

SES Water Water Resources Management Plan 2019: Strategic Environmental Assessment (SEA)

Environmental Report

Project Number: 60527524

August 2018

Quality information

Prepared by



Graham McGrath
Assistant Consultant

Checked by



Alastair Peattie
Associate Director

Approved by



Jane Sladen
Technical Director

Revision History

| Revision | Revision date | Details | Name | Position |
|----------|------------------|---------------------------|------------------|----------------------|
| 1 | 09 November 2017 | Draft for internal review | Graham McGrath | Assistant Consultant |
| 2 | 10 November 2017 | Revised draft | Alastair Peattie | Principal Consultant |
| 3 | 14 November 2017 | Revised draft | Travis Kelly | Principal Consultant |
| 4 | 15 November 2017 | Draft for client review | Jane Sladen | Technical Director |
| 5 | 30 November 2017 | Final | Alastair Peattie | Principal Consultant |
| 6 | 17 August 2018 | Draft for Final WRMP | Alastair Peattie | Associate Director |
| 7 | 23 August 2018 | Final | Alastair Peattie | Associate Director |

Prepared for:

SES Water

Prepared by:

AECOM Limited
3rd Floor
Portwall Place
Portwall Lane
Bristol
BS1 6NA
UK

T: +44 117 901 7000
aecom.com

© 2016 AECOM Limited. All Rights Reserved.

This document has been prepared by AECOM Limited ("AECOM") for sole use of our client (the "Client") in accordance with generally accepted consultancy principles, the budget for fees and the terms of reference agreed between AECOM and the Client. Any information provided by third parties and referred to herein has not been checked or verified by AECOM, unless otherwise expressly stated in the document. No third party may rely upon this document without the prior and express written agreement of AECOM.

THIS PAGE INTENTIONALLY LEFT BLANK

Table of Contents

| | |
|--|-----------|
| Glossary | i |
| Acronyms | iv |
| 1. Introduction | 1 |
| 1.1 What is SEA? | 1 |
| 1.2 Compliance with other environmental legislation | 4 |
| 1.3 Structure of this Environmental Report | 5 |
| 2. The Water Resource Management Plan | 6 |
| 2.1 Introduction to SES Water | 6 |
| 2.2 About the WRMP | 7 |
| 2.3 Development of the WRMP | 7 |
| 2.4 Sustainability reductions | 7 |
| 3. Scoping Information | 8 |
| 3.1 Introduction | 8 |
| 3.2 Consultation on the scope | 8 |
| 3.3 Spatial scope | 8 |
| 3.4 Key issues | 8 |
| 3.5 SEA objectives | 10 |
| 4. Methodology | 13 |
| 4.1 Introduction | 13 |
| 4.2 SEA method | 13 |
| 4.3 Integration of WFD issues | 17 |
| 5. Assessment of Alternatives | 19 |
| 5.1 Introduction | 19 |
| 5.2 Unconstrained options | 19 |
| 5.3 Constrained options | 22 |
| 5.4 SEA of constrained options | 27 |
| 5.5 WFD issues | 31 |
| 5.6 EBSD Modelling | 32 |
| 5.7 Developing the preferred and alternative programmes | 32 |
| 6. Assessment of the Draft Water Resources Management Plan 2019 | 33 |
| 6.1 Introduction | 33 |
| 6.2 SEA of the dWRMP19 | 33 |
| 6.3 WFD issues | 39 |
| 6.4 Cumulative effects | 42 |
| 7. Assessment of the Final Water Resources Management Plan 2019 | 44 |
| 7.1 Introduction | 44 |
| 7.2 The final WRMP19 | 44 |
| 7.3 SEA of the final WRMP19 | 45 |
| 7.4 WFD issues | 45 |
| 7.5 Cumulative effects | 45 |
| 8. Next steps and monitoring | 47 |
| 8.1 Introduction | 47 |
| 8.2 Implementing the WRMP19 | 47 |
| 8.3 Monitoring | 47 |

Appendices available seperately

Glossary

| Term | Explanation |
|--|--|
| Abstraction | The process of taking water from any source, including rivers and aquifers. |
| Agricultural Land Classification | The Agricultural Land Classification provides a method for assessing the quality of farmland to enable informed choices to be made about its future use within the planning system. |
| Appropriate Assessment | Legal term used in the Habitats Directive and the Conservation of Habitats and Species Regulations 2010 to indicate what a competent authority must do where a plan or project is screened 'in' for further appraisal. It forms one part of the HRA and <u>may</u> follow on from the screening stage. |
| Area of Outstanding Natural Beauty | An area of high scenic quality which has statutory protection in order to conserve and enhance the natural beauty of its landscape. They have the same planning protection as National Parks but different purposes without a statutory duty to promote outdoor recreation. |
| Aquifer | A water-bearing rock that groundwater can be extracted from. |
| Biodiversity Action Plan | An agreed plan for a habitat or species, which forms part of the UK's commitment to biodiversity. |
| Catchment water transfer | Man-made transfer of water from one natural catchment or system to another. |
| Consultation body | In England, these are the Environment Agency, Historic England and Natural England. The consultation bodies are statutory consultees at the screening, scoping and environmental report stages of strategic environmental assessment. |
| Deficit | The amount of water shortage between supply and demand. |
| Defra | Department for the environment, food and rural affairs |
| Designated heritage asset | A World Heritage Site, Scheduled Monument, Listed Building, Protected Wreck Site, Registered Park and Garden or Registered Battlefield |
| Destroyed | Lasting damage has occurred to an entire designated feature on the SSSI unit such that the feature has been irretrievably lost (no amount of management will bring this feature back). This feature will never recover in the unit. |
| Environmental Report | The report that documents the assessment of a draft Plan and accompanies the draft Plan for consultation. The Environmental Report needs to contain certain information as set out in Schedule 2 to the SEA Regulations 2004. |
| Environmental Impact Assessment | A procedure to be followed for certain types of project to ensure that decisions on whether to grant development consent (e.g. planning permission) are made in light of an assessment of any likely significant effects on the environment. Evidence is presented in the form of an Environmental Statement (ES) |
| European site (sometimes known as 'Natura 2000' sites / network) | This includes Special Areas of Conservation, candidate Special Areas of Conservation and Special Protection Areas, and potential Special Protection Areas, and is defined in Regulation 8 of the Conservation of Habitats and Species Regulations 2010. This also includes Ramsar sites (see below). |
| Favourable | The designated feature(s) within a unit are being adequately conserved and the results from monitoring demonstrate that the feature(s) in the unit are meeting all the mandatory site specific monitoring targets. |
| Habitats Regulations Assessments (HRA) | This is a general term used for convenience which describes the full step-wise process required in making assessments of the impacts on European sites under the Conservation of Habitats and Species Regulations 2010, including the steps of screening for likely significant effects and making appropriate assessments (AA). |
| Heritage Asset | A building, monument, site, place, area or landscape identified as having a degree |

| Term | Explanation |
|---|---|
| | of significance meriting consideration in planning decisions, because of its heritage interest. Heritage assets include those designated nationally as well as those identified by the local planning authority (including local listing). |
| Impact Risk Zone | A tool/dataset which maps zones around each SSSI according to the particular sensitivities of the features for which it is notified. They specify the types of development that have the potential to have negative impacts at a given location. |
| Flood risk zone | Areas identified as being at significant risk from flooding or disruption from it. |
| Geomorphology | Processes of erosion, deposition and sediment transport that influence the physical form of a river and its floodplain. |
| Grey water | Wastewater generated from domestic activities such as laundry, dishwashing, and bathing, which can be recycled on-site for uses such as landscape irrigation and habitat creation. |
| Invasive species | Non-native species that out-compete native species to the detriment of an ecosystem. |
| Local Plan | The plan for the future development of the local area, drawn up by the local planning authority in consultation with the community. In law this is described as the development plan. |
| National Planning Policy Framework (NPPF) | The Framework sets out the government's national planning policies and how they are expected to be applied in plans and planning decisions. |
| National planning practice guidance (PPG) | Planning practice guidance web-based resource. Important information for any user of the planning system can be found here. |
| Nitrate Sensitive Area | A designation applied to areas of land where the underlying groundwater is at risk of pollution from nitrate polluted water. |
| Nitrate Vulnerable Zone | A designation applied to areas of land that have surface and groundwater at risk from nitrate pollution. |
| Part destroyed | Lasting damage has occurred to part of the designated feature on the SSSI unit such that it has been irretrievably lost and will never recover (no amount of management will allow the feature to ever reach favourable condition). |
| Priority habitat and species | Species and Habitats of Principle Importance included in the England Biodiversity List published by the Secretary of State under section 41 of the Natural Environment and Rural Communities Act 2006. |
| Protected landscapes | Protected landscapes refer to the statutory designations; Areas of Outstanding Natural Beauty (AONBs), the Broads Authority and National Parks (NPs), and the non-statutory areas encompassed by the Heritage Coasts |
| Qualitative appraisal | Assessment based on expert judgement and objectives. This is used for effects that are difficult to assign a value to. |
| Quantitative appraisal | Assessment method that assesses the value of environmental features in monetary or other numeric terms. |
| Ramsar sites | Wetland sites of International Importance, which were designated under the Ramsar Convention and are treated in the same way as European sites as a matter of government policy. |
| Setting of heritage asset | The surroundings in which a heritage asset is experienced. Its extent is not fixed and may change as the asset and its surroundings evolve. Elements of a setting may make a positive or negative contribution to the significance of an asset, may affect the ability to appreciate that significance or may be neutral. |
| Significant effects | Effects that, for the purposes of the SEA Regulations 2004 (Schedule 1) are |

| Term | Explanation |
|---|---|
| | considered to be significant. |
| Sites of special scientific interest (SSSI) | A suite of sites, representing some of the best wildlife and geology, designated under the Wildlife and Countryside Act 1981 (as amended), and subject to national level legal protection. |
| Special Area of Conservation (SAC) | An area given special protection under the EU Habitats Directive, providing increased protection for a variety of habitats, animals and plants. |
| Special Protection Area (SPA) | An area given special protection under the EU Birds Directive, by virtue of its international importance for the breeding, feeding, wintering or the migration of rare and vulnerable species of birds found within the European Union |
| Strategic Environmental Assessment | A procedure (set out in the SEA Regulations) which requires the environmental assessment of certain plans and programmes which are likely to have a significant effect on the environment. |
| Scoping Report | A document produced as part of a Strategic Environmental Assessment that is used to establish the scope of the SEA. |
| Unfavourable recovering | Units/features are not yet fully conserved but all the necessary management mechanisms are in place. Provided that the recovery work is sustained, the unit/feature will reach favourable condition in time. |
| Unfavourable no change | The SSSI unit/feature is not being conserved and will not reach favourable condition unless there are changes to the site management or external pressures and this is reflected in the results of monitoring over time. |
| Unfavourable declining | The SSSI unit/feature is not being conserved and will not reach favourable condition unless there are changes to site management or external pressures. The site condition is becoming progressively worse, and this is reflected in the results of monitoring over time. |
| Water resource management | The management of water sources and demands to minimise any deficit between the two. |
| Water Resource Management Plan | A plan designed to identify water deficits and outline measures that can reduce the deficit. |

Acronyms

| Acronym | Full term |
|---------|--|
| ALC | Agricultural Land Classification |
| AMP | Asset Management Plan |
| AONB | Area of Outstanding Natural Beauty |
| BAP | Biodiversity Action Plan |
| CAMS | Catchment Abstraction Management Strategy |
| Defra | Department for Environment and Rural Affairs |
| DMA | District Metered Area |
| EA | Environment Agency |
| EC | European Commission |
| GEP | Good Ecological Potential |
| GES | Good Ecological Status |
| GIS | Geographical Information Systems |
| HaR | Heritage at Risk |
| HRA | Habitats Regulations Assessment |
| Mld | Megalitres of water per day |
| NNR | National Nature Reserve |
| NSA | Nitrate Sensitive Area |
| NVZ | Nitrate Vulnerable Zone |
| RBMP | River Basin Management Plan |
| PR09 | Periodic review 2009 |
| PR14 | Periodic review 2014 |
| PR19 | Periodic review 2019 |
| RSPB | Royal Society for the Protection of Birds |
| PRV | Pressure Release Valve |
| SAC | Special Area of Conservation |
| SEA | Strategic Environmental Assessment |
| SMP | Shoreline Management Plan |

| Acronym | Full term |
|-----------|---|
| SPA | Special Protection Area |
| SSSI | Site of Special Scientific Interest |
| UKCIP | United Kingdom Climate Impacts Programme |
| UKCP | UK Climate Projections |
| UKWIR | UK Water Industry Research |
| WFD | Water Framework Directive |
| dWRMP2019 | SES Water's draft Water Resource Management Plan 2019 |
| WRMP | Water Resource Management Plan |
| WRSE | Water Resources in the South East |
| WRZ | Water Resource Zone |

1. Introduction

AECOM has been commissioned to undertake the Strategic Environmental Assessment (SEA) of SES Water's Water Resource Management Plan 2019 (WRMP19).

1.1 What is SEA?

The requirement to undertake a SEA arises from EC Directive 2001/42/EC 'on the assessment of the effects of certain plans and programmes on the environment' (the 'SEA Directive'). The SEA Directive is transposed into English law through the Environmental Assessment of Plans and Programmes Regulations 2004 (the 'SEA Regulations'). The SEA Directive and associated regulations require a SEA to be undertaken for certain plans and programmes, which are likely to have significant effects on the environment. The overarching objective of the SEA Directive is:

"To provide for a high level of protection of the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans...with a view to promoting sustainable development, by ensuring that, in accordance with this Directive, an environmental assessment is carried out of certain plans...which are likely to have significant effects on the environment."

SEA Directive (Article 1)

UK Water Industry Research (UKWIR) guidance states that:

"SEA is a qualitative process. Its outputs are often based on qualitative judgements of the significance of varying types of impacts on different receptors"

UKWIR 2012¹

European Commission (EC) guidance states that:

"the essential thing is that the likely significant effects of the plan or programme and the alternatives are identified, described and evaluated in a comparable way."

European Commission 2004²

There are two key procedural requirements of the SEA Directive, which are:

1. When deciding on 'the scope and level of detail of the information' of the assessment, the SEA consultation bodies³ must be provided with the relevant information and given five weeks to comment on the proposed scope and level of detail the assessment will enter into.
2. A report (the 'Environmental Report') is published for consultation alongside the draft WRMP19 that presents an assessment of the plan as published (i.e. discusses 'likely significant effects' that would result from implementation of the draft WRMP19) and any reasonable alternatives.

The SEA process is covered in more detail in three guidance documents: 'A Practical Guide to the Strategic Environmental Assessment Directive'⁴ (the 'Practical Guide'); 'Strategic Environmental Assessment and Habitats Regulations Assessment - Guidance for Water Resources Management Plans and Drought Plans';⁵ and 'Implementation of Directive 2001/42 on the assessment of the effects of certain plans and programmes on the environment'. The SEA process is split into five main stages:

¹ Cascade Consulting (2012) Strategic Environmental Assessment and Habitats Regulations Assessment – Guidance for Water Resources Management Plans and Drought Plans.

² European Commission (2004) Implementation of Directive 2001/42 on the assessment of the effects of certain plans and programmes on the environment [online] @ http://ec.europa.eu/environment/archives/eia/pdf/030923_sea_guidance.pdf. Accessed October 2016

³ In England these are the Environment Agency, Historic England and Natural England.

⁴ ODPM now DCLG (2006) A practical guide to the Strategic Environmental Assessment Directive [online] Available at: <http://www.communities.gov.uk/publications/planningandbuilding/practicalguidesea> Accessed September 2016

⁵ UKWIR (2012) Strategic Environmental Assessment and Habitats Regulations Assessment – Guidance for Water Resources Management Plans and Drought Plans.

- Stage A: Setting the context and objectives, establishing the baseline and deciding on the scope;
- Stage B: Developing and refining alternatives and assessing effects;
- Stage C: Preparing the Environmental Report;
- Stage D: Consulting on the dWRMP2019 and the Environmental Report; and
- Stage E: Monitoring the significant effects of implementing the dWRMP2019 on the environment.

Figure 1.1 illustrates how the SEA, Habitats Regulations Assessment (HRA) (see Section 1.2.1 below) and WRMP219 processes are integrated. This figure has been adapted from the UKWIR SEA guidance. This Environmental Report (highlighted in red in **Figure 1-1**) is the main output from Stage C of the SEA process.

1.1.1 Meeting regulatory requirements

Water companies in England are legally required to supply water to private consumers and businesses within their area. As set out in the Water Industry Act 1991, SES Water must prepare and maintain a Water Resources Management Plan (WRMP) that sets out how the company intends to maintain the balance between water supply and demand.

The WRMP must take a long term view, setting a planning period that is appropriate to the risks in relation to supply and demand, but which covers at least the minimum statutory period of 25 years.

The WRMP is complemented by SES Water's Drought Plan, which sets out the short-term operational steps to be taken during a drought to enhance available water supplies, manage customer demand and minimise environmental impacts.

Through the WRMP and Drought Plan SES Water will contribute to the delivery of Water Framework Directive (WFD) objectives set out in the relevant River Basin Management Plans (RBMPs).⁶

1.1.2 The need for Strategic Environmental Assessment

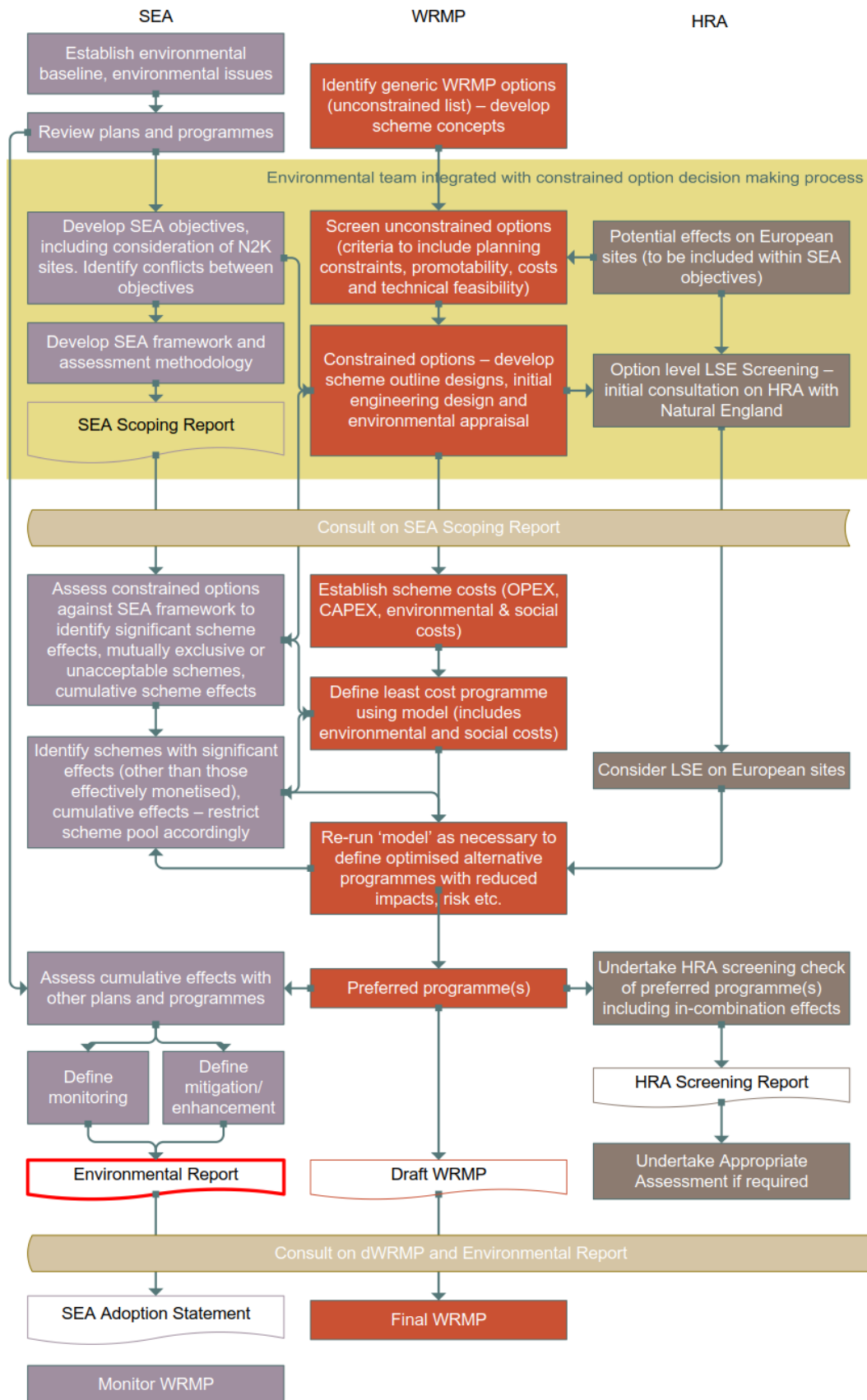
The Water Resource Planning Guideline suggests that water companies investigate "*whether a Strategic Environment Assessment (SEA) is required (if options are needed to balance a supply-demand deficit) and carry out an SEA if required.*"⁷ SES Water will be identifying both supply options to address a forecast deficit and demand options to manage consumption and leakage.

Furthermore, the supply options are likely to include projects that would require assessment under the requirements of Directive 2011/92/EU (as amended in 2014 by Directive 2014/52/EU) 'on the assessment of the effects of certain public and private projects on the environment' (the Environmental Impact Assessment (EIA) Directive) or could have significant effects on the environment. It has therefore been determined by SES Water that an SEA is required.

⁶ Environment Agency and Natural Resources Wales (2016) Final Water Resource Planning Guideline.

⁷ Ibid

Figure 1-1: SEA and HRA aligned with the WRMP process⁸



⁸ 'N2K sites are those sites designated as part of the Habitats and Birds Directives (part of the Natura 2000 network of sites). This report refers to all such designated sites as 'European Sites'.

1.2 Compliance with other environmental legislation

1.2.1 Habitats Regulations

If a plan or project is deemed likely to have a 'significant effect' on any site that is designated under the EU Habitats or Birds Directives, an assessment is required under the Conservation of Habitats and Species Regulations 2010 (as amended) (the 'Habitats Regulations'). This assessment is more commonly referred to as a Habitats Regulations Assessment (HRA). Sites designated under the European Habitats and Birds Directives are Special Areas of Conservation (SACs) and Special Protection Areas (SPAs), respectively, and are collectively referred to as European sites. It is also Government policy for sites designated under the Convention on Wetlands of International Importance (Ramsar sites) to be treated as having equivalent status to European sites. There are four stages of the HRA process, which are summarised below:

- **Evidence Gathering** - Establishing whether the Habitats Regulations apply to the plan or project; collecting information on relevant European sites, their conservation objectives and characteristics and other plans or projects.
- **Stage 1** - Determination of Likely Significant Effect (LSE): To determine whether, in view of a European Site's conservation objectives, the plan or project (either alone or in combination with other projects and plans) could have a 'likely significant effect' on the site. If negative impacts are anticipated, potential mitigation measures to alleviate impacts should be proposed and assessed;
- **Stage 2** - Appropriate Assessment: Where potential for LSE have been identified at Stage 1 Appropriate Assessment is required. Assess whether the plan or project will have a negative effect (or risk of this) on the integrity of a European Site. This may require more detailed bespoke data. If so, there should be an examination of whether the plan or project could be consented subject to certain conditions or restrictions (other than those identified at Stage 1) that would avoid negative effects on the integrity of the site.
- **Stage 3** - Alternative Solutions and IROPI. Determination whether to proceed despite the presence of negative effects on the integrity of the site. If negative effects on the integrity of the sites are identified and negative impacts remain, but it can be clearly shown that no alternative solutions exist, the plan or project may be allowed to proceed in exceptional circumstances (i.e. where there are imperative reasons of overriding public interest (IROPI) and no alternatives). Compensatory measures would be required to offset negative impacts.

The responsibility for undertaking HRA falls to the relevant 'Competent Authority' for the purposes of the Habitats Regulations. Water companies are classed as Statutory Undertakers and hence are 'Competent Authorities' under the Habitats Regulations. Therefore, SES Water is responsible for considering the need for HRA for its plans, in line with the requirements of the Habitats Regulations. An HRA screening exercise (likely significant effects) has been undertaken and it concludes that there will not be any LSE on any European Sites.

1.2.2 Water Framework Directive

Consideration of the WRMP19 in relation to Directive 2000/60/EC (the 'Water Framework Directive' (WFD)) is required. The WFD is designed to protect and improve the environmental condition of all waters, including rivers, lakes, groundwater, estuaries and coastal waters out to one nautical mile. The fundamental objective of the WFD is to prevent any deterioration in the existing status of waters and achieve at least 'good status' in relation to all waters (or 'good potential' status in heavily modified water bodies (HMWB)) by 2015. The WFD recognises that this may not be achieved in some cases and, subject to the criteria set out in the Directive, aims to achieve good status or potential by 2027.

The WFD is implemented through river basin planning, which involves setting environmental objectives for all groundwater and surface water bodies within a river basin district and then devising a programme of measures and actions to meet those objectives.

The objectives, actions, and mitigation measures within the associated River Basin Management Plan (RBMP) will need to be reflected within the SEA process for the WRMP. There is no requirement within the WFD to undertake a formal assessment of the effects of a plan or programme in relation to the WFD; however, taking these issues into consideration within the SEA framework will ensure that

conflicts with RBMP objectives are avoided as far as possible and that opportunities to deliver RBMP objectives are maximised.

1.3 Structure of this Environmental Report

This Environmental Report has been prepared to meet the requirements of the SEA Regulations⁹ and to facilitate consultation with relevant stakeholders.

The Environmental Report is structured as follows:

- Chapter 1 (this chapter) - sets out the need for an SEA and any other relevant assessments;
- Chapter 2 - sets out the background to the WRMP;
- Chapter 3 - provides a summary of the proposed SEA scope and sets out the key issues and SEA Objectives;
- Chapter 4 - sets out the proposed approach and methodology;
- Chapter 5 - sets out the findings for the assessment of alternatives;
- Chapter 6 - sets out the findings of the assessment for the dWRMP19;
- Chapter 7 - sets out the findings of the assessment for the final WRMP19; and
- Chapter 8 - sets out proposed monitoring and next steps.

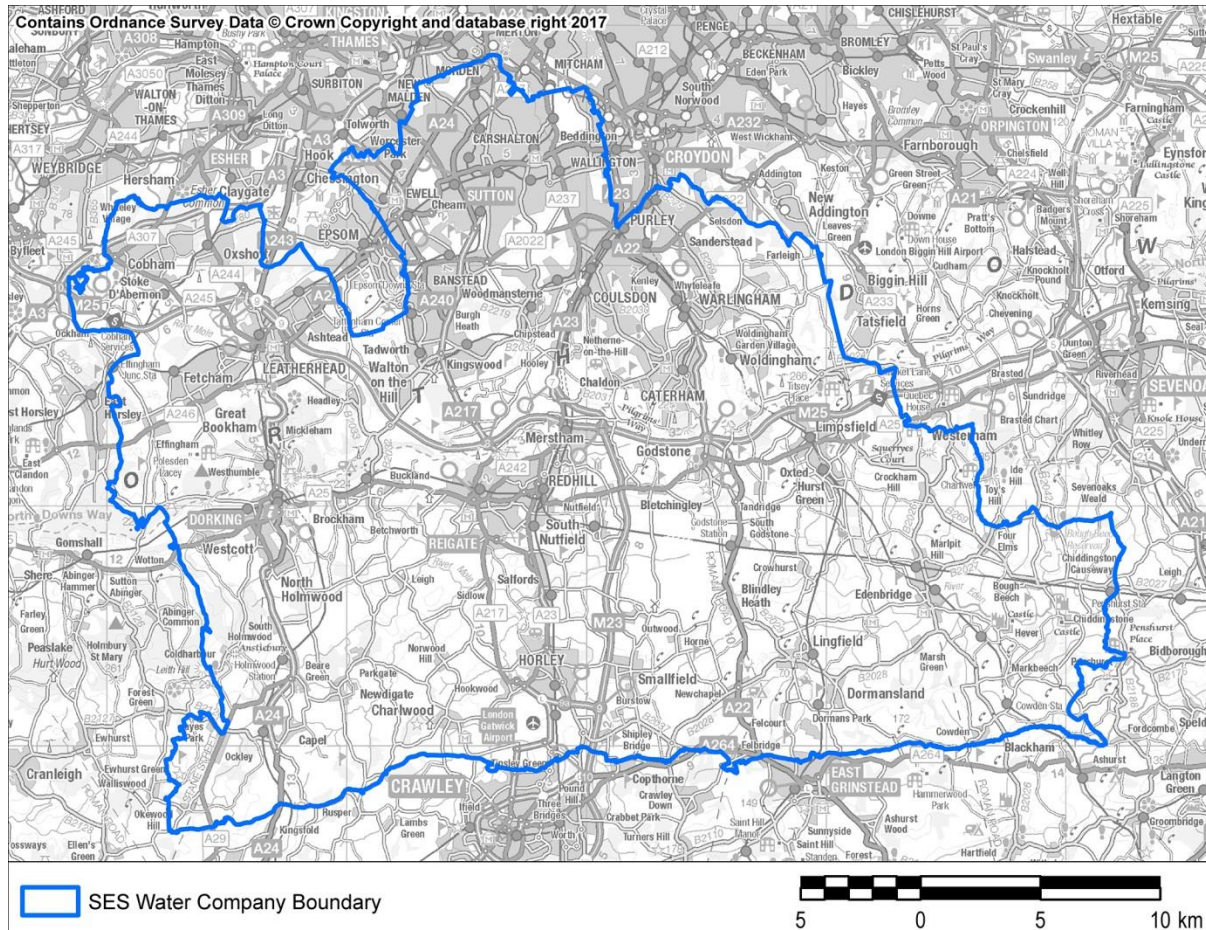
⁹ Regulation 12 (5)

2. The Water Resource Management Plan

2.1 Introduction to SES Water

SES Water are a water-only supply company and serve over 675,000 people¹⁰. The supply area covers 834km² within Surrey, West Kent, and also the London Boroughs of Sutton, Croydon and Merton. The SES Water supply area is formed of one company-wide WRZ for the entire supply area.

Figure 2-1: SES Water supply area



SES Water supplies, on average, 160 million litres of water per day (Ml/d) in this area. However, during the summer period this can increase to above 200Ml/d. Approximately 85% of the raw water is abstracted from groundwater sources and 15% from river sources.

The majority (approximately 85%) of the SES Water’s deployable output is from four main groundwater aquifer resources units (ARUs). These are:

- North Downs Chalk;
- Confined Chalk;
- Mole Valley Chalk; and
- Lower Greensand.¹¹

¹⁰ Sutton and East Surrey Water (2014) Final Water Resource Management Plan [online] available at: http://www.waterplc.com/userfiles/file/WRMP_Final_MainReport.pdf

¹¹ Ibid.

2.2 About the WRMP

Water companies in England and Wales are required by law (Water Act 2003) to produce a WRMP every five years. The WRMP must set out how a water company intends to maintain the balance between water supply and demand over at least a 25-year period. The Plan must be prepared in accordance with the EA Water Resources Planning Guideline (WRPG)¹² developed by government and water industry regulators. It must also take account of and support government policy and aspirations for providing secure, sustainable and affordable water supplies to customers.

The SES Water WRMP19 will set out the preferred programme (comprising a range of options) to reduce any deficit through supply and demand options.

2.3 Development of the WRMP

The preparation of the dWRMP19 will follow the current WRPG. The process is summarised below:

1. Engage early with regulators, customers and interested parties;
2. Undertake pre-consultation;
3. Write the draft WRMP19;
4. Send the draft WRMP19 to the Secretary of State;
5. Publish and distribute the draft WRMP19;
6. Carry out a public consultation on the draft WRMP19;
7. Publish a statement of response;
8. Send the draft final WRMP19 and statement of response to the Secretary of State;
9. Publish final WRMP19;
10. Revise and review the final plan; and
11. Implement the WRMP.

2.4 Sustainability reductions

The Environment Agency is responsible for issuing licences for water abstractions from both groundwater and surface water. It also has the power to amend existing licences or to enter into operating agreements to limit abstraction where it is having a negative effect on the environment.

In response to European and national legislation, the Environment Agency introduced the Water Industry National Environment Programme (WINEP) to ensure that water companies meet European and national targets related to water. The WINEP is a list of environmental improvement schemes which water companies include in their five-yearly Business Plans. It includes requirements for water companies to undertake improvement schemes or, where more evidence is required, to investigate a particular problem. The Environment Agency has published a list of possible 'confirmed' and 'likely' reductions (sustainability reductions) for SES Water, which are part of ongoing discussions with the Environment Agency.

¹² Environment Agency (2016) Guidance: Water Resources Planning [online] available at: <https://www.gov.uk/guidance/balancing-water-resources>

3. Scoping Information

3.1 Introduction

The aim of this chapter is to introduce the reader to the scope of the SEA, i.e. the key issues / objectives that should be a focus for assessment. Further information on the scope of the SEA - i.e. a more detailed review of key issues/objectives as highlighted through a review of the 'policy context' and 'baseline' - is presented in **Appendix II**.

3.2 Consultation on the scope

The SEA Regulations require that "When deciding on the scope and level of detail of the information that must be included in the Environmental Report [i.e. the SEA scope], the responsible authority shall consult the consultation bodies". In England, the consultation bodies are the Environment Agency, Historic England and Natural England.¹³ As such, these authorities were consulted on the SEA scope in early 2017. The consultation responses received and how they have been taken into account are set out in **Appendix III**.

3.3 Spatial scope

The scope of this SEA includes all areas within the company boundary (outlined in Figure 2-1). Where necessary, the SEA also considers the influence of the WRMP19 and alternatives outside of the area where there are potential pathways for effects to occur.

3.4 Key issues

The policy context and baseline information lead to the identification of a number of key issues, which are set out in the table below. These were updated to reflect responses received from statutory consultees.

Table 3-1: Key issues

| SEA topic | Key issues |
|--|---|
| Population and Human Health | |
| Population Growth | The number of households that will need to be supplied is anticipated to grow within the Study Area. Current projections show that property numbers will increase by approximately 67,769 through to 2039/40. The latest available forecast suggests that the total population in the Company supply area will grow by approximately 171,140 from 675,289 in 2011/12 to 846,429 in 2039/40. Major development of infrastructure, housing and industry will result in an increased demand for water, likely to exceed current supply capacity. |
| Tourism and Recreation | No issues identified |
| Material Assets | No issues identified |
| Biodiversity, Flora and Fauna | |
| Sites Designated for Nature Conservation | There are several nationally and internationally designated sites including Ramsar Wetlands, SACs, SPAs and SSSIs and other designated areas within the Study Area. Wetland, grassland and riverine designated sites will be particularly vulnerable to additional abstraction and discharge. |
| Protected and Rare Species | Several rare and protected species are found within the Study Area in terrestrial, riverine and aquatic environments. Many of these species are sensitive to changes in hydrology and water quality. |
| Fisheries | Salmonid fisheries are restricted to non-migratory Brown Trout in the upper reaches of the River Mole. Other watercourses within the Study Area support river and still water course fisheries. However, in general the ecological water quality of the Study Area is either |

¹³ In-line with Article 6(3) of the SEA Directive, these consultation bodies were selected because 'by reason of their specific environmental responsibilities, [they] are likely to be concerned by the environmental effects of implementing plans and programmes.'

| SEA topic | Key issues |
|--|--|
| | moderate or poor. |
| Landscape | |
| Landscape character | Five different National Character Areas cover the Study Area and there are three Areas of Outstanding Natural Beauty (AONBs) within the Study Area. |
| Air and Climatic factors | |
| Climate change | The South East of England is expected to experience some of the most severe impacts due to climate change over the coming century. These will include an increase in summer temperatures, wetter winters, drier summers, and decreases in soil moisture, all of which will impact water availability within the Study Area. |
| Air Quality and Noise | No issues identified |
| Water | |
| Water availability | The Study Area is groundwater-dominated. According to the CAMS the major aquifers are over-licensed or over-abstracted at low flows. The River Eden, the only surface water resource in the area is over-licensed at low flows and thus water is only likely to be available at times of high flows. The predicted influences of climate change are likely to affect the future availability of water in the region. |
| Groundwater quality | The vulnerability of groundwater in the Study Area is monitored by the Environment Agency. In general, risk to groundwater quality results from polluting activities or the accidental release of pollutants. |
| Surface water quality | The quality of surface waters in the Study Area is monitored by the Environment Agency. In general, risk to water quality in rivers and streams is caused by point and diffuse pollution, which is exacerbated by low flows. There may also be risk due to transfer of water from other sources. |
| Flood risk | Some parts of the Study Area are within Flood Zone 3 where there is a significant risk of fluvial flooding. |
| Cultural, Architectural and Archaeological Heritage | |
| Cultural heritage and archaeological potential | Numerous Listed Buildings, Scheduled Monuments and other heritage features exist within the Study Area. There are also many areas considered to have archaeological potential. |
| Soil | |
| Soils and geology | Linked to climate change and groundwater quality, soils are important for regulating water flows. A large proportion of land in the South East is agricultural. As a result of this, agriculture will place increased demand on water resources, especially in light of climate change impacts which is predicted to reduce soil moisture. Additionally, agriculture and sewage treatment works have implications for water quality, as pollutants can enter water resources. This is especially important in nitrate vulnerable zones. There are a number of geological and geomorphological SSSIs and RIGS within the Study Area. |
| Material Assets | |
| Infrastructure and transport | No issues identified |
| Waste | No issues identified |

3.5 SEA objectives

The following table presents the sustainability objectives and assessment questions established through SEA scoping, i.e. in-light of context/baseline review, the key issues and consultation. Taken together, these objectives and assessment questions provide a methodological 'framework' for appraisal.¹⁴

Table 3-2: SEA objectives

| SEA Objective | Assessment question |
|--|---|
| 1. To protect and, where feasible, enhance biodiversity including designated and other important habitats and species | <ul style="list-style-type: none"> • Is the option likely to affect the conservation status of any SPA/SACs, Ramsar Site, SSSIs or NNRs? • Is the option likely to affect ancient woodland, Biodiversity Action Plan (BAP) habitats and/or protected and BAP species? • Is there potential for contribution to achieving 'favourable' conservation status or for creation of new BAP habitats? • Would the option protect and enhance aquatic and terrestrial habitats and species? • Will the option affect any habitats that support legally protected species or species of conservation concern? • Does the option avoid or minimise habitat fragmentation? • Are there any opportunities for habitat creation or restoration? • Would it promote linkages between existing habitats? • WFD: Is there potential for contribution to achieving 'good' ecological status/potential? • Would the option affect the ability of biodiversity to adapt to climate change, and/or affect ecosystem services? • Does the option avoid spreading invasive non-native species? • Will the option help to meet UK Biodiversity Action Plan Objectives? • Would the option affect the ability of internationally, nationally and locally important wildlife sites to achieve favourable condition? |
| 2. To maintain and where possible improve freshwater fisheries | <ul style="list-style-type: none"> • Does the option location affect any important fisheries (e.g. salmonid, coarse fish)? • Are there potential indirect impacts (e.g. from affecting other aspects of aquatic ecology (habitat or food species) upon which fish rely)? • Are there opportunities to improve fish migration or could migration be impeded? • WFD: Is there potential for contribution to achieving 'good' ecological status/potential? |
| 3. Minimise negative impacts on communities and households especially the most vulnerable groups | <ul style="list-style-type: none"> • Is there potential for significant disruption/nuisance/noise to households/communities e.g. from traffic/construction, access severance, disruption during operation? • Is there potential for public health or quality of life to be negatively affected or improved? • Are there any potential impacts on vulnerable sectors of society or risks of increasing social exclusion? • Will the option cause disruption/ loss of amenity at a household level? • Will the option lead to an increase in existing lighting levels in the area, particularly near designated sites and in rural settings? |
| 4. Protect and, where possible, enhance recreation and amenity facilities and increase access and enjoyment of the countryside | <ul style="list-style-type: none"> • Will the option impact on any designated recreational areas, parks, recreational facilities (e.g. water sports) and National Trails/footpaths /access? • Are there opportunities to create new/additional recreational facilities, or potential to increase amenity/ access to riverside/countryside? • Will the use of rivers or other water bodies for angling or navigation be affected? |
| 5. To protect the quality of land and soils, and maintain geological | <ul style="list-style-type: none"> • Is there potential for loss or severance of agricultural land (ALC best and most versatile)? • Will the option result in the alteration of natural drainage patterns? |

¹⁴ N.B. It is important to note that the objectives and assessments questions are often closely linked and there are direct and indirect interrelationships between them.

| SEA Objective | Assessment question |
|---|--|
| diversity | <ul style="list-style-type: none"> • Could there be conflict with known contaminated land sites? • Would the option affect any geological SSSIs? • Does option allow or restore natural geomorphological processes? • Will the option ensure the efficient use of land (e.g., make use of previously developed land)? • Will the option result in soil erosion? |
| 6. To protect and where possible enhance river flows and groundwater resources | <ul style="list-style-type: none"> • Will the option affect river flows? • Does the option take into account requirements for sustainability reductions, CAMS assessments of water availability, and the sensitivity of surface and groundwater to abstraction? • Will there be a conflict with any of these requirements? • Will there be any impacts on third parties, e.g. other abstractors? • Is there potential to help restore sustainable abstraction? • Is there potential to help ameliorate low flows? • Will the option minimise impacts from high and low water flows, particularly along the river bank and on channel processes? |
| 7. To protect and where feasible enhance the quality of surface waters | <ul style="list-style-type: none"> • Is the option likely to affect biological or chemical quality elements? • Would the option affect flow regimes or significantly change water levels? • Is there potential for physical effects on the river channel and/or hydromorphology of watercourse(s)? • For Heavily Modified Water bodies, would the option contribute to or prevent the implementation of mitigation measures specified in the River Basin Management Plan? |
| 8. To protect and enhance groundwater quantity and quality | <ul style="list-style-type: none"> • Is there the potential to affect groundwater quality (e.g. contamination)? • Would the option affect groundwater flows or significantly change groundwater levels? • Could the option contribute to meeting WFD objectives? |
| 9. To minimise the risk of flooding, and reduce flood risk where feasible to do so | <ul style="list-style-type: none"> • Would the option result in a loss/gain of flood plain storage? • Could the option contribute to reducing flood risk (e.g. by attenuating flows)? • Will the option be at risk from flooding? |
| 10. To meet WFD Objectives | <ul style="list-style-type: none"> • Would the option affect the ability of surface water bodies to reach Good Ecological Status or (if artificial or heavily modified) Good Ecological Potential; and for groundwater bodies to reach Good Quantitative Status? • Would the option prevent the status of water bodies reported in current River Basin Management Plans (RBMPs) to suffer no further deterioration? • Would the option affect the ability of surface water bodies to reach the RBMP 2021 objectives? • Would the option affect the ability of surface water bodies to improve in WFD status? • Would the option place waterbodies 'at risk of deterioration'? |
| 11. To reduce greenhouse gas emissions | <ul style="list-style-type: none"> • Will the option have reduced levels of energy use and annual carbon emissions/size of carbon footprint? • Will the option affect emissions during construction and operation (including transport and other sources)? • Is there potential to offset energy use or contribute to renewable energy generation? • Will the option minimise embodied carbon in materials and equipment used in capital assets? • Are there opportunities for promotion of water use efficiency? |
| 12. To avoid negative effects on key transport routes, significant land use and critical infrastructure | <ul style="list-style-type: none"> • Is there potential for loss of any existing properties? • Is there potential for conflict with major development allocations? • Will the option affect the operation of businesses? • Could the option affect critical infrastructure/transport assets, e.g. the closure or restrictions on the transportation network? |

| SEA Objective | Assessment question |
|---|---|
| | <ul style="list-style-type: none"> • Will the option result in the loss of high grade agricultural land? • Will the option make the most effective use of existing assets, or propose new use for assets made redundant as a result of the option development? • Will it affect any navigation routes? |
| 13. To promote sustainable use of resources | <ul style="list-style-type: none"> • What is the type of waste expected to be generated and is there potential for reuse on site? • Can materials be obtained from sustainable sources? |
| 14. To maintain and enhance local air quality | <ul style="list-style-type: none"> • Will the construction or operational activities associated with the option affect local air quality (e.g., proximity to AQMAs or sensitive habitats)? • Will the option help improve existing local air quality? |
| 15. To protect and where feasible enhance sites and features of archaeological, historical and architectural interest, and their settings | <ul style="list-style-type: none"> • Could the option significantly affect (directly or via their setting) any historical, cultural and archaeological sites, e.g. Scheduled Monuments, listed buildings, Registered Parks and Gardens, Conservation Areas, historic landscapes? • Will the option involve abstraction which may alter the hydro-geological setting of water dependent cultural heritage assets? |
| 16. To maintain and where feasible enhance landscape character and visual amenity | <ul style="list-style-type: none"> • Will the option affect any nationally designated landscapes e.g. AONBs? • Are there any important historic landscapes affected by the proposed option? • Is there potential to significantly enhance townscape/landscape character/ visual amenity? • Will the option affect public access to existing landscape features? • Will the option help to protect or enhance non-designated areas of natural beauty and avoid the loss of local distinctiveness? |

4. Methodology

4.1 Introduction

This section sets out how the SEA will be undertaken. It follows the UKWIR SEA guidance and the SEA Practical Guide. The proposed SEA method used broadly reflects the approach undertaken in the SEA of the WRMP14. This similar method has been chosen to allow for continuity of assessment between the two Period Reviews.

4.2 SEA method

4.2.1 Screening of unconstrained options

SES Water identified a list of unconstrained options brought forward from WRMP14 (if not implemented) as well as any new options identified internally, that could help to balance the forecasted supply-demand deficit. These options were then screened by AECOM against a range of criteria. AECOM also identified new supply-side options. The criteria for WRMP19 followed the approach taken in WRMP14 where the options were considered against the yield uncertainty (how well is the concept understood), its technical difficulty, its promotability with regulators and customers and other stakeholders, its flexibility for change in the future (is the cost likely to be worth spending today for long-term resource availability), is it sustainable in terms of energy and material use, and does it impact on conservation or heritage sites, or have a social impact from change to the general landscape or economic changes (such as job creation).

For WRMP19, AECOM took these themes and categorised them as initial and secondary screening criteria with the aim of screening out options that are unlikely to pass crucial tests and therefore should not be considered further. These screening criteria would vary with option type (groundwater and surface water, transfers and treatment). For further details on the method, including the criteria used, please refer to the Options Appraisal - Supply Side Report which is available separately.¹⁵ Demand-side option screening was undertaken by Artesia Consulting Ltd and reported separately.¹⁶

4.2.2 Assessment of constrained options

Each constrained option was assessed against the full SEA Framework identified through the scoping stage (Chapter 3). A qualitative assessment was carried out which evaluated the 'likely significant effects' of each constrained option on the baseline, guided by the sustainability objectives and assessment questions developed through scoping. The assessment was undertaken using professional judgment, supported by the baseline information and wider evidence where relevant.

SEA is informed by the best available information and data; however, data gaps and uncertainties exist and it is not always possible to accurately predict effects at a strategic level of assessment. Assumptions are made cautiously, and explained where necessary.

4.2.2.1 Determining significance

The first step in evaluating the likely significant effects is to firstly have a clear understanding of the scope of the option (including level of new infrastructure required) and then using the baseline information and GIS software, identify potential pathways for impacts to occur as a result of that option.

Once a potential pathway and receptor[s] are identified the magnitude of that effect was then considered. An effect could be either high, medium or low magnitude as well as positive or negative. A high or medium magnitude effect that results in the loss of or damage to a receptor is considered to be of greater significance compared to a low magnitude effect where there may only be a minor level of disturbance. The magnitude scale criteria are set out in Table 4-1 below.

¹⁵ SES Water (March 2017) Draft WRMP 2019 Options Appraisal - Supply Side. Prepared by AECOM.

¹⁶ WRMP19 demand management options – Assessment of Feasible Demand Management Options.

Table 4-1: Effect magnitude scale criteria

| Magnitude | Description of Effect |
|-----------|--|
| High | Negative effects would result in the complete loss of the receptor and/or severe damage to its integrity/quality/key characteristics/features/elements. |
| | Beneficial effects would result in a large scale improvement, enhancement or restoration of a receptor, large scale improvements to integrity/quality, or creation of a new internationally/nationally important resource. |
| Medium | Negative effects would result in some loss of or damage to the receptor, but not sufficient to negatively affect its overall integrity. Partial loss of or damage to quality/key characteristics/features/elements. |
| | Beneficial effects would result in some improvement, enhancement or restoration of a receptor, improvements to integrity/quality, or creation of a new regionally important resource. |
| Low | Negative effects would result in some measurable change to the receptor and/or change in quality or alteration of one or more key characteristics/features/elements. |
| | Beneficial effects would result in a small improvement to or addition of one or more key characteristics/features/elements. Creation of a new locally important receptor/resource. |

Once the magnitude of the effect was identified the sensitivity of the receptor was then considered. Receptors of international or national importance were considered to have very high sensitivity, those of regional importance high sensitivity, sub-regional importance medium sensitivity and local importance low sensitivity. Table 4-2 is a guide as to how the magnitude and sensitivity of the receptor were used to inform the significance of the effect. Please note that the list of receptors in the table is not exhaustive, but provides examples of how the magnitude of predicted effects and sensitivity of receptors was used to determine significance.

Table 4-2: Criteria for determining significance of effects

| Low Magnitude | Medium Magnitude | High magnitude | Description of receptor sensitivity |
|-------------------|-------------------|-------------------|---|
| Moderate to Major | Major | Major | Very high sensitivity National/international importance SPAs, SACs, Ramsar sites, SSSIs, SMs, AONBs, National Parks, World Heritage Sites, nationally important infrastructure, AONBs, SMs, Grade I Listed Buildings, NNRs. |
| Moderate to Major | Moderate to Major | Major | High sensitivity Regional importance Regional Habitats and Species of Principal Importance, RIGS, Water Framework Directive 'Good Ecological Status', National Trails, Regionally important infrastructure. |
| Minor to Major | Moderate to Major | Moderate to Major | Medium sensitivity Sub-regional importance Agricultural Land Classification, Heritage Coasts, Grade II Listed Buildings, historic landscapes, Groundwater quality, Groundwater Source Protection Zones, angling and navigable watercourses. |
| Minor | Minor to moderate | Minor to moderate | Low sensitivity Local importance Local nature conservation designations, Local Habitats and Species of Principle Importance, SMRs, Special Landscape Areas, historic parks and gardens, Conservation Areas, local townscape and visual Amenity, locally important infrastructure, major development allocations, Public Rights of Way. |

In order to help characterise the effects and in line with the SEA Regulations the timescale (short, medium and long term) and permanence (temporary or permanent) of the effect were also noted.

Where negative effects were identified mitigation measures were proposed that could help to reduce the significance of that effect. Taking mitigation into account, professional judgment was used to determine the residual effect against each SEA Objective for each constrained option. The residual effects were recorded and based on the significance key presented in Table 4-3 below.

Table 4-3: Significance key

| | |
|-------------------|-----|
| Major positive | +++ |
| Moderate positive | ++ |
| Minor positive | + |
| Neutral | 0 |
| Uncertain | ? |
| Minor negative | - |
| Moderate negative | -- |
| Major negative | --- |

Moderate and Major positive and negative effects were considered to be of 'significance', whereas neutral, uncertain and minor negative and positive effects were considered non-significant. The findings of the assessment were recorded in an individual matrix for each constrained option.

4.2.3 Assessment of alternative programmes

The findings of the SEA for constrained options were then used to inform the development of alternative programmes (packages of constrained options) through EBSD modelling. Prior to scenario generation it is possible to switch 'on' or 'off' options based on the findings of assessments. An environmental scenario was developed which excluded supply-side options that were identified as potentially causing a risk to WFD status. The exclusions made were the combined results of SEA screening and unconstrained options screening, which was made after consultation with the Environment Agency.

4.2.4 Assessment of the WMRP19

The assessment of the draft and final WRMP19 will build on the findings of the assessment for the constrained options and programmes.

4.2.5 Cumulative effects

The SEA Regulations require that secondary, cumulative and synergistic effects are considered. The approach and method used for the cumulative effects assessment (CEA) of SES Water's dWRMP19 is in line with the regional approach to CEA proposed by Water Resources South East (WRSE) group. A regional approach to CEA was explored by WRSE in response to some short comings in the SEAs of WRMPs produced in 2014 identified by consultees and also with the aim of supporting an improved approach for the next round of WRMPs (2019). The study published in early 2017, sets out a systematic procedure for identifying and evaluating the risk of cumulative effects.¹⁷

4.2.5.1 Intra-plan cumulative effects

Intra-plan refers to the potential cumulative effects arising as a result of interactions between schemes proposed within SES Water's WRMP19.

¹⁷ WRSE (2017) Environmental Information to inform Water Company SEAs - Cumulative Effects Assessment in WRMP SEAs.

In line with the suggested approach by WRSE, the proposed WRMP19 supply schemes were screened in order to identify the potential for cumulative effects. Using GIS as well as the findings of the SEA for constrained options, an initial screening was carried out to determine if there is the potential for cumulative effects:

1. During construction (are any schemes within 5km of each other and have similar delivery dates);
2. Through hydrological / hydrogeological connectivity:
 - a. Hydrological (are schemes within the same Water Framework Directive (WFD) surface water body).
 - b. Hydrogeological (are schemes within the same WFD groundwater body).
3. On high value key receptors (are schemes located within or in close proximity to the same high value receptors). In line with the WRSE study, high value receptors are considered to be the following:
 - Biodiversity, flora and fauna:
 - Special Areas of Conservation (SAC) and candidate SACs;
 - Special Protected Area (SPA) candidate SPAs;
 - Ramsar Sites;
 - Sites of Special Scientific Interest (SSSI); and
 - Marine Conservation Zones.
 - Landscape and visual:
 - Areas of Outstanding Natural Beauty (AONB);
 - National Parks; and
 - Heritage Coasts.

If necessary, any schemes and interactions highlighted through the initial screening process would be reviewed in further detail to assess the potential for cumulative effects and level of risk (Red, Amber or Green (RAG)).

4.2.5.2 Inter-plan cumulative effects

Inter-plan refers to the potential cumulative effects arising as a result of interactions between SES Water's dWRMP19 and other plans and programmes. Other plans and programmes have already been considered to a certain extent during the scoping stage as part of the review of other plans and programmes (see Chapter 3 and **Appendix II**). The UKWIR SEA guidance states that once preferred options have been identified through the WRMP process, specific potential impacts with other plans and programmes should be identified, particularly in the context of spatial and temporal proximity.

The schemes proposed in the dWRMP19 were also screened against a range of other plans and programmes to determine if there is the potential for any interactions. WRSE carried out a study to identify potential cumulative effects arising as a result of interactions between schemes being proposed through emerging dWRMPs (2019) within their area.¹⁸ The initial findings of this work were delivered to SES Water in October 2017.

Following consultation on the dWRMPs, the cumulative effects work was updated to reflect the options being considered through the emerging revised plans. The revised findings were delivered to SES Water in August 2018.

¹⁸ WRSE (2017) Environmental information to inform Water Company SEAs – Identification of potential for cumulative effects between water companies for WRMP19 SEAs. Prepared by Ricardo.

4.3 Integration of WFD issues

The Water Supply Constrained Options Appraisal Report (August 2018) describes the methodology adopted in the development of constrained options for the PR19 Water Resources Management Plan (WRMP), as part of the water resources option appraisal process as set out in the Environment Agency (EA) Water Resources Planning Guideline (WRPG).

As part of the options appraisal process there was an initial screening of all unconstrained options to identify any potential 'show stoppers'. This included consideration of a number of factors including water availability and licensing policy and WFD status and risk of deterioration. See **Table 4-4** below.

Table 4-4: Initial screening criteria relevant to WFD

| Criteria | Issues to consider and scoring |
|---------------------------|--|
| WFD status | If Good then 3 for any scheme, if Moderate then 2 for peak scheme, 1 to average, 1 to any scheme for water body at Poor status |
| WFD Risk of Deterioration | If not at risk then 3, if at risk then 1 to average and 2 to peak. If on sustainable catchments list and also at risk then 1 for any scheme. |

If any of the unconstrained options scored 1 for any of the above then they were potentially screened out, otherwise they continued to secondary screening.

The unconstrained screening was presented to the EA during autumn 2016 and a draft report provided, and their views were minuted and included in the unconstrained list option information sheets and added to the report. SES Water then decided to take approximately half of the options per option type to take forward to the constrained stage for costing.

The schemes on the constrained options list were developed with outline engineering designs and costing together with the assessment of environmental and social costs. This included an evaluation of the carbon footprint and the carbon costs, and an assessment of potential environmental impacts arising from construction and operation.

The findings of the SEA for constrained options were used to inform the development of alternative programmes (packages of constrained options) through EBSD modelling. WFD issues were integrated into the SEA at an early stage in the process. The SEA Framework includes a number of objectives and assessment questions that are relevant to the WFD. These are set out in **Table 4-5** below.

Table 4-5: WFD relevant SEA Objectives

| SEA Objective | Assessment question |
|--|--|
| 6. To protect and where possible enhance river flows and groundwater resources | <ul style="list-style-type: none"> Will the option affect river flows? Does the option take into account requirements for sustainability reductions, CAMS assessments of water availability, and the sensitivity of surface and groundwater to abstraction? Will there be a conflict with any of these requirements? Will there be any impacts on third parties, e.g. other abstractors? Is there potential to help restore sustainable abstraction? Is there potential to help ameliorate low flows? Will the option minimise impacts from high and low water flows, particularly along the river bank and on channel processes? |
| 7. To protect and where feasible enhance the quality of surface waters | <ul style="list-style-type: none"> Is the option likely to affect biological or chemical quality elements? Would the option affect flow regimes or significantly change water levels? Is there potential for physical effects on the river channel and/or hydromorphology of watercourse(s)? For Heavily Modified Water bodies, would the option contribute to or prevent the implementation of mitigation measures specified in the River Basin Management Plan? |
| 8. To protect and enhance | <ul style="list-style-type: none"> Is there the potential to affect groundwater quality (e.g. contamination)? |

| SEA Objective | Assessment question |
|----------------------------------|--|
| groundwater quantity and quality | <ul style="list-style-type: none"> • Would the option affect groundwater flows or significantly change groundwater levels? • Could the option contribute to meeting WFD objectives? |
| 10. To meet WFD Objectives | <ul style="list-style-type: none"> • Would the option affect the ability of surface water bodies to reach Good Ecological Status or (if artificial or heavily modified) Good Ecological Potential; and for groundwater bodies to reach Good Quantitative Status? • Would the option prevent the status of water bodies reported in current River Basin Management Plans (RBMPs) to suffer no further deterioration? • Would the option affect the ability of surface water bodies to reach the RBMP 2021 objectives? • Would the option affect the ability of surface water bodies to improve in WFD status? • Would the option place waterbodies 'at risk of deterioration'? |

The detailed findings of the assessment for constrained options through the SEA are presented in Appendix IV and summarised in Chapter 5 of this Environmental Report.

An environmental scenario was developed through the modelling which excluded supply-side options that were identified as potentially causing a risk to WFD status. The exclusions made were the combined results of the SEA and unconstrained options screening, which was made after consultation with the Environment Agency. The findings of the wider options appraisal process including modelling work is set out in the separate Water Supply Constrained Options Appraisal Report (August 2018).

5. Assessment of Alternatives

5.1 Introduction

This chapter sets out how alternatives have been developed and refined for the emerging WRMP19. It also sets out the findings of the SEA for the alternatives, demonstrates how the outcomes of the SEA have influenced decision-making and provides an outline of the reasons for their selection or rejection.

5.2 Unconstrained options

5.2.1 Screening of unconstrained supply-side options

SES Water identified 46 unconstrained supply side options that could help to balance the forecasted supply-demand deficit. Each of the 46 unconstrained supply-side options were subject to screening by AECOM against a range of criteria. This included consideration of designated biodiversity sites, sustainability, social impacts as well as landscape and heritage where relevant.

Based on the findings of the screening, wider evidence and consultation with the EA - 25 unconstrained supply side options were rejected and not progressed for further consideration and 21 options were progressed for an assessment of costs and social and environmental impacts.

The detailed method and findings of this work, along with an outline reason for the rejection of the 25 options is provided within the Options Appraisal - Supply Side Report available separately.¹⁹

Table 5-1: Unconstrained supply-side options

| Code | Name | Progressed as a feasible option? |
|--|--|----------------------------------|
| Groundwater and surface water options | | |
| N1 | Mole catchment 3rd party licence trading | No |
| N3 | Eden catchment 3rd party licence trading | No |
| R22 | Outwood Lane | Yes |
| R5 | New borehole (Mole Valley Chalk) - Fetcham Springs | Yes |
| N2 | Wandle catchment 3rd party licence trading | No |
| N6 | New Middle Mole Abstraction source | Yes |
| R21 | North Downs Confined Chalk AR extension 2 (new borehole on SE side of Football Club) | Yes |
| R28 | Lowering pumps at Kenley and Purley | Yes |
| | New borehole (Lower Greensand) - Chalk Pit Lane mains connection | No |
| N4 | Leatherhead licence increase | Yes |
| N5 | New Lower Mole Abstraction source | Yes |
| N7 | Leatherhead new boreholes | No |
| R1 | Raising of Bough Beech reservoir | Yes |
| R23 | Duckpit Wood replacement borehole (not Chalk Pit Lane) | No |
| R3 | North Downs Unconfined Chalk AR (recharge at Eyhurst Park, Kingswood) | No |
| R4 | North Downs LGS ASR (recharge at Eyhurst Park, Kingswood) | No |
| R7 | Enhance borehole output (Lower Greensand) - Water Lane increase in pump capacity & pesticide treatment | No |
| R2 | North Downs Confined Chalk AR extension 1 (Bishopsford Road) | No |
| N9 | Removal of constraints and or optimisation of WRZ source use | No |
| Treatment options | | |
| P1 | Increase Bough Beech WTW capacity from 50MI/d to 70MI/d - Items 1, 2 & 3 | No |
| P1b | Increase Bough Beech WTW capacity from 50MI/d to 70MI/d - Items 1 & 2 | No |

¹⁹ SES Water (October 2017) Draft WRMP 2019 Options Appraisal - Supply Side. Prepared by AECOM.

| Code | Name | Progressed as a feasible option? |
|---|---|----------------------------------|
| P1c | Increase Bough Beech WTW capacity from 50MI/d to 70MI/d - Items 1 | Yes |
| R8 | Upgrade WTW (Lower Greensand) - The Clears ammonia and pesticide treatment | Yes |
| R26 | Secombe Centre UV | Yes |
| R24 | Duckpit Wood hydrogen sulphide treatment | |
| R25 | Pains Hill Springs refurb including UV | |
| Transfer and Bulk Supply Options | | |
| R13 | 12MI/d transfer from Langley Park/North Looe Reservoirs to Buckland | Yes |
| R12-Reverse | 20MI/d transfer from Outwood PS to Langley Park/North Looe Reservoirs | Yes |
| R13-Reverse | 12MI/d transfer from Outwood PS to Langley Park/North Looe Reservoirs | Yes |
| R2 | North Downs Confined Chalk AR extension 1 (Bishopsford Road). This scheme connects the existing licensed borehole into the WTW A East Main at Source 14 | Yes |
| R12 | 20MI/d transfer from Langley Park/North Looe Reservoirs to Outwood PS | Yes |
| R10 | 15MI/d bulk supply from Thames Water (London WRZ) to SES Water at Merton | Yes |
| R11 | 5MI/d bulk supply from Thames Water (London WRZ) to SES Water at Merton (maximum existing capacity requiring no mains upgrade works) | No |
| R15 | 10MI/d bulk supply from SEW RZ2 (Maidenbower/Whitely Hill) to Outwood PS | Yes |
| R16 | 10MI/d bulk supply from Thames Water (Shalford WTW, Guildford WRZ) to SES Water at Effingham SR | Yes |
| n/a 2 | 10MI/d bulk supply from SES Water Outwood PS to SEW RZ2 at Maidenbower/Whitely Hill | Yes |
| N8 | Pipeline linking Pains Hill, Duckpit Wood and Chalk Pit Lane to existing treatment works at Westwood and Godstone | Yes |
| R9 | 30MI/d bulk supply from Thames Water (London WRZ) to SES Water at Merton | No |
| R14 | 5MI/d bulk supply from SEW RZ2 (Maidenbower/Whitely Hill) to SES Water at Outwood PS | No |
| n/a 1 | 5MI/d bulk supply from SES Water Outwood PS to SEW RZ2 Maidenbower/Whitely Hill | No |
| n/a 4 | 10MI/d (ADO) & 15MI/d (PDO) Bough Beech to Blackhurst (SEW) treated water transfer (1) | No |
| n/a 5 | 10MI/d (ADO) & 15MI/d (PDO) Bough Beech to Blackhurst (SEW) treated water transfer (2) | No |
| n/a 8 | 10MI/d (ADO) & 15MI/d (PDO) Bough Beech to Riverhill (SEW) treated water transfer | No |
| n/a 3 | 5MI/d (ADO or PDO) Bough Beech to Blackhurst (SEW) treated water transfer | No |
| n/a 6 | 1.5MI/d (ADO) & 5MI/d (PDO) Release from Bough Beech to Forstall (R. Medway, SEW) | No |
| n/a 7 | 3MI/d (ADO) & 10MI/d (PDO) Release from Bough Beech to Forstall (R. Medway, SEW) | No |

5.2.2 Screening of unconstrained demand options

SES Water identified 42 unconstrained demand options that could help to balance the forecasted supply-demand deficit. Each of the 42 unconstrained supply-side options were subject to screening by Artesia against a range of criteria. This included consideration of environmental impacts as well as suitability and technical difficulty.

Based on the findings of the screening, wider evidence and consultation with the EA - 23 unconstrained demand options were rejected and not progressed for further consideration and 19 options were progressed for an assessment of costs and social and environmental impacts.

The detailed method and findings of this work, along with an outline reason for the rejection of the 23 options is provided within the Options Appraisal - Demand Side Report available separately.²⁰

Table 5.2: Unconstrained demand options

| Code | Name | Progressed as a feasible option? |
|-------------------------|---|----------------------------------|
| Leakage | | |
| 073 | Increasing ALC effort. Increase leakage find and fix budget by 'x' percent | Yes |
| 302 | Improved R&M efficiency | Yes |
| 178 | Raw water and WTW leakage reduction | Yes |
| 301 | Increasing ALC efficiency (detection and location) | Yes |
| 303 | Enhanced pressure management | Yes |
| 304 | Mains / asset renewal | No |
| 183 | Review and strengthen current CSPL reduction programme | No |
| 300 | Use of new technologies | No |
| 057 | Better trunk mains monitoring | No |
| Metering | | |
| 311 | Smart metering of selected households | Yes |
| 113 | Smart metering of all households | Yes |
| 312 | Smart metering of selected non households | Yes |
| 310 | Meter all residential homes that fall into nonHH, Bulk metering to detect leakage and wastage | No |
| 028 | Meter all households with an outside tap | No |
| 031 | Meter remaining unmetered swimming pool owners | No |
| RWH & GWR | | |
| 124 | Installation of rainwater harvesting in new build non-households | Yes |
| 120 | Water Butts | No |
| 207 | Large user - rainwater harvesting (Gatwick Airport) | No |
| 134 | Treated greywater reuse in new households. | No |
| 208 | Large user - surface water reuse (Gatwick Airport) | No |
| Tariffs | | |
| 038 | Special tariff for sprinkler users | Yes |
| 015 | Increasing volumetric charges | Yes |
| 044 | Introducing spot pricing for selected customers | No |
| 039 | Special tariff for swimming pool owners | No |
| 016 | Daily peak/off peak tariffs | No |
| 040 | Introducing lower charges for major customers with significant storage | No |
| 017 | Seasonal tariffs | No |
| 018 | Rising block tariffs - Smart and daily | No |
| Water efficiency | | |
| 019 | Household water efficiency programme (Company led, self install) | Yes |
| 020 | Household water efficiency programme (Company led, plumber installed) | Yes |
| 305 | Domestic retrofit programme targeting high consumers | Yes |
| 021 | Household water efficiency programme (Partnering approach, home visit) | Yes |
| 022 | Non-household water efficiency programme (Company led, self install) | Yes |
| 308 | Targeting leaking WCs, taps and showers | Yes |
| 157 | Dual flush toilet retrofits (company funded) | Yes |
| 307 | Variable infrastructure charge | Yes |
| 304 | Behavioural change programme | No |
| 201 | Water Audits - Retail (Non-process) | No |
| 306 | Promote ultra low flush toilets in Non Households | No |

²⁰ WRMP19 demand management options – Assessment of Feasible Demand Management Options.

| Code | Name | Progressed as a feasible option? |
|------|---|----------------------------------|
| 150 | Water efficient white goods | No |
| 200 | Targeted water conservation - Recreation facilities e.g. parks and golf courses | No |
| 202 | Water Audits - Commercial (Process) | No |

5.3 Constrained options

5.3.1 Description of supply-side options

The screening stage identified 21 constrained supply-side options to progress for an assessment of costs and social and environmental impacts. **Table 5-3** sets out these options together along with estimated yields.

Table 5-3: Constrained supply-side options yield benefit

| Code | Name | Yield benefit | |
|--------------------------------------|---|---------------|------------|
| | | ADO (MI/d) | PDO (MI/d) |
| Groundwater and surface water | | | |
| R1 | Raising of Bough Beech reservoir | 4.9 | 0 |
| R5 | New borehole (Mole Valley Chalk) - Fetcham Springs | 4.78 | 3.148 |
| R21 | North Downs Confined Chalk AR extension 2 (new borehole on SE side of Football Club) | 2.16 | 5 |
| R22 | Outwood Lane | 3.4 | 5 |
| R28 | Lowering pumps at Kenley and Purley | 3.4-4.7 | 14.5 |
| N4 | Leatherhead licence increase | 2 | 2 |
| N5 | New Lower Mole Abstraction source | 17 | 17 |
| N6 | New Middle Mole Abstraction source | 40 | 40 |
| Treatment | | | |
| R8 | Upgrade WTW (Lower Greensand) - The Clears ammonia and pesticide treatment | 1.6 | 2.57 |
| R26 | Secombe Centre UV | 2.07 | 4.54 |
| P1c | Increase Bough Beech WTW capacity from 50MI/d to 70MI/d - Items 1 | -0.6 | 20 |
| Transfer and bulk supply | | | |
| R2 | North Downs Confined Chalk AR extension 1 (Bishopsford Road). | 0 | 5 |
| R10 | 15MI/d bulk supply from Thames Water (London WRZ) to SES Water at Merton | 15 | 15 |
| R12 | 20MI/d transfer from Langley Park/North Looe Reservoirs to Outwood PS | 20 | 20 |
| R13 | 12MI/d transfer from Langley Park/North Looe Reservoirs to Buckland | 12 | 12 |
| R12-Reverse | 20MI/d transfer from SES Water at Outwood PS to Langley Park/North Looe Reservoirs | 20 | 20 |
| R13-Reverse | 12MI/d transfer from Outwood PS to Langley Park/North Looe Reservoirs | 12 | 12 |
| R15 | 10MI/d bulk supply from SEW RZ2 at Maidenbower/Whitely Hill to SES Water at Outwood PS | 10 | 10 |
| R16 | 10MI/d bulk supply from Thames Water (Shalford WTW, Guildford WRZ) to SES Water (Effingham SR) | 10 | 10 |
| n/a 2 | 10MI/d bulk supply from SES Water (Outwood PS) to SEW RZ2 (Maidenbower/Whitely Hill) | -10 | -10 |
| N8 | Pipeline linking Pains Hill, Duckpit Wood and Chalk Pit Lane to existing treatment works at Westwood and Godstone | 1.37 | 2.14 |

The constrained supply-side options are described in turn below.

R1- Raising of Bough Beech reservoir

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.

R5 - New borehole (Mole Valley Chalk) - Fetcham Springs

The PDO of the Fetcham Spring/Boreholes source could potentially be increased by 3.148MI/d to the peak licence by the installation of new boreholes which would allow abstraction above the current potential yield of the source. The scheme comprises the installation of a collector well and radiating horizontal boreholes to intercept natural springflow and minimising drawdown thereby reducing the environmental impact on natural groundwater flow to the River Mole.

R21 - North Downs Confined Chalk AR extension 2 (new borehole on SE side of Football Club)

This scheme is contingent on the Bishopsford Road borehole scheme being implemented first as it is effectively an extension of that scheme and assumes that it would tap into a new main running to Bishopsford Rd. The scheme now comprises the drilling of another borehole approximately halfway between Goatbridge and Bishopsford Road boreholes. Subject to a licence variation, this borehole would allow recovery of the water that has been artificially recharged at Hackbridge between November and March at a higher rate and over a shorter period of time than is currently possible. This would effectively increase the PDO by an assumed 5MI/d to allow the Company to address increases in peak demand from Cheam over the summer months. The annual licence would remain unchanged.

R22 - Outwood Lane

This scheme seeks an increase in daily licence from 3 MI/d to 8 MI/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 MI/d.

R28 - Lowering pumps at Kenley and Purley

Increase Kenley PDO from 18 MI/d by 6 MI/d to 24 MI/d by lowering pump and pump cutout in Borehole No. 1 by 2m. Increase Purley PDO from 6.9 MI/d by 8.5 MI/d to 15.4 MI/d by lowering pump and pump cutout in Borehole Nos. 5, 6 & 7 by approximately 15m.

N4 - Leatherhead licence increase

Scheme to increase licence by 2 Mld to take water available at least 50% of the time in CAMS policy. Treat at Elmer as per existing source where there is existing capacity.

N5 - New Lower Mole Abstraction source

Water availability in CAMS at least 50% of the time below Leatherhead. Scheme is to identify new source location for groundwater abstraction from the Chalk or surface water abstraction (or river terrace gravels). Pipeline required for treatment at Elmer WTW where there is existing capacity. Depending on land access can be as short a pipeline distance as possible once down gradient of CAMS assessment point at Leatherhead. Using this source for the 50% of water availability reduces the ADO on other sources which means they can be increased above current ADO when in use to meet existing annual licence.

N6 - New Middle Mole Abstraction source

Water availability in CAMS at least 50% of the time in Dorking area. Scheme is to identify new source location for groundwater abstraction from the Lower Greensand or surface water abstraction along the River Mole east of Dorking.

Existing Dorking Lower Greensand abstraction delivered to Elmer WTW for treatment, so can use existing infrastructure to add additional source. Alternatively additional volume could be delivered via

a new pipe connection to Headley Reservoir or Buckland Booster to deliver it to the Buckland area and north toward Croydon where there is greater demand, improving network resilience. Using this source for the 50% of water availability reduces the ADO on other sources which means they can be increased above current ADO when in use to meet existing annual licence.

R8 - Upgrade WTW (Lower Greensand) - The Clears ammonia and pesticide treatment

The Cliftons Lane Licence Group (Cliftons Lane, Buckland and The Clears) ADO is constrained by combination of DAPWL (Cliftons Lane) and water quality (Buckland) but is only 1.6 MI/d short of licence based on difference between daily average licence and abstraction returns from 2010-2016, so little scope for significant increase in ADO.

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 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.

P1c - Increase Bough Beech WTW capacity from 50MI/d to 70MI/d - Items 1

Bough Beech WTW has a current peak deployable output of 45MI/d. Ongoing refurbishment works at the WTW will increase the output to 50MI/d by the end of AMP5. These AMP5 funded works have been included as a planned scheme within the baseline supply-demand balance. Further substantial utilisation of the reservoir storage can be provided to meet peak demand. This option would involve increasing the WTW capacity from 50MI/d to the licensed peak abstraction volume of 70MI/d. The scheme is expected to have limited environmental impact as the abstraction licence to refill the reservoir from the river would remain unchanged.

R2 - North Downs Confined Chalk AR extension 1 (Bishopsford Road).

Bishopsford Rd borehole was drilled and constructed in 2008. This scheme connects the borehole into the Cheam WTW East Main at Goatbridge. The objective of the scheme is to increase the PDO of the licence group by allowing recovery of the artificially recharged volume at Hackbridge at a higher abstraction rate over a shorter period of time during the subsequent peak demand period. In order to realise this 5 MI/d increase in PDO, a licence variation would be required allowing a 5 MI/d increase in the daily licence from 19 MI/d to 24 MI/d.

R10 - 15MI/d bulk supply from Thames Water to SES Water at Merton

This option involves the same infrastructure components as the 30MI/d transfer scheme, but each component is instead sized to accommodate a 15MI/d bulk transfer from Thames Water's London ring main into the north of SES Water's area at Merton. The scheme comprises a new pumping station at Merton, significant mains upgrade works to transport water from Merton to Cheam WTW, where it will require additional softening at a new ion exchange softening plant before being blended with the other water treated at Cheam and distributed throughout the SES Water area. Two new distribution mains will then also be required to transport the water from Cheam WTW to SES Water's North Looe and Langley Park service reservoirs, for onward distribution throughout the supply area. This scheme is mutually exclusive with the other two size variants of this option.

R12 - 20MI/d transfer from Langley Park/North Looe Reservoirs to Outwood PS

This option involves constructing a new internal transfer option. There is an existing transfer in the opposite direction, which can transfer up to 18MI/d peak flow. Having a reverse transfer would enable any transfers into the SES Water area at Merton to be transported to the south should it be required. This 20MI/d variant of the option is not mutually exclusive with the 12MI/d variant - they could be constructed in parallel to total a 32MI/d transfer capacity. The transfer will comprise new pumping stations at on the sites of existing service reservoirs at Langley Park, North Looe, Nork and Margery, as well as new storage capacity at Margery service reservoir to enable reverse flow to Buckland. This transfer is bi-directional.

R13 - 12MI/d transfer from Langley Park/North Looe Reservoirs to Buckland

This option involves constructing a new internal transfer option. There is an existing transfer in the opposite direction, which can transfer up to 18MI/d peak flow. Having a reverse transfer would enable any transfers into SES Water's area at Merton to be transported south should it be required. This 12MI/d variant of the option is not mutually exclusive with the 20MI/d variant - they could be constructed in parallel to total a 32MI/d transfer capacity. The transfer will comprise new pumping stations at on the sites of existing service reservoirs at Langley Park, North Looe, Nork and Margery, as well as new storage capacity at Margery service reservoir to enable reverse flow to Buckland. This transfer is bi-directional.

R12-Reverse - 20MI/d transfer from Outwood PS to Langley Park/North Looe Reservoirs

This option is the reverse internal transfer for R12.

R13-Reverse - 12MI/d transfer from Outwood PS to Langley Park/North Looe Reservoirs

This option is the reverse internal transfer for R13.

R15 - 10MI/d bulk supply from SEW RZ2 (Maidenbower/Whitely Hill) to Outwood PS

This option involves a 10MI/d bulk supply from South East Water's (SEW's) RZ2 at Whitely Hill into SES Water's area at Outwood. A new pumping station would be required at Whitely Hill, a new treated water transfer main to transport water north to Outwood, and a new softening plant at Outwood to soften the water prior to distribution throughout the area. This variant of the option is not mutually exclusive with the 5MI/d option, i.e. there could be in total a 15MI/d transfer.

R16 - 10MI/d bulk supply from Thames Water (Shalford WTW, Guildford WRZ) to SES Water (Effingham SR)

This option involves a 10MI/d bulk supply from Thames Water's Guildford WRZ (Shalford WTW) to SES Water's Effingham service reservoir. The option would involve laying of a pipeline that would enable bi-directional flow to/from the bulk supply connection. However, from the point of view of SES Water's WRMP14, the option has the potential to supply the area with 10MI/d of additional supply at average or at peak. SES Water has reviewed Thames Water treated water quality information and concluded that a treated water transfer could be taken directly into supply at SES Water's Effingham service reservoir.

n/a 2 - 10MI/d bulk supply from SES Water Outwood PS to SEW RZ2 (Maidenbower/Whitely Hill)

This option involves a 10MI/d bulk supply from SES Water at distribution node G to South East Water's (SEW's) RZ2. This is the reverse direction of the 10MI/d bulk supply from SEW RZ2 (Whitely Hill) to Outwood scheme, and it is expected that a new pumping station would be required at SES Water's distribution node G, although the treated water transfer main used for the 10MI/d bulk supply from SEW RZ2 (Whitely Hill) to Outwood would be the conduit of the flow. In the investment modelling and WRSE modelling process, this scheme is considered to be mutually inclusive of the reverse direction transfer, so capex costs are not duplicated should both directions be required at different points in the planning period. This variant of the option is not mutually exclusive with the 5MI/d option, i.e. there could be in total a 15MI/d transfer.

N8 - Pipeline linking Pains Hill, Duckpit Wood and Chalk Pit Lane to existing treatment works at Westwood and Godstone

Pipeline linking Pains Hill, Duckpit Wood and Chalk Pit Lane to existing treatment works at Westwood and Godstone (alternative to R24 and R25). Making use of existing spare capacity at Godstone WTW.

5.3.2 Description of Demand management options

The screening stage identified 19 constrained or feasible demand options to progress for an assessment of costs and social and environmental impacts. Following the consultation on the dWRMP, further EBSD runs were carried out and to reflect SES Water's evolving business plan a number of additional demand options were identified. This brought the number of feasible demand options up to 28. It should be noted that a quantitative assessment for some of the options was not possible, please see the Demand Management Options Report for further details and a description of the options.²¹ The constrained demand options are set out in **Table 5-4** below.

Table 5-4: Constrained demand options

Code Name

| Leakage | |
|-------------------------|--|
| 073 | Increasing ALC effort. Increase leakage find and fix budget by 'x' percent |
| 302 | Improved R&M efficiency |
| 178 | Raw water and WTW leakage reduction |
| 301 | Increasing ALC efficiency (detection and location) |
| 303 | Enhanced pressure management |
| 399 | Main renewal |
| 900 | Leakage bundle |
| Metering | |
| 311 | Smart metering of selected households |
| 113 | Smart metering of all households |
| 113a | Compulsory metering (AMR) of all households |
| 312 | Smart metering of selected non households |
| 555 | Smart metering - enhanced meter penetration |
| 600 | Smart metering - enhanced meter penetration (higher meter penetration) |
| RWH & GWR | |
| 124 | Installation of rainwater harvesting in new build non-households |
| Tariffs | |
| 038 | Special tariff for sprinkler users |
| 015 | Increasing volumetric charges |
| 800a | Tariffs - scenario A |
| 800b | Tariffs - scenario B |
| Water efficiency | |
| 019 | Household water efficiency programme (Company led, self install) |
| 020 | Household water efficiency programme (Company led, plumber installed) |
| 305 | Domestic retrofit programme targeting high consumers |
| 021 | Household water efficiency programme (Partnering approach, home visit) |
| 022 | Non-household water efficiency programme (Company led, self install) |
| 308 | Targeting leaking WCs, taps and showers |
| 157 | Dual flush toilet retrofits (company funded) |
| 307 | Variable infrastructure charge |
| 700a | PR19 Option 1a |
| 700b | PR19 Option 1b |

²¹ Artesia, 2018. WRMP19 Demand Management Options – Assessment of Feasible Demand Management Options.

5.4 SEA of constrained options

As set out in Chapter 4, each constrained (or feasible) supply-side option was assessed against the full SEA Framework with an individual matrix produced for each option. It is unlikely that demand options will result in significant effects; therefore, a single assessment against the SEA Framework was carried out for demand options as a whole. It is important to note that the assessment of the constrained options for WRMP19 builds on the work carried out for SEA of the WRMP14. A number of the identified supply-side options have not changed since WRMP14. Therefore, if there have been no significant changes to the baseline it is considered that the assessments carried out for these options for WRMP14 are still valid.

Constrained supply-side options that were previously considered through the SEA for WRMP14 are as follows:

- **R1** - Raising of Bough Beech reservoir
- **R5** - New borehole (Mole Valley Chalk) - Fetcham Springs
- **R21** - North Downs Confined Chalk AR extension 2 (new borehole on SE side of Football Club)
- **R22** - Outwood Lane
- **R28** - Lowering pumps at Kenley and Purley
- **R8** - Upgrade WTW (Lower Greensand) - The Clears ammonia and pesticide treatment
- **R26** - Secombe Centre UV
- **P1c** - Increase Bough Beech WTW capacity from 50MI/d to 70MI/d - Items 1
- **R2** - North Downs Confined Chalk AR extension 1 (Bishopsford Road). This scheme connects the existing licensed borehole into the WTW A East Main at Source 14
- **R10** - 15MI/d bulk supply from Thames Water (London WRZ) to SES Water at Merton
- **R12** - 20MI/d transfer from Langley Park/North Looe Reservoirs to Outwood PS
- **R13** - 12MI/d transfer from Langley Park/North Looe Reservoirs to Buckland
- **R15** - 10MI/d bulk supply from SEW RZ2 (Maidenbower/Whitely Hill) to Outwood PS

New constrained supply-side options that were not previously considered through the SEA for WRMP14 are as follows:

- **N4** - Leatherhead licence increase
- **N5** - New Lower Mole Abstraction source
- **N6** - New Middle Mole Abstraction source
- **R12-Reverse** - 20MI/d transfer from Outwood PS to Langley Park/North Looe Reservoirs
- **R13-Reverse** - 12MI/d transfer from Outwood PS to Langley Park/North Looe Reservoirs
- **R16** - 10MI/d bulk supply from Thames Water (Shalford WTW, Guildford WRZ) to SES Water (Effingham SR)
- **n/a 2** - 10MI/d bulk supply from SES Water Outwood PS to SEW RZ2 (Maidenbower/Whitely Hill)
- **N8** - Pipeline linking Pains Hill, Duckpit Wood and Chalk Pit Lane to existing treatment works at Westwood and Godstone

Note that as part of ongoing consultation with SES Water on the development of these options, some were not taken forward to EBSD modelling for various reasons. These decisions are described in the constrained options report. All of the constrained supply-side options were assessed through the SEA.

The summary findings of the SEA for supply-side options are presented in **Table 5-5**. The detailed assessment tables are provided in **Appendix IV**. In line with the UKWIR SEA guidance the

assessment is strategic in nature, consistent where possible, and provides a strategic overview of effects. A narrative of the key major positive and major negative effects is included in the below table.

Table 5-5: Option assessment summary table

| SEA objective | | R1 | R5 | R21 | R22 | R28 | N4 | N5 | N6 | R8 | R26 | P1C | R2 | R10 | R12 | R13 | R12-r | R13-r | R15 | R16 | Na 2 | N8 | Dem and | |
|---|-----------|----|----|-----|-----|-----|----|----|----|-----|-----|-----|----|-----|-----|-----|-------|-------|-----|-----|------|-----|---------|---|
| Obj 1 Biodiversity | Short | -- | - | - | - | - | 0 | - | -- | - | - | 0 | - | - | -- | -- | 0 | 0 | -- | -- | 0 | --- | 0 | |
| | Med/ long | + | -- | - | 0 | - | 0 | 0 | 0 | --- | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -- | 0 |
| Obj 2 Fisheries | Short | 0 | - | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Med/ long | + | -- | - | 0 | - | 0 | 0 | 0 | -- | - | 0 | 0 | + | + | + | 0 | 0 | + | 0 | 0 | 0 | 0 | + |
| Obj 3 Communities | Short | -- | - | - | 0 | - | 0 | - | - | - | - | - | - | -- | -- | -- | 0 | 0 | - | - | 0 | - | - | |
| | Med/ long | -- | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | 0 | 0 | - | 0 | 0 | 0 | 0 | |
| Obj 4 Recreation | Short | - | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | - | - | 0 | 0 | - | - | 0 | - | 0 | |
| | Med/ long | + | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Obj 5 Land, Soil, Geology | Short | 0 | 0 | 0 | 0 | 0 | 0 | - | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | 0 | - | 0 | |
| | Med/ long | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Obj 6 River flow & groundwater resource | Short | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | |
| | Med/ long | + | -- | - | -- | -- | 0 | 0 | 0 | -- | -- | + | 0 | + | + | + | 0 | 0 | + | 0 | 0 | 0 | + | |
| Obj 7 Surface water quality | Short | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | - | 0 | |
| | Med/ long | + | -- | 0 | -- | -- | 0 | 0 | 0 | -- | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Obj 8 Groundwater Quality / Quantity | Short | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| | med/long | 0 | 0 | 0 | --- | -- | 0 | 0 | 0 | -- | -- | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | + | |
| Obj 9 Minimise flooding | Short | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| | Med/ long | + | + | 0 | + | + | + | + | + | + | + | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Obj 10 Meet WFD objectives | Short | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| | Med/ long | ++ | - | 0 | - | - | + | 0 | 0 | -- | - | ++ | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Obj 11 Reduce greenhouse gas | Short | -- | - | - | 0 | - | 0 | - | - | - | - | - | - | -- | -- | -- | 0 | 0 | -- | -- | - | -- | - | |
| | Med/ long | - | - | - | 0 | - | 0 | - | - | - | - | - | 0 | - | - | - | 0 | 0 | - | - | - | 0 | + | |

| SEA objective | | R1 | R5 | R21 | R22 | R28 | N4 | N5 | N6 | R8 | R26 | P1C | R2 | R10 | R12 | R13 | R12-r | R13-r | R15 | R16 | Na 2 | N8 | Demand |
|---|-----------|-----|----|-----|-----|-----|----|----|----|----|-----|-----|----|-----|-----|-----|-------|-------|-----|-----|------|----|--------|
| Obj 12 Transport | Short | -- | 0 | 0 | 0 | 0 | 0 | - | - | 0 | 0 | - | - | -- | -- | -- | 0 | 0 | -- | - | 0 | -- | - |
| | Med/ long | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Obj 13 Sustainable resource use | Short | - | 0 | - | 0 | 0 | 0 | - | - | - | - | - | - | -- | -- | -- | 0 | 0 | -- | -- | - | - | 0 |
| | Med/ long | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Obj 14 Enhance local air quality | Short | - | 0 | 0 | 0 | - | 0 | - | - | 0 | - | - | 0 | -- | - | - | 0 | 0 | - | - | 0 | - | 0 |
| | Med/ long | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | 0 | 0 | - | 0 | 0 | 0 | 0 |
| Obj 15 Archaeological, historical, architectural sites | Short | 0 | - | - | 0 | 0 | 0 | - | - | - | - | - | 0 | - | - | - | 0 | 0 | - | - | 0 | -- | 0 |
| | Med/ long | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Obj 16 Landscape & Visual amenity | Short | --- | - | - | 0 | 0 | 0 | - | - | - | - | - | - | - | -- | -- | 0 | 0 | -- | --- | - | -- | 0 |
| | Med/ long | -- | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -- | 0 | 0 | 0 |

As illustrated by the summary table above, there are no major positive effects predicted. There are however five options which are identified as having the potential for a major negative effect. The options, and predicted major negative effects are as follows:

- Option R1: major negative effect on landscape and visual amenity.
- Option R22: major negative effect on groundwater quality and quantity.
- Option R8: major negative effect on biodiversity.
- Option R16: major negative effect on landscape and visual amenity.
- Option N8: major negative effect on biodiversity.

Option R1 will result in the enlargement of Reservoir A. The scheme will require embankments to protect current local infrastructure and residential houses. Because the reservoir sits within the Low Weald National Character Area, with a small section at the northern edge sitting within the Kent Downs AONB, there are predicted to be major negative effects on landscape and visual amenity during construction due to the activity needed to raise the height of the embankment. Longer term, effects are likely to be moderate negative. However, initial research by SES Water show that few viewpoints would be affected, and that some would be enhanced. As such, there may also be positive effects.

Option R22 may result in additional drawdown of groundwater. This may negatively impact on downstream company sources. Furthermore, the London CAMS identifies the chalk aquifer as no water available and therefore there would be greater pressure on the groundwater source. This is predicted to have the potential for a major negative effect on groundwater quality and quantity over the medium to long term.

Option R8 may have major negative effects on biodiversity over the medium to long term. This option requires an increase in abstraction, although this will be within existing licences, it will still increase drawdown on the greensand aquifer. In turn this may reduce baseflow to streams and thus have potential negative impacts on aquatic biodiversity. In this context, there is the potential for operational impacts on Reigate Heath SSSI (located to the south) from reduced groundwater baseflow inputs. The Wallace Brook, which is an important habitat, could also be affected by the increased abstraction, as it runs along the edge of this site.

Option R16 requires the installation of a pipeline which falls predominantly within the Surrey Hill AONB, with the new pumping station falling just outside. As such, there will be a major negative short term effect on landscape and visual amenity. The pipeline will eventually be buried so will not have any impacts during operation and screening/planting should ensure that the residual effects of the pumping station are minimised during operation. As such, the medium to long term effect will only be moderately negative.

Option N8 is predicted to have a major short term negative effect on biodiversity as it requires the installation of a pipeline which passes through an Ancient Woodland. There will be potential for permanent loss of some Ancient Woodland and short term disturbance to a number of Ancient Woodland sites during construction. There is also additionally potential for disturbance to local habitats and species.

5.5 WFD issues

The SEA and wider water resource options appraisal process identified that three constrained options (R22, R28, R8) are in catchments flagged by the EA as potentially requiring measures to achieve Good status or could put future status at risk.

The SEA found that options R22, R28, R5 and R8 all have the potential for either moderate or significant negative effects during operation on SEA objectives that are relevant to the WFD. It is recommended that if selected for inclusion within the WRMP, there would need to be further investigation into the hydrological effects of the options to quantify the potential effect and to determine the appropriate mitigation in the form of the timing and volume of abstraction.

5.6 EBSD Modelling

The EBSD model was run for numerous scenario types. Runs evolved in some instances in an iterative way; that is, the outcome of the previous run raised questions as to why the model selected or didn't select certain options, or decided to implement them at certain times. And in other instances runs were created in a way to force the model to discriminate against certain options to see what it would select instead.

Four scenarios were developed: least cost, environmental (taking account of SEA findings), levels of service, and stakeholder. The detail is described in the Constrained Options Report.

Each scenario was run under the worst drought in the historic record (WDHR) and a hypothetical 1 in 200 year drought. These scenario runs would enable SES Water to decide on the best programme of measures to suit their business from the range of programmes generated by EBSD modelling.

As stated in Section 4.2.3, not all constrained options were brought into the EBSD model and therefore were not available to the EBSD model in each scenario. The findings from the scenario runs are described in separate Water Supply Constrained Options Appraisal Report (August 2018).

5.7 Developing the preferred and alternative programmes

The preferred plan was selected taking into consideration the Government's guiding principles and the preferences of stakeholders and customers. The plan focuses on affordability, innovation, resilience and reducing consumption.

6. Assessment of the Draft Water Resources Management Plan 2019

6.1 Introduction

This Chapter of the Environmental Report presents the assessment of the dWRMP19. It builds upon the SEA work carried out for alternatives, in particular constrained options, set out in the previous Chapter.

6.2 SEA of the dWRMP19

The preferred programme of options for the dWRMP are comprised of two separate batches, 1 set of options were selected for the worst drought on historic record (WDHR) and one set selected for a 1 in 200 year drought event. These options are shown in **Table 6-1** below.

Table 6-1: dWRMP19 schemes

| Name | Delivery Year | Option utilised |
|--|---------------|-----------------|
| Worst drought on historic record (WDHR) | | |
| SESW-MET-555: Compulsory smart metering - higher meter penetration | 2020 | Y |
| SESW-LEA-399d: Mains renewal | 2020 | Y |
| SESW-LEA-303: Enhanced pressure management | 2020 | Y |
| SESW-EXW-WAF1 : Existing WAFU Sources | 2020 | Y |
| SESW-NGW-N4: Leatherhead licence increase | 2054 | Y |
| SESW-NGW-R5: New borehole (Mole Valley Chalk) - Fetcham Springs | 2057 | N |
| SESW-NGW-N5: New Lower Mole Abstraction source | 2063 | N |
| SESW-WEF-308: Campaign targeting domestic customers with high consumption - leaking toilets | 2065 | Y |
| SESW-WEF-307: Variable infrastructure charge | 2069 | Y |
| SESW-WEF-157: Dual flush toilets retrofit | 2069 | Y |
| SESW-LEA-302c: Improve RM efficiency | 2070 | Y |
| SESW-LEA-301a: Improve ALC efficiency | 2071 | Y |
| SESW-RTR-N8: Pipeline linking Pains Hill, Duckpit Wood and Chalk Pit Lane to existing treatment works at Westwood and Godstone | 2074 | N |
| SESW-WEF-022: Non HH WEFF company led self install | 2075 | Y |
| SESW-WEF-305: Domestic retrofit targeting high consumers | 2075 | Y |
| 1 in 200 year drought | | |
| SESW-MET-555: Compulsory smart metering - higher meter penetration | 2020 | Y |
| SESW-LEA-399d: Mains renewal | 2020 | Y |
| SESW-LEA-303: Enhanced pressure management | 2020 | Y |
| SESW-EXW-WAF1 : Existing WAFU Sources | 2020 | Y |
| SESW-NGW-N4: Leatherhead licence increase | 2053 | N |
| SESW-NGW-R5: New borehole (Mole Valley Chalk) - Fetcham Springs | 2056 | N |
| SESW-LEA-302c: Improve RM efficiency | 2057 | Y |
| SESW-NGW-N5: New Lower Mole Abstraction source | 2064 | N |
| SESW-WEF-307: Variable infrastructure charge | 2065 | Y |
| SESW-WEF-308: Campaign targeting domestic customers with high consumption - leaking toilets | 2065 | Y |
| SESW-WEF-022: Non HH WEFF company led self install | 2075 | Y |

| Name | Delivery Year | Option utilised |
|--|---------------|-----------------|
| SESW-WEF-021: Household WEFF programme partnering approach home visit | 2075 | Y |
| SESW-WEF-305: Domestic retrofit targeting high consumers | 2075 | Y |
| SESW-RTR-N8: Pipeline linking Pains Hill, Duckpit Wood and Chalk Pit Lane to existing treatment works at Westwood and Godstone | 2078 | N |

It should be noted that a number of these schemes, including the four supply-side schemes, will either not be utilised and/ or not delivered during the statutory plan period and therefore may not necessarily be utilised if not required. Despite this, all of the schemes have been considered through the SEA as they could potentially be utilised in the future.

The SEA for the dWRMP19 builds on the assessment work carried out for constrained options. The method is explained in Chapter 4. A narrative is provided below to highlight some of the key positive and negative effects identified in relation to proposed demand and supply schemes.

6.2.1 Summary assessment findings for demand schemes

The assessment found that the demand schemes are not likely to have any significant positive or negative effects against SEA Objectives. The demand management schemes will help to reduce demand and therefore reduce pressure on water resources. In summary, the assessment found the following:

- There is likely to be a minor negative effect in the short term on communities and households. The demand options have the potential to result in some disturbance to communities in the short term through the installation of meters, water efficient devices and works to fix leaks. Good construction practices and detailed pre-works consultation would help to reduce construction impacts.
- The demand management options will help to reduce demand and therefore reduce pressure on water resources. This could have a minor positive effect on water levels in the medium to long term.
- The demand options will require travel to properties in order to install meters and water efficient devices. In the longer term there is the potential for a carbon saving associated with the reduced water requirement. However, there will be a minor negative effect in the short term. Careful operation of schemes will help to maximise efficiencies and minimise travel.
- There is the potential for some disturbance to transport routes in the short term. Careful operation of the schemes will minimise disturbance to transport routes.
- Further work will be required at the implementation stage to assess the environmental risks associated with leakage schemes once specific sites are known.

6.2.2 Summary assessment findings for supply/resilience schemes

Only one supply scheme was selected to form part the first batch of options relating to the WDHR. Another three supply schemes are identified but are not utilised as part of that first batch. None of the four supply schemes are identified as being utilised in the second batch of options relating to the 1 in 200 year drought. Taking a precautionary approach, all of the four supply schemes have considered through the SEA as part of the dWRMP as they could be utilised in the future as resilience schemes.

The four options are: SESW-RTR-N8 (Pipeline linking Pains Hill, Duckpit Wood and Chalk Pit Lane to existing treatment works at Westwood and Godstone), SESW-NGW-N5 (New Lower Mole Abstraction source), SESW-NGW-N4 (Leatherhead licence increase) and SESW-NGW-R5 (New borehole (Mole Valley Chalk) - Fetcham Springs). The narrative below highlights the key effects and proposed mitigation measures identified through the assessment.

6.2.2.1 SESW-RTR-N8: Pipeline linking Pains Hill, Duckpit Wood and Chalk Pit Lane to existing treatment works at Westwood and Godstone

This option proposes a new pipeline linking Pains Hill, Duckpit Wood and Chalk Pit Lane to existing treatment works at Westwood and Godstone. It makes use of existing spare capacity at Godstone WTW.

This option was found to have the potential for a major short term negative effect on biodiversity during construction as it requires the installation of a pipeline which passes through an Ancient Woodland. There will be potential for permanent loss of some Ancient Woodland and short term disturbance to a number of Ancient Woodland sites during construction. There is also additionally potential for disturbance to local habitats and species. The assessment recommends that the pipeline route should avoid the Ancient Woodland to the north of Duckpit Wood close to the M25. It also recommends that further more detailed ecological survey work will be required to inform the precise route of the pipeline and any specific mitigation required.

Given the relatively large construction (12 km pipeline) the assessment predicted that the construction phase would require the importation of resources and would lead to increased emissions due to use of plant and vehicles. As a result of the construction phase, embodied carbon is high. Once in operation there would be minimal impacts in terms of greenhouse gas emissions. It is recommended that low carbon construction methods are used and energy efficient equipment utilised during operation.

The assessment identifies the potential for construction impacts on predominantly local transport routes. However, there is also the potential for construction impacts to the A25 which links to the A22 and Junction 6 of the M25. It is assumed that there will be no disturbance to the M25. It is likely that good construction practices will help to reduce the residual effect so it is not significant.

The construction of the new pipeline is likely to be visible from a number of listed buildings, including a Grade I listed building. It also passes close to a Registered Park and Garden. Potential for a short-term, temporary negative effect during construction. Pipeline will be buried operation so it is predicted that there will be a residual neutral effect in the long term.

The new pipeline passes through the Surrey Hills AONB so the assessment predicts the potential for impacts in the short-term during construction. If required, further studies will be undertaken to generate detailed information about the option across a range of topics including the effects on long range views. These studies will be used to identify and inform the optimal design and the detailed mitigation measures required to minimise any potential effect. The SEA recommends that prior to construction, a landscape mitigation strategy should be developed and integrated into construction method statements to minimise the adverse effects of the construction phase to the protected landscape. The strategy will include details such as locating construction facilities sensitively; the location of existing and any proposed planting, the import and storage of equipment and materials, and the nature of post-construction hard and soft landscaping works. Good construction practice will be employed to minimise the potential visual disturbance and impacts. The new infrastructure will be appropriately designed to help blend in with the existing landscape, and include appropriate screening

to minimise any adverse effects on views and on protected landscapes. The pipeline will be buried during operation so should not have any significant negative effects in the medium to long-term.

6.2.2.2 SESW-NGW-N5: New Lower Mole Abstraction source

This option will identify a new source location for groundwater abstraction from the Chalk or surface water abstraction (or river terrace gravels). In this context, the option requires a pipeline to be installed for treatment at Elmer WTW where there is existing capacity.

With regard to biodiversity features which may be affected by the option, there is an Ancient Woodland within the identified area of search for the borehole. There is potential for negative effects if Ancient Woodland is removed or damaged. However, as long as the Ancient Woodland is avoided during construction there should not be any significant impacts. Further more detailed ecological survey work will be required to determine the extent of this effect. Survey work will also help to inform the precise location of the borehole and route of the pipeline as well as any specific mitigation required.

It is not predicted that the construction of the borehole, pumps and pipeline would have a significant impact on the River Mole itself. It is assumed that the pipeline would follow existing roads and good construction practices will ensure that impacts are avoided or minimised. The pipeline should, where possible, avoid the Ancient Woodland in the search area.

The construction phase could create short term negative effects on population and communities through noise, dust and disruption to traffic. There are also likely to be related short term negative effects on designated recreational facilities. In the long term no change to the baseline is predicted as the pipeline will be buried.

With regards to effects on agricultural land, it is predicted that there is potential for disturbance to soil and loss of a small amount of Greenfield land during construction. This may result in short term minor negative effects. The Land take is expected to be minimal. It is assumed that the pipeline route will follow existing roads where possible and therefore minimise disturbance to soil.

The option may also have a minor positive effect with regards to flood risk in the medium to long term because the option will only abstract water during high flows which has the potential to improve outcomes in groundwater flooding.

The pipeline route is expected to follow existing highways infrastructure where possible. As such, there is potential for construction impacts to the A25 which links to the A22 and Junction 6 of the M25. As such, this may have a minor short term negative effect on air quality. Good construction practices will help limit impacts.

The construction of the new pipeline is likely to be visible from at least one listed buildings. As such, there is the potential for short-term, temporary negative effects on heritage assets during construction. The pipeline will however be buried, as such it is predicted that there will be a residual neutral effect during operation.

6.2.2.3 SESW-NGW-N4: Leatherhead licence increase

This scheme proposes to increase the Leatherhead licence by 2 MI/d in order to take water available at least 50% of the time in the CAMS policy. The water will be treated at Elmer as per the existing source where there is existing capacity.

The scheme makes use of existing infrastructure and will also make use of existing unused licence headroom for 3rd party licence holders. As such, no new water will be abstracted from the catchment above that of the existing CAMS licence.

Screening work identified that the Bookham Commons and Mole Gap to Reigate Escarpment SSSIs are within 2km of the abstraction. However, it is not considered that additional abstraction from this location would have a detrimental impact on these habitats not being situated along the River Mole but on chalk slope and plateau environments. In light of these considerations, it is not predicted that this option will have any minor, moderate, or major negative effects on any SEA objectives,

The catchment is noted as being susceptible to flooding; however, no significant groundwater flooding has been recorded to date. The option will only abstract water during high flows and there is therefore potential to improve outcomes in groundwater flooding over the medium to long term. As such, it is predicted there may be a minor positive effect over this time frame with regarding to minimising the risk of flooding.

As discussed the scheme will make use of existing unused licence headroom for 3rd party licence holders, and as such, no new water will be abstracted from the catchment above that of the existing CAMS licence. Consequently there is an opportunity for local improvements to meet the WFD objectives if abstraction in the River Eden is reduced higher in the catchment and taken lower in catchment where it has a higher flow. In terms of meeting WFD objectives, it is predicted that this scheme will have a minor positive effect over the medium to long term.

6.2.2.4 SESW-NGW-R5: New borehole (Mole Valley Chalk) - Fetcham Springs

The peak deployable output of the Fetcham Spring/Boreholes source could potentially be increased by 3.148Ml/d to the peak licence by the installation of new boreholes which would allow abstraction above the current potential yield of the source. This option comprises the installation of a collector well and radiating horizontal boreholes to intercept natural springflow, and minimise drawdown, thereby reducing the environmental impact on natural groundwater flow to the River Mole.

There is the potential for temporary impacts during construction such as noise and dust which may have a minor short term negative effect on local communities and disrupt public footpaths which run close to the option.

Local habitats along the site comprise amenity open grassland space, patches of trees and woodland scrub, aquatic features (the Mill Pond). Construction works associated with this option may have a minor negative effect on biodiversity in the short term as they may perturb undisturbed areas and cause damage to plants and vegetation, and disrupt the presence and habitats of nesting birds and other local wildlife including protected species.

Over the medium to long term the option would increase abstraction within licence limits. However, the abstraction may take Chalk groundwater that would otherwise flow into the Mill Pond as upwelling springflow, and the Mill Stream that flows round the northern side of the pond and then joins the River Mole. It could negatively impact on the River Mole Local Nature reserve which is nearby and its associated aquatic biodiversity. There is also the potential for the reduced springflows to negatively impact on the adjacent Mill Pond and its associated aquatic biodiversity. As such, the option may have moderate negative effects on biodiversity over the medium to long term.

The abstraction associated with the option may also have minor negative effects over the short term, and moderate negative effects over the medium to long term on fisheries through reductions in springflow to the River Mole. This reduction in springflow will also have moderate negative effects in the medium to long term on the water flow and water quality of the River Mole. Furthermore this may have a minor negative effect over the medium to long term on the ability to meet WFD objectives, and will also have minor negative effects in the short to medium term on greenhouse gas emission reduction.

Short term minor negative effects may also be experienced during construction phase on landscape character and the potential for construction to impact on hidden or as yet undiscovered archaeology during excavation.

6.2.3 Summary of proposed mitigation and areas for further investigation

Table 6-2 below summarises proposed key mitigation as well as areas for further investigation/assessment relating to any potential moderate and/or major negative effects. Further studies and environmental assessments will be required at the project level once detailed planning and design has been carried out. These will be able to set out detailed mitigation measures to avoid and/or reduce the significance of any negative effects.

Table 6-2: Proposed mitigation and areas for further investigation

| Scheme | Potential impact | Mitigation / further investigation |
|---|--|---|
| <p>SESW-RTR-N8: Pipeline linking Pains Hill, Duckpit Wood and Chalk Pit Lane to existing treatment works at Westwood and Godstone</p> | <p>Potential for a major short term negative effect on biodiversity during construction as it requires the installation of a pipeline which passes through an Ancient Woodland.</p> | <p>The pipeline route should avoid the Ancient Woodland to the north of Duckpit Wood close to the M25. The detailed feasibility study to be carried out in the next five year business planning period will explore the environmental impacts of the proposed scheme in more detail. This should explore route options for the pipeline that avoids the Ancient Woodland and minimises potential impacts. During works related to pipeline installation it should be ensured that adequate pollution prevention measures are in place, especially if contaminated land is crossed.</p> |
| | <p>The assessment identifies the potential for construction impacts on predominantly local transport routes. However, there is also the potential for construction impacts to the A25 which links to the A22 and Junction 6 of the M25. It is assumed that there will be no disturbance to the M25.</p> | <p>Good construction practices should ensure that there is no significant residual effect.</p> |
| | <p>The new pipeline passes through the Surrey Hills AONB and the construction would be visible from a number of listed buildings and also passes close to a Registered Park and Garden. Potential for impacts in the short-term during construction.</p> <p>The pipeline will be buried during operation so should not have any significant negative effects in the medium to long-term.</p> | <p>The detailed feasibility study to be carried out in the next five year business planning period will explore the environmental impacts of the proposed scheme in more detail. This study will be used to identify and inform the optimal design and the detailed mitigation measures required to minimise any potential effect. The SEA recommends that prior to construction, a landscape mitigation strategy should be developed and integrated into construction method statements to minimise the adverse effects of the construction phase to the protected landscape and historic environment. The strategy will include details such as locating construction facilities sensitively; the location of existing and any proposed planting, the import and storage of equipment and materials, and the nature of post-construction hard and soft landscaping works. Good construction practice will be employed to minimise the potential visual disturbance and impacts.</p> |
| <p>SESW-NGW-N5: New Lower Mole Abstraction source</p> | <p>There is an Ancient Woodland within the identified area of search for the borehole. There is potential for negative effects if Ancient Woodland is removed or damaged.</p> | <p>The detailed feasibility study to be carried out in the next five year business planning period will explore the environmental impacts of the proposed scheme in more detail. This should ensure that the Ancient Woodland is avoided during construction and not significantly impacted by the scheme.</p> |
| | <p>The construction phase could create short term negative effects on population and communities through noise, dust and disruption to traffic. There are also likely to be related short term negative effects on designated recreational facilities. In the long term no change to the baseline is predicted as the pipeline will be buried.</p> | <p>The detailed feasibility study to be carried out in the next five year business planning period will explore the impacts of the proposed scheme in more detail. This study will be used to identify and inform the optimal design and the detailed mitigation measures required to minimise any potential effect. Good construction practices should also help to ensure that there is no significant residual effect.</p> |
| | <p>The assessment identifies the potential for construction impacts on predominantly local transport routes. However, there is also the</p> | <p>Good construction practices should ensure that there is no significant residual effect.</p> |

| Scheme | Potential impact | Mitigation / further investigation |
|---|--|--|
| | potential for construction impacts to the A25 which links to the A22 and Junction 6 of the M25. It is assumed that there will be no disturbance to the M25. | |
| SESW-NGW-R5: New borehole (Mole Valley Chalk) - Fetcham Springs | There is the potential for temporary impacts during construction such as noise and dust which may have a minor short term negative effect on local communities and disrupt public footpaths which run close to the option. | The detailed feasibility study to be carried out in the next five year business planning period will explore the impacts of the proposed scheme in more detail. This study will be used to identify and inform the optimal design and the detailed mitigation measures required to minimise any potential effect. Good construction practices should also help to ensure that there is no significant residual effect. |
| | The abstraction associated with the option may also have minor negative effects over the short term, and moderate negative effects over the medium to long term on fisheries through reductions in springflow to the River Mole. This reduction in springflow will also have moderate negative effects in the medium to long term on the water flow and water quality of the River Mole. | Further investigation into the hydrological effects of the option is required to quantify the potential effect and to determine the appropriate mitigation in the form of the timing and volume of abstraction. Please refer to Section 6.3 for information relating to the WFD. |

6.3 WFD issues

As previously stated, there are only four supply schemes being considered at this stage and none of them are being proposed during the plan period.

SESW-RTR-N8 (Pipeline linking Pains Hill, Duckpit Wood and Chalk Pit Lane to existing treatment works at Westwood and Godstone) proposes the delivery of a new pipeline to make use of existing spare capacity at Godstone WTW. This option was identified at the unconstrained options screening stage as not having any impacts relating to the WFD as it does not propose the abstraction of any new water.

Building on the work already carried out **Table 6-3** below pulls together the findings from the options appraisal process and SEA findings for the remaining three supply schemes to clearly set out findings in relation to the WFD.

Table 6-3: WFD assessment

| Water body | WFD Status (2016) | WFD Risk of Deterioration | Scheme | Impacts | Mitigation and residual impacts | WFD Compliant? |
|---|--|---|--|---|--|----------------|
| Mole (Horley to Hersham) Surface Water Body | Ecological - Moderate Chemical - Good | Classified as Probably Not at Risk of not supporting Good Ecological Status but considered Probably at Risk of Deterioration. | SESW-NGW-N5 (New Lower Mole Abstraction source) | Scheme based on making use of CAMS water availability so should not affect status if surface water abstraction. Groundwater abstraction from confined Chalk so no impact to stream environment. | N/A | Yes |
| | | | SESW-NGW-N4 (Leatherhead licence increase) | Scheme is to use unused licence headroom from 3rd party licence holders so no new water abstracted from catchment. Therefore no change in status, opportunity for local improvement if abstraction reduced higher in catchment and taken lower in catchment where River Eden has higher flow. | N/A | Yes |
| | | | SESW-NGW-R5 (New borehole (Mole Valley Chalk) - Fetcham Springs) | <p>The scheme may reduce springflow to the River Mole which could impact on water quality. The WFD supporting flow element has not been assessed so assumed that flow quantity is not the cause of Moderate status.</p> <p>The scheme is within licence with new boreholes drilled to achieve the licensed peak or average unused headroom. Therefore the scheme does not add to existing licensed volumes so should not be restricted by CAMS policy. EA likely to impose restriction of abstraction at low flow.</p> <p>Will require feasibility study to confirm where there are additional impacts.</p> | <p>Further investigation into the hydrological effects of the option is required to quantify the potential effect and to determine the appropriate mitigation in the form of the timing and volume of abstraction.</p> <p>Implementing scheme N5 should mean that less abstraction is required at R5 from mid to high flows, improving the groundwater levels to support baseflow during low flow abstraction compared to present. If necessary, mitigation could also be provided by applying a Hands off flow (HOF) to maintain WFD status and objectives.</p> | Uncertain |
| Dorking North Downs Chalk Groundwater | Ecological - Poor Chemical - Good | Groundwater Body considered At Risk for the Water | SESW-NGW-N5 (New Lower Mole) | Scheme based on making use of CAMS water availability so should not change risk of deterioration. | Further investigation into the hydrological effects of the option is required to quantify the potential effect and to determine the appropriate mitigation in the | Uncertain |

| Water body | WFD Status (2016) | WFD Risk of Deterioration | Scheme | Impacts | Mitigation and residual impacts | WFD Compliant? |
|------------|-------------------|---|--|---|--|----------------|
| Body | | Balance test and Probably at Risk for the Impact to Surface Waters. | Abstraction source) | Abstraction from confined aquifer should not affect river flow. Will require feasibility study to confirm. | form of the timing and volume of abstraction. If necessary, mitigation could also be provided by applying a Hands off flow (HOF) to maintain WFD status and objectives. | |
| | | | SESW-NGW-N4 (Leatherhead licence increase) | Scheme based on making use of CAMS water availability so should not change risk of deterioration. Will require feasibility study to confirm. | Further investigation into the hydrological effects of the option is required to quantify the potential effect and to determine the appropriate mitigation in the form of the timing and volume of abstraction. Needs EA clarification that CAMS water availability does not lead to deterioration. Leatherhead and Elmer are on the Sustainable Catchments list as Category 1, which is inconsistent with CAMS water availability. If necessary, mitigation could also be provided by applying a Hands off flow (HOF) to maintain WFD status and objectives. | Uncertain |
| | | | SESW-NGW-R5 (New borehole (Mole Valley Chalk) - Fetcham Springs) | The Fetcham boreholes are in the Dorking North Downs Chalk groundwater body which has a Poor status due to the water balance test. As the surface water dependence test is Good then the cause of the failure may not be in the Leatherhead Chalk area where the Fetcham abstraction draws its water. However this status represents an impediment in the sense that it requires clarification before this scheme can be implemented. | Compliant with the WFD 'no deterioration' objective, as the proposed infrastructure would intercept natural spring flow and minimise drawdown thereby reducing the environmental impact on natural groundwater flow to the River Mole. The site is on the Sustainable Catchments list for risk of Serious Damage. Scheme for peak abstraction may be acceptable to EA for short periods. Average scheme may not be acceptable as this will increase recent actual abstraction and would be a significant (Category 1) impact. Implementing scheme N5 should mean that less abstraction is required at R5 from mid to high flows, improving the groundwater levels to support baseflow during low flow abstraction compared to present. If necessary, mitigation could also be provided by applying a Hands off flow (HOF) to maintain WFD status and objectives. | Uncertain |

6.4 Cumulative effects

6.4.1 Introduction

This section sets out potential cumulative effects arising as a result of interactions from schemes proposed within the dWRMP19 itself (intra-plan) as well as interactions with other plans and programmes (inter-plan), including other WRMPs.

The approach and method used for the cumulative effects assessment (CEA) of SES Water's dWRMP19 is in line with the regional approach to CEA proposed by Water Resources South East (WRSE) group. A regional approach to CEA was explored by WRSE in response to some short comings in the SEAs of WRMPs produced in 2014 identified by consultees and also with the aim of supporting an improved approach for the next round of WRMPs (2019). The study published in early 2017, sets out a systematic procedure for identifying and evaluating the risk of cumulative effects.²²

The CEA focuses on supply schemes proposed in the dWRMP19 as they have specific locations and are most likely to result in cumulative significant effects. Proposed demand management schemes are non-site specific and the assessment (see Chapter 5) found that they are unlikely to result in a significant negative effect. Overall they are more likely to have a significant cumulative positive effect with the supply side options by helping to balance the supply demand deficit and reduce water use. This approach is supported through the WRSE work on cumulative effects and there is recognition that there is the potential at a regional scale for beneficial cumulative effects arising as a result of demand management options.

6.4.2 Intra-plan cumulative effects

Intra-plan refers to the potential cumulative effects arising as a result of interactions between schemes proposed within SES Water's dWRMP19.

The supply-side schemes are either not within 5km and/or there is a sufficient gap between the delivery years. As a result, there is no risk of interactions during construction. The schemes do not fall within any of the same high value receptors.

There is a potential risk for three of the supply-side resilience options to interact as they fall within the same WFD catchment. SESW-NGW-N5 (New Lower Mole Abstraction source), SESW-NGW-N4 (Leatherhead licence increase) and SESW-NGW-R5 (New borehole (Mole Valley Chalk) - Fetcham Springs).

SESW-NGW-N4 (Leatherhead licence increase) proposes to increase the Leatherhead licence by 2 Ml/d in order to take water available at least 50% of the time in the CAMS policy. The water will be treated at Elmer as per the existing source where there is existing capacity. SESW-NGW-N5 (New Lower Mole Abstraction source) will make use of available water (excludes summer period) in the licensing policy, so while there is the potential for a cumulative effect on the river flow lower down from all the abstraction upstream (Fetcham), the recent actual flows must be above environmental flow for at least half the year to make the water available. Furthermore, SESW-NGW-R5 (New borehole (Mole Valley Chalk) - Fetcham Springs) includes the installation of a collector well and radiating horizontal boreholes to intercept natural springflow, and minimise drawdown, thereby reducing the environmental impact on natural groundwater flow to the River Mole.

Taking the above into account it is considered that there is a low risk for cumulative effects on the Mole WFD catchment. Despite this, it is recommended that there should be further investigation and a more detailed assessment should be carried out, if necessary, and that there should also be discussions with the Environment Agency to ensure compliance with the WFD.

6.4.3 Inter-plan cumulative effects

Inter-plan refers to the potential cumulative effects arising as a result of interactions between SES Water's dWRMP19 and other plans and programmes.

²² WRSE (2017) Environmental Information to inform Water Company SEAs - Cumulative Effects Assessment in WRMP SEAs.

6.4.3.1 Other SES Water Plans

Other SES Water plans include the following:

- SES Water's Drought Management Plan; and
- SES Water's Business Plan.

Overall, it is considered that the potential risk for the dWRMP19 and the plans above to have a cumulative effect are low. Drought permit options would be temporary in nature and are likely to have a small impact compared to natural drought impacts.

6.4.3.2 Other WRMPs

WRSE carried out a study to identify potential cumulative effects arising as a result of interactions between schemes being proposed through emerging dWRMPs (2019) within their area.²³ The initial findings of this work were delivered to SES Water in October 2017. The study identified that none of the schemes proposed in the dWRMP19 are likely to interact with schemes proposed in other WRMPs to have a cumulative effect.

6.4.3.3 Other plans and programmes

Other plans and programmes have already been considered to a certain extent during the scoping stage as part of the review of other plans and programmes (see Chapter 3 and **Appendix II**). The UKWIR SEA guidance states that once preferred options have been identified through the WRMP process, specific potential impacts with other plans and programmes should be identified, particularly in the context of spatial and temporal proximity.

In line with the WRSE study the following plans and programmes have been considered:

- Thames River Basin Management Plan;
- Environment Agency Regional Action Plan for South East Region;
- Catchment Abstraction Management Strategies / Abstraction licensing strategies;
- Catchment Flood Management Plans;
- Land use and development plans; and
- Major projects.

There are unlikely to be any cumulative effects arising between any of the above plans, programmes or projects and the dWRMP19 during the construction or operation of schemes. There is the potential for interactions during the construction for the two supply schemes with other new infrastructure in close proximity. However, the risk is low once mitigation and delivery dates are taken into account.

The key to avoiding and minimising the potential for cumulative negative effects during construction is to have ongoing and effective communication between the relevant authorities' (local planning, transport, minerals and waste authorities) and key stakeholders (Environment Agency, Historic England and Natural England). Local collaboration should be encouraged along with more transparent decision-making when both planning and delivering activities to deliver infrastructure.

²³ WRSE (2017) Environmental information to inform Water Company SEAs - Identification of potential for cumulative effects between water companies for WRMP19 SEAs. Prepared by Ricardo.

7. Assessment of the Final Water Resources Management Plan 2019

7.1 Introduction

The draft WRMP19 was published for consultation in March 2018 and was accompanied by the Environmental Report. A number of responses were received and these were reviewed and further work carried out to inform the identification of preferred schemes for inclusion in the final WRMP19. The Environmental Report has been updated to reflect consultation responses received as well as revisions to the WRMP. This Chapter provides a brief summary of the further work carried out and how this influenced the final WRMP, it also sets out the assessment of the final WRMP19.

7.2 The final WRMP19

SES Water has developed additional demand side options since the dWRMP consultation ended. Further EBSD modelling work was carried out to try and maximise demand side schemes and attempt to not rely on new supply side schemes, reflecting stakeholder preferences.

The preferred programme of options that comprise the final WRMP19 are set out in **Table 7-1** below.

Table 7-1: final WRMP19 schemes

| Name | Delivery Year |
|---|---------------|
| Worst drought on historic record (WDHR) | |
| SESW-LEA-900: Leakage bundle 1 | 2020 |
| SESW-WEF-700b-ph1: PR19 Option 1b (phase 1) | 2020 |
| SESW-MET-600: Compulsory metering AMI – enhanced higher meter penetration | 2020 |
| SESW-TAR-800b: Tariffs (scenario b) | 2045 |
| SESW-WEF-700b-ph2: PR19 Option 1b (phase 1) | 2045 |
| 1 in 200 year drought | |
| SESW-LEA-900: Leakage bundle 1 | 2020 |
| SESW-WEF-700b-ph1: PR19 Option 1b (phase 1) | 2020 |
| SESW-MET-600: Compulsory metering AMI – enhanced higher meter penetration | 2020 |
| SESW-TAR-800b: Tariffs (scenario b) | 2045 |
| SESW-WEF-700b-ph2: PR19 Option 1b (phase 1) | 2045 |

The supply-side options identified in Chapter 6 relating to the dWRMP and selected in some of the EBSD model scenarios remain as the preferred supply-side options when these become necessary, hence they represent resilience options. SES Water opted to retain these supply schemes in order to enhance the resilience of the final WRMP19 to the following:

- Non-drought risks at source and production sites, including flooding, pollution and emergency incidents;
- Network risks including major bursts and freeze-thaw impacts;
- Population growth beyond that planned for; and
- Climate change impacts greater than those planned for.

The resilience options are selected beyond 2040 and SES Water intend to carry out detailed feasibility studies in the next five year business planning period, in particular to assess environmental impacts and refine cost estimates.

The resilience options are SESW-RTR-N8 (Pipeline linking Pains Hill, Duckpit Wood and Chalk Pit Lane to existing treatment works at Westwood and Godstone), SESW-NGW-N5 (New Lower Mole

Abstraction source), SESW-NGW-N4 (Leatherhead licence increase) and SESW-NGW-R5 (New borehole (Mole Valley Chalk) - Fetcham Springs).

7.3 SEA of the final WRMP19

In terms of the SEA there are no significant differences between the draft and final WRMP. As per the dWRMP the final WRMP19 is comprised predominantly of demand management schemes. The assessment of demand options (see Chapter 5) found that they not likely to have any significant positive or negative effects against SEA Objectives. A summary of the findings is presented in Chapter 6, Section 6.2.1 of this Report and are not repeated here. The demand management schemes will help to reduce demand and therefore reduce pressure on water resources.

As stated above, there are also four supply schemes retained as resilience options beyond 2040. These four schemes were considered as part of the SEA of the dWRMP in Chapter 6 of this Report. A summary of the findings is presented in Chapter 6, Section 6.2.2 of this Report and are not repeated here.

Table 6-3 in Chapter 6 summarises proposed key mitigation as well as areas for further investigation/assessment relating to any potential moderate and/or major negative effects. Further studies and environmental assessments will be required at the project level once detailed planning and design has been carried out. These will be able to set out detailed mitigation measures to avoid and/or reduce the significance of any negative effects.

7.4 WFD issues

As previously stated, there are only four supply schemes being considered at this stage and none of them are being proposed during the plan period. The same four schemes were considered through the assessment of the dWRMP presented in Chapter 6. The findings of this work are presented in **Table 6-3** of this Report and are not repeated here.

7.5 Cumulative effects

Cumulative effects can arise as a result of interactions from schemes proposed within the WRMP19 itself (intra-plan) as well as interactions with other plans and programmes (inter-plan), including other WRMPs.

A regional approach to cumulative effects assessment was explored by Water Resources South East (WRSE) group in response to some short comings in the SEAs of WRMPs produced in 2014 identified by consultees and also with the aim of supporting an improved approach for the next round of WRMPs (2019). The study published in early 2017, sets out a systematic procedure for identifying and evaluating the risk of cumulative effects.²⁴ Following consultation on the dWRMPs, the cumulative effects work was updated to reflect the options being considered through the emerging revised plans. The revised findings were delivered to SES Water in August 2018.

The final WRMP19 includes demand management schemes. These are non-site specific and the assessment (see Chapter 5) found that they are unlikely to result in a significant negative effect. Overall they are more likely to have a significant cumulative positive effect with the supply side options by helping to balance the supply demand deficit and reduce water use. This approach is supported through the WRSE work on cumulative effects and there is recognition that there is the potential at a regional scale for beneficial cumulative effects arising as a result of demand management options.

As for the dWRMP the final WRMP19 includes four supply-side schemes as resilience options after 2040. These four schemes were considered as part of the cumulative effects assessment for the dWRMP in Chapter 6. The findings of this work are presented in Section 6.4 of this Report and are not repeated here. The revised cumulative effects work carried out by WRSE in 2018 does not change the findings of the previous work.

²⁴ WRSE (2017) Environmental Information to inform Water Company SEAs - Cumulative Effects Assessment in WRMP SEAs.

Taking the above into account, it is concluded that the final WRMP19 is not likely to result in any significant negative (intra or inter-plan) cumulative effects.

8. Next steps and monitoring

8.1 Introduction

The Chapter sets out the next steps for the WRMP and SEA as well as the measures envisaged for monitoring.

8.2 Implementing the WRMP19

As soon as reasonably practicable after the adoption of the final WRMP, the SEA Regulations require that the WRMP, Environmental Report and SEA Post Adoption Statement are made publicly available.

The SEA Post Adoption Statement must include:

- How environmental considerations have been integrated into the WRMP;
- How the Environmental Report has been taken into account during preparation of the WRMP;
- The reasons for choosing the WRMP as adopted, in the light of the other reasonable alternatives dealt with;
- How the opinions expressed by the public and consultation bodies during consultation on the WRMP and Environmental Report have been taken into account; and
- The measures that are to be taken to monitor the significant effects identified for the WRMP.

8.3 Monitoring

At the current time, there is a need only to present 'measures envisaged concerning monitoring'. The SEA Regulations expect monitoring and mitigation to be linked, and that the focus should be on any significant negative effects identified through the assessment. The UKWIR SEA guidance recommends that existing arrangements for monitoring should be used where possible to avoid duplication of effort.

Based on the findings of the SEA at this stage, the following monitoring measures are proposed:

- Groundwater levels, surface water levels and WFD status for waterbodies in the Mole catchment (already monitored by the Environment Agency).

