archaeology	**N/A**	**N/A**	**0**	**0**	The drought permit would not result in flows lower than would be experienced in the system and so from a Heritage and archaeology perspective it is considered that the drought permit would not result in a significant change (i.e. it would not be changed as a result of the drought permit to an extent that would differ than that which would typically occur throughout the summer)	None Identified	**N/A**	**N/A**	**0**	**0**	
								Characterisation of effects				
								N/A	N/A	Small	Small	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**

								N/A	N/A	High	High	**Certainty**
Population and human health	To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	**N/A**	**N/A**	**++**	**-**	Within the River Eden catchment water-related recreation takes place within Bough Beech reservoir and along the banks of the River Eden. Water related recreational activities include coarse fishing, canoeing and rowing and cycling. Bough Beech reservoir is also used for sailing, windsurfing and stand-up paddle boarding. In addition, within the catchment there are numerous walking tracks of both national and local importance, including the Eden Valley Walk. In terms of the angling amenity in the Eden, the effect of the proposed drought permit may impact the fishing both upstream and downstream of the Bough Beech river intake. The Environment Agency designated Principal Coarse fishery located upstream of the intake could be affected by any reductions in the free movement of fish populations between the two reaches of the Eden. However, due to the presence of both the indicator and additional species of angling interest recorded upstream of the Principal Coarse fishery, the impact of the proposed drought permit on angling upstream of the intake is considered to be low and temporary. It is considered that the amenity value of the river and reservoir to walkers and other recreational users, besides angling, will not be significantly changed as the hydrology will not be reduced to levels that the system is not already accustomed to and low flows should be anticipated during the summer months. The drought permit will support and sustain the water-related recreation which takes place within Bough Beech reservoir and therefore the drought permit provides a benefit to these activities.	None Identified	**N/A**	**N/A**	**++**	**-**	
								Characterisation of effects				
								N/A	N/A	Medium	Medium	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	High	High	**Certainty**

	To maintain and enhance tourism and recreation	N/A	N/A	+	-	The drought permit is anticipated to alleviate pressures on water availability in the short term, thereby facilitating some tourism and recreation functions e.g. provision of water for major consumers such as hotels. It may however lead to increased pressures on fisheries/angling and other water based recreational activities.	Monitoring of surface water flows	**N/A**	**N/A**	**+**	**-**	
								Characterisation of effects				
								N/A	N/A	Medium	Medium	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	Medium	Medium	**Certainty**
Material assets	To minimise resource use and waste production	N/A	N/A	++	0	The drought permit has the potential to reduce the need for more resource intensive external transfers and abstractions.	None identified	**N/A**	**N/A**	**++**	**0**	
								Characterisation of effects				
								N/A	N/A	Medium	Medium	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	Medium	Medium	**Certainty**
	To avoid negative effects on built assets / infrastructure	N/A	N/A	+	0	Should the drought permit act to alleviate demand restrictions which have the potential to impact on built assets and infrastructure (by enforcing cleaning and maintenance restrictions), beneficial effects are anticipated.	None identified	**N/A**	**N/A**	**+**	**0**	
								Characterisation of effects				
								N/A	N/A	Small	Small	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	Low	Low	**Certainty**

Table D-11: River Eden Summer Drought Permit

Option ID	SES_SES_RE-DRP_REP_ALL_river-eden-summerdp
Option Name	River Eden Drought Permit Summer Abstraction
Option Description	Bough Beech reservoir is refilled primarily via an abstraction from the River Eden which normally operates during the autumn/winter. A drought permit to enable summer abstraction from the River Eden (after any May drought permit has ceased) to permit abstraction of up to 272.2Ml/d through June, July and August. A Minimum Residual Flow of 22Ml/d would apply and the annual abstraction limit of 29,000Ml/d would apply (it is assumed that the cap would extend from the preceding September through to the end of August**). No construction would be required in order to facilitate the increased abstraction associated with the drought permit**. Due to operational practice and infrastructure constraints, the abstraction would cease well before natural flows in the river reduce to 22Ml/d and when flows are recovering would not start until flows are much higher than 22Ml/d.
Embedded Mitigation	Walkover surveys are therefore proposed to look for evidence of distress and to observe potential changes in the habitat characteristics of the impacted reach. Plan for fish rescue if required. Macrophyte, fish and macroinvertebrate samples should be used to identify the presence and distribution of INNS Implementation of Drought monitoring Plan (See Drought Permit EAR for further details). Weed cutting if necessary around the two continuous water quality monitoring sites to ensure monitoring results are representative of the conditions in the River Eden channel Production of a monitoring and environmental impact report following the period of the drought permit. This will review the impacts associated with the drought permit, based on evidence collected as part of the monitoring regime and mitigation actions. River Habitat Surveys to be completed along three 500m reaches of the River Eden downstream of the abstraction by an accredited RHS surveyor and following the approved methodology. This will set the baseline going into the drought. The survey will be repeated if the drought continues in a second year (if there have not been flushing flows) to record the effect of the low flows. Dissolved oxygen will be used as a trigger for a cessation clause.

SEA Topic	**SEA Objective**	**Construction**		**Operational**		**Comment**	**Mitigation**	**Residual Construction**		**Residual Operational**		
		Positive Effects	Negative Effects	Positive Effects	Negative Effects			Positive Effects	Negative Effects	Positive Effects	Negative Effects	
Climate Factors	To reduce vulnerability of built infrastructure to climate change risks and hazards	**N/A**	**N/A**	**++**	**-**	The Drought Permit is in itself a response to prolonged dry weather events which are anticipated to be exacerbated by climate change. With the body of evidence and forward planning set out in the EAR and Drought Permit, the implementation of this measure will increase resilience to climate change. Climate change may exacerbate drought conditions within the river and therefore increase pressure on remaining water resources. Protections are, however, afforded to the River Eden by the MRF, operational practice and infrastructure constraints. The abstraction would cease well before natural flows in the river reduce to 22 Ml/d and when flows are recovering would not start until flows are much higher than 22 Ml/d.	None identified	**N/A**	**N/A**	**++**	**-**	
								Characterisation of effects				
								N/A	N/A	Medium	Medium	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	High	High	**Certainty**

	To reduce or manage flood risk, taking climate change into account	N/A	N/A	0	0	No impacts identified	None identified	**N/A**	**N/A**	**0**	**0**	
								Characterisation of effects				
								N/A	N/A	Low	Low	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	Medium	Medium	**Certainty**
Water	To protect and enhance the quantity and quality of surface, groundwater, estuarine, coastal waterbodies and water dependent habitats	N/A	N/A	++	-	No wastewater treatment works are located on the reach from Bough Beech abstraction point to the confluence with the River Medway. It was noted that the nearest site with an active discharge consent upstream of the Bough Beech abstraction point on the River Eden was Edenbridge WwTWs, located 4.1km upstream (Figure 3-14) and with a consented DWF of 2.24Ml/d. Given the sizeable distance of this discharge upstream and relatively insignificant discharge volume, it was determined that this would not place additional water quality pressures on the system. Overall, the waterbody is of Moderate Ecological Potential and the 'macrophyte and phytobenthos combined' biological quality element is at Moderate status. The proposed drought action should not impact on the macrophyte biological quality element and there is no mechanism for it to affect the supporting elements assessment for the waterbody. Its Chemical Status is classified as Fail on the basis of mercury (Hg) and its compounds, perfluorooctane sulphonate (PFOS) and polybrominated diphenyl ethers (PBDE) however PFOS, mercury and PBDE assessments reported in the EAR indicates that application of	None identified	**N/A**	**N/A**	**++**	**-**	
								Characterisation of effects				
								N/A	N/A	Medium	Medium	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	High	High	**Certainty**

						drought permit abstractions are unlikely to affect concentrations. Water quality monitoring data during a drought permit abstraction was only available in May 2012. It was assumed that, from a water quality perspective, the River Eden would respond to future drought permit abstraction in a similar way as in May 2012 even though the permit under consideration would be between June and August. Future drought permit abstraction during June – August is expected to have a Minor 'overall category of impact' on the water quality in the River Eden (from Bough Beech abstraction point to confluence with River Medway). In addition to the protection afforded to the River Eden by the MRF, due to operational practice and infrastructure constraints, the abstraction would cease well before natural flows in the river reduce to 22Ml/d and when flows are recovering would not start until flows are much higher than 22Ml/d. The pump setup at the abstraction means that a minimum of 12Ml/d can be abstracted (to protect the asset) - small quantities cannot be abstracted. This Option, as part of the wider Drought Plan, will help ensure reliability and resilience of the water supply during extreme or prolonged dry periods.						

Biodiversity	To protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	N/A	N/A	0	-	There are no internationally designated sites within the River Eden catchment downstream of the Chiddingstone abstraction point. Bough Beech Reservoir is not internationally designated and there are no sites downstream of the reservoir to the confluence with the Eden. On the River Medway, the following internationally designated sites are present: • Peter's Pit Special Area of Conservation (SAC), which lies outside of the Medway floodplain and for which there is no mechanism for impact. • Medway Estuary and Marshes Special Protection Area (SPA). The Medway Estuary and Marshes SPA is a significant distance downstream of the abstraction point (in excess of 25km). In addition, the Lower Eden Waterbody does not have Protected Area Status for designated sites. The assessments of hydrological effects and predicted water quality impacts did not identify any observed or predicted effects in the River Medway, even at its confluence with the Eden. Consequently, it can be concluded that designated sites on the Medway can be excluded from the assessment as the drought action will have No Likely Significant Effect are predicted on the Medway Estuary and Marshes SPA. There are no other SPA, SAC, possible SAC or potential SPA that require consideration. There are no nationally designated sites within the River Eden catchment downstream of the Chiddingstone abstraction point. Bough Beech Reservoir is not nationally designated and there are no sites downstream of the reservoir to the confluence with the Eden. The internationally	None identified	N/A	N/A	0	-	
								Characterisation of effects				
								N/A	N/A	Medium	Medium	**Magnitude**
								N/A	N/A	Regional	Regional	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	High	High	**Certainty**

						designated sites listed above are also nationally designated. There are further nationally designated sites on the Medway: • River Beult Site of Special Scientific Interest (SSSI), which is more than 25km downstream of the abstraction. Its confluence is in the navigable reach of the River Medway. • Holborough to Burham Marshes SSSI, to the east of Snodland. The designated site includes a tidal reach of the River Medway, reedbeds, fen and neutral grassland. The absence of hydrological and water quality impacts on the River Medway means that we can conclude that there will be no impacts on water dependent SSSI from the proposed drought actions. The River Eden from Edenbridge to its confluence with the River Medway is a Local Wildlife Site (LWS). It is noted for its varied aquatic and marginal habitats and, in particular, the dragonfly community it supports. Bough Beech Reservoir and its environs are also designated as LWS. Much of the River Medway, its floodplains and adjacent aquatic systems are designated as LWS. The following LWS are within 25km of the abstraction point: • River Medway South of Leigh • East Tonbridge Copses and Dykes • East Peckham Ponds • Hale Street Ponds and Pasture Reflecting the distance from the location of the proposed drought action to the LWS on the River Medway, no impacts are predicted from the drought action.						

						In the reach of the River Eden downstream of the Chiddingstone abstraction, there are multiple areas of Priority Habitat identified in the vicinity of the river. There is an area of semi-improved grassland to the east of Hampkins Hill and an area of traditional orchard to the southwest of The Glebe. There are further areas of deciduous woodland that are also identified by Natural England as Priority Habitats. In the vicinity of Bough Beech Reservoir, the only areas of Priority Habitats identified are deciduous woodland. No Priority Habitats are identified in the watercourse downstream of Bough Beech Reservoir. Formally recorded protected species in the area are Anguilla anguilla (European eel), Austropotamobius pallipes (white-clawed crayfish) and Cottus gobio (bullhead). No significant impacts on protected species are anticipated. Predicted impacts on priority habitats and protected species are also not considered significant. The main issue to consider in relation to INNS would be the creation of new pathways for INNS to spread, for example, through a new transfer pipeline. The proposed drought permit does not include the creation of any new pathways through which INNS could spread. It is considered unlikely that the drought permit will increase the risk of spreading INNS					
Soil	To Protect and enhance the functionality, quantity and quality of soils	**N/A**	**N/A**	**0**	**-**	The greatest threat to geomorphology during operation of a drought permit is from deposition: lower flows result in the river having less energy to carry sediment; thus, it could be deposited. The dominant process in the impacted reach of the River Eden is tending towards deposition.	None identified	**N/A**	**N/A**	0	-	
								Characterisation of effects				
								N/A	N/A	Small	Small	**Magnitude**
								N/A	N/A	Local	Local	**Scale**

						The key influences on the annual sediment budget are storm events during the winter months and Hever Castle Lake. The 'likely impact' of the drought permit on the geomorphology of the River Eden is Low – the hydrological changes are expected to result in only short term impacts on sediment dynamics, the river channel and/or the river bank, which are unlikely to lead to significant changes in wetted areas or the integrity of river function. Whilst lower flows are likely to occur for longer than normal during periods of drought permit operation, the lowest flows are not affected by the permit as they are protected by the MRF, and the flushing flows that are an important to the overall sediment dynamics of the river are unlikely to occur in the drought permit period, more likely occurring over the autumn or winter period.		N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	High	High	**Certainty**
Air Quality	To reduce and minimise air and noise emissions	**N/A**	**N/A**	**+**	**-**	The drought permit has the potential to reduce the need for more resource intensive inter-company transfers and abstractions which would result in more significant noise and air quality impacts. With the exception of additional pumping and treatment requirements which may lead to minor adverse effects during operation, no additional impacts anticipated.	None identified	**N/A**	**N/A**	**+**	**-**	
								Characterisation of effects				
								N/A	N/A	Small	Small	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	High	High	**Certainty**
Greenhouse Gas Emissions	To achieve SES target of reducing operational carbon emissions and contribute to national target of Net Zero by 2050	**N/A**	**N/A**	**+**	**--**	Abstracting additional water from the River Eden to supplement Bough Beech Reservoir supply will increase operational carbon emissions. While abstractions already take place over winter months (September to April) this option would extend this abstraction through months of June, July and August thereby introducing additional pumping	None identified	**N/A**	**N/A**	**+**	**--**	
								Characterisation of effects				
								N/A	N/A	Low	Low	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**

						requirements and operational carbon emissions. The drought permit has the potential to reduce the need for more resource intensive external transfers and abstractions which would result in greater embodied and operational carbon emissions.		N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	Medium	Medium	**Certainty**
Landscape	To conserve, protect and enhance landscape, townscape and seascape character and visual amenity	**N/A**	**N/A**	**0**	**0**	The drought permit would not result in flows lower than would be experienced in the system and so visually it is considered that the drought permit would not result in a significant change (i.e. it would not be changed as a result of the drought permit to an extent that would differ than that which would typically occur throughout the summer).	None identified	**N/A**	**N/A**	**0**	**0**	
								Characterisation of effects				
								N/A	N/A	Medium	Medium	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	High	High	**Certainty**
Cultural Heritage	To conserve, protect and enhance the historic environment and assets, including archaeology	**N/A**	**N/A**	**0**	**0**	The drought permit would not result in flows lower than would be experienced in the system and so from a Heritage and archaeology perspective it is considered that the drought permit would not result in a significant change (i.e. it would not be changed as a result of the drought permit to an extent that would differ than that which would typically occur throughout the summer)	None identified	**N/A**	**N/A**	**0**	**0**	
								Characterisation of effects				
								N/A	N/A	Small	Small	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	High	High	**Certainty**
Population and human health	To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	**N/A**	**N/A**	**++**	**-**	Within the River Eden catchment water-related recreation takes place within Bough Beech reservoir and along the banks of the River Eden. Water related recreational activities include coarse fishing, canoeing and rowing and cycling. Bough Beech reservoir is also used for sailing, windsurfing and stand-up paddle boarding. In addition, within the catchment there are numerous	None identified	**N/A**	**N/A**	**++**	**-**	
								Characterisation of effects				
								N/A	N/A	Medium	Medium	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**

						walking tracks of both national and local importance, including the Eden Valley Walk. In terms of the angling amenity in the Eden, the effect of the proposed drought permit may impact the fishing both upstream and downstream of the Bough Beech river intake. The Environment Agency designated Principal Coarse fishery located upstream of the intake could be affected by any reductions in the free movement of fish populations between the two reaches of the Eden. However, due to the presence of both the indicator and additional species of angling interest recorded upstream of the Principal Coarse fishery, the impact of the proposed drought permit on angling upstream of the intake is considered to be low and temporary. It is considered that the amenity value of the river and reservoir to walkers and other recreational users, besides angling, will not be significantly changed as the hydrology will not be reduced to levels that the system is not already accustomed to and low flows should be anticipated during the summer months. The drought permit will support and sustain the water-related recreation which takes place within Bough Beech reservoir and therefore the drought permit provides a benefit to these activities.		N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	High	High	**Certainty**
	To maintain and enhance tourism and recreation	**N/A**	**N/A**	**+**	**-**	The drought permit is anticipated to alleviate pressures on water availability in the short term, thereby facilitating some tourism and recreation functions e.g. provision of water for major consumers such as hotels. It may however lead to increased pressures on fisheries/angling and other water based recreational activities.	Monitoring of surface water flows	**N/A**	**N/A**	**+**	**-**	
								Characterisation of effects				
								N/A	N/A	Medium	Medium	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**

								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	Medium	Medium	**Certainty**
Material assets	To minimise resource use and waste production	**N/A**	**N/A**	**++**	**0**	The drought permit has the potential to reduce the need for more resource intensive inter-company transfers and abstractions.	None identified	**N/A**	**N/A**	**++**	**0**	
								Characterisation of effects				
								N/A	N/A	Medium	Medium	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	Medium	Medium	**Certainty**
	To avoid negative effects on built assets / infrastructure	**N/A**	**N/A**	**+**	**0**	Should the drought permit act to alleviate demand restrictions which have the potential to impact on built assets and infrastructure (by enforcing cleaning and maintenance restrictions), beneficial effects are anticipated.	None identified	**N/A**	**N/A**	**+**	**0**	
								Characterisation of effects				
								N/A	N/A	Small	Small	**Magnitude**
								N/A	N/A	Local	Local	**Scale**
								N/A	N/A	Short term	Short term	**Duration**
								N/A	N/A	Temporary	Temporary	**Permanence**
								N/A	N/A	Low	Low	**Certainty**

Table D-12: Secombe Centre UV

Option ID		SES_SES_HI-LRE_WT2_ALL_r26									
Option Name		Secombe Centre UV									
Option Description		This scheme provides UV treatment for the Secombe Centre groundwater source which is currently out of supply due to bacti detections on the raw water. Due to the limited footprint available at the Secombe Centre site, the UV treatment plant would be located at Cheam WTW on the 'East Main' which feeds water from Hackbridge, Goatbridge, Woodcote, Oaks, Langley Park, Sutton and Sutton Court Rd boreholes as well as Secombe Centre.									
Embedded Mitigation		None identified									
SEA Topic	**SEA Objective**	**Construction**		**Operational**		**Comment**	**Mitigation**	**Residual Construction**		**Residual Operational**	
		Positive Effects	Negative Effects	Positive Effects	Negative Effects			Positive Effects	Negative Effects	Positive Effects	Negative Effects
Climate Factors	To reduce vulnerability of built infrastructure to climate change risks and hazards	0	0	+	0	Option offers a way to treat water to make use of available resources; this may have positive effects for climate resilience as vulnerability of water environment to climate change is reduced/reducing demands elsewhere, may increase resilience to drought.	None identified.	0	0	+	0
								Characterisation of effects			
								Medium	Medium	Medium	Medium **Magnitude**
								Local	Local	Local	Local **Scale**
								Short term	Short term	Long term	Long term **Duration**
								Temporary	Temporary	Permanent	Permanent **Permanence**
								Medium	Medium	Medium	Medium **Certainty**
	To reduce or manage flood risk, taking climate change into account	0	0	0	0	Works are located within FZ1 and therefore effects on flood risk are considered negligible.	None identified.	0	0	0	0
								Characterisation of effects			
								Low	Low	Low	Low **Magnitude**
								Local	Local	Local	Local **Scale**
								Short term	Short term	Long term	Long term **Duration**
								Temporary	Temporary	Permanent	Permanent **Permanence**
								Medium	Medium	Medium	Medium **Certainty**
Water	To protect and enhance the quantity and quality of surface, groundwater, estuarine, coastal waterbodies and water dependent habitats	0	-	+	--	The option does not fall within a Drinking Water Safeguard Zone (DWSZ) for surface water, with the closest at a distance of 6.72km. The option falls within a Drinking Water Safeguard Zone (DWSZ) for groundwater. The option is also within a Source Protection Zone.	Best practicable means to prevent impacts to surface water receptors during construction phase may include provision of CEMP which outlines measures to protect water environment. WFD mitigation for Epsom North Downs Chalk:	0	-	+	--
								Characterisation of effects			
								Low	Medium	Low	Low **Magnitude**
								Local	Local	Local	Local **Scale**
								Short term	Short term	Long term	Long term **Duration**

						There are no waterbodies with the option boundary. There is potential for the option to impact the water environment during the construction phase owing to its situation within a DWSZ and SPZ. WFD assessment identified three rivers (Beverley Brook (Motspur Park to Thames) and Pyl Brook at West Barnes, Hogsmill and Wandle (Carshalton Branch at Carshalton)) and a groundwater body (Epsom North Downs Chalk). A level 2 assessment was carried out for Epsom North Downs Chalk and identified possible deterioration between classes, impediments to GES and GEP and compromises to waterbody objectives. Works will supply water on completion and treat water to improve quality.	• Operational controls and monitoring of groundwater levels and associated surface water bodies. • Further WFD assessment required. Monitoring of groundwater source to ensure no adverse effects.	Temporary Medium	Temporary Medium	Permanent Medium	Permanent Low	**Permanence** **Certainty**

Biodiversity	To protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	0	-	0	0	The HRA identified no likely significant effects for Wimbledon Common SAC (6.7km north) or Richmond Park SAC (8.3km north west) as no impact pathways were identified. The nearest NNR is 7.3km south-west (Ashtead Common). The nearest LNR, Anton Crescent Wetland, is at a distance of 1.2km north-east. The nearest SSSI is Banstead Bowns (2.4km south). There is not anticipated to be any effects on chalk rivers. The nearest RSPB Reserve is Rainham Marshes, over 30km north east. The site lies within the Thames Valley National Priority Focus Area. There is ancient woodland and priority habitat 1.2km from the site. Installation of a UV treatment plant may require footprint expansion of the existing WTW though no protected habitat and/or species have been noted in the immediate area and loss is anticipated to be minimal. Construction may require felling of mature trees within/bounding the site and introduce indirect effects such as noise, light and vibration on habitats in the wider area however effects are not anticipated to be significant. Risk of INNS transfer is very low during operation as water is to be sourced from groundwater. Low-level construction phase INNS risk only, which should be easily mitigated.	Best practice methods to be implemented to minimise disturbance effects and habitat loss. Habitat to be reinstated on completion, or if unavoidable compensatory habitat to be considered to replace damaged or lost habitat. Future design will need to undertake ecology surveys.	0	-	0	0	
								Characterisation of effects				
								Medium	Medium	Medium	Medium	**Magnitude**
								Local	Local	Local	Local	**Scale**
								Short term	Short term	Long term	Long term	**Duration**
								Temporary	Temporary	Permanent	Permanent	**Permanence**
								High	High	High	Low	**Certainty**
Soil	To Protect and enhance the functionality, quantity and quality of soils	0	0	0	0	Natural Englands Open Mosaic Habitat records one area of previously developed land within 1.6km east of the option. Beddington Corner Landfill (Suez Recycling & Recovery Southern Ltd) is a permitted waste site situated 4.45km north east.	None identified.	0	0	0	0	
								Characterisation of effects				
								Small	Small	Small	Small	**Magnitude**
								Local	Local	Local	Local	**Scale**

						Rosehill Park Historic Landfill is located 2km north east of the option. The option is not located within agricultural land. No impacts are anticipated on soils at the site.		Short term Temporary Low	Short term Temporary High	Long term Permanent High	Long term Permanent Low	**Duration** **Permanence** **Certainty**
Air Quality	To reduce and minimise air and noise emissions	0	--	0	-	Works are within Sutton AQMA and is adjacent a residential area. A Noise Action Planning Important Area (road) is 0.6km south west of the option and there are two others within 2.5km. Potential to result in a deterioration of air and noise environment during construction due to scale of works. Potential for operational emissions from UV plant.	Best practice mitigation measures to be implemented during construction, this may include dust management plan, use of low or no-emissions plant/machinery and noise monitoring. UV plant to operate within agree air quality limits.	0	-	0	0	
								Characterisation of effects				
								Small Local Short term Temporary High	Small Local Short term Temporary High	Small Local Long term Permanent High	Small Local Long term Permanent Medium	**Magnitude** **Scale** **Duration** **Permanence** **Certainty**
Greenhouse Gas Emissions	To achieve SES target of reducing operational carbon emissions and contribute to national target of Net Zero by 2050	0	-	0	-	Carbon will be generated from materials used to construct the new infrastructure (embodied carbon), construction activities and from operation. The relative carbon scale identified that the option has minor construction and operation carbon emissions (relative to other WRSE Regional Plan options).	Investigate use of renewables during construction and operation for energy supply and use of materials with lower embodied carbon. Carbon footprint study could help identify areas for carbon savings or alternative materials. As the electricity grid is decarbonised, greener energy will be available.	0	-	0	-	
								Characterisation of effects				
								Small Local Short term Temporary High	Small Local Short term Temporary Medium	Small Local Long term Permanent High	Small Local Long term Permanent Medium	**Magnitude** **Scale** **Duration** **Permanence** **Certainty**
Landscape	To conserve, protect and enhance landscape, townscape and seascape character and visual amenity	0	-	0	-	The South Downs National Park is 47.6km south. The option is within the Thames Basin Lowlands NCS and is within 8.6km of Surrey Hills AONB. The option lies outside the London greenbelt. Minor negative effects on townscape character and visual amenity during construction. Potential for effects on completion although this is limited because the UV plant will be within the Cheam WTW.	Best practice measures to be implemented to minimise effects during construction although temporary effects during construction may remain. UV plant to be designed to be in keeping with local townscape character.	0	-	0	-	
								Characterisation of effects				
								Small Local Short term Temporary High	Small Local Short term Temporary High	Small Local Long term Permanent High	Small Local Long term Permanent High	**Magnitude** **Scale** **Duration** **Permanence** **Certainty**

Cultural Heritage	To conserve, protect and enhance the historic environment and assets, including archaeology	+	-	0	0	The option is 1.2km south west of the nearest Registered Park and Garden (Nonsuch Park Grade II). Another Registered Park and Garden (Carshalton House) is located 2.7km east of the option. The option is 19km from an identified Roman Road. The option is 32km from the nearest Registered Battlefield. The nearest Scheduled Monument is the Milestone outside No. 135 Cheam Road, Cheam, 0.38km south east of the option. The option is 0.45km of the nearest listed building, (Church Farmhouse Grade II). No data is available with respect to conservation area status in this local authority. Construction and operation may affect the setting of these historic assets although this is considered to be limited because the UV plant will be within the Cheam WTW. Depending on the location of the UV plant and the need for excavation, there is potential to impact buried archaeology if present however this would act to improve local archaeological understanding.	Best practice measures to be implemented to minimise setting effects during construction. UV plant to be designed to be in keeping with local character. Further work may be required to determine significance of effect, depending on the presence or absence of buried archaeology.	+	-	0	0	
								Characterisation of effects				
								Small	Small	Small	Small	**Magnitude**
								Local	Local	Local	Local	**Scale**
								Short term	Short term	Long term	Long term	**Duration**
								Temporary	Temporary	Permanent	Permanent	**Permanence**
								Medium	Medium	Medium	Medium	**Certainty**
Population and human health	To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	0	-	0	-	The nearest national trial is The Ridgeway, situated 9km north west of the option. The option falls within NHS South West London CCG. The nearest medical care site is situated 1.4km north east of the option. Horton Country Park is 4.5km west of the option. The option is adjacent to residential areas and there are schools, public parks or gardens, playing fields, churches and religious grounds, allotments and other community facilities within 500m.	Best practice mitigation measures e.g. noise management to be implemented to minimise effects during construction and land will be reinstated. Engagement with local residents outlining construction activities and any disruptions anticipated.	0	-	0	0	
								Characterisation of effects				
								Small	Small	Small	Small	**Magnitude**
								Local	Local	Local	Local	**Scale**
								Short term	Short term	Long term	Long term	**Duration**
								Temporary	Temporary	Permanent	Permanent	**Permanence**
								Medium	Medium	Medium	Medium	**Certainty**

						There is no direct land take from these areas however there is likely to be temporary disturbance effects on users of these sites and to the local community during construction. Potential for effects during operation are not thought to be significant as the UV plant will be within the Cheam WTW. The option is within IMD decile 9.						
	To maintain and enhance tourism and recreation	0	-	0	0	The option is located 0,7Km from a public park (Perrett's Garden) and is 120m from another park (Seears Park) . There are allotments and playing fields within 500m. There is likely to be temporary disturbance effects on users of these areas during construction however effects are not anticipated to be significant.	Best practice mitigation measures e.g. noise management to be implemented to minimise effects during construction.	0	-	0	0	
								Characterisation of effects				
								Small	Small	Small	Small	**Magnitude**
								Local	Local	Local	Local	**Scale**
								Short term	Short term	Long term	Long term	**Duration**
								Temporary	Temporary	Permanent	Permanent	**Permanence**
								Medium	Medium	Medium	Medium	**Certainty**
Material assets	To minimise resource use and waste production	0	-	0	-	Requires new materials and chemicals during operation.	Seek opportunity to implement sustainable design measures, such as reuse and recycling of materials, to reduce the impact, however it is likely that minor negative effects will remain.	0	-	0	-	
								Characterisation of effects				
								Small	Small	Small	Small	**Magnitude**
								Local	Local	Local	Local	**Scale**
								Short term	Short term	Long term	Long term	**Duration**
								Temporary	Temporary	Permanent	Permanent	**Permanence**
								Medium	Medium	Medium	Medium	**Certainty**
	To avoid negative effects on built assets / infrastructure	0	-	0	0	The nearest school is 0.382km east (Homefield Preparatory School). The nearest gas main is 17.36km south-east, Gravesend Thames South to Tatsfield. The nearest overhead electricity line (high voltage) is over 5.5km east. The nearest substation is 1.66km north.	Best practice measures including a Traffic Management Plan will likely be implemented to minimise disturbance during construction.	0	-	0	0	
								Characterisation of effects				
								Small	Small	Small	Small	**Magnitude**
								Local	Local	Local	Local	**Scale**
								Short term	Short term	Long term	Long term	**Duration**

						Homefield Preparatory School gas site is 26.11km south east of the option. No railways interest the option and the closest is within 300m. The closest major road, Maiden Road, is 620m west of the option. An important Religious Building,St Dunstan's, is within 500m of the option. There is potential for the construction phase to have a minor impact on the local road network however effects would be temporary to the construction phase.		Temporary Medium	Temporary Medium	Permanent Medium	Permanent Medium	**Permanence** **Certainty**

D.3: SEA Objective Assessment Rationale

Table D-13: SEA Objective Assessment Rationale

SEA Theme and Objectives	Datasets/Key Themes	Effect		Description
Biodiversity, Flora, Fauna: • To protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	SPA SAC Ramsar site SSSIs MPA MCZ NNR LNR Priority habitats and species Non-designated sites Terrestrial, aquatic and marine habitats, species and protected sites Green networks and corridors (e.g. foraging areas and commuting routes, migration routes, hibernation areas etc. at all scales)	+++	Major Positive	Would result in a major enhancement on the quality of designated sites / habitats due to changes in flow or groundwater levels, water quality or habitat quality and availability. Would result in a major increase in the population of a priority species. Effects could be caused by beneficial changes in water flows/water quality, or large amounts of creation or enhancement of habitat, promoting a major increase in ecosystem structure and function. Would result in a major reduction or management of INNS. Would deliver Biodiversity Net Gain.
		++	Moderate Positive	Would result in a moderate enhancement on the quality of designated and/or non-designated sites / habitats due to changes in flow or groundwater levels, water quality or habitat creation and enhancement measures. Would result in a moderate increase in the population of a priority species. Effects could be caused by beneficial changes in water flows/water quality, or moderate amounts of creation or enhancement of habitat, promoting a moderate increase in ecosystem structure and function. Would result in a moderate reduction or management of INNS.
		+	Minor Positive	Would result in a minor enhancement of the quality of designated and/or non-designated sites / habitats due to changes in flow or groundwater levels, water quality or habitat creation and enhancement measures. Would result in a minor increase in the population of a priority species. Effects could be caused by beneficial changes in water flows/water quality, or small amounts of creation or enhancement of habitat, promoting a minor increase in ecosystem structure and function. Would result in a minor reduction or management of INNS.
		0	Neutral	Would not result in any effects on designated or non-designated sites including habitats and/or species). It will not have an effect on INNS.
		-	Minor Negative	Would result in a minor negative effect on the quality of designated and/or non-designated sites / habitats due to changes in flow or groundwater levels, water quality or habitat loss or degradation. Would result in a minor decrease in the population of a priority species. Effects could be caused by detrimental changes in flows/water quality, or small losses or degradation of habitat leading to a minor loss of ecosystem structure and function. Would result in a minor increase or spread of INNS.
		--	Moderate Negative	Would result in a moderate negative effect on the quality of designated and/or non-designated sites / habitats due to changes in flow or groundwater levels, water quality or habitat loss or degradation. Would result in a moderate decrease in the population of a priority species. Effects could be caused by detrimental changes in flows/water quality, or moderate loss or degradation of habitat leading to a moderate loss of ecosystem structure and function. Would result in a moderate increase or spread of INNS.
		---	Major Negative	Would result in a major negative effect on the quality of designated and/or non-designated sites / habitats due to changes in flow or groundwater levels, water quality or habitat loss or degradation. Would result in a major decrease in the population of a priority species. Effects could be caused by detrimental changes in flows/water quality, or large losses or degradation of habitat leading to a major loss of ecosystem structure and function. Would result in a major increase or spread of INNS.
		?	Uncertain	From the level of information available the effect on this objective is uncertain.
Soil: • To protect and enhance the	Agricultural Land Classification Landfill sites – authorised and historic	+++	Major Positive	Would result in a major enhancement on the quality of soils through the implementation of catchment approaches, remediation or other measures.
		++	Moderate Positive	Would result in a moderate enhancement on the quality of soils through the implementation of catchment approaches, remediation or other measures.

SEA Theme and Objectives	Datasets/Key Themes	Effect	Description	
functionality, quantity and quality of soils		+	Minor Positive	Would have no effect on soils or existing land use. Would result in the remediation of contaminated land.
		0	Neutral	Would not result in any effects on soils or land use.
		-	Minor Negative	Would result in a minor loss of best and most versatile agricultural land or is in conflict with existing land use. Would result in land contamination.
		--	Moderate Negative	Would result in a moderate loss of best and most versatile agricultural land or is in substantial conflict with existing land use. Would overlay mineral resources leading to partial mineral sterilisation.
		---	Major Negative	Would result in a major loss of best and most versatile agricultural land or is in substantial conflict with existing land use. Would result in land contamination. Would overlay mineral resources leading to mineral sterilisation.
		?	Uncertain	From the level of information available the effect on this objective is uncertain
Water: • To protect and enhance the quantity and quality of surface, groundwater, estuarine and coastal waterbodies	Environment Agency Flood Defences Environment Agency Main Rivers Flood Zones 2 and 3 Surface Water Features WFD River Waterbody Catchments WFD River Waterbodies Cycle 2 Bathing Waters (for desal options) Shellfish Waters (desal options) Source Protection Zones WFD Groundwater bodies Drinking Water Safeguard Zone (Groundwater)	+++	Major Positive	Would achieve WFD Good Ecological Status / Good Ecological Potential. Would result in a major improvements in water efficiency, reduces demand and improves resilience.
		++	Moderate Positive	Would achieve savings through demand management and does not require abstraction to achieve yield. Would address failure of WFD Good Ecological Status / Good Ecological Potential partially.] Would result in a moderate improvements in water efficiency, reduces demand and improves resilience.
		+	Minor Positive	Would achieve savings through demand management and does not require abstraction to achieve yield. Would result in a minor improvements in water efficiency, reduces demand and improves resilience.
		0	Neutral	Would have no discernible effect on river flows or surface/coastal water quality or on groundwater quality or levels.
		-	Minor Negative	Would result in minor decreases in river flows. River and/or coastal water quality may be affected and lead to short term or intermittent effects on receptors (e.g. designated habitats, protected species or recreational users of rivers and the coastline) that could not be avoided but could be mitigated. Would result in minor decreases in groundwater quality or levels. Would result in minor decreases in water efficiency, increases demand and reduces resilience.
		--	Moderate Negative	Would result in moderate decreases in river flows. River and/or coastal water quality may be affected and lead to long term or continuous effects on receptors (e.g. designated habitats, protected species or recreational users of rivers and the coastline) that could not reasonably be mitigated. Would result in the likely deterioration of WFD classification. Would result in moderate decreases in groundwater quality or levels. Would result in moderate decreases in water efficiency, increases demand and reduces resilience.
		---	Major Negative	Would result in major decreases in river flows. River and/or coastal water quality may be affected and lead to long term or continuous effects on receptors (e.g. designated habitats, protected species or recreational users of rivers and the coastline) that could not reasonably be mitigated. Would result in the deterioration of WFD classification. Would result in major decreases in groundwater quality or levels. Would result in major decreases in water efficiency, increases demand and reduces resilience.
		?	Uncertain	From the level of information available the effect is uncertain.

SEA Theme and Objectives	Datasets/Key Themes	Effect	Description	
Air: To reduce and minimise air and noise emissions	Air Quality Management Zones Air quality monitoring sites Noise Action Planning Important Areas	+++	Major Positive	Would result in a major enhancement of the air quality within one or more AQMAs. Would result in a major enhancement of the noise environment.
		++	Moderate Positive	Would result in a moderate enhancement of the air quality within one or more AQMAs. Would result in a moderate enhancement of the noise environment.
		+	Minor Positive	Would result in an enhancement of the air quality. Would result in an enhancement of the noise environment.
		0	Neutral	Would not result in any effects on Air Quality, AQMAs or noise.
		-	Minor Negative	Would result in a decrease of the air quality. Would increase or contribute to noise levels.
		--	Moderate Negative	Would result in a decrease of the air quality within one or more AQMAs. Would result in a moderate increase or contribution to noise levels and/or is in proximity to Noise Action Planning Important Areas.
		---	Major Negative	Would result in a major decrease in the air quality within one or more AQMAs. Would result in a major increase or contribution to noise levels and/or intersects Noise Action Planning Important Areas.
		?	Uncertain	From the level of information available the effect on this objective is uncertain.
Greenhouse Gas Emissions: To achieve SES target of reducing operational carbon emissions and contribute to national target of Net Zero by 2050	Carbon data Renewable energy data Sequestration data	+++	Major Positive	Would substantially reduce operational carbon emissions. Would generate significant additional zero carbon energy that can be fed back into the grid. Would achieve net zero through carbon sequestration
		++	Moderate Positive	Would reduce operational carbon emissions to a great extent. Would generate moderate additional zero carbon energy that can be fed back into the grid. Would result in a moderate increase in carbon sequestration.
		+	Minor Positive	Would reduce operational carbon emissions to a small extent. Would generate minor additional zero carbon energy that can be fed back into the grid/reduce carbon emissions. Would result in a minor increase in carbon sequestration.
		0	Neutral	Would have no discernible effect on carbon emissions.
		-	Minor Negative	Would generate minor construction and/or operational carbon emissions . Would result in a small release of previously sequestered.
		--	Moderate Negative	Would generate moderate construction and/or operational carbon emissions. Would result in a moderate release of previously sequestered carbon.
		---	Major Negative	Would generate significant construction and/or operational carbon emissions. Would result in a major release of previously sequestered carbon
		?	Uncertain	From the level of information available the effect is uncertain.

SEA Theme and Objectives	Datasets/Key Themes	Effect		Description
Climatic Factors: To reduce vulnerability to climate change risks and hazards To reduce or manage flood risk, taking climate change into account	UKCP18 climate data Sea level rise projections	+++	Major Positive	Would increase resilience/decrease vulnerability to climate change effects. Would result in a major improvement to flood risk.
		++	Moderate Positive	Would increase resilience/decrease vulnerability to climate change effects. Would result in a moderate improvement to flood risk.
		+	Minor Positive	Would increase resilience/decrease vulnerability to climate change effects. Would result in a minor improvement to flood risk.
		0	Neutral	Would not increase resilience/decrease vulnerability to climate change effects. Would not have an effect on or be affected by flood risk.
		-	Minor Negative	Would impact on resilience/decrease vulnerability to climate change effects. Would locate in Flood Zone 2.
		--	Moderate Negative	Would impact on resilience/significantly decrease vulnerability to climate change effects. Would located in Flood Zone 3.
		---	Major Negative	Would have a major impact on resilience/significantly decrease vulnerability to climate change effects. Would locate in Flood Zone 2 or 3 and further contribute to flood risk.
		?	Uncertain	From the level of information available the effect is uncertain.
Landscape: To conserve, protect and enhance landscape and townscape character and visual amenity	Areas of Outstanding Natural Beauty National Character Areas Green Belt land National Park	+++	Major Positive	Would have a major positive contribution to designated landscape (AONB or National Park) management plan objectives. Would result in new, above ground infrastructure that significantly enhances the local landscape, townscape or seascape.
		++	Moderate Positive	Would have a moderate positive contribution to designated landscape management plan objectives. Would result in new, above ground infrastructure that has a moderate positive effect on the local landscape, townscape or seascape.
		+	Minor Positive	Would result in new, above ground infrastructure that has a minor positive effect on the local landscape, townscape or seascape.
		0	Neutral	Would not result in any effects on the local landscape, townscape or seascape.
		-	Minor Negative	Would result in new, above ground infrastructure that has a minor negative effect on the local landscape, townscape or seascape.
		--	Moderate Negative	Would have a moderate negative effect on a designated landscape or feature (i.e. significant visually intrusive infrastructure) whose effects could not be reasonably mitigated. Would result in new, above ground infrastructure that has a moderate negative effect on the local landscape, townscape or seascape.
		---	Major Negative	Would have a negative effect on a designated landscape or feature (i.e. significant visually intrusive infrastructure) whose effects could not be reasonably mitigated. Would results in new, above ground infrastructure that has a major negative effect on the local landscape, townscape or seascape.
		?	Uncertain	From the level of information available the effect is uncertain.

SEA Theme and Objectives	Datasets/Key Themes	Effect		Description
Historic Environment: To conserve/protect and enhance historic assets/cultural heritage and their setting, including archaeological important sites.	Listed buildings: - Grade I listed structures - Grade II* listed structures - Grade II listed structures Registered Parks and Gardens: - Grade I Registered Parks and Gardens - Grade II* Registered Parks and Gardens - Grade II Registered Parks and Gardens Protected Wrecks Registered Battlefields Scheduled Monuments Conservation Areas World Heritage Sites	+++	Major Positive	Would result in enhancements to designated heritage assets and/or their setting, fully realising the significance and value of the asset. Would secur repairs or improvements to heritage assets, especially those identified in the Historic England Buildings/Monuments at Risk Register. Would improve interpretation and public access to important heritage assets.
		++	Moderate Positive	Would result in enhancements to designated heritage assets and/or their setting. Would improve interpretation and public access to important heritage assets.
		+	Minor Positive	Would result in enhancements to non-designated heritage assets and/or their setting.
		0	Neutral	Would have no effect on cultural heritage assets or archaeology.
		-	Minor Negative	Would result in the loss of significance of undesignated heritage assets and/or their setting, notwithstanding remedial recording of any elements affected. Would result in limited damage to known, undesignated archaeology important sites with a consequent loss of significance only partly mitigated by archaeological investigation.
		--	Moderate Negative	Would result in the loss of significance of undesignated heritage assets and/or their setting, notwithstanding remedial recording of any elements affected. Would diminish of significance of designated heritage assets and/or their setting, notwithstanding remedial recording of any elements affected.
		---	Major Negative	Would diminish the significance of designated heritage assets and/or their setting. Would result in demolition or further deterioration in the condition of designated heritage assets especially those identified in the Historic England Buildings/Monuments at Risk Register. Would result in loss of public access to important heritage assets and lack of appropriate interpretation. Would result in major damage to known, designated archaeology important sites with a consequent loss of significance only partly mitigated by archaeological investigation.
		?	Uncertain	From the level of information available the effect is uncertain.
Population, Human Health: To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing To maintain and enhance tourism and recreation	Indices of Multiple Deprivation 2015 Functional site: - Schools - Medical facilities OS Greenspace dataset: - Allotments - Bowling green - Cemetery - Golf course - Sports facility - Play space - Playing field - Public park or garden - Religious grounds - Tennis courts Natural England - Country Parks National Parks Section 15 open access areas	+++	Major Positive	Would lead to major positive effect on the health of local communities and will ensure that surface water and bathing water quality is maintained within statutory limits. Would create new, and significantly enhances existing, recreational facilities, publicly accessible greenspace and/or tourism within the operational area.
		++	Moderate Positive	Would lead to positive effect on the health of local communities and will ensure that surface water and bathing. Would lead to water quality being maintained within statutory limits. Would enhance existing, recreational facilities, publicly accessible greenspace and/or tourism within the operational area.
		+	Minor Positive	Would have a temporary positive effect on the health of local communities and ensure that surface water and bathing water quality is maintained within statutory limits.
		0	Neutral	Would not result in any effects on human health and existing recreational facilities and/or tourism.
		-	Minor Negative	Would have a temporary effect on human health (e.g. noise or air quality). Would reduce the availability and quality of existing recreational facilities and/or tourism within the operational area.
		--	Moderate Negative	Would have an effect on human health (e.g. noise or air quality). Would result in the permanent removal of existing recreational facilities, publicly accessible greenspace and/or tourism within the operational area.
		---	Major Negative	Would have a significant long-term effect on human health (e.g. noise or air quality). Would result in the removal of existing recreational facilities, publicly accessible greenspace and/or tourism within the operational area.
		?	Uncertain	From the level of information available the effect is uncertain.

SEA Theme and Objectives	Datasets/Key Themes	Effect	Description	
	CRoW S4 Conclusive Registered Common Land Public rights of way Drinking water (surface water) safeguard zone			
Material Assets To minimise resource use and waste production To avoid negative effects on built assets/infrastructure	Transport: - Major roads – A roads - Major roads motorway - Railway line - National cycle route - National trails - Buildings - Infrastructure and facilities	+++	Major Positive	Would re-use or recycle substantial quantities of waste materials and any new infrastructure will incorporate substantial sustainable design measures and materials. Would result in no increase in energy consumption or energy will be from 100% renewable sources. Would improve national cycle routes or national trails.
		++	Moderate Positive	Would re-use or recycle moderate quantities of waste materials and any new infrastructure will incorporate some sustainable design measures and materials. Would not result in increase in energy consumption or energy will be mainly from renewable sources. Would improve national cycle routes or national trails.
		+	Minor Positive	Would re-use or recycle a limited quantity of waste materials and any new infrastructure will incorporate some limited sustainable design measures and materials. Would result in no increase in energy consumption or energy will be from some renewable sources. Would improve national cycle routes or national trails.
		0	Neutral	Would not result in any effects on material assets.
		-	Minor Negative	Would require new infrastructure with only limited opportunities for the re-use or recycling of waste materials and/or limited opportunities for sustainable design or the use of sustainable materials. Would result in a minor increase in energy consumption with no renewable energy options. Would result in a minor disruption on built assets and infrastructure, including transport.
		--	Moderate Negative	Would require new infrastructure with only limited opportunities for the re-use or recycling of waste materials. Would result in a moderate increase in energy consumption with no renewable energy options. Would result in a moderate disruption on built assets and infrastructure, including transport links.
		---	Major Negative	Would require significant new infrastructure that cannot be provided through the re-use or recycling of waste material and/or there are no opportunities for sustainable design or the use of sustainable materials. Would result in a major increase in energy consumption with no renewable energy options. Would result in a major disruption on built assets and infrastructure, including transport links.
		?	Uncertain	From the level of information available the effect is uncertain.

Appendix E. Option Figures

These figures have been redacted on the grounds of national security.

Appendix F. Habitats Regulations Assessment

Technical Note

Project:	SES Water WRMP24		
Subject:	Summary of WRSE SES Water HRA Screening		
Author:	David McLeod		
Date:	07/11/2022	Project No.:	5197934

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1. Introduction

This HRA Technical Note reports on the Stage 1 Screening Assessment (Test of Likely Significance) undertaken by Water Resources South East (WRSE)[1] for options being considered by SES Water, as part of the environmental assessment work to support the development of the WRSE Emerging Regional Plan. SES Water are one of the six water companies in the south east of England region within the WRSE alliance. The HRA assessments presented here have been undertaken by WRSE and results considered in the undertaking of the SEA of SES Water's WRMP24. No review of the HRA assessments have been undertaken and they are produced here only in summary.

1.1. Habitats Regulations Assessment

Legislation

HRA is required by Regulation 63 of the Conservation (Natural Habitats, and species) Regulations 2017 (as amended)[2], where a project or plan is likely to have a significant effect on a European site or European offshore marine site (either alone or in combination with other plans and projects) and is not directly connected with or necessary to the management of that site.

European sites include Special Areas of Conservation (SAC) and Special Protection Areas (SPA). HRA is also required, as a matter of UK Government policy[3], for potential SPAs (pSPA), possible SACs (pSAC) and listed and proposed wetlands of international importance (Ramsar sites and proposed Ramsar sites), and sites identified, or required, as compensatory measures for adverse effects on habitats sites, pSPA, pSAC and listed or proposed Ramsar sites, for the purposes of considering plans and projects which may affect them. Hereafter, all of the above designated nature conservation sites are referred to as 'European Sites'.

The stages of HRA process are:

- Stage 1 - Screening: To test whether a Scheme either alone or in combination with other plans and projects is likely to have a significant effect on a European Site;
- Stage 2 - Appropriate Assessment: To determine whether, in view of a European Site's conservation objectives, the Scheme (either alone or in combination with other plans and projects) would have an adverse effect on the integrity of the site with respect to the site structure, function and conservation objectives. If adverse impacts are anticipated, potential mitigation measures to alleviate impacts should be proposed and assessed;
- Stage 3 - Assessment of alternative solutions: Where a Scheme is assessed as having an adverse impact (or risk of this) on the integrity of a European Site, there should be an examination of alternatives (e.g., alternative locations and designs of development); and,
- Stage 4 – Imperative Reasons of Overriding Public Interest (IROPI): Assessment where no alternative solutions have been identified and where adverse impacts remain. In exceptional circumstance (e.g., where there are imperative reasons of overriding public interest), compensatory measures can be put in place to offset negative impacts.

A number of European Sites fall within the SES Water WRMP24 area, hereafter referred to as the 'Plan Area'. Under the Habitats Regulations, Competent Authorities, i.e. any minister, government department, statutory undertaker, public body, or person holding public office, have a general duty, in the exercise of any of their functions to have regard to the Habitats Regulations. Furthermore, according to UKWIR 2021 Guidance[4], a water company is the Competent Authority with respect to HRA. The Water Resource Planning Guideline (WRPG) for England and Wales[5] stipulates that Water Resources Management Plans (WRMPs) should be

[1] WRSE (2022) WRSE Draft Regional SEA Environmental Report – Appendix G. September 2022
[2] Amended by the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019, which means that SACs and SPAs in the UK no longer form part of the EU's Natura 2000 ecological network and now form part of the UK's national network of European Sites
[3] Ministry of Housing, Communities and Local Government (2021) National Planning Policy Framework (NPPF). Paragraph 181
[4] UK Water Industry Research (2021) Environmental Assessment Guidance for Water Resources Management Plans and Drought Plans (21/WR/02/15
[5] Water Resource Planning Guidelines, 2021, Environment Agency, Ofwat, Natural Resources Wales and Supplementary Planning Guidance 'Environmental and Society in Decision-Making'

subject to a HRA as set out in the Habitats Regulations. Therefore, SES Water has a statutory duty to prepare a WRMP and is the Competent Authority for the HRA in respect of it.

This HRA report summarises the Stage 1 Screening undertaken by WRSE on the SES Water options selected by SES Water for inclusion in WRMP24. Those options that remain screened in following review are to be taken forward to Stage 2, Appropriate Assessment (AA).

HRA is based on application of the precautionary principle; where Likely Significant Effect (LSE) cannot be ruled out or uncertainty remains, an impact is assumed, triggering the requirement for AA of that option.

1.2. Methodology

This methodology section sets out the approach taken to the HRA.

Stage 1–Screening

HRA screening determines whether there will be any LSEs on any European Site as a result of implementation of identified options 'alone' or 'in combination' with other plans or projects.

A critical part of the HRA Screening process is determining whether or not the proposals are likely to have a significant effect on European Sites and, therefore, if they will require an Appropriate Assessment. The concept of 'likely significant effect' as embodied in Article 6 (3) of the Habitats Directive and Regulation 61 (1) of the Habitats Regulations is central to their operation. Its interpretation is well established in law and guidance and embraces the precautionary principle.

The European Court Waddenzee judgement[6] provides clarification regarding the term 'likely'. It concludes that 'any plan or project not directly connected with or necessary to the management of the site is to be subject to an appropriate assessment of its implications for the site in view of the site's conservation objectives if it cannot be excluded, on the basis of objective information, that it will have a significant effect on that site, either individually or in combination with other plans or projects.'

Clarification has also been provided through case law on the meaning of 'likely' in relation to Bagmoor Wind Ltd v The Scottish Ministers[7]. 'The word 'likely' in the regulation is not to be construed as an expression of probability, in a legal sense, but as a description of the existence of a risk (or possibility)'. Consequently, if the possibility of a significant effect cannot be excluded based on objective information, an Appropriate Assessment will be required.

The European Court Waddenzee judgement also provides further clarification regarding the term 'significant': "where a plan or project not directly connected with or necessary to the management of a site is likely to undermine the site's conservation objectives, it must be considered likely to have a significant effect on that site. The assessment of that risk must be made in the light inter alia of the characteristics and specific environmental conditions of the site concerned by such a plan or project".

The Bagmoor Wind case also provides guidance on the term 'objective.' It states: "Objective, in this context, means information based on clear verifiable fact rather than subjective opinion". The Habitats Regulations Handbook2 states: "It will not normally be sufficient for an applicant merely to assert that the plan or project will not have an adverse effect on a site, nor will it be appropriate for a competent authority to rely on reassurances based on supposition or speculation. On the other hand, there should be credible evidence to show that there is a real rather than a hypothetical risk of effects that could undermine the site's conservation objectives. Any serious possibility of a risk that the conservation objectives could be undermined should trigger an 'appropriate assessment".

The test for likelihood of significant effects requires that consideration is given to potential causes and potential effects (i.e. any potential impact pathways). To do this, information on the Proposed Development is needed to identify the potential causes of effects, and information on the European Site is needed to identify any potential implications related to these effects. In the absence of a potential impact pathway, it can be concluded that no LSE would arise. Relevant aspects (effects) of the Proposed Development have been checked against all features of the relevant European Sites (i.e. screened) to determine whether an LSE may arise.

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[6] Case C –127/02 Waddenzee, reference for a preliminary ruling from the Raad van State: Landelijke Vereniging tot Behoud van de Waddenzee, Nederlandse Vereniging tot Bescherming van Vogels v Staatssecretaris van Landbouw, Natuurbeheer en Visserij, 7th September 2004

[7] Bagmoor Wind Limited v The Scottish Ministers, Court of Sessions [2012] CSIH 93

The judgement as to whether a significant effect is likely needs to be based on the best readily available information. Sources of information may include evidence from projects where similar operations have affected sites with similar qualifying features and conservation objectives and the judgement of relevant specialists that an effect is likely, as well as survey data collected to date for a particular project. In line with the precautionary principle, where there is uncertainty, and/or information is lacking in relation to the capacity of the effect to undermine the site's conservation objectives, it must be assumed that there will be an effect, unless further information can be made available to eliminate any areas of doubt.

The implication of the Court of Justice of the European Union (CJEU) judgement referred to as People Over Wind (Peter Sweetman v Coillte Teoranta, Case C-323/17) is that competent authorities cannot take account of any "measures that are intended to avoid or reduce the harmful effects of the envisaged project on the site concerned", when considering at the HRA screening stage whether the plan or project is likely to have an adverse effect on a European Site. The effect of this is that the screening stage must be undertaken on a precautionary basis with no regard to any proposed additional avoidance or reduction measures.

It is now accepted best practice to undertake a targeted 'source-pathway-receptor' approach to identifying European Sites for screening. This allows for the movement of mobile/migratory species, such as birds, fish and, if necessary, marine mammals, and their potential to interact with infrastructure and/or individual sites associated with options to be taken into account.

Stage 1 Screening has been undertaken by WRSE and results provided for the SES Water preferred options.

Options Assessed

The following options were assessed by WRSE and are included in at least one of the Preferred Plan (BVP), LCP and/or BESP alternatives.

Table 1: Options Assessed

SES Water Option Name	WRSE Option ID	Scheme Description	Plan Featured	Year Selected
Outwood Lane	SES_SES_HI-GRW_RE2_ALL_r22	This scheme seeks an increase in daily licence from 3 Ml/d to 8 Ml/d and requires an equivalent increase in pump capacity. The hydraulic capacity of the source has been proved during previous test pumping. The increase in PDO associated with the scheme would be 5 Ml/d. Potential for an ADO scheme has been considered by comparing the Woodmansterne group daily average licence limit with abs traction returns for the group from 2010-2016. The group licence offers an average headroom of 3.4 Ml/d if the borehole can be made to yield it.	LCP BESP	2042
Secombe Centre UV	SES_SES_HI-LRE_WT2_ALL_r26	This scheme provides UV treatment for the Secombe Centre groundwater source which is currently out of supply due to bacti detections on the raw water. Due to the limited footprint available at the Secombe Centre site, the UV treatment plant would be located at Cheam WTW on the 'East Main' which feeds water from Hackbridge, Goatbridge, Woodcote, Oaks, Langley Park, Sutton and Sutton Court Rd boreholes as well as Secombe Centre.	LCP BESP	2045
Raising of Bough Beech reservoir	SES_SES_HI-ROC_RE2_ALL_r1	Raising the Bough Beech reservoir embankment would increase the volume of stored water, which would provide an increase in the average yield from the reservoir. This option has been included to demonstrate the costs and likely increases in	BVP LCP BESP	2051

SES Water Option Name	WRSE Option ID	Scheme Description	Plan Featured	Year Selected
		average yield from such a scheme. Based on available drawings of the earth dam alignment, a 3m raising of the embankment would appear to be feasible. It is likely that some realignment of the embankment locally to the small housing development on the north side of the embankment would be required. A detailed study would be necessary to confirm the viability of this scheme. A 3m raising of the embankment would increase the storage volume of the reservoir by approximately 3,600Ml. The Aquator model of the Bough Beech reservoir system was used to estimate the additional average yield created by the dam raising. It is estimated that the scheme would provide an additional annual average yield of 5.5Ml/d, but no increase in peak output which is constrained by the WTW capacity.		

2. Stage 1 Screening

2.1. Assessment of Likely Significant Effects – Alone

The results of WRSEs Stage 1 Screening assessments are presented in Table 2 below. It can be seen that five European Sites have been considered in the screening of the three options. These are:

- Ashdown Forest SAC
- Ashdown Forest SPA
- Wimbledon Common SAC
- Richmond Park SAC
- Mole Gap to Reigate Escarpment SAC

No LSEs were identified 'alone' due to the distance of options from the European Sites and the absence of feasible impact pathways.

2.2. In combination assessment

The scope for LSEs in-combination with other plans and projects needs to be determined during screening at Stage 1. As all the options were assessed as having no impact pathways, there is no scope for the options to have any effect on European Sites. Therefore, there is no potential for LSEs in-combination and an in-combination assessment is not required.

2.3. Screening Conclusion

As a result of the Stage1 Screening exercise, WRSE identified that each of the three supply options featuring in at least one of the Preferred Plan (BVP), LCP and/or BESP can be screened out, both alone and in-combination and do not require a Stage 2 Appropriate Assessment.

Table 2: WRSE Level 1 Screening Results

Option ID Number	Option Title	Option Description	European Sites Assessed (inc distances)	Qualifying Features	SSSI Condition Assessment	Screening Result	Justification for Assessment
SES_SES_HI-ROC_RE2_ALL_r1	Raising of Bough Beech reservoir	This option considers the raising the Bough Beech reservoir embankment	Ashdown Forest SAC, located approximately 13.8km south of the option	**Annex I habitats that are a primary reason for selection of this site**: 4010 Northern Atlantic wet heaths with *Erica tetralix* 4030 European Dry Heaths **Annex II species present as a qualifying feature, but not a primary reason for site selection**: 1166 Great Crested Newt *Trituris cristatus*	Ashdown Forest SSSI: Favourable: 20.31% Unfavourable - Recovering: 79.29% Unfavourable - No change: 0.00% Unfavourable - Declining: 0.40%	No Likely Significant Effects	The SAC site is located a significant distance from the works with no effect pathways considered
			Ashdown Forest SPA, located approximately 13.8km south of the option	Article 4.1 Qualification of the SPA During the breeding season the area regularly supports: Caprimulgus europaeus 1% of the GB breeding population Sylvia undata 1.3% of the GB breeding population		No Likely Significant Effects	
SES_SES_HI-LRE_WT2_ALL_r26	Secombe Centre UV	This scheme provides UV treatment for the Secombe Centre groundwater source which is currently out of supply due to bacti detections in the raw water. Due to the limited footprint available at the Secombe Centre site, the UV treatment plant would be located at Cheam WTW on the 'East Main' which feeds water from Hackbridge, Goatbridge, Woodcode, Oaks, Langley Park, Sutton and Sutton Court Rd.	Wimbledon Common SAC, located approximately 4.7km north west of the option	**Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site** 4010 Northern Atlantic wet heaths with *Erica tetralix* 4030 European dry heaths **Annex II species that are a primary reason for selection of this site** 1083 Stag beetle *Lucanus cervus* Wimbledon Common has a large number of old trees and much fallen decaying timber. It is at the heart of the south London centre of distribution for stag beetle *Lucanus cervus*, and a relatively large number of records were received from this site during a recent nationwide survey for the species (Percy et al. 2000). The site supports a number of other scarce invertebrate species associated with decaying timber.	Wimbledon Common SSSI: Unfavourable - Recovering - 94.99% Unfavourable - No Change - 5.01%	No Likely Significant Effect	The option is considered to be located at enough of a distance, with no effect pathways identified, to be at risk of causing an effect on the SAC qualifying species, stag beetle, or its associated habitat of decaying timber.

Option ID Number	Option Title	Option Description	European Sites Assessed (inc distances)	Qualifying Features	SSSI Condition Assessment	Screening Result	Justification for Assessment
		boreholes as well as Secombe Centre. Although the PDO of Secombe Centre is only 4.54 ML/d, the daily licence for the East Main Sources is 66Ml/d and so the plant would need to have this capacity. This would provide pre-emptive protection against any further bacti or cryptosporidium detections at other sources on the main. The anticipated increase in ADO is 2.07 Ml/d and in PDO is 4.54Ml/d.	Richmond Park SAC, located approximately 6.4km north west of the option	**Annex II species that are a primary reason for selection of this site** 1083 Stag beetle *Lucanus cervus* Richmond Park has a large number of ancient trees with decaying timber. It is at the heart of the south London centre of distribution for stag beetle *Lucanus cervus*, and is a site of national importance for the conservation of the fauna of invertebrates associated with the decaying timber of ancient trees.	Richmond Park SSSI: Unfavourable - Recovering - 100%	No Likely Significant Effect	The option is considered to be located at enough of a distance, with no effect pathways identified, to be at risk of causing an effect on the SAC qualifying species Stag beetle, or its associated habitat of decaying timber.
SES_SES_HI-GRW_RE2_ALL_r22	Outwood Lane	This option considers the increase of daily licence from 3Ml/d to 8Ml/d which will require an equivalent increase in pumping capacity.	Mole Gap to Reigate Escarpment SAC, located approximately 5.2km south of the option	**Annex I habitats that are a primary reason for selection of this site** 5110 Stable xerothermophilous formations with Buxus sempervirens on rock slopes (Berberidion p.p.) 6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) 91J0 Taxus baccata woods of the British Isles * Priority feature **Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site** 4030 European dry heaths 9130 *Asperulo-Fagetum* beech forests **Annex II species present as a qualifying feature, but not a primary reason for site selection** 1166 Great crested newt *Triturus cristatus* 1323 Bechstein's bat *Myotis bechsteinii*	Mole Gap to Reigate Escarpment SSSI: Favourable - 52.79% Unfavourable - Recovering - 46.71% Unfavourable - No change - 0.51%	No Likely Significant Effect	No effect pathways identified between the option and the SAC. No new infrastructure required for the scheme and, therefore, the option is unlikely to effect the SAC considering the distance. This includes through susceptibility to hydrological/hydrogeological changes.

Appendix G. Water Framework Directive

Technical Note

Project:	SES Water WRMP24
Subject:	Summary of WRSE SES Water WFD Screening
Author:	David McLeod; Simon Wood
Date:	11/11/2022
Project No.:	

Document history

Revision	Purpose description	Originated	Checked	Reviewed	Authorised	Date
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Client signoff

Client	SES Water
Project	SES Water WRMP24
Project No.	
Client signature / date	

1. Introduction

This document presents the findings of the Water Framework Directive (WFD) assessment that has been undertaken as part of the environmental assessment process to support the development of the WRSE Emerging Regional Plan.

The WFD assessments presented here have been undertaken by WRSE and results considered in the undertaking of the SEA of SES Water's WRMP24. No review of the WFD assessments has been undertaken and they are produced here only in summary.

1.1. Water Framework Directive

Legislation

The Water Framework Directive (WFD) came into force in 2000 (Directive 2000/60/EC) and was transposed into UK law in 2003 (The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003) and most recently updated in 2017 (The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017). Assessments undertaken to assess compliance with this legislation have been commonly referred to as WFD assessments. In 2021, the UK Government sought to drop reference to any European legislation post BREXIT and thus has started to call the previously named WFD assessments as Water Environment Regulations (WER) assessments. However, as the terminology needs to be consistent across several ongoing assessments across the UK, WFD terminology is retained for this assessment.

The WFD's principal aims are to protect and improve the water environment and promote the sustainable use of water. The headline environmental objectives of the WFD and its daughter directives are to:

- Prevent the deterioration of aquatic ecosystems; and,
- Protect, enhance and restore water bodies to Good Status; which is based on ecology (with its supporting hydromorphological and physico-chemical factors) and chemical factors for surface water, and water quantity and Chemical Status for groundwaters. Where a water body is designated as Heavily Modified, or Artificial, the water body will need to be Good Ecological Potential.

Surface Water Bodies

The WFD sets a default objective for all rivers, lakes, estuaries, groundwater and coastal water bodies to achieve Good Status by 2027 at the latest. For natural surface water bodies, Good Status is a function of both Good Chemical Status (GCS) and Good Ecological Status (GES). The River Basin Management Plans (RBMPs) outline the actions required to enable natural water bodies to achieve these objectives. Artificial and Heavily Modified Water Bodies (A/HMWBs) are considered unable to attain GES due to the modifications that are necessary to maintain their function for society or their 'human use' as they provide important socio-economic benefits. They are, however, required to achieve Good Ecological Potential (GEP), through the implementation of a series of Mitigation Measures outlined in the RBMP. A/HMWBs still need to attain GCS which, along with GEP will collectively result in Good Status in these water bodies.

New activities and Schemes that affect the water environment may adversely impact biological, hydromorphological, physico-chemical and/or chemical quality elements (WFD quality elements) that could lead to a deterioration in water body status. They may also preclude the implementation or effectiveness of the proposed improvement measures, leading to the water body failing to meet its WFD objectives for GES/GEP. Under the WFD, activities and Schemes must not cause deterioration in water body status or prevent a water body from meeting GES/GEP by invalidating improvement measures.

The overall ecological status of a water body is primarily based on consideration of its biological quality elements (phytoplankton, macrophytes, phytobenthos, benthic invertebrates and fish) and is determined by the lowest scoring of these elements. These biological elements are 'supported' by the physico-chemical (water quality) and hydromorphological (hydrological or tidal regime, river continuity and morphological conditions (i.e. habitat)) quality elements.

To achieve GCS, a water body must pass a separate chemical status assessment, relating to pass/fail checks on the concentrations of various identified priority/dangerous substances.

Groundwater Bodies

For groundwater bodies, good status has a quantitative and a chemical component. Both are measured on a scale of good, moderate or poor, and a confidence rating is assigned to the status assessment of high or low. Together, these provide a single final classification of either good or poor status. There is also a trend objective set for groundwater water bodies where environmentally significant and sustained rising trends in pollutant concentrations need to be identified along with a definition of the starting point (percentage of level or concentration) for trend reversal. Furthermore, the daughter directive of the WFD specifically concerning groundwater (the Groundwater Directive) also requires the prevention of any input of priority substances and limiting (or control) of the input of all other substances to groundwater to prevent the deterioration of status.

1.2. Methodology

Approach to WFD assessments

The All Company Working Group (ACWG) developed a consistent framework for undertaking WFD assessments for Strategic Resource Options (SROs) to demonstrate where options would or would not cause deterioration in status of any WFD water bodies. The assessment considers mitigation that would need to be put in place to protect water body status. The assessment also considers WFD future objectives. This methodology is also being used in the development of WRMP's and has been followed for this assessment.

Two stages of assessment are completed under the ACWG WFD approach, an initial Level 1 basic screening and a Level 2 detailed impact screening. These are conducted/reported using a spreadsheet assessment tool which is automated based on option information for Level 1 and expert judgment for Level 2. The Level 1 assessment broadly aligns to the Screening and Scoping stages of the Planning Inspectorate (PINS) guidance and the Level 2 assessment the Impact assessment.

Level 1 assessment – Basic screening

The Level 1 WFD assessment was completed as part of the WRSE emerging regional plan and has been reviewed and updated here for the WRMP24 Schemes. 33 schemes have been previously assessed at Level 1. The assessment followed the ACWG methodology, but for all options also included additional activities and scoring that have been carried forward into this assessment.

The Level 1 assessment follows these steps:

- Identify affected water bodies.
- Breakdown option into activities involved in construction, operation and decommissioning phases.
- Assign each activity an impact score (based on a predefined list, with scores as per Table 1).
- Consider any embedded mitigation measures.
- Calculate a screening score (using a 6-point scale from -2 to 3) to 'screen out' water bodies and options with no or very minor potential impacts from further assessment. If the maximum impact score is greater than 1 (minor localised impact) then the water body will need to be taken forward into Level 2 screening.

Where water bodies and option impacts were 'screened in', they are then to be taken forward to Level 2 assessment.

Table 1: Impact scoring system from the WFD assessments

Impact	Score	Description
Very beneficial	-2	Impacts that, taken on their own, have the potential to lead to the improvement in the ecological status or potential of a WFD quality element for the entire water body.
Beneficial	-1	Impacts that, when taken on their own, have the potential to lead to a minor localised or temporary improvement that does not affect the overall WFD status of the water body or any quality elements.
No/minimal	0	No measurable change in the quality of the water environment or the ability for target WFD objectives to be achieved.
Low	1	Impacts that, when taken on their own, have the potential to lead to a minor localised, short-term and fully reversible effects on one or more of the quality elements but would not result in the lowering of WFD status. Impacts would be very unlikely to prevent any target WFD objectives from being achieved.
Medium	2	Impacts that, when taken on their own, have the potential to lead to a widespread or prolonged effect on the quality of the water environment that may result in the temporary reduction in WFD status. Impacts have the potential to prevent target WFD objectives from being achieved.
High	3	Impacts when taken on their own have the potential to lead to a significant effect and permanent deterioration of WFD status. Potential for high impact on preventing target WFD objectives from being achieved.

1.3. Level 2 assessment – detailed impact screening

The Level 2 assessment has been undertaken only on those supply options selected before 2050 by the WRSE Best Value Plan (BVP), Best Environmental and Societal Plan (BESP) or the Least Cost Plan (LCP) and is based on the ACWG methodology for each of the Schemes following these steps:

Water body scale detailed assessment of impacts to each WFD quality element for each activity proposed as part of each option;

- Assessment of data confidence level and design certainty – confidence levels are assigned for each assessment, based on the quality and availability of both physical data and design information about the option at the time of assessment. This has been taken at low for both aspects for all the options;
- Identification of further mitigation needs;
- Assessment of impacts after mitigation (scoring on a 6-point scale); and
- Identification of activities to improve certainty of assessment outcomes.

The Level 2 assessment spreadsheet that records the ACWG methodology only considers surface and transitional water bodies so separate assessment sheets have been developed following the same principles for groundwater and coastal water bodies and coastal catchments.

Where a Level 2 assessment of a groundwater body is required, a similar methodology has been developed as for surface water bodies. The Level 2 groundwater assessment spreadsheet assesses potential impacts for each activity proposed as part of an option against each of the quantitative and chemical elements of the groundwater body. In line with the surface water body assessment, data confidence and design certainty have been assessed and mitigation requirements identified.

In some instances, the options may interact with coastal catchments which are not currently assessed under the WFD as part of the RBMP Cycle 2 or 3. These areas do not have associated WFD data. Although these catchments are not currently reported under the WFD, they are under the same protection from WFD

legislation. Therefore, these water bodies have been included as part of this assessment to ensure WFD compliance. Where these water bodies are scoped into the Level 2 assessment, a high-level approach has been taken. As these water bodies do not have associated classifications or objectives it has been assumed that they are currently at Good Status. Because each individual element does not have an associated status, the Level 2 assessment has been conducted against the WFD Status Component rather than the individual elements. These status components have also been assumed to be at Good Status.

1.4. Method limitations

Limitations of the ACWG methodology identified during the assessment of these Schemes are listed below:

- The ACWG Level 2 assessment guidance and spreadsheet tool is set up for river and transitional water bodies only. Bespoke assessment tools have been developed for groundwater and coastal water bodies and coastal catchment to provide a comparative assessment.
- The methodology over-assesses some activities/impacts, whilst under-assessing others (in relation to WFD elements).
- The existing impacts and mitigation are not accurately identifying all impacts associated with an activity. For example, flow regime and hydromorphology are intrinsically linked, but this is not always the case when following the assessment methodology. However, the original version of this assessment has been completed for consistency with other projects / assessments.
- For HMWBs, the ACWG methodology suggests obtaining HMWB measures information from the Environment Agency to add to the RNAG/PoM table in the Level 2 assessment. This information is not publicly available, and engagement with the Environment Agency has not been undertaken as part of this project, therefore this information is not included.

1.5. Data used

The following available data has been used to undertake these assessments:

- Dossiers summarising the schemes as provided by SES Water
- Where available, scheme plans provided in GIS by SES Water
- WFD baseline information from the Environment Agency's Catchment Data Explorer (for RBMP 2 and 3 as outlined)
- British Geological Survey open source 1:625k geological mapping, including bedrock, superficial deposits and linear features
- Ordnance Survey Rivers watercourse mapping
- Environment Agency mapping of Ground Water Dependent Terrestrial Ecosystems (GWDTEs).

1.6. Schemes assessed

As mentioned above, Level 2 assessments have only been undertaken on options that have been selected prior to 2050 by the WRSE Best Value Plan (BVP), Best Environmental and Societal Plan (BESP) and the Least Cost Plan (LCP) and which were Level 1 screened in as requiring L2 assessment.

The pre-2050 SES Water options selected in the WRSE BVP, BESP and LCP are listed in Table 2. The Level 1 and Level 2 assessments for these schemes are summarised in Table 3 and described in Section **Error! Reference source not found.**

Table 2: Schemes assessed

SES Water Option Name	WRSE Option ID	Scheme Description	Plan Featured	Year Selected
Outwood Lane	SES_SES_HI-GRW_RE2_ALL_r22	This scheme seeks an increase in daily licence from 3 Ml/d to 8 Ml/d and requires an equivalent increase in pump capacity. The hydraulic capacity of the source has been proved during previous test pumping. The increase in PDO associated with the scheme would be 5 Ml/d. Potential for an ADO scheme has been considered by comparing the Woodmansterne group daily average licence limit with abstraction returns for the group from 2010-2016. The group licence offers an average headroom of 3.4 Ml/d if the borehole can be made to yield it.	BVP LCP BESP	2042
Secombe Centre UV	SES_SES_HI-LRE_WT2_ALL_r26	This scheme provides UV treatment for the Secombe Centre groundwater source which is currently out of supply due to bacti detections on the raw water. Due to the limited footprint available at the Secombe Centre site, the UV treatment plant would be located at Cheam WTW on the 'East Main' which feeds water from Hackbridge, Goatbridge, Woodcote, Oaks, Langley Park, Sutton and Sutton Court Rd boreholes as well as Secombe Centre.	LCP	2053
			BESP	2045
Raising of Bough Beech reservoir	SES_SES_HI-ROC_RE2_ALL_r1	Raising the Bough Beech reservoir embankment would increase the volume of stored water, which would provide an increase in the average yield from the reservoir. A 3m raising of the embankment would increase the storage volume of the reservoir by approximately 3,600 Ml. The Aquator model of the Bough Beech reservoir system was used to estimate the additional average yield created by the dam raising. It is estimated that the scheme would provide an additional annual average yield of 5.5 Ml/d, but no increase in peak output which is constrained by the WTW capacity.	BVP LCP BESP	2051

1.7. Design assumptions

The options considered are still in the early stages of design development and in many cases only high level design information is available for the assessment. Therefore, a precautionary approach has been exercised because of residual uncertainty. The designs assessed are based on the information provided in the dossiers as provided by SES Water. The WFD assessments all have the following assumptions:

- The assessment assumes pipelines are underground (directionally drilled or pipe-jacked beneath any watercourses) and therefore will not cross watercourses above ground or cause direct impacts.
- For effluent reuse options, it is assumed that the current discharge water quality would fail to meet Good status for at least some of the WFD water quality parameters in receiving water bodies. At this stage the WFD risk assessment does not take into account additional treatment and retains a risk of changes to physico-chemical conditions until further evidence is provided by treatment process design and water quality dispersion modelling.

- Assessment assumes fail safes / stop of transfer will be in place in the case of a significant failure of treatment.
- The geographical extent of the WFD assessment has been limited to water bodies between the start point and end point of the option. For options which involve abstractions from or discharges to watercourses there is potential for some effects continuing downstream, although it is assumed these would become increasingly limited to 'negligible' with distance.
- Transfer operational requirements are unknown at this stage and the assessment has not accounted for seasonality or sweetening flows (e.g. with respect to flows in watercourses).
- At the locations where new intakes are required on watercourses, it is assumed that there will be no requirements for impoundments or weirs as part of the design, unless stated otherwise within the design detail.
- Where embankments are required for the operation of reservoirs, it is assumed that below ground structures will not be present.
- Where pumping stations are part of the Schemes, it is assumed that below ground structures in the form of deep foundations will be associated with them.
- Pipelines will be situated at a depth which does not interact with the groundwater table.
- Water discharged to a watercourse from a Water Treatment Works (WTW) will be treated to ensure equal or better quality than the receiving water body.
- Assume any WTW associated with schemes will operate within their own permits.

2. Scheme assessments

The findings of the Level 1 basic screening and Level 2 detailed screening assessments are reported in Table 3 with details of the assessments described in the following sub-sections.

2.1. Outwood Lane (SES_SES_HI-GRW_RE2_ALL_r22)

2.1.1. Level 1 basic screening assessment

Two water bodies were identified as potentially at risk of impact on WFD status for Level 1 screening assessment:

- Wandle (Croydon to Wandsworth) and the Graveney river water body (GB106039023460)
- Epsom North Downs Chalk groundwater body (GB40601G602200)

Due to the option only requiring changes to pumping infrastructure at the abstraction source, the option activities are high up within the Wandle and the Graveney catchment at least 8 km away from the springhead of the these rivers. The option was therefore screened as not directly presenting any risk to the river water body. However, the increase in abstraction activity associated with the option was identified as potentially presenting a risk to the WFD status of the Epsom North Downs Chalk groundwater body (including the River Wandle's dependency upon it) and therefore triggered the requirement for a Level 2 assessment.

2.1.2. Level 2 detailed screening assessment

Only the Epsom North Downs Chalk groundwater body (GB40601G602200) was screened as requiring L2 assessment for this option due to the option activity of increased groundwater abstraction. The Level 2 assessment concluded an overall residual medium risk (Score 2) of WFD impact based upon the worst post-mitigation impact score from the following WFD status components:

- Quantitative Dependent Surface Water Body Status test post-mitigation impact score 2 (Medium risk)
  - GB106039023460 Wandle (Croydon to Wandsworth) and the Graveney Water Body and GB106039017640 Wandle (Carshalton Branch at Carshalton) are the surface water bodies (HMWB rivers) that are dependent upon the Epsom North Downs Chalk groundwater body. This is due to these rivers being in part fed by Chalk springs whose flow is dependent upon the groundwater levels in the Chalk aquifer from which Outwood Lane source (the proposed option) abstracts to the south, up groundwater gradient.

  - Whilst the most recent (2019) overall quantitative status is 'Poor' the component 'Quantitative Dependent Surface Water Body Status' is 'Good'. This reflects that surface water bodies that are dependent on the groundwater body and at Poor status do not make up more than 20% of the groundwater body area. Indeed, the Wandle (Croydon to Wandsworth) and Graveney HMWB is at Moderate Ecological Status with a 'supports good' hydrological regime and the EA assessed this 'quantitative dependent surface water body status' component as 'Probably Not at Risk of Deterioration' in its 2020 assessment.
  - Although the option is to increase the daily licence from 3 Ml/d to 8 Ml/d, the annual licensed volume would not change and so over the long-term, it is considered unlikely that relatively short periods of peak abstraction would result in a deterioration in status of the dependent surface water body.
  - The groundwater body contributes to baseflow, however, the Wandle and the Graveney are located over 9 km from the proposed location, the proposal is unlikely to significantly reduce baseflow but this is unknown without further investigation. Further work is required to understand the impacts of the proposal on the quantitative dependent surface water body test.
- Quantitative GWDTEs test post-mitigation impact score 0 (No/Minimal risk)
  - This GWDTE component has a latest (2019) status of 'Good' and the EA's 2020 assessment concluded that it is 'Probably Not At Risk' of deterioration. Increased rates of daily abstraction from the Epsom North Downs Chalk groundwater body may cause an increase in localised drawdown of groundwater levels but the short-term impact on groundwater emergence at the springline 9 km to the NNE is less likely to be evident if annual abstraction remains unchanged..Further work is required to understand the impacts on the quantitative dependent GWDTE test.
- Quantitative Saline Intrusion test post-mitigation impact score 0 (No/Minimal risk)
  - This component of the quantitative status has a latest (2019) status of 'Good'. The risk of deterioration resulting from increases in daily licence and short-term higher abstraction but no change to long-term annual abstraction is unlikely to result in risk of deterioration of this component.
- Quantitative Water Balance test post-mitigation impact score 2 (Medium risk)

  Even after the 2019 change in way this Quantitative Water Balance component is calculated, the status remains 'Poor' with High Confidence. This means that the Available Groundwater Resource is less than the Recent Actual long term average abstraction. The EA's 2020 assessment put it 'At Risk' of deterioration which means that 'the Available Groundwater Resource is less than the Future Predicted abstraction'. A short-term increase in abstraction rates associated with this option should not affect the risk of deterioration so long as long-term (annual) abstraction doesn't increase. Further work is required to understand whether this option would result in a long-term increase in abstraction above Recent Actual.
- Chemical test components post-mitigation impact score 0 (No/minimal risk):
  - The increase in abstraction associated with this option is considered to present a minimal risk to the WFD groundwater body chemical test components.

2.2. Secombe Centre UV (SES_SES_HI-LRE_WT2_ALL_r26)

2.2.1. Level 1 basic screening assessment

Four water bodies were identified as potentially at risk of impact on WFD status for Level 1 screening assessment:

- Epsom North Downs Chalk groundwater body (GB40601G602200)
- Wandle (Carshalton Branch at Carshalton) river water body (GB106039017640)
- Beverly Brook river water body (GB106039022850)
- Hogsmill river water body (GB106039017640)

Due to the option only requiring changes to pumping and water treatment infrastructure at the abstraction source and at Cheam Water Treatment Works, Level 1 screening determined the WFD impact risk on the surface water bodies to be low and therefore a Level 2 assessment was not required. However, the increase in abstraction (above recent abstraction) activity associated with the option was identified as potentially presenting a risk to the WFD status of the Epsom North Downs Chalk groundwater body (including the potential dependency of the River Wandle, Beverley Brook and River Hogsmill on it) and therefore triggered the requirement for a Level 2 assessment.

2.2.2. Level 2 detailed screening assessment

Only the Epsom North Downs Chalk groundwater body (GB40601G602200) was screened as requiring L2 assessment for this option due to the option activity of increased groundwater abstraction (above recent actual rates). The Level 2 assessment concluded an overall residual medium risk (Score 2) of WFD impact based upon the worst post-mitigation impact score from the following WFD status components:

- Quantitative Dependent Surface Water Body Status test post-mitigation impact score 2 (Medium risk)
  - In 2019, the Quantitative Dependent Surface Water Body component status was 'Good' indicating that the percentage coverage of the groundwater body by 'Poor or Bad status' surface water bodies is <20%. The groundwater body contributes baseflow at the springhead of the GB106039017440 Hogsmill ('Moderate Ecological Status' and 'Supports Good Hydrological Regime' in 2019) and GB106039017640 River Wandle Carshalton Branch at Carshalton ('Bad Ecological Status' and 'Does Not Support Good' in 2019). The GB106039022850 Beverley Brook (Motspur Park to Thames) and Pyl Brook at West Barnes Water Body ('Moderate Ecological Status' and 'Supports Good Hydrological Regime' in 2019) is fed by surface runoff and treated effluent from STW and is not believed to be fed significantly by Chalk springflow.
  - This option would allow increased abstraction within current licence but above recent actual abstraction by eliminating a bacteriological water quality constraint on the deployable output of the Cheam Licence Group. Any increase in abstraction above the recent actual abstraction could potentially result in a deterioration of the Hogsmill WFD status thereby increasing the percentage area at Poor or Bad to over 20% and resulting in a decline in the Groundwater Body Quantitative status.
- Quantitative GWDTEs test post-mitigation impact score 0 (No/Minimal risk)
  - Increased abstraction from the Epsom North Downs Chalk groundwater body may cause a drawdown of groundwater levels potentially resulting in deterioration of GWDTEs. However, no GWDTE are located within 1km of the proposal
- Quantitative Saline Intrusion test post-mitigation impact score 0 (No/Minimal risk)
  - Although currently at good class for the Quantitative Saline Intrusion test, increased abstraction (above recent actual) in the area has the potential to cause deterioration of the quantitative saline intrusion test. However, an increase in ADO and PDO, when the groundwater body is not connected to coastal areas, is unlikely to result in a groundwater body scale change.
- Quantitative Water Balance test post-mitigation impact score 2 (Medium risk)
  - Even after the 2019 change in way this Quantitative Water Balance component is calculated, the status remains 'Poor' with High Confidence. This means that the Available Groundwater Resource is less than the Recent Actual long term average abstraction. The EA's 2020 assessment put it 'At Risk' of deterioration which means that 'the Available Groundwater Resource is less than the Future Predicted abstraction'. An increase in long-term average abstraction above recent actual abstraction associated with this option could put the poor status at risk of further deterioration but if the increases in abstraction are short-term to address peak demand without an overall increase in long-term average abstraction, the risk of deterioration is likely to be lower. Further work is required to understand whether this option would result in a long-term increase in abstraction above recent actual and on the impact of such abstraction on springflow to the Hogsmill and the Wandle.
- Chemical test components post-mitigation impact score 0 (No/minimal risk):
  - The increase in abstraction associated with this option is considered to present a minimal risk to the WFD groundwater body chemical test components.

2.3. Raising of Bough Beech Reservoir (SES_SES_HI-ROC_RE2_ALL_r1)

2.3.1. Level 1 basic screening assessment

Two water bodies were identified as potentially at risk of impact on WFD status for Level 1 screening assessment:

- Bough Beech Reservoir lake water body (GB30643602)
- Lower Eden river body (GB106040018160)

The option activities of modification of an existing reservoir and new or increased surface water abstraction triggered the requirement for a Level 2 assessment.

2.3.2. Level 2 detailed screening assessment

The Level 2 assessment concluded an overall residual medium risk (Score 2) of WFD impact based upon the worst post-mitigation impact score from the following WFD status components:

- Biological Quality Elements post-mitigation impact score 2 (Medium risk)
  - The proposed increase abstraction may have effects on flow velocity that can have an effect on the hydroecology and a furhter investigation may be required to establish potential risks, however, the abstraction from the Lower Eden will be undertaken within the abstraction within licence limits and during winter months (Sept-April) when flow and water levels are likely to be higher and unlikely to substantially affect surface water flows and levels. The abstraction volumes are also constrained by the variable MRF linked to the licence.
- Hydromorphological Supporting Elements test post-mitigation impact score 2 (Medium risk)
  - Potential changes in sedimentation may occur as a result of higher abstraction thereby affecting the exisitng hydroecology and a further investigation may be required to evaluate these risks, however, the abstraction is proposed to only be undertaken during the winter months (Sep - Apr) when flows are naturally higher. Furthermore, water abstracted is constrained by the MRF linked to the licence.
  - Higher abstraction during the winter months (Sep - April) may have an effect on the hydromorphology of the water body as a result of less flow going through the channel, an investigation may be required to establish the risks to hydroecology. However, it is noted that the abstraction will take place when higher water flows and volumes are expected, and the proposed quantities are constrained by the existing MRF linked to the licence.

Table 3: Summary findings the Level 1 and Level 2 assessments

SES Water Option Name	Scheme type	Water Body ID	Water Body Name	Water Body type	L1 review findings (WRMP24)	Reason for Level 2 assessment	Level 2 assessment summary
Outwood Lane	Supply	GB106039023460	Wandle (Croydon to Wandsworth) and the Graveney	River (Heavily Modified)	L2 assessment required	N/A	N/A
		GB40601G602200	Epsom North Downs Chalk	Groundwater	L2 assessment required	New or increased groundwater abstraction; Increase in surface water and groundwater abstraction licences	Medium remaining risk score 2 (Quantitative dependent surface water body status; quantitative water balance)
Secombe Centre UV	Supply				L2 assessment required	New or increased groundwater abstraction	Medium remaining risk score 2 (Quantitative dependent surface water body status; quantitative water balance)
		GB106039017440	Hogsmill	River (Heavily Modified)	Screened as WFD compliant	N/A	N/A
		GB106039022850	Beverley Brook (Motspur Park to Thames) and Pyl Brook at West Barnes	River (Heavily Modified)	Screened as WFD compliant	N/A	N/A
Raising of Bough Beech reservoir	Supply	GB106040018160	Lower Eden	River (Heavily Modified)	L2 assessment required	Modification of an existing reservoir; new or increased surface water abstraction	Medium remaining risk score 2 (Biological quality elements; hydromorphological Supporting Elements)
		GB30643602	Bough Beech Reservoir	Lake (Heavily Modified)	L2 assessment required	Modification of an existing reservoir	Medium remaining risk score 2 (Biological quality elements; hydromorphological Supporting Elements)

3. Cumulative impact assessment

3.1. Background

This section provides the findings of the Water Framework Directive (WFD) cumulative assessment which has been undertaken for options selected by the WRSE BVP to support the development of SES Water's WRMP24.

Level 1 (basic screening) assessments have been undertaken for all of the BVP options, and if the Level 1 assessment indicated there may be an impact upon a waterbody, then, for those options selected before 2050, a Level 2 (detailed screening) assessment has also been undertaken. The cumulative assessment detailed here combines the outputs from the Level 1 and Level 2 assessments, to assess cumulative impacts on a waterbody scale.

WRSE is undertaking WFD cumulative assessments for option impacts which interface between the water company boundaries (i.e. are within a 500 m of a water company boundary). However, SES Water is responsible for undertaking WFD cumulative assessments for all of its options within its water company boundary.

High-level guidance is provided by WRSE for undertaking cumulative WFD assessments in its 'Regional Approach to In combination and cumulative effects assessment of the WRSE draft Plan'.

The WFD cumulative assessment methodology provided within Appendix A of the above-mentioned guidance indicates that:

- Cumulative assessments look at whether the individual options that make up the regional plan could have in-combination effects that would affect the WFD objectives of a waterbody.
- The WFD Level 1 and 2 screening assessments are used to identify potential for in-combination effects.
- Although an individual option may not affect WFD status on its own, when combined with another option or group of options, there could be an in-combination effect.

3.2. Cumulative Assessment

Other than the drought permit options, which are temporary and cumulatively assessed within SES Water's Drought Plan SEA, only one permanent supply option is selected under the WRSE BVP before 2050. This option is:

- R22 Outwood Lane

A further supply option, R1: Raising of Bough Beech reservoir, not selected by the BVP until 2055, has been included in cumulative impact assessment as its construction would need to commence before 2050 for this option to deliver supply benefit by 2055.

Table 4: Summary of water body impact assessment from WRSE BVP SES Water water supply options that are selected pre-2050 or which require construction to commence pre-2050

Potentially impacted water body identified during L1 and L2 screening		Water body impact risk (Not applicable; stage screened out; remaining risk			
		R22 Outwood Lane		R1 Bough Beech raising	
Water body number	Water body name	L1	L2	L1	L2
GB106039023460	Wandle (Croydon to Wandsworth) and the R. Graveney	Screened out at L1	N/A	N/A	N/A
GB40601G602200	Epsom North Downs Chalk	Activity triggered L2 assessment	Remaining risk (Quantitative dependent surface water body status; quantitative water balance)	N/A	N/A
GB106040018160	Lower Eden	N/A	N/A	Activity triggered L2 assessment	Remaining risk (Biological effects, hydromorphological supporting elements)
GB30643602	Bough Beech	N/A	N/A	Activity triggered L2 assessment	Remaining risk (Hydromorphological supporting elements)

As Table 4 indicates, there is no potentially impacted water body common to the two BVP selected non-temporary water supply options. There is therefore considered to be negligible risk that implementation of these two options together would result in a cumulative impact on a WFD water body that is greater than the impact of the individual option on its own.

Appendix H. Biodiversity Net Gain

WRMP24

Biodiversity Net Gain

SES Water

30 September 2022

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Notice

This document and its contents have been prepared and are intended solely as information for SES Water and use in relation to WRMP24

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Client signoff

Client	SES Water
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Contents

Tables

1. Overview

1.1. Introduction

This appendix presents a summary of the Biodiversity Net Gain (BNG) Assessment that has been undertaken as part of the environmental assessment process to support the development of Sutton and East Surrey (SES) Water's Water Resources Management Plan 2024 (WRMP24). The BNG assessment has been undertaken by Water Resources South East (WRSE) to support the development of the WRSE Emerging Regional Plan for options being considered by SES Water (one of the six water companies in the south east of England region within the WRSE alliance).

The BNG Assessment undertaken by WRSE which has been used to support the emerging regional plan will inform the WRSE Draft Regional Plan to be published in November 2022.

As per SES Water instruction, an independent review of the WRSE BNG Assessment has not been undertaken. Sections 2 and 3 of this appendix merely summarise the WRSE methodology taken for the BNG Assessment and the results for SES Water's preferred options.

1.2. Biodiversity Net Gain

The British Standard BS 8683:2021[1] defines BNG as "a specific, quantifiable outcome from project activities that deliver demonstrable benefits for biodiversity compared to the baseline situation".

The Biodiversity Metric 3.1, published by Natural England[2] in April 2022, provides a way of measuring and accounting for biodiversity losses and gains resulting from development and/or land management change. Biodiversity Metric 3.1 is an updated version of the original Defra biodiversity metric and its subsequent revisions (the Biodiversity Metric 2.0 beta test version and Biodiversity Metric 3.0).

BNG assessments of emerging options were initially undertaken using Biodiversity Metric 2.0. The BNG assessment process then adopted Biodiversity Metric 3.0 upon its publication in July 2021. WRSE has confirmed that the BNG assessments of preferred options will not be updated using Biodiversity Metric 3.1, and that any additional emerging options will be assessed using Biodiversity Metric 3.0[3], referred to hereafter as 'the metric'.

1.2.1. Legislative Change

A new piece of legislation called the Environment Act (hereafter referred to as 'the Act') was given royal assent in November 2021. This is an act to make provision about targets, plans and policies in relation to the environment – including Part 6 of the Act 'nature and biodiversity', which includes biodiversity gain in planning. For England, plans include mandating a 10% BNG including provision for habitat enhancements to be maintained for a period of at least 30 years. However, Section 147 (3) of the Act states:

> *The following provisions of this Act come into force on such day as the Secretary of State may by regulations appoint –…*

One of the 'following provisions' is: "*(s), 'Part 6 (nature and biodiversity)*'". Currently no regulations have brought into force the nature and biodiversity provisions of the Act.

However, some Local Planning Authorities have already set out planning policies requiring BNG targets of 10% in keeping with the forthcoming legislation. Furthermore, the Water Resources Planning Guidance (WRPG)

[1] The British Standards Institution 2021. BS 8683:2021 Process for designing and implementing Biodiversity Net Gain – Specification. BSI Standards Limited 2021.
[2] The Biodiversity Metric 3.1 - JP039 (nepubprod.appspot.com)
[3] . Advice from Natural England is to continue to use Biodiversity Metric 3.0 for the duration of the project it is being used for as it may be that certain biodiversity unit values Biodiversity Metric 3.1 generates will differ from those generated by Biodiversity Metric 3.0.

requires that WRMPs contribute to conservation and enhancement of biodiversity and deliver net biodiversity gain (where appropriate).

1.3. SES Water Preferred Options

Each water company's emerging regional plan is based on an adaptive approach to planning to take into account various supply and demand projections. The three plans are: Best Value Plan (BVP), Least Cost Plan (LCP) and Best Environmental and Societal Plan (BESP). Each plan is modelled using nine forecast 'situations' based on population growth, climate change and environmental ambition.For this BNG Assessment and the wider environmental assessment process, WRSE have identified options based on the selection of 'Situation 4' for each plan. These are listed in Table 1-1 below.

Table 1-1 - SES Water Preferred Options for WRMP24

WRSE ID	Option Name
SES_SES_HI-GRW_RE2_ALL_r22	Outwood Lane
SES_SES_HI-ROC_RE2_ALL_r1	Raising Bough Beech Reservoir
SES_SES_HI-LRE_WT2_ALL_r26	Seacombe Centre UV
SES_SES_RE-DRP_REP_ALL_hackbridge-dp	Hackbridge drought permit
SES_SES_RE-DRP_REP_ALL_ken-pur-dp	Kenley and Purley drought permit
SES_SES_RE-DRP_REP_ALL_outwood-dp	Outwood Lane drought permit
SES_SES_RE-DRP_REP_ALL_river-eden-maydp	River Eden May drought permit
SES_SES_RE-DRP_REP_ALL_river-eden-summerdp	River Eden Summer drought permit

2. WRSE BNG Assessment Methodology

2.1. WRSE Draft Plan – Draft Strategic Environmental Assessment Report

Requirement for BNG

A BNG assessment forms an integral part of the Strategic Environmental Assessment (SEA). The Draft SEA Report for the WRSE Draft Plan outlines the approach to the BNG assessment and where it fits in the overall assessment framework.

Biodiversity, Flora and Fauna is an environmental topic that has been scoped into the WRSE Draft Plan – Draft SEA. The report states:

The WRSE regional plan should ensure that there are no impacts on biodiversity and should look to enhance biodiversity and achieve biodiversity net gain where possible. There are opportunities to include options which result in improvements to the natural environment and biodiversity net gain through habitat creation or enhancement, support Nature Recovery Networks and Strategies, connectivity of ecological networks to increase species resilience and introduction of vegetation to slow run-off and reduce flood risk, amongst others.

As stated in Section 4.5.3 of the Draft SEA Report, only options with land use change were assessed as part of the BNG Assessment. The report also states that the assessment "*used the BNG 2.0 metric to determine the BNG units lost or gained from the option*". However, as reported in Section 1.2 of this appendix, WRSE has since adopted Biodiversity Metric 3.0 ,upon its publication in July 2021, for the BNG assessment process.

Following Section 1.2.1 of this appendix, Section 5.5.2 of the Draft SEA Report, reiterates that the *"Environment Act 2021 makes a minimum 10% biodiversity net gain a condition of planning permission in England and in relation to consent for nationally significant infrastructure projects."*

The Draft SEA Report confirms that a BNG assessment has been undertaken of *"each option and a cumulative assessment of the draft regional plan to identify current BNG status and opportunities to increase the net gain."*

Methodology

The BNG assessment is provided within Appendix I of the Draft SEA Report.

Important updates to guidance are noted in the assessment, including Natural England's release of Biodiversity Metric 3.0 in July 2021. It reiterates Natural England's advice that, due to certain biodiversity unit values being different between Metric 2.0 and Metric 3.0, that existing projects carry on using Biodiversity Metric 2.0 and that new projects use the Metric 3.0. This is a standard approach and is effective provided that all assessments are undertaken using the same metric, where comparison is necessary.

In relation to BNG and the development of a WRMP (in England), the Water Resources Planning Guideline[4] states that the plan should:

Contributes to the conservation and enhancement of biodiversity, delivers net biodiversity gain where appropriate, delivers environmental gain and uses a proportionate natural capital approach.

Provide an assessment of the contribution of the option to the conservation and enhancement of biodiversity and a high-level assessment of biodiversity net gain (if the option requires planning permission).

Look to contribute to, and enhance, the natural environment by providing opportunities for biodiversity gain and enhancement.

Consider what actions you can take in your plan to conserve and enhance biodiversity. You should set objectives to further biodiversity and these should influence your decision-making. You should clearly set out in your plan how your WRMP is contributing to enhancing biodiversity and how you are leaving the natural environment in a measurably better state that it is currently. If you conclude that you cannot take any actions to enhance biodiversity you should justify this in your plan.

Consider going beyond what might be required by the Environment Act 2021 to provide an ambitious level of measurable biodiversity net gain.

Incorporate biodiversity gain into the design of your supply and transfer options where reasonable. If this is not possible, you are likely to be obliged to provide this equivalent off-site.

The inclusion of BNG as part of the WRMP24 environmental assessment process is supported by the updated Water Resources Planning Guideline Supplementary Guidance 'Environmental Society in Decision Making' (November 2021).

The methodology for the BNG Assessment is provided in Section 2.1.4 of Appendix I of the Draft SEA Report. It describes how the baseline scenario was established from spatial data sets of habitats inventories and that post construction land use, including agreed mitigation, was used to establish the post development scenario.

The assessment has adopted a precautionary approach as it was undertaken using open-source data only, i.e. no field-based habitat surveys and condition assessments have been undertaken. On review of the methodology, it is clear that the following assumptions have been made for both baseline and post development scenarios when completing the metric calculation tools:

- Where a condition assessment is required, all habitats have been assessed as being in moderate condition.
- Strategic significance has been set at low.
- Where Metric 2.0 has been used, ecological connectivity has been set at medium.
- Very high distinctiveness habitats will be retained (impacts will be avoided).
- Habitat enhancement has not been considered as a post development intervention.

[4] Available at https://www.gov.uk/government/publications/water-resources-planning-guideline (last updated July 2022)

- Linear hedgerow and river features have not been included in the assessment.

It is acknowledged that to increase the accuracy of the BNG assessments for each option, individual companies will need to develop the work undertaken as part of the BNG Assessment set out in Appendix I of the Draft SEA Report and supplement the open-source datasets with local datasets and undertake field surveys. Accurate BNG assessments will require habitat surveys (using the UK Habitat Classification (UKHab)[5]) and habitat condition assessments (using the condition criteria set out within the Technical Supplement of the appropriate metric).

It is noted that catchment management options, as mentioned under Section 3.2 of Appendix I, have potential to provide net gains but are still being developed and have, therefore, not been included in the assessment. The progress of this source of potential gain should be explored during more detailed BNG assessment of options. This is further supported by text in Section 4.1.2.1, which states that contribution at a local or regional scale to off-site compensation can often result in greater gains for biodiversity than could be provided within a constrained development site.

Limitations

A few assessment limitations are outlined in the Draft SEA Report and largely relate to reliance on published data and information provided by WRSE and from third party organisations for the production of the report. As the regional plan covers a large geographical area, the baseline is a high-level review of conditions within the region. It is stated that detailed local baseline data, such as local (non-designated) wildlife sites were not included at this stage; this information will be gathered (where possible) at the WRMP level.

Furthermore, the WRSE assessment is based on options information and GIS data provided by the water companies. Therefore, it was noted that the information available to inform the assessments varied as the options were at varying levels of development.

3. WRSE BNG Assessment Results for SES Water WRMP24 Options

3.1. Results

All 'drought permit' options were screened out for BNG assessment.

Table 3.1 below presents the results of the BNG assessments of the remaining three options.

Table 3-1 - SES Water WRMP24 Options - BNG Assessment Results

WRSE ID	Option Name	BNG Assessment Results
SES_SES_HI-GRW_RE2_ALL_r22	Outwood Lane	Scoped out due to the current available option information. The option is unlikely to results in any potential impacts based on available information. Any additional impacts within the option Zone of Influence will be captured within the SEA, WFD & resilience assessments.
SES_SES_HI-ROC_RE2_ALL_r1	Raising Bough Beech Reservoir	Scoped out due to the current available option information. The option has potential to generate impacts on Natural Capital and Ecosystem services however these cannot be confirmed due to the available option information. Any additional impacts within the option Zone of Influence will be captured within the SEA, WFD & resilience assessments.

[5] Butcher, B., Carey, P., Edmonds, R., Norton, L. and Treweek, J. (2020). UK Habitat Classification V1.1. Available at: http://ukhab.org

WRSE ID	Option Name	BNG Assessment Results
SES_SES_HI-LRE_WT2_ALL_r26	Seacombe Centre UV	Scoped out due to the current available option information. Any additional impacts within the option Zone of Influence will be captured within the SEA, WFD & resilience assessments.

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Appendix I. Natural Capital

Natural Capital Appendix

SES Water SEA for WRMP24

SES Water

November 2022

Notice

This document and its contents have been prepared and are intended solely as information for SES Water.

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1. Executive Summary

In this appendix to the SES Water Strategic Environmental Assessment (SEA), a summary is provided of the methodology and outputs of the natural capital assessments undertaken by Water Resources in the South East (WRSE) for SES Water's three water resource supply options across the best value (BVP), least cost (LCP) and best environment and society (BESP) programmes. This appendix is in support of the submission of the Water Resources Management Plan (WRMP) for Price Review 2024.

The three supply side water resource options were selected by WRSE as part of the multi-criteria integrated risk and investment modelling. This generates BVP, LCP and BESPs across the whole WRSE region, incorporating options from each of the member companies.

All three supply side options were scoped out of a natural capital assessment by WRSE. This means that there are no numerical outputs of the NCAs of SES Water's options due to no expected natural capital impacts based on all available option information.

Nonetheless, a summary of the methodology from scoping to final outputs is provided to communicate the natural capital framework and assessment methodology used by WRSE, and by extension SES Water through the funding and use of the WRSE NCA outputs.

2. Introduction

2.1 Purpose of this Appendix

Water Resources in the South East (WRSE) have undertaken natural capital assessments (NCA) of all the potential SES Water (SES) water resource options for their Water Resources Management Plan for Price Review 2024 (WRMP24). SES has chosen to directly use the WRSE NCA outputs produced as part of the WRSE process.

This Appendix provides a summary of the WRSE process (including the methodology, and the framework for integrating the NCAs into the decision-making process) and the outputs of the NCAs.

Of all the SES water resource options that were either scoped-in or scoped-out for a NCA by WRSE, this summary collates, and summarises the results of those that were shortlisted within the SES BVP, LCP and BESPs. In line with the water resources planning guidelines (WRPG)[1] only supply options were considered for a NCA under the WRSE process, which amounts to three options across the three programmes.

This Appendix supports SES' Strategic Environmental Assessment (SEA) of the WRMP24 by:

- Providing a summary of the natural capital approach undertaken by WRSE; and
- Providing a summary of the outputs of the natural capital approach undertaken by WRSE for the SES options.

2.2 Natural Capital and Water Resources Management Planning

Natural capital is defined in the 25 Year Environment Plan[2] (England) as "*the elements of nature that either directly or indirectly provide value to people*". As a new and emerging approach, natural capital incorporates methodologies and approaches (such as the ecosystem services framework) to understand the value that natural assets provide. For the water industry, these can be substantial. The WRPG (England and Wales) state that WRMPs should "*use natural capital in decision-making*", "*use a proportionate natural capital approach*", "*deliver environmental net gain*", and provide cost information on monetised ecosystem service costs and benefits where monetisation is used. The purpose is to support the identification of "best value" options.

2.3 Water Resources in the South East and options assessments

WRSE has undertaken a NCA of member companies' WRMP24 feasible supply side options for the purpose of regional scale planning. The analysis was implemented in a Geographic Information Systems (GIS) environment to derive quantitative and monetary 'Natural Capital Metrics' for the WRSE options, including SES' WRMP24 options. Metrics include the value of changes in carbon sequestration and flood hazard prevention provided by natural capital stocks. These metrics were used in WRSE's multicriteria optimisation as well as forming part of the WRSE SEA process for assessing environmental effects. The NCA approach used by WRSE is detailed in the following documents produced by WRSE:

- the WRSE NC & Biodiversity Net Gain (BNG) Method Statement[3]
- the WRSE Regional Plan NC and BNG report[4]

The WRSE regional plan intends to provide a reliable NCA that is suitable for regional scale planning and provides a framework to be built upon by individual water companies. Because these

[1] Water resources planning guideline - GOV.UK (www.gov.uk) section 8.3, point L

[2] 25 Year Environment Plan - GOV.UK (www.gov.uk)

[3] WRSE Natural Capital & Biodiversity Net Gain Method Statement (08/12/2020)

[4] WRSE Regional Plan: Natural capital and Biodiversity Net Gain Report (25/02/2022)

assessments undertaken by WRSE included a NCA of SES' WRMP24 options, SES have decided to utilise these outputs in the WRMP24 submission. NCA 'outputs' refers to i) the rationale for scoping-in options for conducting a NCA, ii) the Natural Capital Metrics produced as a result of the methodology and iii) the rationale for scoping-out options for a NCA. SES' has used the results of the WRSE NCA outputs directly as these have been previously scrutinised as part of the WRSE approval process, and WRSE's assertion that the methods applied in these assessments align with at least the 'minimum practice' described in WRPG guidance.

This Appendix summarises the WRSE methodology in full, from scoping to assessing, and provides a summary of the NCA outputs relating to the three SES supply supply-side options included across the BVP, LCP and BESPs.

3. Methodology

This section summarises the following key components of the methodology used to prepare this Appendix:

1. The approach used to summarise the WRSE NCA methodology and outputs.
2. An overview of the methodology applied by WRSE for the NCAs, covering the scoping process, the quantification and monetisation approach, and the final Natural Capital Metrics.
3. An overview of how the output of the NCA was incorporated into the decision-making process.

3.1 Review Methodology

This Appendix draws on the following key documents:

- WRSE Regional Plan: Natural Capital and Biodiversity Net Gain Report[5]
- WRSE Emerging Regional Plan: Strategic Environmental Assessment Environmental Report[6]
- Natural Capital and Biodiversity Method Statement[7]
- WRSE Method Statement: Best Value Planning[8]
- The NCAs of the three SES Water supply side options:
  - Outwood Lane (08/02/2021)
  - Secombe Centre UV (08/02/2021)
  - Raising of Bough Beech Reservoir (08/02/2021)

Outputs and commentary have been taken directly from the WRSE NCAs for the relevant options. No critical analysis of the assessment and evaluation by WRSE was undertaken as part of the development of this Appendix. It is therefore assumed that all assessments followed the methodologies reported in the documents above, and that the outputs had been internally assured.

Table 1 provides an overview of the three SES supply side options that were included within the three SES programmes. As shown in the table all three were scoped out of the quantitative and monetary NCA due to either i) being unlikely to result in potential natural capital impact or ii) the lack of available information at this current stage of the design process. The text is quoted from WRSE.

A summary of the WRSE process and methodology will now follow in sections 3.2 and 3.3.

[5] WRSE Regional Plan: Natural capital and Biodiversity Net Gain Report (25/02/2022)

[6] WRSE Emerging Regional Plan: Strategic Environmental Assessment Environmental Report (25/02/2022)

[7] WRSE Natural Capital & Biodiversity Net Gain Method Statement (08/12/2020)

[8] WRSE Method Statement: Best Value Planning (January 2022)

Table 1 - Full List of SES Water options considered for NCA

Category	Option	WRSE ID	Scoped In / Out	Rationale
Supply	Outwood Lane	SES_SES_HI-GRW_RE2_ALL_r22	Scoped Out	The option is unlikely to result in any potential natural capital impacts based on available information.
	Secombe Centre UV	SES_SES_HI-LRE_WT2_ALL_r26	Scoped Out	Natural Capital and Biodiversity Net Gain Assessment has been scoped out due to the current available option information.
	Raising of Bough Beech Reservoir	SES_SES_HI-ROC_RE2_ALL_r1	Scoped Out	The option has potential to generate impacts on natural capital and ecosystem services; however, these cannot be confirmed due to the limited option information available.

3.2 WRSE Natural Capital Assessment Methodology

A detailed summary of the WRSE methodology is provided below. Whilst WRSE concluded that none of the options required a NCA, the following provides visibility of the framework that SES has chosen to align with and committed to in continuing to integrate a natural capital approach with their water resource management processes.

3.2.1 WRSE context and timeline

As stated in the *WRSE Regional Plan: Natural Capital and Biodiversity Net Gain Report*, the WRSE NCA process faced additional complexity and challenges due to the updating of key guidance during the WRSE modelling and assessment stage. There was an update to the Enabling Natural Capital Approach (ENCA) guidance in August 2021, which updated values for the quantification of some ecosystem services, and notably the carbon price profile developed by Department of Business, Energy and Industrial Strategy (BEIS) for the monetisation of the carbon sequestration ecosystem service.

All options scoped in for a NCA were initially assessed using the 'Original WRSE Methodology', developed prior to the updates to ENCA referenced above. WRSE provided 'Updated Methodology' NCAs in April 2022 for the options included in the WRSE Emerging Regional Plan – a subset of the total number of options put forward by the water companies.

As the investment modelling process at WRSE level continued, the final options included in each company's BVP, LCP and BESP varied from those included within the WRSE Emerging Regional Plan, and therefore a combination of Original and Updated Methodology assessments are available from WRSE, providing comparison challenges between the options.

It should be noted that the Original Methodology assessments were used throughout the whole investment modelling process in order to retain consistency in valuation methodology and allow for fair comparison within the multi-criteria analysis. It is therefore noted that the investment modelling process did not draw on or incorporate the Updated Methodology.

3.2.2 Scoping process

An initial scoping process was undertaken by WRSE, in collaboration with all water companies (in this case SES) to identify the SES options that required a NCA. Whilst the methodology statement produced by WRSE does not directly state the criteria for scoping in or scoping out, it does refer to the WRPG Supplementary Guidance[9] (WRPG SG) which includes proportionality as one of the key principles of a natural capital approach.

The WRSE NCA outputs provide the following criteria in their rationale for scoping NCAs for water resource options. These are provided in the WRSE NCA sheets for individual options, rather than in the associated WRSE reporting and documentation:

- *Option was scoped out from NC due its characteristics and location.*
- *Option was scoped out of NC because it relates to upgraded works on an existing option.*
- *Option was scoped out as the available option information does not indicate any NC impacts.*
- *Option is located within an existing roadway and built up area, so would not have a NC impact.*

[9] Water resource planning guideline supplementary guidance – 03/02/2022

3.2.3 Overarching NCA methodology

For all options scoped in for NC assessment the following four step process was developed and followed by WRSE:

1. The identification of the zone of influence (ZOI) for each option. This provided a clear boundary for each respective NCA.
2. Recording the natural capital stocks within the ZOI for each option across three stages: pre-construction, during construction and post-construction.
3. Mapping these natural capital stocks to the provision of ecosystem services across all three stages for both quantitative and monetary impacts. Different methods are used to calculate changes in each ecosystem service, which is discussed in the following section.
4. Calculation of the Natural Capital Metric: summation of the impact of the option on the natural capital stocks and their provision of ecosystem services in both the short term (during construction) and long term (post-construction) compared to the baseline (pre-construction) state for each ecosystem service and summed across all services.

The Natural Capital Metric sums the economic monetary values of changes in all ecosystem services, and this was used in the WRSE investment model (discussed in the decision-making section 3.3).

3.2.4 Zone of Influence

WRSE defined the ZOI for each option as the area of receiving (i.e., a watercourse receiving a discharge) or providing (i.e., an aquifer where abstraction will occur) environment with the potential to be altered or changed because of the option. This is therefore larger than the scheme footprint and extends to provide a wider ZOI.

For supply options, all ecosystem services are assessed within the option footprint, with natural hazard management and water purification also being assessed in the ZOI. It is understood this is to provide a proportionate analysis for each ecosystem service in accordance with the principles of the WRPG; for example, it is unlikely for carbon sequestration outside of the option footprint to be directly impacted.

For catchment options, all ecosystem services were assessed within the catchment ZOI. For SES Water there are no catchment options.

3.2.5 Natural Capital Stocks

Pre-Construction

All option boundaries were broken down by natural capital stock type based on the categorisation of the Natural England's National Natural Capital Atlas where possible. Additional abiotic stocks and key habitats were included by the consultant at the request of WRSE to cover habitats that are key to the WRSE region, such as chalk streams and rivers.

Appendix A to the *WRSE Regional Plan: NC & BNG Report* provides a thorough breakdown of the stock components and data sources used, which included multiple opensource GIS-based databases.

During Construction & Post-Construction

The impact of each option on the natural capital stock was then reported for both the construction and post-construction phase to give an estimation of the impact of the option's whole lifecycle. This also allows for the modelling of potential environmental mitigation and compensation included as part of the option that the WRSE NCAs have assumed to be implemented. One of the main types of mitigation assumed is that in the post-construction phase many natural capital stocks will be returned to their pre-construction levels.

Note on implications of methodology for results

The WRSE NCA methodology is based on land-use change alone; i.e., changes in natural capital stock quantities. Due to the regional focus of the analysis and limited option data available, the WRSE NCAs do not consider changes in stock condition or quality. Because the WRSE NCAs assume reinstatement, restoration and compensation as part of the options' environmental mitigation, the

results of the NCAs show the most significant losses of natural capital value during the construction period, which are partially recuperated in the post-construction phase.

Whilst separate BNG assessments were carried out by WRSE, these are not integrated with the natural capital results. I.e., there is no target level of BNG (e.g., 10%) integrated within the NCA methodology, so it does not attempt to model the natural environment being enhanced as a result of the options. Instead, it focuses on measuring the natural capital stocks once they are reinstated and restored to their previous state, and the ecosystem service provision of returning to the previous stocks.

3.2.6 Ecosystem Service – generic screening

The natural capital stocks mapping allowed for the assessment of the ecosystem service provision by each option across all three time periods (pre-construction, during construction and post-construction). The WRPG recommends the following five services to be assessed as part of 'minimum' practice for NCA in water resources planning: biodiversity and habitat, climate regulation, natural hazard regulation, water purification and water regulation.

Biodiversity and habitat and water regulation were scoped out of the WRSE assessments, whilst climate regulation, natural hazard regulation and water purification were scoped in. The additional ecosystem services scoped in were air pollutant removal, food production and recreation. WRSE's rationale for scoping-out those from the five recommended WRPG ecosystem services, and scoping-in additional ecosystem services is summarised below:

- **Biodiversity and habitat** was scoped out by WRSE on the basis that this was assessed separately as part of the BNG Assessments, using Defra's BNG Metric 3.0.
- **Water regulation** (referring to water supply/provisioning) was scoped out by WRSE to avoid potential double accounting of benefits within the multi-criteria optimisation.
- **Air pollutant removal** was assessed by WRSE as an additional service beyond the minimum practice in the WRPG. It is understood that this was included due to some options being located close to Air Quality Management Areas (AQMAs) and built-up areas, resulting in air pollutant removal being a key ecosystem service due to its benefit to human health.
- **Food production** was assessed by WRSE as an additional service beyond the minimum practice in the WRPG. It is understood this was included due to some options being at least partially located in rural areas, with this having the potential to impact agricultural land and the provision of this ecosystem service.
- **Recreation and amenity** was assessed by WRSE as an additional service beyond the minimum practice of the WRPG. It is understood this was included due the significant value of green space and the potential for many of the options to impact upon it due to their location and size.

Concurrent BNG Assessments were also undertaken by BNG specialists on behalf of WRSE. Both NCA and the BNG were assessed based on the same input information on landcover and habitats i.e., the same natural capital stocks, providing consistency in the findings.

A total of six ecosystem services were included on the final shortlist by WRSE, greater than the minimum number of services required within the WRPG.

The following services were 'scoped in' for assessment by WRSE for each option. Some of these were quantified and monetised, while others were assessed qualitatively by WRSE:

- **Quantified and monetised:**
  - Carbon sequestration
  - Natural hazard management
  - Food production
  - Air pollutant removal
  - Recreation and amenity value
- **Qualitatively assessed:**
  - Water purification: WRSE judged that a common value for different habitat types could not be applied due to extensive variation in local factors which determine the provisioning of water purification which could not be captured within the regional scale approach that was required.

3.2.7 Methodologies for individual ecosystem services: scoping, quantification, monetisation, assumptions and limitations

For each option, ecosystem services were scoped in or out by WRSE, dependent upon pre-set scoping criteria.

The following sub-sections summarise the scoping process, the quantification and monetisation of the six ecosystem services, key assumptions and any noted limitations.

Carbon Sequestration

Scoping: Scoped in by WRSE when the option causes a temporary or permanent loss to a natural capital stock.

Quantification: Carbon sequestration rates for 14 land-use types are utilised to generate a physical value of carbon sequestration for pre-construction. These values are listed in a table within the WRPG[10], having been collated by JBA Consulting from a number of sources. The land-use types that directly correlate to the natural capital stocks mapped in the first stage of the NC assessments are multiplied by the per hectare carbon sequestration values. Natural capital stocks that do not directly correlate to the land-use types are excluded by WRSE from the calculations and therefore no carbon sequestration impact is measured for those stocks.

In the post-construction quantification, a multiplier of 0.75 is applied by WRSE to the sequestration contribution of woodland stocks which have been removed during construction, but re-planted post-construction. The WRSE NCA Excel spreadsheets detail that this scaler is in place to account for the time to maturity of 30 years for newly planted woodland; however, no evidence source is provided for this value. In discussion with the WRSE Natural Capital specialists it was noted that in addition to the time to maturity, this 0.75 scale also accounts for the survival rate of newly planted woodland being below 100% based on a 2021 research paper not referenced within the reviewed WRSE documents[11].

In post-construction quantification, where any ancient woodland is removed and 're-planted' the value of this woodland is set to zero given the time to maturity required to gain the benefits of an ancient woodland.

Monetisation: To monetise this service, the BEIS Valuation of Greenhouse Gas Emissions[12] carbon values are used. These values enable monetisation of carbon impacts according to a national standard approach. The 'High' value for 2021 was used by WRSE in the monetisation calculations. Although not documented in the WRSE reports reviewed, it is understood from subsequent discussions with WRSE NC team that the rationale for this was to present a "worst case" scenario i.e. the higher the value of carbon would provide an upper bound estimate for any impact on carbon sequestration. It was understood this is due to the uncertainty around the actual impacts and option footprints given the early design stage at which these assessments were carried out by WRSE.

In the Original Methodology the historic non-traded price of carbon was used – resulting in lower carbon storage related impacts.

Natural Hazard Management

Scoping: Service focuses on flooding and excludes drought. Scoped in by WRSE when the ZOI of the option intercepts with the Environment Agency's Indicative Flood Map Zones 2 and 3. This restriction focuses the assessment of this ecosystem service to catchment areas which drain to downstream communities impacted by flooding.

Quantification: The methodology does not attempt to quantify the physical impact on water flow / water storage that occurs as a result of the option. Instead, the methodology uses pre-determined monetary valuation figures from the WRPG that are applied on a per hectare basis for the respective natural capital stocks (see below).

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[10] Water resources planning guidelines supplementary guidance – Environment and society in decision-making (03/02/2022)

[11] The environmental performance of protecting seedlings with plastic tree shelters for afforestation in temperate oceanic regions: A UK case study - ScienceDirect

[12] Valuation of greenhouse gas emissions: for policy appraisal and evaluation - GOV.UK (www.gov.uk)

Monetisation: To generate a monetary valuation the WRSE methodology makes use of the WRPG recommended value from Forest Research[13] of £88.60 in 2018 prices per hectare of woodland to measure the provision of natural hazard regulation. This represents the average value of woodland provision of flood water storage service nationally. This figure is multiplied by the area of broadleaved mixed woodland, woodland priority habitat, coniferous and mixed woodland, ancient woodland and urban woodland in the pre-, during and post-construction scenarios. No other stocks are included in the valuation of this ecosystem service.

Air Pollutant Removal

Scoping: Scoped in by WRSE when the option ZOI intersects with a built-up area or an AQMA.

Quantification: The methodology does not attempt to quantify the physical impact on air pollution that occurs as a result of the option. Instead, the methodology uses pre-set monetary valuation figures sourced from Defra's Enabling a Natural Capital Approach (ENCA) guidance that are applied on a per hectare basis for the respective natural capital stock (see below).

Monetisation: To generate a monetary valuation the ENCA recommended values from Jones et al[14] are utilised. Guidance on assessment of this ecosystem service is not included within WRPG, and ENCA is considered an appropriate source for monetisation values. This study provides indicative average values for air pollution removal in 2012 prices for a range of UK located habitats. This valuation is based on the avoided health costs driven by reduced concentrations of air pollutants attributable to UK vegetation.

The study provides values for the following habitats:

- Urban Woodland
- Rural Woodland
- Urban Grassland
- Enclosed Farmland
- Coastal Margins

The value provided by the natural capital stocks of each option, and their changes through the three scenarios are then calculated using the per hectare monetised value. Natural capital stocks which do not easily map to one of these five habitats were not included by WRSE.

Recreation & Amenity Value

Scoping: Scoped in by WRSE when there is a permanent loss in greenspace, as defined by the OS Open Greenspace Layer. When there is an intersect between greenspace from this layer and the ZOI of each option, then recreation is scoped in. The Greenspace Layer maps both publicly accessible and private greenspaces within an urban area, and these are therefore assumed to have existing recreational value.

Quantification: No quantification assessment was undertaken by WRSE for Recreation, and instead all assessment takes place within the Defra-endorsed Outdoor Recreation Valuation Tool (ORVal). WRSE have not provided the outputs in terms of changes in visitor numbers.

Monetisation: ORVal is a Defra-endorsed tool and is recommended within ENCA as a key source for recreation valuation. It uses as inputs changes in natural capital stocks and the creation or removal of greenspace to generate a monetary valuation according to probabilistic predictions of visitor numbers based on scarcity of sites, substitution possibilities, travel distances and park attributes using a travel-cost valuation approach.

Food Production

Scoping: Scoped in by WRSE when there is a permanent loss in either arable or pasture natural capital stocks.

Quantification: No quantification was undertaken by WRSE. Assessment for Food Production is undertaken within the Defra- and WRPG-endorsed Natural Environment Valuation Online Tool

[13] Valuing flood regulation services of existing forest cover to inform natural capital accounts - Forest Research

[14] Developing estimates for the valuation of air pollution removal in ecosystem accounts. Final report for Office of National Statistics - NERC Open Research Archive

(NEVO). Outputs from this tool are produced in a monetary basis only, and therefore there are no WRSE outputs which related to a quantity of food production delivered by the option area. These quantities would be generated via the underlying assumptions in the tool. The quantity of arable land lost as a result of the option is the main quantitative input to the NEVO tool.

Monetisation: NEVO is a web application tool developed by the Land, Environment, Economics and Policy (LEEP) Institute at the University of Exeter, with support from Defra and Natural Environment Research Council (NERC). It is referenced in both the WRPG and ENCA documentation. It takes inputs on the change in natural capital stocks for arable and pasture to generate a monetary valuation based on spatially disaggregated values of agricultural production in England and Wales, which can be impacted via changing land-use options.

Water Purification

Scoping: Scoped in by WRSE when there is a temporary or permanent loss in either woodland or semi-natural grassland stocks.

Assessment: Water purification is assessed by WRSE on a qualitative basis because it was considered there was no appropriate common value that could be used for habitat types to quantify the effect of water purification. This was due to significant variation within habitat types due to a number of local factors which determine the provisioning of the service, such as its proximity to a water source.

Instead, the natural capital stocks within each ZOI that provide this ecosystem service were graded on a scale from high to low, and then consideration was given as to whether there would be a temporary or permanent loss to the provision based on the during- and post-construction scenarios. A likely future provision trend of “up”, “static”, “down”, was given for each option. No further info is provided on how natural capital stocks were classified as either high or low.

3.2.8 Natural Capital Metrics

Once the ecosystem services have been scoped in or out and the quantification and valuation methodology applied, then the WRSE assessment provides three total natural capital values (sum across the ecosystem services) for pre-, during- and post-construction. These figures are then used by WRSE to calculate the difference (“change”) between the pre-construction and post-construction natural capital value.

This metric provides the basis for WRSE’s overall assessment of the natural capital impact of each option and is used to compare options based on their estimated natural capital and ecosystem services impact.

In the following subsection, a summary of how the NC Metric is incorporated into the decision-making process is summarised.

3.3 Investment Modelling and Decision-Making process

Multi-criteria integrated risk modelling (IRM) and investment modelling (IVM) was undertaken by WRSE in line with the WRPG. IRM is focused on defining the water resource supply and demand problems over the planning period, whilst the IVM is focused on solving these problems via multiple optimised investment programmes for comparison and shortlisting.

A full description of this process is found within the WRSE Method Statement: Best Value Planning document[15]. The early stages of the IVM process focus upon identifying a least cost solution to the agreed baseline forecast scenario and also identifying a sub-set of future scenarios to be taken forward to multi-metric modelling.

This is where the Natural Capital Metric is incorporated alongside 12 other metrics which are defined as optimisable functions. These are least cost, intergenerational equity, environmental benefit, environmental dis-benefit, BNG, carbon, reliability, adaptability, evolvability, leakage, water consumption and customer preference for option type.

The natural capital optimisation function is to maximise, for all years, for all water resource zones, the natural capital values for all new options. Those with no / nil natural capital impacts, and those with

[15] WRSE Method Statement: Best Value Planning – January 2022

minimal natural capital impacts therefore integrate positively within the optimisation process, whilst those with greater natural capital impacts are less preferred. This process allows for the development of a minimum of two programmes: i) the least cost programme and ii) the best environmental and society programme. As stated above, the natural capital metrics included in this optimisation process related to the Original Methodology, so that values could be utilised for a larger number of options, rather than the Updated Methodology, which only incorporated the Regional Emerging Plan options.

The BESP programme takes into account the overall performance across the SEA, Natural Capital and BNG metrics, and engagement with stakeholders. These, alongside other alternative best value plans derived from the multi-criteria assessment, were shortlisted, and together provided the basis for creation of the final preferred plan.

Through the introduction of a natural capital approach to options evaluation, the natural capital impact and benefit of the individual options and the aggregated natural capital impact and benefits of the programmes are integrated in the decision-making process. The SEA, BNG, NCA results are all integrated with equal weighting into the best environment and society programme, included in the optimisation process, and quantified during the least-cost programme, all of which contribute towards the designation of the preferred approach.

4. Results and Conclusions

4.1 Summary of results

As highlighted in Table 1, all three of the supply side options relating to SES Water that were selected across the BVP, LCP and BESP, were scoped out of the NCA process according to WRSE's scoping criteria and exclusion rules for NCA. A summary of the rationale is provided below. These summaries are based upon the NCA outputs produced by WRSE.

Outwood Lane: The Outwood Lane scheme seeks an increase in daily licence from 3 Ml/d to 8 Ml/d and requires an equivalent increase in pump capacity. The hydraulic capacity of the source has been proved during previous test pumping. The increase in PDO associated with the scheme would be 5 Ml/d. The option is unlikely to results in any potential impacts based on available information. Any additional impacts within the option ZOI will be captured within the SEA, water framework directive (WFD) and resilience assessments.

Secombe Centre UV: The Secombe Centre UV scheme provides ultra-violet (UV) treatment for the Secombe Centre groundwater source which is currently out of supply due to bacterial detections on the raw water. Due to the limited footprint available at the Secombe Centre site, the UV treatment plant would be located at Cheam WTW on the 'East Main' which feeds water from Hackbridge, Goatbridge, Woodcote, Oaks, Langley Park, Sutton and Sutton Court Rd boreholes as well as Secombe Centre. Natural capital and BNG Assessment has been scoped out due to the current available option information. Any additional impacts within the option ZOI will be captured within the SEA, WFD and resilience assessments.

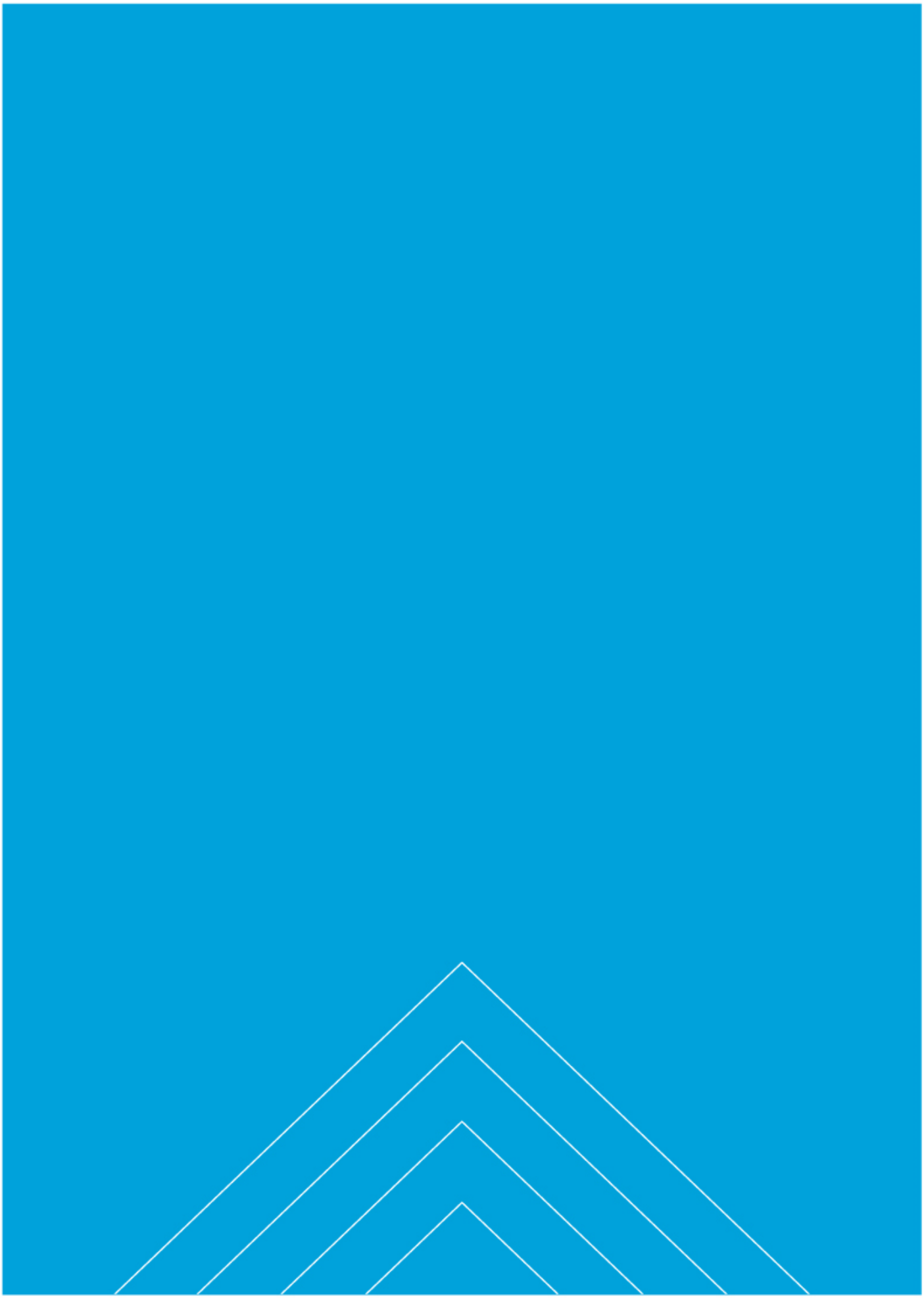
Raising of Bough Beech reservoir: This scheme is the raising of the Bough Beech reservoir embankment**.** The option has potential to generate impacts on natural capital and ecosystem services; however, these cannot be confirmed due to the available option information. Any additional impacts within the option ZOI will be captured within the SEA, WFD and resilience assessments.

Whilst not within the scope of this report, it is recommended that for the revised draft plan the above outputs are re-considered by SES to ensure that no additional information is now available that would deem a NCA in scope.

For future and further assessment of the options involved within this plan it should be noted that Natural Capital Assessment is an emerging practice with new guidance, datasets and standards emerging. Future NCA's of options should be undertaken according to the most current relevant guidance.

4.2 Final Conclusions

This report summarises SES Water's commitment to natural capital through its contribution to the WRSE modelling and assessment process and SES' use of the WRSE NCA outputs. Whilst no SES options were scoped in for a NCA by WRSE, the rationale is justified and documented by WRSE. This scoping activity is understood to have been undertaken by WRSE in collaboration with the water companies to align with the principles of the WRPG SG, most notably the principle of proportionality in NCA for water resources planning.



Appendix J. Invasive Non-Native Species

ATKINS

Member of the SNC-Lavalin Group

Sutton and East Surrey Water - Water Resource Management Plan 2024

INNS Risk Assessment

Sutton and East Surrey Water

11 November 2022

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Revision	Purpose description	Originated	Checked	Reviewed	Authorised	Date
1.0	Draft for Client Review	SR	IPM	AJ	PMcE	22/09/2022
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Client signoff

Client	Sutton and East Surrey Water
Project	Sutton and East Surrey Water - Water Resource Management Plan 2024
Job number	5197934
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Contents

Tables

1. Introduction

This chapter summarises the Level 1 (L1) screening assessment undertaken by Sutton and East Surrey (SES) Water, to determine the requirement for any Level 2 (L2) Invasive Non-Native Species (INNS) risk assessments as part of its Water Resource Management Plan 2024 (WRMP24). The three schemes considered include:

- Outwood Lane (*WRSE ID: SES_SES_HI-GRW_RE2_ALL_r22*)
- Raising of Bough Beech reservoir (*WRSE ID: SES_SES_HI-ROC_RE2_ALL_r1*)
- Secombe Centre UV (*WRSE ID: SES_SES_HI-LRE_WT2_ALL_r26*)

For each of the three schemes screened, only the operational impacts have been assessed, with the assumption that risks associated with the construction or upgrade of any new infrastructure are controlled through good practice construction methodologies and supplementary construction mitigation as required. Detail of good practice construction methodologies are provided by WRSE.

An INNS is any "*non-native animal or plant that has the ability to spread causing damage to the environment, the economy, our health or the way we live*"[1]. Whilst this definition does not include pathogens, it is widely acknowledged that INNS can also carry (non-native) pathogens which can affect native populations more than they do the INNS themselves, for example crayfish plague (*Aphanomyces astaci*). Invasive non-native species are considered the second biggest threat, after habitat loss and destruction, to biodiversity worldwide and carry a significant cost burden for UK water companies annually, both through the cost of their direct control and from damage to infrastructure and operational disruption[2].

The latest Environment Agency INNS Position Statement (April 2022)[3] considers a hierarchy for the assessment of new raw water transfers and their risk of spreading INNS. Firstly, any new transfers between otherwise isolated locations are required to have mitigation measures in place to ensure that INNS cannot be spread by any new raw water transfers, whilst those transferring raw water between already connected locations should have, at a minimum, a risk assessment of the relative risk the scheme poses.

Water Resources South East's (WRSE) high-level screening methodology was used for this assessment, which is summarised in Section 2.

2. Methodology

Screening criteria were developed by WRSE to determine which, of a total of three WRMP24 options, required an INNS assessment. This was based on the frequency in which transfers would be operational (Table 2-1) and the severity of their impact, as inferred by the nature and volume of water being transferred (Table 2-2). These criteria formed the screening matrix for assessment (Table 2-3), in which only schemes scoring 'low', 'medium' or 'high' were to be taken forward for a L2 assessment. The outcomes of the screening assessment are provided in Section 3.

Table 2-1 – WRSE screening criteria for assessing the frequency of impact experienced by a new scheme

Frequency	Criteria
Infrequent	Only occurs in emergency or during situations not considered part of the normal running of the scheme
Periodical	Will happen during start up or shut down, or periodically during routine maintenance or operation of the option
Regular	Will occur throughout the regular operation of the option

[1] Scottish Invasive Species Initiative. (n.d.). Invasive species. [online]. Available at: Invasive species | Scottish Invasive Species Initiative [Accessed on: 22/09/2022].
[2] UK Water Industry Research (UKWIR). (2016). Invasive Non-Native Species (INNS) Implications on the Water Industry. [online]. Available at: https://ukwir.org/Invasive-and-Non-Native-Species-(INNS)-Implications-on-the-Water-Industry [Accessed on: 19/09/2022].
[3] Environment Agency. (2022). Managing the risk of spread of Invasive Non-Native Species through raw water transfers – Position Statement April 2022.

Table 2-2 – WRSE screening criteria for assessing the severity of impact experienced by a new scheme

Severity	Criteria
Very Low	Treated water, effluent or groundwater
Low	Existing pathway between waterbodies or treated water / groundwater / effluent with no INNS risk being transferred
Medium	Change in volume of transfer between waterbodies which are already connected.
High	New pathway between waterbodies not current connected or potential to introduce new INNS not currently observed in the UK

Table 2-3 – WSRE screening matrix for new schemes, accounting for perceived frequency and severity of impact

Frequency / Severity	Infrequent	Periodical	Regular
Very Low	1 = Very Low	1 = Very Low	1 = Very Low
Low	2 = Low	2 = Low	3 = Low
Medium	3 = Low	4 = Moderate	4 = Moderate
High	4 = Moderate	5 = High	6 = High

3. Screening assessment outcomes

The L1 WRSE screening outcome (considering the general scheme type only) for the three schemes concluded that none required a further L2 assessment. As such, no further review of these high-level screening outcomes has been undertaken.

Table 3-1 - Summary of the screening assessment undertaken for all WRMP24 schemes which are listed in at least one of the final plans*

Option	WRSE ID	BVP	LCP	BESP	L2 Assessed
Outwood Lane	SES_SES_HI-GRW_RE2_ALL_r22	✓	✓	✓	No
Raising of Bough Beech reservoir	SES_SES_HI-ROC_RE2_ALL_r1	✓	✓	✓	No
Secombe Centre UV	SES_SES_HI-LRE_WT2_ALL_r26		✓	✓	No

BVP = Best Value Plan

LCP = Least Cost Plan

BESP = Best Environmental and Social Plan

**ticks indicate they are listed within the corresponding plan (column header)*

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