Thames Water Utilities Ltd

Habitats Regulations Assessment

of

Thames Water Utilities Ltd Draft Drought Plan

Screening Report

September 2016

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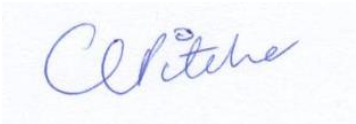

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EXECUTIVE SUMMARY

Water companies are required to prepare and maintain Statutory Drought Plans every five years, and as part of this process, must ensure the Drought Plan meets the requirements of the Habitats Regulations.

Under Regulations 61 and 102, any plan or project which is likely to have a significant effect on a European site (either alone or in-combination with other plans or projects) and is not directly connected with, or necessary for the management of the site, must be subject to a Habitats Regulations Assessment (HRA) to determine the implications for the site in view of its conservation objectives. For the purposes of the HRA, a European site includes Special Areas of Conservation (SAC), Special Protection Areas (SPA) and Ramsar sites.

Thames Water has completed the first stage of the HRA process, screening, on its draft Drought Plan options list. The screening stage identifies whether any options have the potential for a Likely Significant Effect (LSE) on the integrity of a European designated site.

A summary of the conclusions of HRA Screening is presented in **Table A**. This shows that no options are considered to have LSEs on European designated sites, either alone or in combination with other drought options in Thames Water's Draft DP 2016.

In-combination effects of Thames Water's draft DP 2016 with its WRMP14, the Environment Agency's regional DPs, the Thames River Basin Management Plan, and other water company WRMPs and DPs available at this time, are not considered likely to have significant adverse effects on European sites.

On the basis of the results in **Table A**, Appropriate Assessment of the Drought Plan is not required.

Table A Summary of HRA Screening Conclusions

Drought Option	Is scheme likely to have a significant effect on European site(s) alone?	Effect in combination with existing consents?	Effect in combination with other drought options?	Appropriate Assessment (AA) required?
Demand Management				
Media/water efficiency campaign	No	No	No	No
Leakage reduction	No	No	No	No
Sprinkler and unattended hose pipe ban	No	No	No	No

Drought Option	Is scheme likely to have a significant effect on European site(s) alone?	Effect in combination with existing consents?	Effect in combination with other drought options?	Appropriate Assessment (AA) required?
Temporary use Ban	No	No	No	No
Drought Order to ban Non-Essential Use	No	No	No	No
Emergency Drought Order	No	No	No	No
Supply Side Options				
London WRZ				
North London Artificial Recharge Scheme	No	No	No	No
Thames Gateway Water Treatment Works (TGWTW)	No	No	No	No
Hoddesdon Transfer Scheme (River Lee Flow Augmentation)	No	No	No	No
Chingford Artificial Recharge Scheme (CHARS)	No	No	No	No
Reduction in lowest residual flow on the Lower Thames Control Diagram at Teddington Weir from 300Ml/d to 200Ml/d	No	No	No	No
Earlier reduction in residual flow at Teddington Weir on the Lower Thames Control Diagram	No	No	No	No
East London Resource Development (ELRED)	No	No	No	No
Stratford Box	No	No	No	No
Old Ford	No	No	No	No
West Berkshire Groundwater Scheme (WBGWS)	No once abstraction licence for RoC Stage 4 avoidance/ mitigation measures is completed	No once abstraction licence for RoC Stage 4 avoidance/ mitigation measures is completed	No once abstraction licence for RoC Stage 4 avoidance/ mitigation measures is completed	No
Drought permit/order				
London WRZ				
Sundridge 1	No	No	No	No
Sundridge 2	No	No	No	No
Lower Thames	No	No	No	No
Crayford	No	No	No	No
Horton Kirby (Aquifer Storage & Recovery)	No	No	No	No
Eynsford	No	No	No	No
Wansunt	No	No	No	No
Increase in M2 annual licence	No	No	No	No
Waddon	No	No	No	No
SWOX Water Resource Zone				
Baunton 1	No	No	No	No
Baunton 2	No	No	No	No
Latton	No	No	No	No
Meysey Hampton	No	No	No	No

Drought Option	Is scheme likely to have a significant effect on European site(s) alone?	Effect in combination with existing consents?	Effect in combination with other drought options?	Appropriate Assessment (AA) required?
Farmoor	No	No	No	No
Axford 1	No	No	No	No
Axford 2	No	No	No	No
Bibury	No	No	No	No
Blewbury	No	No	No	No
Gatehampton	No	No	No	No
Ogbourne emergency boreholes	No	No	No	No
Oxford Canal - Banbury	No	No	No	No
Sor Brook	No	No	No	No
Childrey Warren	No	No	No	No
Ogbourne	No	No	No	No
Kennet Valley Water Resource Zone				
Compton 1	No	No	No	No
Compton 2	No	No	No	No
Fobney Emergency Boreholes	No	No	No	No
Pangbourne	No	No	No	No
Playhatch	No	No	No	No
Fobney Direct	No	No	No	No
Guildford Water Resource Zone				
Albury	No	No	No	No
Shalford	No	No	No	No
SWA Water Resource Zone				
New Ground	No	No	No	No
Pann Mill	No	No	No	No
Henley Resource Zone				
Harpsden/Sheeplands	No	No	No	No

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1 INTRODUCTION

1.1 BACKGROUND

Water companies in England and Wales are required to prepare and maintain Statutory Drought Plans under Sections 39B and 39C of the Water Industry Act 1991, as amended by the Water Act 2003, which set out the short operational steps a company will take before, during and after a drought.

The requirement for a Habitats Regulations Assessment (HRA) is established through Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora, hereby referred to as the 'Habitats Directive', in Articles 6(3) and 6(4). The Habitats Directive is transposed into national legislation by the Conservation of Habitats and Species Regulations 2010 (as amended)[1]. Under Regulations 61 and 102, any plan or project which is likely to have a significant effect on a European site (either alone or in-combination with other plans or projects) and is not directly connected with, or necessary for the management of the site, must be subject to a HRA to determine the implications for the site in view of its conservation objectives.

Water companies in England are required to produce a Drought Plan every five years. The Environment Agency's Drought Plan Guidance[2] specifies that a water company must ensure that its drought plan meets the requirements of the Habitats Regulations. The Environment Agency Drought Plan Guidance states that the UK Water Industry Research (UKWIR) report *'Strategic Environmental Assessment and Habitat Regulations Assessment - Guidance for Water Resources Management Plans and Drought Plans'*[3] should be used. The UKWIR report recommends that all Drought Plans should be subject to the first stage of HRA, i.e. screening for likely significant effects (LSE). More recent additional drought plan guidance from the Environment Agency[4] provides information (within Appendix 1) on the requirements of the Habitats Directive. Defra's Drought Plan Direction[5] identifies additional matters to be addressed in drought plans which include 'the measures that may be needed to mitigate any adverse effect on the environment resulting from the implementation of a drought plan measure'.

[1] Including The Conservation of Habitats and Species (Amendment) Regulations 2011 and the Conservation of Habitats and Species (Amendment) Regulations 2012
[2] Environment Agency (2015) *How to write and publish a Drought Plan,* December 2015. Available at https://www.gov.uk/government/collections/how-to-write-and-publish-a-drought-plan.
[3] UKWIR (2012) Strategic Environmental Assessment and Habitats Regulations Assessments - Guidance for Water Resources Management Plans and Drought Plans (WR/02/A).
[4] Environment Agency (2016) Drought plan guideline extra information, Environmental assessment for water company drought plans.
[5] The Drought Plan (England) Direction 2016.

1.2 REQUIREMENT FOR HRA

The responsibility for undertaking the Habitats Regulations Assessment lies with Thames Water Utilities Ltd ("Thames Water") as the Plan making authority.

HRA Guidance for the appraisal of Plans[6] summarises the Habitats Regulations. Regulation 61(5) states that the Plan making authority (in this case Thames Water) shall adopt, or otherwise give effect to, the Plan only after having ascertained that it will not adversely affect the integrity of a European site, subject to Regulation 62 or 102 of the Habitats Regulations.

Regulation 62 of the Habitats Regulations states:

62.—(1) If the competent authority are satisfied that, there being no alternative solutions, the plan or project must be carried out for imperative reasons of overriding public interest (which, subject to paragraph (2), may be of a social or economic nature), they may agree to the plan or project notwithstanding a negative assessment of the implications for the European site or the European offshore marine site (as the case may be).

(2) Where the site concerned hosts a priority natural habitat type or a priority species, the reasons referred to in paragraph (1) must be either—

(a) reasons relating to human health, public safety or beneficial consequences of primary importance to the environment; or

(b) any other reasons which the competent authority, having due regard to the opinion of the European Commission, consider to be imperative reasons of overriding public interest.

Regulation 102 of the Habitats Regulations states:

102.—(1) Where a land use plan—

(a) is likely to have a significant effect on a European site or a European offshore marine site (either alone or in combination with other plans or projects), and

(b) is not directly connected with or necessary to the management of the site,

the plan-making authority for that plan must, before the plan is given effect, make an appropriate assessment of the implications for the site in view of that site's conservation objectives.

(2) The plan-making authority must for the purposes of the assessment consult the appropriate nature conservation body and have regard to any representations

[6] Tyldesley, D. & Chapman, C. (2015) The Habitats Regulations Assessment Handbook. DTA Publications. Version 4.

made by that body within such reasonable time as the authority specify.

(3) They must also, if they consider it appropriate, take the opinion of the general public, and if they do so, they must take such steps for that purpose as they consider appropriate.

(4) In the light of the conclusions of the assessment, and subject to regulation 103 (considerations of overriding public interest), the plan-making authority or, in the case of a regional strategy, the Secretary of State must give effect to the land use plan only after having ascertained that it will not adversely affect the integrity of the European site or the European offshore marine site (as the case may be).

(5) A plan-making authority must provide such information as the appropriate authority may reasonably require for the purposes of the discharge of the obligations of the appropriate authority under this Chapter.

(6) This regulation does not apply in relation to a site which is—

(a) a European site by reason of regulation 8(1)(c), or

(b) a European offshore marine site by reason of regulation 15(c) of the 2007 Regulations (site protected in accordance with Article 5(4) of the Habitats Directive).

Article 6 of the Habitats Directive (Council Directive 92/43/EEC on the conservation of natural habitats and of wild flora and fauna) states:

6(3). Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives. In the light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public.

6(4). If, in spite of a negative assessment of the implications for the site and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of a social or economic nature, the Member State shall take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected. It shall inform the Commission of the compensatory measures adopted.

Guidance[7] recommends that if there are no alternative solutions and if, in exceptional

[7] Tyldesley, D. & Chapman, C. (2015) The Habitats Regulations Assessment Handbook. DTA Publications. Version 4.

circumstances, it is proposed that a Plan be adopted despite the fact that it may adversely affect the integrity of a European site, the HRA will need to address and explain the imperative reasons of Overriding Public Interest which the Plan making authority considers to be sufficient to outweigh the potentially adverse effects on the European site(s).

1.3 APPROACH TO HRA

Four stages of the HRA of Thames Water's Drought Plan have been identified:

1. Firstly, a screening process is undertaken to identify whether each drought option in Thames Water's Drought Plan (either alone or in combination with other plans or projects) is likely to have significant effects on European sites.

2. Where a significant effect is likely (noting the precautionary principle), an Appropriate Assessment will then be undertaken of the drought option to determine whether this would adversely affect the integrity of the European site(s), either alone or in combination with other plans and projects, taking into account available mitigation measures.

3. Where significant adverse effects are identified at the Appropriate Assessment stage, alternative options would be examined to avoid any potential significant effects on the integrity of the European site as Stage 3 of the HRA.

4. Stage 4 comprises an assessment of compensatory measures where, in the light of an assessment of Imperative Reasons of Overriding Public Interest, it is deemed that the Plan should proceed.

The HRA has been undertaken in accordance with currently available guidance[8,9,10,11,12,13,14,15] and has been based on a precautionary approach as required under the Habitats Regulations. It has followed the staged HRA approach as detailed in **Section 1.2**, commencing with the Stage 1 screening of all options contained within the Drought Plan.

[8] European Commission Environment DG (2001) Assessment of plans and projects significantly affecting European Sites. Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC.
[9] Department for Communities and Local Government (DCLG) (2006) Planning for the Protection of European Sites. Guidance for Regional Spatial Strategies and Local Development Documents.
[10] English Nature (1997) The Appropriate Assessment (Regulation 48) The Conservation (Natural Habitats &c) Regulations, 1994. Guidance Note HRGN1.
[11] English Nature (1997) The Determination of Likely Significant Effect under The Conservation (Natural Habitats &c.) Regulations 1994. Guidance Note HRGN3.
[12] Countryside Council for Wales (2012) Draft Guidance for Plan Making Authorities in Wales: The Appraisal of Plans Under the Habitats Regulation. Prepared by Tyldesley D.
[13] Tyldesley, D. (2011) Assessing projects under the Habitats Directive: guidance for competent authorities. Report to the Countryside Council for Wales, Bangor
[14] Defra (2012) The Habitats and Wild Birds Directives in England and its seas: Core guidance for developers, regulators & land/marine managers.
[15] Tyldesley, D. & Chapman, C. (2015) The Habitats Regulations Assessment Handbook. DTA Publications. Version 4.

The assessment refers to the LSE of an option on one or more European sites, including Special Protection Areas (SPAs) and Special Areas of Conservation (SACs) (also known as Natura 2000 sites).

- SPAs are classified under the European Council Directive 'on the conservation of wild birds' (2009/147/EC; 'Birds Directive') for the protection of **wild birds and their habitats** (including particularly rare and vulnerable species listed in Annex 1 of the Birds Directive, and migratory species).

- SACs are designated under the Habitats Directive (92/43/EEC) and target particular **habitats** (Annex 1) **and/or species** (Annex II) identified as being of European importance.

The Government also expects potential SPAs (pSPAs), candidate SACs (cSACs), compensation habitat and Ramsar sites to be included within the assessment.

- Ramsar sites support **internationally important wetland habitats** and are listed under the Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention, 1971).

For ease of reference through the HRA process, these designations are collectively referred to as European sites, despite Ramsar designations being made at the international level.

The purpose of the screening stage is to determine whether any part of the plan in question (in this case the draft Drought Plan) is likely to have a significant effect on any European site. This is judged in terms of the implications of the plan for a site's conservation objectives, which relate to its 'qualifying features' (i.e. those Annex I habitats, Annex II species, and Annex I bird populations[16], or Ramsar criterion, for which it has been designated). Significantly, HRA is based on a rigorous application of the precautionary principle. Where uncertainty or doubt remains, an impact should be assumed, triggering the requirement for Appropriate Assessment of that scheme.

The screening stage also has to conclude whether any in-combination effects would result from the schemes within the plan itself, or from the plan in-combination with other plans and projects, for example neighbouring water companies drought plans and water resource management plans, and whether these would adversely affect the integrity of a European site.

This document reports the HRA Screening of Thames Water's draft Drought Plan (DP), i.e. Stage 1 as identified above. HRA Screening identifies whether the drought

[16] Annexes are contained within the relevant EC Directive.

options contained within Thames Water's DP will have likely significant effects on European sites, and as such determines the requirement for Appropriate Assessment. HRA is based on a rigorous application of the precautionary principle. Where uncertainty or doubt remains, an impact should be assumed, triggering the requirement for Appropriate Assessment of that option. Natural England was consulted on the approach taken in the HRA and on the findings.

Thames Water are also undertaking an SEA of their draft DP. The SEA of Thames Water's draft DP is being undertaken in parallel with the HRA assessment and reported separately.

1.4 THAMES WATER SUPPLY SYSTEM AND DROUGHT PLANNING

Thames Water supplies water to some 9.1 million people and 0.45 million non-household customers. Some 77% of Thames Water's water supply is derived from surface water abstraction (largely from the upper and lower Thames and the River Lee) and the remainder is derived from groundwater abstraction[17]. However, as for most of South East England, during periods of prolonged low rainfall leading to a serious drought, water supply is largely sustained by groundwater abstraction, groundwater derived baseflow within rivers and available water stored in reservoirs.

Thames Water sets out how it will maintain planned levels of service in its Water Resources Management Plan (WRMP). The latest WRMP was published in 2014 and sets out a "twin-track" approach of demand management measures together with timely development of new water sources to ensure a positive supply/demand balance during prolonged dry weather. The 2014 WRMP sets out the actions Thames Water will take to maintain its customer levels of service for water supply reliability, in particular planning for a Temporary Use Ban and/or a non-essential use ban on selected water uses to only be implemented, on average, once in every 20 years and planning with the objective that rota cuts or standpipes will never be required. The Thames Water Drought Plan complements the WRMP (published 2014) and is focused on the actions that Thames Water will take during drought conditions when there are increased risks of temporary water use restrictions being required along with implementing temporary measures to augment water supply availability in order to maintain essential water supplies to all customers. Thames Water is currently preparing an updated WRMP due for publication in 2019.

For water resource and drought planning purposes, the Thames Water water supply area is divided into six water resources zones (WRZs) reflecting the different characteristics of the supply areas and associated risks associated with meeting demand within the Thames Water area (see **Figures 1.1** and **1.2**). The largest of

[17] Average abstraction rate, 2010-2015.

these zones is the London WRZ, which covers the Greater London area, followed by Swindon and Oxfordshire (SWOX). The water resources for both of these zones are largely based on abstraction from the River Thames, with the abstracted water stored in reservoirs. The other zones to the west of London are Kennet Valley (including Reading and Newbury); Henley; Slough/Wycombe/Aylesbury (SWA) and Guildford. These latter four zones are largely reliant on groundwater abstraction although there are significant abstractions directly from local rivers, notably the River Kennet in Reading and the River Wey near Guildford. The Thames Water DP describes these WRZs from a drought perspective as follows:

1.4.1 London and SWOX Water Resource Zones

The water resources for London and SWOX WRZs are derived from a combination of river abstraction, raw water reservoir storage and groundwater sources. For both zones, the critical element in the system is the level of reservoir storage, which in turn is dependent upon river flow and during drought this is primarily made up of the baseflow from the catchment's major aquifers.

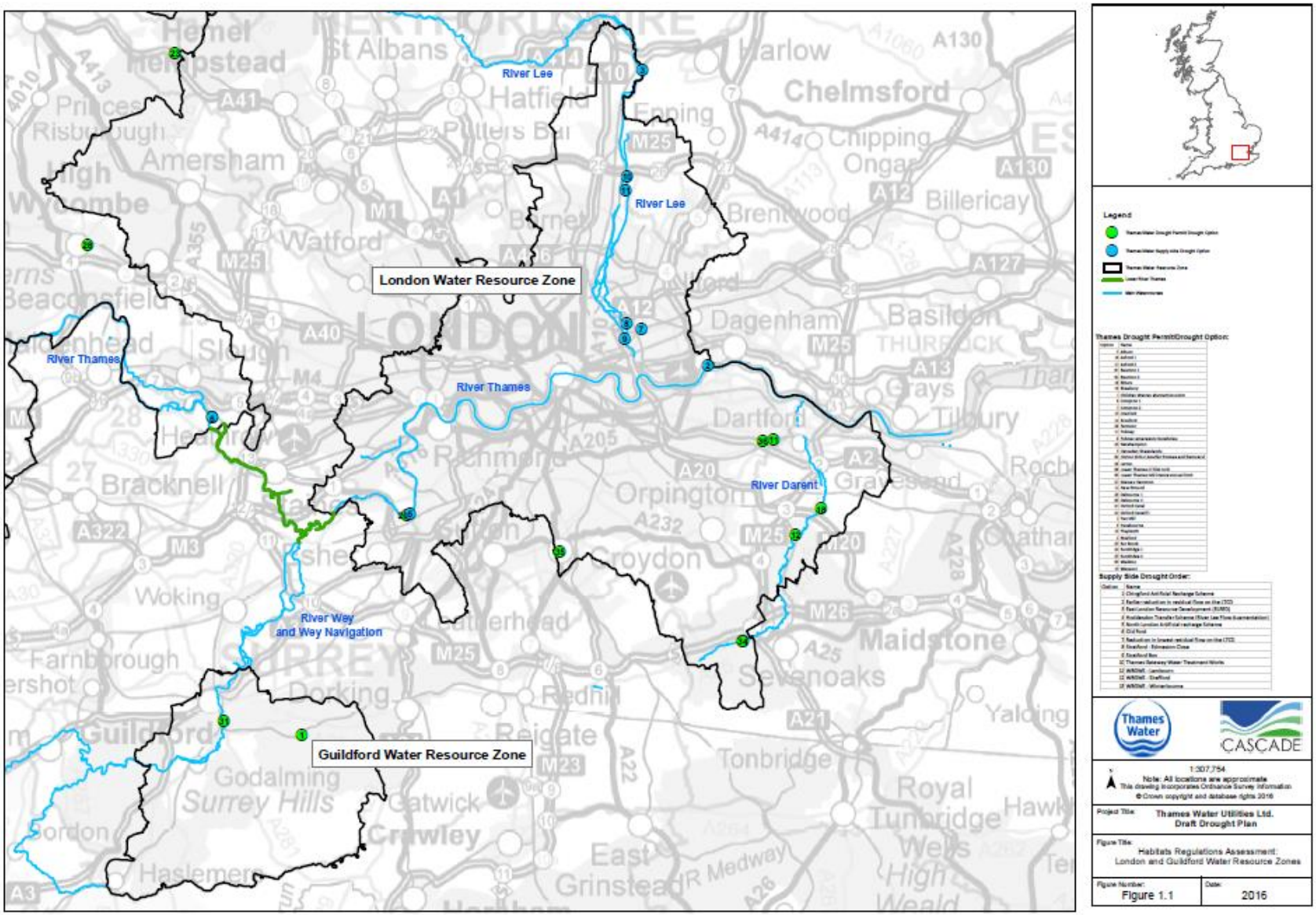
1.4.2 Kennet Valley and Guildford Water Resource Zones

Although groundwater provides a major contribution in these zones, the critical drought elements are the surface water sources on the River Kennet and River Wey for Kennet Valley and Guildford zones, respectively. Consequently, the protocol for these zones consists of a trigger mechanism for implementing drought measures based on river flows receding to critical low levels.

1.4.3 SWA and Henley Water Resource Zones

These two zones are entirely supplied by groundwater sources, which historically have remained robust during drought. That is to say, the critical point at which source outputs decline below their deployable output has never been reached. The approach in these zones, therefore, is to track groundwater levels in key regional observation boreholes as well as the linked performance of selected groundwater sources in relation to their deployable output. Stonor Park observation borehole has been chosen for tracking groundwater levels in the Chilterns and forms the basis for defining drought management guide levels for both the SWA and Henley zones.

Through the Environment Agency's Restoring Sustainable Abstraction (RSA) programme and requirements of European Directives, Thames Water has made sustainability reductions in the SWOX, SWA and London WRZs. Thames Water is currently investigating the implications of future potential sustainability reductions in the SWA and Henley WRZ.


London Water Resource Zone
Guildford Water Resource Zone
River Lee
River Lee
River Thames
River Thames
River Darent
River Wey
and Wey Navigation
Legend
Thames Drought Permit/Drought Option:
Supply Side Drought Order:
Thames Water
CASCADE
1:307,754
Note: All locations are approximate
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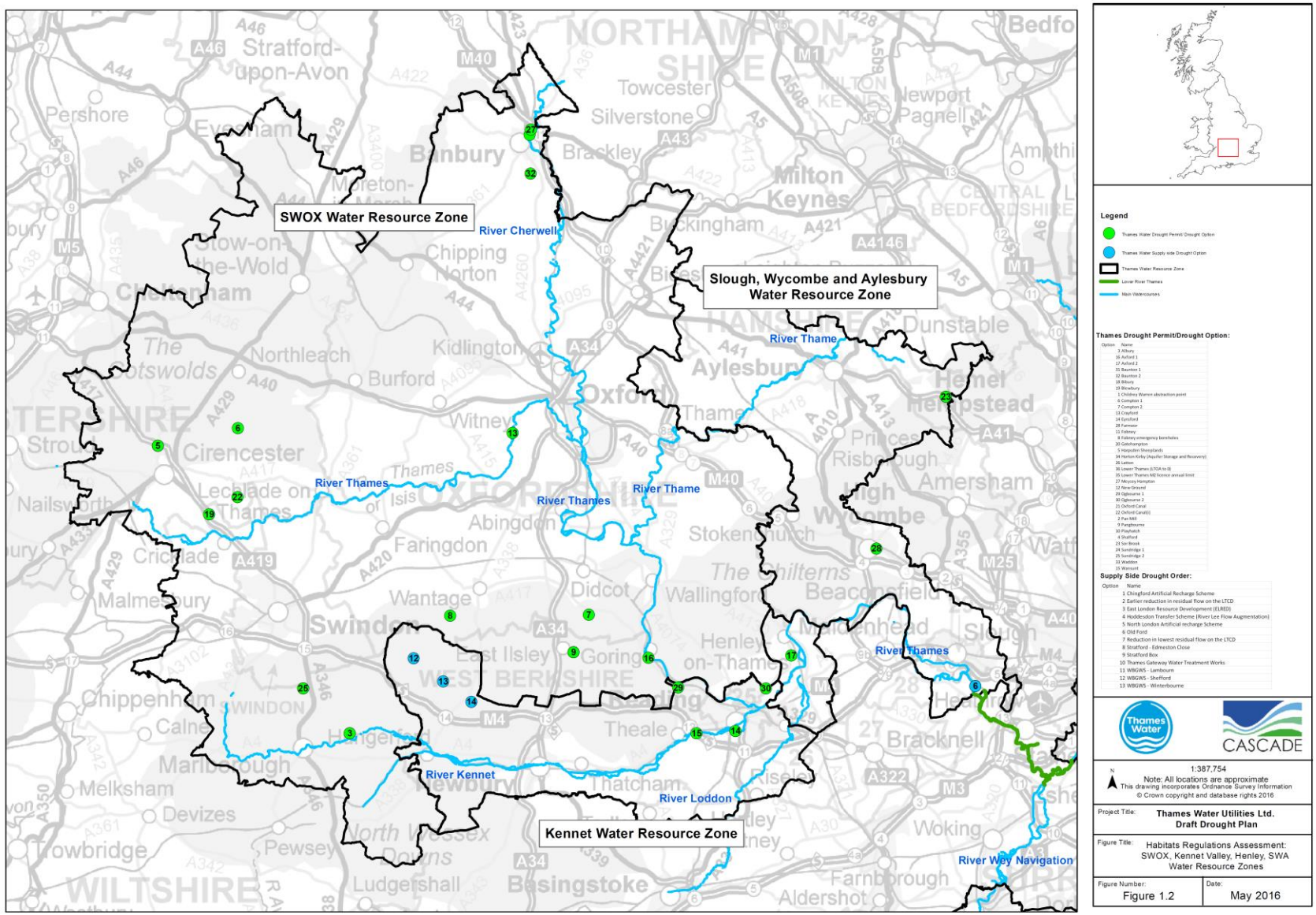
Thames Water Utilities Ltd.
Draft Drought Plan
Figure Title:
Habitats Regulations Assessment:
London and Guildford Water Resource Zones
Figure Number:
Figure 1.1
Date:
2016


SWOX Water Resource Zone
Slough, Wycombe and Aylesbury Water Resource Zone
Kennet Water Resource Zone
River Cherwell
River Thame
River Thames
River Kennet
River Loddon
River Wey Navigation
Legend
Thames Water Drought Permit/ Drought Option
Thames Water Supply side Drought Option
Thames Water Resource Zone
Lower River Thames
Main Watercourses
Thames Drought Permit/Drought Option:
Supply Side Drought Order:
1 Chingford Artificial Recharge Scheme
2 Earlier reduction in residual flow on the LTCD
3 East London Resource Development (ELRED)
4 Hoddesdon Transfer Scheme (River Lee Flow Augmentation)
5 North London Artificial recharge Scheme
6 Old Ford
7 Reduction in lowest residual flow on the LTCD
8 Stratford - Edmeston Close
9 Stratford Box
10 Thames Gateway Water Treatment Works
11 WBGWS - Lambourn
12 WBGWS - Shefford
13 WBGWS - Winterbourne
1:387,754
Note: All locations are approximate
This drawing incorporates Ordnance Survey Information
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Project Title: Thames Water Utilities Ltd. Draft Drought Plan
Figure Title: Habitats Regulations Assessment: SWOX, Kennet Valley, Henley, SWA Water Resource Zones
Figure Number: Figure 1.2
Date: May 2016

1.5 THAMES WATER DROUGHT PLANNING PROCESS

1.5.1 Overview and Timetable

Water companies in England and Wales are required to prepare and maintain Statutory DPs under Sections 39B and 39C of the Water Industry Act 1991, as amended by the Water Act 2003, which set out the short operational steps a company will take before, during and after a drought. The Water Industry Act 1991 defines a DP as *'a plan for how the water undertaker will continue, during a period of drought, to discharge its duties to supply adequate quantities of wholesome water, with as little recourse as reasonably possible to drought orders or drought permits'.*

Thames Water published its final Statutory DP in 2013. The Drought Direction 2011 states that revised DPs should be submitted according to the following schedule:

6(b) for a revised drought plan –

i. if section 39B(6)(a) of the Act applies as a result of a material change of circumstances arising from a new statutory provision, within 12 months after the date on which the change occurs;

ii. if section 39B(6)(a) of the Act applies as a result of a material change of circumstances arising for any other reason, within 6 months after the date on which the change occurs;

iii. if section 39B(6)(c) of the Act applies, within 3 years and 6 months after the date on which its drought plan, or its last revised drought plan, is published.

On 1 October 2010, Section 76 of the Water Industry Act 1991 was amended by the commencement of Section 36 of the Flood and Water Management Act 2010. The Water Use (Temporary Bans) Order 2010 also commenced on 1 October 2010 and provides definitions and clarifications on these activities.

The period encompassed by the Draft DP 2016 is 2017 to 2022. The next revision of the DP would be published in 2022.

Permission to abstract water, granted through licences issued by the Environment Agency and held and operated by Thames Water, was subject to a 'Review of Consents' in accordance with Regulation 63 of the Conservation of Habitats and Species Regulations 2010 (as amended) (referred to as the Habitats Regulations). This Review of Consents was undertaken by the Environment Agency and included screening to determine a likely significant effect and Appropriate Assessment where likely significant effects are identified, to either affirm an abstraction licence or recommend action to amend the licence conditions. This was in order to ensure that the integrity of European sites is not at risk from the impacts of abstraction.

Information provided by the outcomes of the Review of Consents was used to support the HRA screening of Thames Water's DP 2013[18]. This identified that none of the drought options included in the 2013 Final DP required an "Appropriate Assessment" for a Habitats Directive European site.

Only those drought options which are relevant to the period encompassed by the Draft DP 2016 (2017 to 2022) are considered in the SEA and HRA process. To this end, environmental effects of the Draft DP options are considered within the context of the current licence operating conditions. Potential new sources (which Thames Water may bring on line in the future), new drought options, or revisions to existing options which are only envisaged to become operational post 2022 have, therefore, been excluded from the SEA and HRA screening process. The same approach has also been taken with respect to cumulative plans, projects and programmes, in that only those that are likely to be effective in the period to 2022 were considered in the SEA.

1.6 THAMES WATER DROUGHT OPTIONS

The draft DP proposes a number of options which would make more water available for supply than is available under normal licensed conditions. Drought options include demand side options (e.g. water use restrictions), continued utilisation of existing licensed water sources within Thames Water's resource base (referred to as supply side options) and drought permits/orders.

1.6.1 Demand Side Options

Demand side options are designed to reduce the demand for water and the options available to Thames Water are consistent across all resource zones (see **Table 1.1**).

Table 1.1 Demand Side Options (all water resource zones)

Measure	Description of Measure	Company Level of Service
Media /water efficiency campaign	Wide-scale media activity and advertising to encourage voluntary reduction in water usage	1
Leakage reduction	Increased leakage activity / Network pressure management	Not applicable
Sprinkler and unattended hose pipe ban	Sprinkler ban and unattended hose pipe ban	2
Temporary use ban	Temporary use ban	3
Drought Order to ban Non-Essential Use	Application to Defra to grant Non Essential Use Bans, as part of DD11 Ordinary Drought Order application	3

[18] Thames Water Utilities Limited (2013) Habitats Regulations Assessment of Thames Water Utilities Limited Final Draft Statutory Drought Plan Screening Report (Final). Prepared by Cascade Consulting.

Measure	Description of Measure	Company Level of Service
Emergency Drought Order	Application to Defra to grant an Emergency Drought Order to authorise water supply via temporary rota cuts or standpipes	4

The above measures include a sub-set of Thames Water's baseline demand management (leakage reduction, metering and water efficiency) in the WRMP. During the course of a drought, leakage reduction and water efficiency can, to some extent, be enhanced.

1.6.2 Supply Side Options

Thames Water categorise the full range of supply side measures into the following:

- Optimisation of existing sources
- Strategic drought water resource schemes
- Bulk supplies
- Drought permits/orders
- Recommissioning of disused sources
- *In extremis* options

Supply side measures are measures available to Thames Water to introduce during the course of a drought to increase the amount of water available for supply. Supply side drought options that do not require drought permits/orders are listed in **Table 1.2**.

Table 1.2 Supply Side Drought Options

Option	Description	Trigger level
London Water Resource Zone		
North London Artificial Recharge Scheme	The scheme is licensed for 275Ml/d peak and 150Ml/d average.	Drought Event Level 1
Thames Gateway Water Treatment Works (TGWTW)	There is an Operating Agreement governing use of the scheme. The TGWTW would take between 4-6 weeks to ramp up to full output. The scheme is maintained in a state of readiness at the beginning of the year and so it does not need to be increased to full output from zero output.	Drought Event Level 1 and naturalised Teddington flows below 3000Ml/d for 10 days
Hoddesdon Transfer Scheme (River Lee Flow Augmentation)	12.5 Ml/d in any month - transfer of additional flow from Deephams sewage treatment works (STW) to Rye Meads STW for treatment, and which increases the discharge to the River Lee.	Drought Event Level 1 and naturalised Teddington flows below 3000Ml/d for 10 days
Chingford Artificial Recharge Scheme (CHARS)	16Ml/d average, 16Ml/d peak - CHARS is a water treatment works (WTW) using a number of the NLARS boreholes. It is not restricted to use under the NLARS Operating Agreement but can be used under any conditions, although its use is primarily to meet peak demands and drought demands.	Drought Event Level 1 and naturalised Teddington flows below 3000Ml/d for 10 days

Option	Description	Trigger level
Reduction in lowest residual flow on the Lower Thames Control Diagram at Teddington Weir from 300Ml/d to 200Ml/d	100Ml/d - increased abstraction from the River Thames, reducing residual flow over Teddington Weir.	Agreed between the Environment Agency and Thames Water during potentially severe drought.
Earlier reduction in residual flow at Teddington Weir on the Lower Thames Control Diagram	The gain in abstraction capability would be equal to the difference in reduction agreed at each stage on the Lower Thames Control Diagram, for the period when that flow band is operable.	Agreed between the Environment Agency and Thames Water during potentially severe drought.
East London Resource Development (ELRED)	ELRED comprises a number of groundwater abstraction locations along the route of the Channel Tunnel Rail Link which can be used to meet demand for water in London as well as contributing to the management of groundwater level rises. The licence held allows for abstraction of 18 Ml/d average and 20.57Ml/d peak.	Drought Event Level 1 and naturalised Teddington flows below 3000Ml/d for 10 days
Stratford Box	Stratford Box is a groundwater source in East London which is run at low level of baseload output in order to keep groundwater levels suppressed to protect Stratford International Station. The option available during a drought is to increase the output from 5Ml/d to 8 Ml/d in aggregate with Edmeston Close. The groundwater level management is not carried out by Thames and is de-watering.	Drought Event Level 1 and naturalised Teddington flows below 3000Ml/d for 10 days
Old Ford	Old Ford is a groundwater source in East London which abstracts from the Chalk aquifer. The licence allows for the abstraction of 4.5 Ml/d average, 4.5Ml/d peak to meet peak demands and demand during drought conditions.	Drought Event Level 1 and naturalised Teddington flows below 3000Ml/d for 10 days
West Berkshire Groundwater Scheme (WBGWS)	Provides up to 66Ml/d benefit to London. The scheme also provides benefit to the Fobney abstraction during a severe drought.	Level 2 on the Lower Thames Control Diagram

1.6.3 Supply Side Drought Permit/Order Options

Potential drought permit/order sites are identified in **Table 1.3**.

Table 1.3 Supply Side Drought Permit/Order Options

Water Source	Potential Drought Permits/Orders
London Water Resource Zone	
Sundridge 1	0 - 6.64 Ml/d - relax the annual average licence rate so that for the 6 months of the drought order, 8Ml/d could be abstracted each day (1,470Ml over 6 months).
Sundridge 2	10.64Ml/d -relax the annual average licence rate and increase the peak licence rate so that for the 6 months of the drought order, 12Ml/d could be abstracted each day (sequential to Sundridge 1).
Lower Thames	100 - 200Ml/d – depending on agreement with the Environment Agency and water availability.
Crayford	2.8Ml/d - increase in abstraction beyond existing licence limit.
Horton Kirby (Aquifer Storage & Recovery)	2.4Ml/d - the option would be to bring forward the Aquifer Storage and Recovery (ASR) scheme which abstracts from the Greensand aquifer.
Eynsford	5Ml/d - increase in peak rate of abstraction to 11.6Ml/d and relaxation of annual licence limit to allow 6 months of abstraction at peak daily rate (equating to 2,505.8Ml/y).
Wansunt	6.0Ml/d - increase in abstraction beyond existing licence limit.
Increase in M2 annual licence	Increase the annual maximum abstraction permitted under the M2 licence by up to 5%. Abstractions would still be restricted when flows are medium to low (as per normal operations).

Water Source	Potential Drought Permits/Orders
Waddon	0 – 7Ml/d - increase in abstraction beyond existing licence limit (average rate per year of 7.6Ml/d).
Swindon Oxford Water Resource Zone	
Baunton 1	6.3Ml/d - re-establish abstraction from existing boreholes (revoked through sustainability reductions).
Baunton 2	17Ml/d – an additional abstraction of up to 10.7Ml/d above the additional 6.3Ml/d from Baunton 1.
Latton	5Ml/d increase in average licence limit.
Meysey Hampton	11.37Ml/d - additional abstraction from the Great Oolite boreholes when preceding flow (mean 5 days before) in the River Coln at Bibury is less than 68 Ml/d (i.e. as per the terms of the revoked 'summer' licence).
Farmoor	10 - 30Ml/d - additional abstraction direct from the river in addition to that allowed by the existing licence.
Axford	Option would be to increase from the constrained level of 6 Ml/d peak and average to unconstrained abstraction of 13.1Ml/d peak and average. i.e. to go from 6 to 13.1Ml/d a gain of 7.1Ml/d.
Axford 2	Option would be to increase from 6 Ml/d to 20 Ml/d peak and average i.e. an increase of 14 Ml/d.
Bibury	Up to 5Ml/d - Increase abstraction at the current boreholes by up to 5Ml/d. The arrangement for river flow augmentation would continue.
Blewbury	5Ml/d- recommissioning of abstraction from boreholes (revoked in 2007).
Gatehampton	3.5Ml/d - continuation of abstraction from boreholes beyond licence conditions.
Ogbourne emergency boreholes	Abstract 4 Ml/d from existing boreholes located 1 km away from the boreholes used in Thames Water's Ogbourne abstraction licence.
Oxford Canal - Banbury	5 -10Ml/d - abstraction from Oxford Canal with the permission of the Canal and River Trust and transfer to Grimsbury Reservoir for storage and supply.
Sor Brook	4.546Ml/d - direct surface water abstraction - continuation of existing licence beyond flow constraint conditions.
Childrey Warren	4.5Ml/d - resume historical abstraction to previous licence limit.
Ogbourne	Abstract 3.5 Ml/d from the existing Ogbourne boreholes used in the revoked abstraction licence (2017).
Kennet Valley Water Resource Zone	
Compton 1	5Ml/d – re-establish abstraction from existing boreholes (revoked due to high nitrate concentrations).
Compton 2	8.6Ml/d – extending abstraction established from Compton 1 to abstract to the maximum possible yield of 13.6Ml/d.
Fobney Emergency Boreholes	12 - 30Ml/d - manipulation of control mechanisms restricting maximum allowable abstraction.
Pangbourne	7Ml/d – removes flow constraint and allows the full amount of the Pangbourne licence to be abstracted.
Playhatch	2.8 - 4.1Ml/d - increase in peak abstraction of existing licence from 8.2Ml/d to 12.3Ml/d.
Fobney Direct	Variable, up to 20Ml/d – manipulation of the Arrowhead control structure at extreme low flows (<173Ml/d gauged at Theale) to allow abstraction from River Kennet at expense of flows to Holy Brook.
Guildford Water Resource Zone	
Albury	6.8 - extension of abstraction beyond a lower limit of flow in associated Law Brook.
Shalford	5Ml/d - extension of existing surface water abstraction from the River Wey.
SWA Water Resource Zone	
New Ground	6.5Ml/d – resume historical abstraction from boreholes currently operating through emergency licence (10 days only at a rate of 8.138Ml/d through agreement with the Environment Agency).
Pann Mill	Increase from revised licence of 9.5 Ml/d up to old deployable output of 16.8 Ml/d (i.e. an option providing 7.3 Ml/d)
Henley Water Resource Zone	
Harpsden / Sheeplands	6Ml/d – aggregate abstraction from multiple sources.

1.7 CONSULTATION

Natural England and the Environment Agency, will be invited to express their views on the draft HRA Screening Report and use it as a reference point in expressing their views on Thames Water's draft DP. The consultation period for both the SEA Environmental Report and the draft HRA Screening Report will run concurrently with consultation on Thames Water's draft DP following on from the submission to Defra in October 2016. Comments received (as set out in the SoR (published TBC)) will be taken into account in finalising this report.

At the time of the previous submission of Thames Water's Drought Plan in 2013, the Environmental Assessment Reports (EARs) were prepared, which included several stages of consultation with the Environment Agency and Natural England. Consultation meetings were held regarding the scope and methodology of the EARs (February and March 2013) and during the development of the EARs (October 2012). Consultation on the draft EARs and final EARs took place between December 2012 and March 2013.

Following publication of the 2013 Drought Plan, consultation between Environment Agency, Natural England and Cascade Consulting continued. This included consultation with Natural England regarding the assessment against designated site conservation objectives (October 2013), annual reporting of baseline monitoring submitted to the Environment Agency and Natural England (where necessary) in 2014, 2015 and 2016, and a meeting with the Environment Agency to discuss and confirm the approach to the updates for the EARs (January 2016). The EARs are currently being issued for review by the Environment Agency and (where necessary) Natural England, and comments from this review will be integrated into the final EARs issued for consultation with the 2016 draft Drought Plan.

1.8 STRUCTURE OF THE REPORT

The report is divided into the following sections; Section 2 Methodology, Section 3 HRA Findings for Drought Options and Section 4 Conclusions and Recommendations.

The HRA has also informed the production of the Strategic Environmental Assessment (SEA) of the Drought Plan.

2 METHODOLOGY

The objective of the HRA is to establish firstly whether schemes included in draft DP are likely to have a significant effect on European sites (alone or in-combination with other supply schemes in the plan, or with other plans and projects), and secondly, where a significant effect is likely, to determine through Appropriate Assessment, whether the plan would adversely affect the integrity of the European site(s).

HRA screening was therefore completed for all of the drought options considered in the development of the draft DP. As recommended in the UKWIR Guidance[19], regarding existing abstraction licences, the HRA screening has reviewed the outcome of the Review of Consents undertaken by the Environment Agency.

2.1 REVIEW OF EXISTING ABSTRACTION LICENCES

The Review of Consents for Thames Water's existing abstractions (released to Thames Water on 29 August 2008) is relevant to the options in Thames Water's draft Drought Plan that involve increasing existing abstraction at licensed sites while still remaining within the existing licensed limit. Where these existing licences have been assessed by the Environment Agency's Review of Consents as not having an adverse effect on European sites, the additional (and temporary) increase in abstraction from the new resource scheme (which would be within the existing licensed limit) is also deemed not to have any likely significant effects on European sites as a result.

The Environment Agency's Review of Consents was undertaken by considering all European sites within Thames Water's supply area. The European sites were initially screened to identify all sites with water dependent habitat within Thames Water's supply area. Those sites that contained water dependent habitat were then reviewed to assess whether Thames Water abstractions were located within the same groundwater or surface water catchment and therefore could have potential to affect the hydrogeological or hydrological regime of the sites. Any sites that were in the same catchment as a Thames Water licensed abstraction source were assessed in more detail to determine whether the abstraction would be likely to have a significant effect. The Environment Agency looked in more detail at the sensitivities of the European site to water supply, and at the local hydrology. For example, a European site may be fed by surface water and the abstraction may be downstream, or the abstraction may be from a confined aquifer which could not impact the water supply at the protected site. In addition, the Environment Agency was also able to use simple drawdown calculations to conclude that the impact would be insignificant. The Environment Agency then sought to agree the screening conclusions with

[19] UKWIR (2012) Strategic Environmental Assessment and Habitats Regulations Assessments - Guidance for Water Resources Management Plans and Drought Plans (WR/02/A).

Natural England (Environment Agency (August 2008): Sustainability Reductions, 080829/SR).

2.2 IDENTIFICATION OF EUROPEAN SITES FOR ASSESSMENT

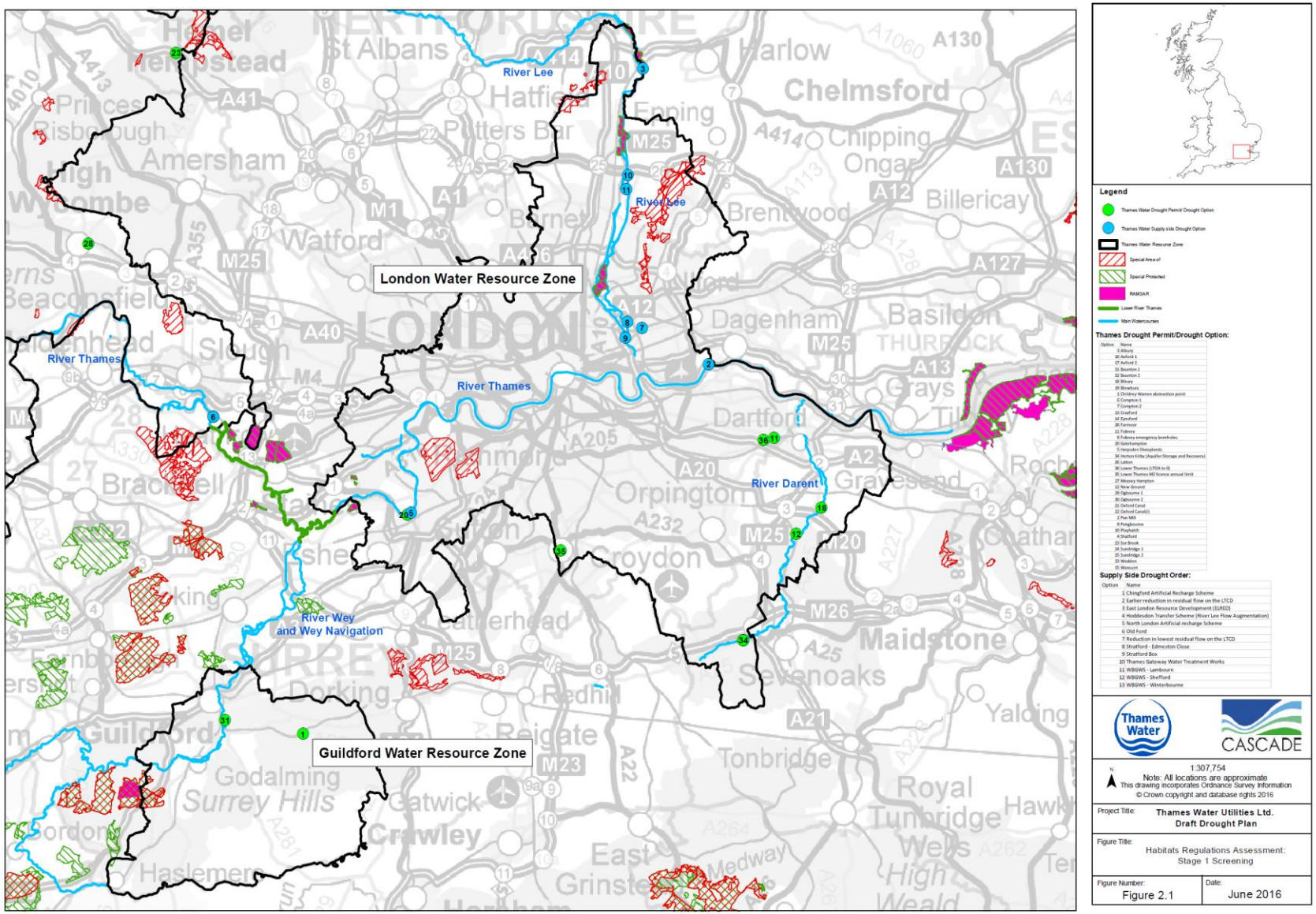
To provide an indication of those options more likely to have a significant effect on a European site(s), those options that are within 10km of a European site were identified. Consideration was also given to the relative locations of options and designated sites within the same surface and groundwater catchments (where this information was available) to ensure that any connectivity over a longer distance that might affect water-dependent sites was taken into account. GIS data were used to map the locations and boundaries of European sites within or adjacent to the Thames Water Water Resource Zones[20] (WRZs) using publicly available data from Natural England. European sites are shown in **Figure 2.1** (London and Guildford WRZs) and **Figure 2.2** (Swindon and Oxfordshire (SWOX); Kennet Valley; Henley; Slough/Wycombe/Aylesbury (SWA) WRZs)**.**

The attributes of European sites, which contribute to and define their integrity, were considered with reference to Standard Data forms for SACs and SPAs and Information Sheets for Ramsar sites[21]. An analysis of these information sources enabled the identification of European site qualifying features. Conservation objectives and site vulnerability assessments have been provided by Natural England. A summary of the information provided by these documents is provided in **Appendix A.** This information allows identification of those features of each site which determine site integrity and the specific sensitivities of the site, as well as an analysis of how potential impacts of the drought options may affect site integrity.

The locations of the supply side and drought permit/order options were also mapped in order to establish their geographic proximity to the European site.

[20] UKWIR/Environment Agency define a WRZ as: 'The largest possible zone in which all resources, including external transfers, can be shared, and hence, the zone in which all customers will experience the same risk of supply failure from a resource shortfall.'

[21] These were obtained from the Joint Nature Conservation Committee and Natural England websites (www.jncc.gov.uk and www.naturalengland.org.uk).


London Water Resource Zone
Guildford Water Resource Zone
River Lee
River Lee
River Thames
River Thames
River Darent
River Wey
and Wey Navigation
Legend
Thames Water Drought Permit Drought Option
Thames Water Supply side Drought Option
Thames Water Resource Zone
Special Area of
Special Protected
RAMSAR
Lower River Thames
Main Watercourses
Thames Drought Permit/Drought Option:
Supply Side Drought Order:
1:307,754
Note: All locations are approximate
This drawing incorporates Ordnance Survey Information
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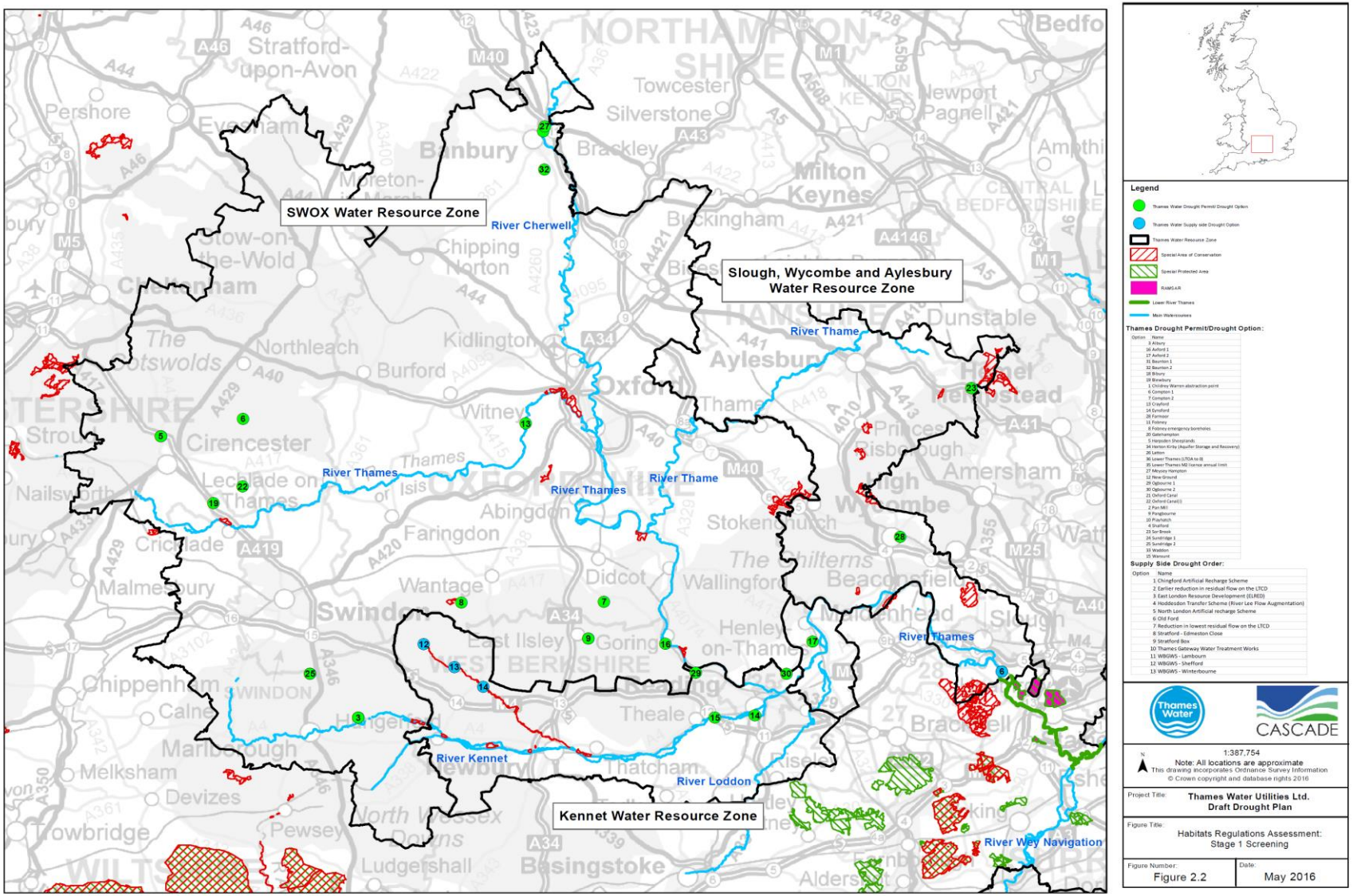
Project Title: Thames Water Utilities Ltd. Draft Drought Plan
Figure Title: Habitats Regulations Assessment: Stage 1 Screening
Figure Number: Figure 2.1
Date: June 2016


SWOX Water Resource Zone
Slough, Wycombe and Aylesbury Water Resource Zone
Kennet Water Resource Zone
River Cherwell
River Thame
River Thames
River Kennet
River Loddon
River Wey Navigation
Legend
Thames Water Drought Permit/ Drought Option
Thames Water Supply side Drought Option
Thames Water Resource Zone
Special Area of Conservation
Special Protected Area
RAMSAR
Lower River Thames
Main Watercourses
Thames Drought Permit/Drought Option:
Supply Side Drought Order:
1 Chingford Artificial Recharge Scheme
2 Earlier reduction in residual flow on the LTCD
3 East London Resource Development (ELRED)
4 Hoddesdon Transfer Scheme (River Lee Flow Augmentation)
5 North London Artificial recharge Scheme
6 Old Ford
7 Reduction in lowest residual flow on the LTCD
8 Stratford - Edmeston Close
9 Stratford Box
10 Thames Gateway Water Treatment Works
11 WBGWS - Lambourn
12 WBGWS - Shefford
13 WBGWS - Winterbourne
1:387,754
Note: All locations are approximate
This drawing incorporates Ordnance Survey Information
© Crown copyright and database rights 2016
Project Title: Thames Water Utilities Ltd. Draft Drought Plan
Figure Title: Habitats Regulations Assessment: Stage 1 Screening
Figure Number: Figure 2.2
Date: May 2016

Managed Wetlands

Currently, many existing abstractions are exempt from requiring an abstraction licence. These includes the primary offtake from water courses for managed wetlands. Natural England has indicated that following the implementation of the Water Act of 2003, such exemptions will no longer be in place from either winter 2016 or spring 2017. Any abstraction after this period will require a licence.

The potential impacts of the implementation of a drought permit/order on designated sites has been included in the EAR for each drought option (see **Section 2.4** below). During a drought, any drought permit/order will take precedence, but it will still be important to determine the effect of the implementation of a drought permit/order on the abstraction of water for managed wetlands and the conservation of such wetlands.

At this stage, any exceptions are still in place and no licences have been issued. As a result, a detailed assessment of the effect of a drought permit/order on the abstraction of water for managed wetlands will need to be determined at the time of implementation of a permit/order.

2.3 POTENTIAL IMPACTS OF THE OPTIONS CONSIDERED IN THE DRAFT DROUGHT PLAN

The qualifying habitats and species of European sites are vulnerable to a wide range of impacts such as physical loss or damage of habitat, disturbance from noise, light, human presence, changes in hydrology (e.g. changes in water levels/flow, flooding), changes in water or air quality and biological disturbance (e.g. direct mortality, introduction of disease or non-native species). However, the schemes considered for inclusion in the draft Drought Plan only have the potential to give rise to some of these impacts.

The demand management schemes are unlikely to have any effects on European sites as they comprise measures which will not result in any new development or water abstraction (repairing leakage and water efficiency measures) and which are largely implemented within urban areas. However, they have still been subject to the HRA screening process, the results of which are included in **Section 3**.

In determining the likelihood of significant effects on European sites from the supply side drought options and drought permit/drought order drought options, particular consideration has been given to the possible source-receptor pathways through which effects may be transmitted from activities associated with drought plan options to features contributing to the integrity of the European sites (e.g. groundwater or surface water catchments, air etc). **Table 2.1** shows the type of impacts drought

options could have on European site qualifying features.

Screening for likely significant effects has been determined on a proximity basis for many of the types of impacts, based on the proximity of the drought option location to each European site. However, there are many uncertainties associated with using set distances as there are very few standards available as a guide to how far impacts will extend. Different types of impacts can occur over different distances, and the assumptions and distances used in this HRA and justification for them are shown in **Table 2.1**.

Table 2.1 Potential Impacts of Drought Options on European Sites

Broad categories, and examples, of potential impacts on European sites	**Examples of operations responsible for impacts *(Distance assumptions shown in italics)***
Physical loss - Removal (including offsite effects, e.g. foraging habitat) - Smothering	Development of built infrastructure associated with scheme, e.g. reservoir embankments, water treatment plant, pipelines, pumping stations. *Physical loss is most likely to be significant where the boundary of the scheme extends within the boundary of the European site, or within an offsite area of known foraging, roosting, breeding habitat (that supports species for which a European site is designated).* *In some cases, indirect effects can result in loss of habitat for example where reduction in flows in a river effectively cause a reduction in designated river habitat area or where a reduction in flows dry out shallow marginal habitat which effectively is lost.*
Physical damage - Sedimentation / silting - Prevention of natural processes - Habitat degradation - Erosion - Trampling - Fragmentation - Severance/barrier effect - Edge effects	Construction of structures associated with scheme e.g. reservoir embankments, water treatment plant, pipelines, pumping stations. *Physical damage is likely to be significant where the boundary of the scheme extends within or is directly adjacent to the boundary of the European site, or within/adjacent to an offsite area of known foraging, roosting, breeding habitat (that supports species for which a European site is designated, or where natural processes link the scheme to the site, such as through hydrological connectivity downstream of a scheme).*
Non-physical disturbance - Noise - Visual presence e.g. of cranes/plant - Human presence - Light pollution	Noise from construction activities. *Taking into consideration the noise level generated from general building activity[22] (c. 122dB(A)) and considering the lowest noise level identified in appropriate guidance[23] as likely to cause disturbance to bird species, it is concluded that noise impacts could be significant up to approximately 1km from the boundary of the European site.* Noise from vehicular traffic during construction of scheme. *Noise from construction traffic is only likely to be significant where the transport route to and from the scheme is within or in proximity to the boundary of the*

[22] British Standards Institute (BSI) (2009) BS5228 - Noise and Vibration Control on Construction and Open Sites. BSI, London.
[23] Environment Agency (2013) Bird Disturbance from Flood and Coastal Risk Management Construction Activities. Overarching Interpretive Summary Report. Prepared by Cascade Consulting and Institute of Estuarine and Coastal Studies.

Broad categories, and examples, of potential impacts on European sites	Examples of operations responsible for impacts *(Distance assumptions shown in italics)*
	European site, or within/adjacent to an offsite area of known foraging, roosting, commuting, or breeding habitat (that supports species for which a European site is designated). Plant and personnel involved in construction and operation of schemes e.g. for maintenance. *These effects (visual/human presence) are only likely to be significant where the boundary of the scheme extends within or is directly adjacent to the boundary of the European site, or within/adjacent to an offsite area of known foraging, roosting, breeding habitat (that supports species for which a European site is designated).* Development of built infrastructure associated with scheme, which includes artificial lighting. *Effects from light pollution are only likely to be significant where the boundary of the scheme is within 500 m of the boundary of the European site. From a review of Environment Agency internal guidance on HRA and various websites it is considered that effects of vibration and light are more likely to be significant if development is within 500 metres of a European site.*
Water table/availability - Drying - Flooding/stormwater - Changes to surface water levels and flows - Changes in groundwater levels and flows - Changes to coastal water movement	Changes to water levels and flows due to water abstraction, storage and drainage interception. *These effects are only likely to be significant where the boundary of the scheme extends within the same ground or surface water catchment as the European site. However, these effects are dependent on hydrological continuity between the scheme and the European site, and sometimes, whether the scheme is up or down stream from the European site.*
Toxic contamination - Water pollution - Soil contamination - Air pollution	Accidental spills of fuel or chemicals during the construction phase. *Effects of water pollution are likely to be significant where works are in the vicinity of, or upstream of a European site.* Mobilisation of contaminated soils or materials during excavations. *These effects are only likely to be significant where the boundary of the scheme extends within the same ground or surface water catchment as the European site. However, these effects are dependent on hydrological connectivity between the scheme and the European site, and sometimes, whether the scheme is up or down stream from the European site.* Air emissions associated with vehicular traffic during construction of schemes. *This effect is only likely to be significant where the transport route to and from the scheme is within or in proximity to the boundary of the European site[24,25].*
Non-toxic contamination - Nutrient enrichment (e.g. of soils and water) - Algal blooms	Changes to water salinity, nutrient levels, turbidity, thermal regime. *These effects are only likely to be significant where the boundary of the scheme extends within the same ground*

[24] Highways Agency (2003) Design Manual for Roads and Bridges (DMRB), Volume 11.
[25] Institute of Air Quality Management (2014) Guidance on the assessment of dust from demolition and construction v1.1.

Broad categories, and examples, of potential impacts on European sites	Examples of operations responsible for impacts *(Distance assumptions shown in italics)*
- Changes in salinity - Changes in thermal regime - Changes in turbidity - Air pollution (dust)	*or surface water catchment as the European site. However, these effects are dependent on hydrological continuity between the scheme and the European site, and sometimes, whether the scheme is up or down stream from the European site. This level of information is not available until data such as groundwater modelling is collected to accompany planning applications.* Emissions of dust during earthworks, construction of plant and tunnel/pipeline construction associated with schemes. *This effect is only likely to be significant where the construction works for the scheme are within or in proximity of the boundary of the European site*[25]
Biological disturbance - Direct mortality - Out-competition by non-native species - Selective extraction of species - Introduction of disease - Rapid population fluctuations - Natural succession	Potential mortality or injuring of terrestrial, aquatic and marine species during building of structures associated with the scheme. *This effect is only likely to be significant when land take is within the boundary of the European site or within an offsite area of known foraging, roosting, breeding habitat (that supports species for which a European site is designated).* Introduction of non-native or native invasive species due to contaminated vehicles, receiving water from canal and river transfers etc. *This effect is only likely to be significant where the receiving water for the scheme is the European site or a tributary of the European site.*

Construction phase and operational phase impacts were reviewed and assessed. Most of the drought permit/order options reviewed comprise a change to an existing abstraction licence, with little or no requirement for additional infrastructure, and as such, few of these options can be considered to have a 'construction' phase.

The HRA Screening process was undertaken using professional judgement taking into account potential extent, complexity, duration, frequency, reversibility and probability of impacts, and assuming the implementation of suitable mitigation measures.

Where uncertainty remains after screening, and it cannot be concluded that a drought option is not likely to have significant effects on the qualifying features of a European site, the drought option should be taken forward to Stage 2, which requires a full Appropriate Assessment of that option to be undertaken.

2.4 DROUGHT CONTINGENCY PLANNING ENVIRONMENTAL ASSESSMENTS

Environmental Assessment Reports (EARs) are being prepared for the drought permit/order sites identified in **Table 1.3**, to support Thames Water's Drought Plan.

The aim of these studies is to produce environmental reports that have been agreed with the Environment Agency and Natural England such that in the event of a drought, they are readily available for refreshing based on the prevailing drought situation at that time. The environmental studies consider all potentially affected habitats and species including, but not limited to, SACs, SPAs and Ramsar features as well as any Site of Special Scientific Interest (SSSI) or species/habitats of principal importance for the conservation of biodiversity in England (identified in the Natural Environment and Rural Communities (NERC) Act 2006 Section 41). The reports also include Environmental Monitoring Plan (EMP) recommendations for each drought permit/order site. These environmental studies, undertaken outside of an actual drought event, are intended to be used as the basis for the EAR to be prepared in support of a specific drought permit / order application, should the need arise.

Following publication of the 2013 Drought Plan, a further assessment of potential impacts on designated sites in proximity to the drought permit/order sites was undertaken in consultation with Natural England[26]. This screening assessment identified and agreed those designated sites that may be impacted during drought permit/order implementation. Those sites identified as potentially impacted have been included for full assessment in the EARs drafted in support of the 2016 Drought Plan. Information from the assessments has been used to inform the HRA.

2.5 REVIEW OF POTENTIAL IN-COMBINATION EFFECTS

Article 6(3) of the Habitats Directive requires an Appropriate Assessment of *'Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives'.*

The review has therefore considered the in-combination effects of the drought options in the Thames Water draft DP, and the in-combination effects of the draft DP and a number of plans and projects, that could have an impact on the European sites identified within this HRA of the draft DP. The following plans and projects have been considered in the cumulatives effects assessment:

- Inter-option effects within the Thames Water DP
- Thames Water WRMP14
- Other water company WRMPs and DPs:
    - Affinity Water Central and Southeast

[26] Consultation of the potential impacts of the scheme on conservation objectives (received 20 March 2014) was undertaken with Natural England on 12 April 2016.

  - Anglian Water
  - Bristol Water
  - Essex and Suffolk Water
  - Severn Trent
  - South East Water
  - Southern Water
  - Sutton and East Surrey Water
  - Wessex Water
- Thames River Basin Management Plan
- Environment Agency National Drought Action Plan
- Environment Agency River Thames Scheme
- Environment Agency Oxford Flood Alleviation Scheme
- Environment Agency Abingdon Flood Alleviation Scheme
- Canal and Rivers Trust Putting Water into Waterways Water Resources Strategy 2015-2020

The assessment has used all publicly available information. It should also be noted that the water companies are at different stages of updating their WRMPs and DPs and therefore further updates may be required to the HRA cumulative assessment as these become available between the draft and final submissions.

3 HRA FINDINGS FOR DROUGHT OPTIONS

3.1 POTENTIAL EFFECTS OF DROUGHT OPTIONS

The HRA of the draft DP 2016 screened all of the drought options in each of Thames Water's WRZs. A total of 61 options (demand side, supply side and supply side drought permit/order options) were screened, with 26 of these options identified as being within 10km of a European site or where a source receptor pathway beyond 10km could occur. This provided an indication of the schemes that may be likely to have a significant effect on a European site(s). The HRA screening matrix for this assessment is presented in **Tables 3.1-3.3**. As described in **Section 2**, an assessment of potential impacts on designated sites in proximity to the drought permit/order sites that were included in the 2013 DP was undertaken in consultation with Natural England. This screening assessment identified and agreed those designated sites that may be impacted during drought permit/order implementation, and this information was used to inform the HRA in 2013 and this update. The screening work completed in 2013 and for this update confirms the following options as not being within 10km of a European site or where a source receptor pathway beyond this distance could occur: Thames Gateway Water Treatment Works; Sundridge 1; Sundridge 2; Crayford; Horton Kirby (Aquifer Storage & Recovery); Eynsford; Wansunt; Increase in M2 annual licence; Waddon; Bibury; Ogbourne emergency boreholes; Oxford Canal – Banbury; Sor Brook; Ogbourne; Compton 1; Compton 2; Pangbourne; Playhatch; and Albury.

Potential mitigation measures available were taken into account in the screening process, during both 2013 and this update. Effects in combination with other drought options within Thames Water's draft DP were assessed in the screening process and are documented in the matrix.

The tables show that the majority of options within Thames Water's draft DP 2016 are not considered likely to have significant adverse effects on the qualifying features of European sites. The exception to this is the West Berkshire Groundwater Scheme (WBGWS). The WBGWS is not a drought permit option but a well-established strategic scheme for the London WRZ owned by the Environment Agency. It is operated in accordance with an Environment Agency/Thames Water operating agreement and its use is triggered when London reservoir storage reaches the Level 2 on the Lower Thames Control Diagram. The Environment Agency identified avoidance and mitigation measures to be put in place to avoid the scheme affecting the integrity of European sites. These measures have now been put in place. Completion of the licence application is still required and alternative drought options should be used by Thames Water until this is the case.

Table 3.1 Screening of Demand Side Drought Options for Impacts on European Sites

Option	Likely Significant Effect and Potential for Alteration of Measure to Avoid Effects?	Further HRA Assessment Required?
Media /water efficiency campaign	None – media/water efficiency campaign includes increased water efficiency messages via increased customer communications. No impacts on designated sites are anticipated, other than to acknowledge that decreased consumer demand will have a net positive effect in combination with existing abstraction and/or drought option sites that have the potential to impact European sites due to reduced pressure on water resources and reduced abstraction at source.	No
Leakage reduction	None - it is envisaged that leakage detection and repair schemes will largely be undertaken primarily in urban areas. No impacts on designated sites are anticipated, other than to acknowledge that decreased consumer demand will have a net positive effect in combination with existing abstraction and/or drought option sites that have the potential to impact European sites due to reduced pressure on water resources and reduced abstraction at source.	No
Sprinkler and unattended hose pipe ban	None – a sprinkler ban, or any restrictions on consumer water use are demand management measures and as such, are not anticipated to have impacts on European sites. It is acknowledged that decreased consumer demand will have a net positive effect in combination with existing abstraction and/or drought option sites that have the potential to impact European sites, due to reduced pressure on water resources and reduced abstraction at source.	No
Temporary use ban	None – a hose pipe ban, or any restrictions on consumer water use are demand management measures and as such, are not anticipated to have impacts on European sites. It is acknowledged that decreased consumer demand will have a net positive effect in combination with existing abstraction and/or drought option sites that have the potential to impact European sites, due to reduced pressure on water resources and reduced abstraction at source.	No
Drought Order to ban Non-Essential Use	None – a non-essential use ban and its components are demand management measures and as such are not anticipated to have impacts on European sites. It is acknowledged that decreased consumer demand will have a net positive effect in combination with existing abstraction and/or drought option sites that have the potential to impact European sites due to reduced pressure on water resources and reduced abstraction at source.	No
Emergency Drought Order	None – an emergency drought order includes extreme demand management measures and as such are not anticipated to have impacts on European sites. It is acknowledged that decreased consumer demand will have a net positive effect in combination with existing abstraction and/or drought option sites that have the potential to impact European sites due to reduced pressure on water resources and reduced abstraction at source.	No

Table 3.2 Screening of Supply Side Drought Options for Impacts on European Sites

Option	European Site[27]	Qualifying features	Potential for effects on qualifying features?	Is scheme likely to have a significant effect on European site(s) alone?	Effect in combination with existing consents?	Effect in combination with other drought options?
North London Artificial Recharge Scheme	Epping Forest SAC (3km from the nearest borehole)	**Primary features** **9120 Atlantic acidophilous beech forests with *Ilex* and sometimes also *Taxus* in the shrublayer (*Quercion robori-petraeae* or *Ilici-Fagenion*)** - Epping Forest represents Atlantic acidophilous beech forests in the north-eastern part of the habitat's UK range. Although the epiphytes at this site have declined, largely as a result of air pollution, it remains important for a range of rare species, including the moss *Zygodon forsteri*. The long history of pollarding, and resultant large number of veteran trees, ensures that the site is also rich in fungi and dead-wood invertebrates. **1083 Stag beetle *Lucanus cervus*** Epping Forest is a large woodland area in which records of stag beetle *Lucanus cervus* are widespread and frequent; the site straddles the Essex and east London population centres. Epping Forest is a very important site for fauna associated with decaying timber, and supports many Red Data Book and Nationally Scarce invertebrate species. **Qualifying features** **4010 Northern Atlantic wet heaths with *Erica tetralix*** **4030 European dry heaths**	Construction There is no construction phase associated with this drought option. Operation The Epping Forest SAC Review of Consents Stage 1 and 2 concluded that the only designated feature of the SAC potentially sensitive to the impacts of abstraction is Northern Atlantic wet heaths. The Review concluded that this feature is not hydrologically connected with the boreholes that would be utilised under a drought order and therefore no impacts of this abstraction on the designated site were identified, either alone or in combination with other licences or consents. No LSEs are anticipated from the construction or operation of the NLARS drought option on the Epping Forest SAC, either alone, or in combination with other licences and consents.	No	No	No

[27] The distances given are to the nearest element of each scheme.

Option	European Site[27]	Qualifying features	Potential for effects on qualifying features?	Is scheme likely to have a significant effect on European site(s) alone?	Effect in combination with existing consents?	Effect in combination with other drought options?
	Lee Valley SPA and Ramsar (1km from the nearest borehole)	**Article 4.1** Over winter: • Bittern *Botaurus stellaris*, 6 individuals representing at least 6.0% of the wintering population in Great Britain (5 year peak mean, 1992/3-1995/6) **Article 4.2** Over winter: • Gadwall *Anas strepera*, 515 individuals representing at least 1.7% of the wintering Northwestern Europe population (5 year peak mean 1991/2 - 1995/6) • Shoveler *Anas clypeata*, 748 individuals representing at least 1.9% of the wintering Northwestern/Central Europe population (5 year peak mean 1991/2 - 1995/6) **Ramsar Criterion 2** The site supports the nationally scarce whorled water-milfoil (*Myriophyllum verticillatum*) and rare invertebrate *Micronecta minutissima* (a water boat-man). **Ramsar Criterion 6** Site supports Northern shoveler and gadwall.	Construction There is no construction phase associated with this drought option. Operation The option operates from the confined Chalk aquifer. The SPA and Ramsar site consists of artificial bunded reservoirs which are supplied with water from the River Lee. There is no evidence to suggest hydrological connectivity between the reservoirs and aquifers and it is therefore highly unlikely that the drought order would impact on the designated features of either the SPA or the Ramsar. No LSEs are anticipated from the construction or operation of the NLARS drought option on the Lee Valley SPA or Lee Valley Ramsar, either alone, or in combination with other licences and consents.	No	No	No
Hoddesdon Transfer Scheme (River Lee Flow Augmentation)	Lee Valley SPA and Ramsar (at site)	**Article 4.1** Over winter: • Bittern *Botaurus stellaris*, 6 individuals representing at least 6.0% of the wintering population in Great Britain (5 year peak mean, 1992/3-1995/6) **Article 4.2** Over winter: • Gadwall *Anas strepera*, 515 individuals representing at least 1.7% of the wintering Northwestern Europe population (5 year peak mean 1991/2 - 1995/6) • Shoveler *Anas clypeata*, 748 individuals representing at least 1.9% of the wintering Northwestern/Central Europe population (5 year peak mean 1991/2 - 1995/6) **Ramsar Criterion 2** The site supports the nationally scarce whorled water-milfoil (*Myriophyllum verticillatum*) and rare invertebrate *Micronecta minutissima* (a water boat-man). **Ramsar Criterion 6** Site supports Northern shoveler and gadwall	Construction There is no construction phase associated with this drought option. Operation The drought option involves transferring flow from Deephams STW catchment to Rye Meads STW catchment. The transfer increases the volume of treated water discharged into the River Lee diversion channel augmenting the river flow and enabling greater abstraction into the Lee Valley Reservoirs downstream. The drought option will operate within the terms of the existing discharge consent for Rye Meads STW and the existing abstraction licence for the subsequent abstraction. The Rye Meads STW discharge consent was reviewed as part of the Review of Consents. Stage 2 of the Review of Consents concluded that this discharge could not be concluded not to have adverse impacts on the SPA/Ramsar (Rye Meads unit), due to water quality impacts. However, further assessment as part of Stage 3 concluded no adverse impacts on the SPA/Ramsar and the consent was affirmed. This drought option therefore operates within the terms of the existing discharge permit. No LSEs are anticipated from the construction or operation of the Hoddesdon Transfer Scheme drought option on the Lee Valley SPA and Ramsar are anticipated, either alone or in combination with other licences or consents.	No	No	No
	Wormley-Hoddesdon park Woods SAC (3.5km)	**Primary features** **9160 Sub-Atlantic and medio-European oak or oak-hornbeam forests of the Carpinion betuli** Large stands of almost pure hornbeam	Construction There is no construction phase associated with this drought option. Operation As this habitat is unlikely to be affected by changes in water levels and flows in the	No	No	No

Option	European Site[27]	Qualifying features	Potential for effects on qualifying features?	Is scheme likely to have a significant effect on European site(s) alone?	Effect in combination with existing consents?	Effect in combination with other drought options?
		Carpinus betulus (former coppice), with sessile oak *Quercus petraea* standards.	River Lee diversion channel and Lee Valley Reservoirs, and no abstractions are required from groundwater sources, LSEs during operation are considered unlikely. No LSEs are anticipated from the construction or operation of the Hoddesdon Transfer Scheme drought option on the Wormley-Hoddesdonpark Woods SAC, either alone or in combination with other licences or consents			
Chingford Artificial Recharge Scheme (CHARS)	Epping Forest SAC (1.7km from the nearest borehole)	**Primary features** **9120 Atlantic acidophilous beech forests with *Ilex* and sometimes also *Taxus* in the shrublayer (*Quercion robori-petraeae* or *Ilici-Fagenion*)** - Epping Forest represents Atlantic acidophilous beech forests in the north-eastern part of the habitat's UK range. Although the epiphytes at this site have declined, largely as a result of air pollution, it remains important for a range of rare species, including the moss *Zygodon forsteri*. The long history of pollarding, and resultant large number of veteran trees, ensures that the site is also rich in fungi and dead-wood invertebrates. **1083 Stag beetle *Lucanus cervus*** Epping Forest is a large woodland area in which records of stag beetle *Lucanus cervus* are widespread and frequent; the site straddles the Essex and east London population centres. Epping Forest is a very important site for fauna associated with decaying timber, and supports many Red Data Book and Nationally Scarce invertebrate species. **Qualifying features** **4010 Northern Atlantic wet heaths with *Erica tetralix*** **4030 European dry heaths**	Construction There is no construction phase associated with this drought option. Operations The Epping Forest SAC Review of Consents Stage 1 and 2 concluded the Northern Atlantic wet heaths habitat is the only designated feature of the site which is potentially sensitive to the impacts of abstraction. The Review concluded that this abstraction licence is not in hydrological continuity with the wet heaths habitat, therefore no impacts of this abstraction on the designated site were identified, either alone or in combination with other licences or consents. No LSEs are anticipated from the construction or operation of the CHARS drought option on the Epping Forest SAC, either alone, or in combination with other licences and consents.	No	No	No
	Lee Valley SPA and Ramsar (8.4km from the nearest borehole)	**Article 4.1** Over winter: • Bittern *Botaurus stellaris*, 6 individuals representing at least 6.0% of the wintering population in Great Britain (5 year peak mean, 1992/3-1995/6) **Article 4.2** Over winter: • Gadwall *Anas strepera*, 515 individuals representing at least 1.7% of the wintering Northwestern Europe population (5 year peak mean 1991/2 - 1995/6) • Shoveler *Anas clypeata*, 748 individuals representing at least 1.9% of the wintering Northwestern/Central Europe population (5 year peak mean 1991/2 - 1995/6) **Ramsar Criterion 2** The site supports the nationally scarce whorled water-milfoil (*Myriophyllum verticillatum*) and rare invertebrate *Micronecta minutissima* (a water boat-	Construction There is no construction phase associated with this drought option. Operation Operation of this drought option would be in accordance with the existing abstraction licence. The SPA and Ramsar site consists of artificial bunded reservoirs which are supplied with water from the River Lee. There is no evidence to suggest hydrological connectivity between the reservoirs and aquifers and it is therefore highly unlikely that the drought order would impact on the designated features of either the SPA or the Ramsar. No LSEs are anticipated from the construction or operation of the CHARS drought option on the Lee Valley SPA and Ramsar, either alone, or in combination with other licences and consents.	No	No	No

Option	European Site[27]	Qualifying features	Potential for effects on qualifying features?	Is scheme likely to have a significant effect on European site(s) alone?	Effect in combination with existing consents?	Effect in combination with other drought options?
		man). **Ramsar Criterion 6** Site supports Northern shoveler and gadwall				
Reduction in lowest residual flow on the LTCD from 300Ml/d to 200Ml/d	South West London Water bodies SPA and Ramsar (operationally direct link)	**Article 4.2** *Overwinter:* • Gadwall *Anas strepera*, 786 individuals representing at least 2.6% of the wintering Northwestern Europe population (5 year peak mean 1991/2 - 1995/6) • Shoveler *Anas clypeata*, 1,075 individuals representing at least 2.7% of the wintering Northwestern/Central Europe population (5 year peak mean 1991/2 - 1995/6). **Ramsar Criterion 6** Supports species/populations occurring at levels of international importance; Northern shoveler (2.6% of GB population in spring) and gadwall (2.8% of GB population over winter).	Construction There is no construction phase associated with this drought option. Operation The drought option would allow greater abstraction from the River Thames via the Lower Thames intakes, resulting in reduction of the rate of drawdown in the Thames Valley storage reservoir system (including those reservoirs designated as part of the SPA and Ramsar). The scheme will thus contribute to maintaining water levels in South West London Reservoirs over the winter which could have a minor benefit on the overwintering bird population, however this is unlikely to be significant and has not been considered further. Potentially shorter duration of drawdown, or a less extensive drawdown than might have occurred without the drought option in the summer months is unlikely to significantly affect the sites' qualifying features. No LSEs are anticipated during construction and operation of the reduction in lowest residual flow on the LTCD drought option on the Southwest London Waterbodies SPA and Ramsar, either alone, or in combination with other licences and consents.	No	No	No
	Windsor Forest and Great Park SAC (1km from the River Thames)	**Primary features** **9190 Old acidophilous oak woods with *Quercus robur* on sandy plains** Largest number of veteran oaks *Quercus* spp. in Britain (and probably in Europe). Of importance for its range and diversity of saproxylic invertebrates, including many rare species. **1079 Violet click beetle *Limoniscus violaceus*** The site is thought to support the largest of the known populations of this species in the UK. **Qualifying features** **9120 Atlantic acidophilous beech forests with *Ilex* and sometimes also *Taxus* in the shrublayer (*Quercion robori-petraeae* or *Ilici-Fagenion*).**	Construction There is no construction phase associated with this drought option. Operation As the qualifying features are unlikely to be affected by changes in water levels and flows in the River Thames and Thames Valley storage reservoir system, and no abstractions are required from groundwater sources, LSEs during operation are considered unlikely. No LSEs are anticipated from the construction or operation of the reduction in lowest residual flow on the LTCD drought option on the Windsor Forest and Great Park SAC, either alone, or in combination with other licences and consents.	No	No	No
	Richmond Park SAC (1km from the River Thames)	**Primary features** **1083 Stag beetle *Lucanus cervus*** Large number of ancient trees with decaying timber support stag beetle population.	Construction There is no construction phase associated with this drought option. Operation The designated feature of the SAC is not water dependent therefore LSEs during operation are considered unlikely. No LSEs are anticipated during the construction and operation of the reduction in lowest residual flow on the LTCD drought option on the Richmond Park SAC, either alone, or in combination with other licences and consents.	No	No	No
Earlier reduction in residual flow on the LTCD	South West London Water bodies SPA, Ramsar (operationally direct link)	**Article 4.2** *Overwinter:* • Gadwall *Anas strepera*, 786 individuals representing at least 2.6% of the wintering Northwestern Europe population (5 year peak mean 1991/2 - 1995/6) • Shoveler *Anas clypeata*, 1,075 individuals representing at least 2.7% of the	Construction There is no construction phase associated with this drought option. Operation The drought option would allow greater flexibility in abstraction capability from the River Thames via the Lower Thames intakes, resulting in reduction of the rate of drawdown in the Thames Valley storage reservoir system (including those reservoirs designated as part of the SPA).	No	No	No

Option	European Site[27]	Qualifying features	Potential for effects on qualifying features?	Is scheme likely to have a significant effect on European site(s) alone?	Effect in combination with existing consents?	Effect in combination with other drought options?
		wintering Northwestern/Central Europe population (5 year peak mean 1991/2 - 1995/6). **Ramsar Criterion 6** Supports species/populations occurring at levels of international importance; Northern shoveler (2.6% of GB population in spring) and gadwall (2.8% of GB population over winter).	The scheme therefore has the potential to contribute to maintaining water levels in South West London Reservoirs over the winter which will benefit overwintering birds. Potentially shorter duration of drawdown, or a less extensive drawdown than might have occurred without the drought option in the summer months is unlikely to significantly affect the sites' qualifying features. No LSEs are anticipated from the construction or operation of the earlier reduction in residual flow on the LTCD drought option on the Southwest London Waterbodies SPA and Ramsar, either alone, or in combination with other licences and consents.			
	Windsor Forest and Great Park SAC (1km from the River Thames)	**Primary features** **9190 Old acidophilous oak woods with *Quercus robur* on sandy plains** Largest number of veteran oaks *Quercus* spp. in Britain (and probably in Europe). Of importance for its range and diversity of saproxylic invertebrates, including many rare spec **1079 Violet click beetle *Limoniscus violaceus*** The site is thought to support the largest of the known populations of this species in the UK. **Qualifying features** **9120 Atlantic acidophilous beech forests with *Ilex* and sometimes also *Taxus* in the shrublayer (*Quercion robori-petraeae* or *Ilici-Fagenion*).**	Construction There is no construction phase associated with this drought option. Operation The designated features of the SAC are not water dependant and therefore LSEs during operation are considered unlikely. No LSEs are anticipated from the construction or operation of the earlier reduction in residual flow on the LTCD drought option on the Windsor Forest and Great Park SAC, either alone, or in combination with other licences and consents.	No	No	No
	Richmond Park SAC (1km from the River Thames)	**Primary features** **1083 Stag beetle *Lucanus cervus*** Richmond Park has a large number of ancient trees with decaying timber. It is at the heart of the south London centre of distribution for stag beetle *Lucanus cervus*, and is a site of national importance for the conservation of the fauna of invertebrates associated with the decaying timber of ancient trees.	Construction There is no construction phase associated with this drought option. Operation The designated feature of the SAC is not water dependant and therefore LSEs during operation are considered unlikely. No LSEs are anticipated from the construction or operation of the earlier reduction in residual flow on the LTCD drought option on the Richmond Park SAC, either alone, or in combination with other licences and consents.	No	No	No
East London Resource Development (ELRED)	Epping Forest SAC (8.2km)	**Primary features** **9120 Atlantic acidophilous beech forests with *Ilex* and sometimes also *Taxus* in the shrublayer (*Quercion robori-petraeae* or Ilici-Fagenion)** - Epping Forest represents Atlantic acidophilous beech forests in the north-eastern part of the habitat's UK range. Although the epiphytes at this site have declined, largely as a result of air pollution, it remains important for a range of rare species, including the moss *Zygodon forsteri*. The long history of pollarding, and resultant large number of veteran trees, ensures that the site is also rich in fungi and dead-wood invertebrates. **1083 Stag beetle *Lucanus cervus*** Epping Forest is a large woodland area in which records of stag beetle *Lucanus cervus* are widespread and frequent; the site straddles the Essex and east London population centres. Epping Forest is a very	Construction There is no construction phase associated with this drought option. Operation An Environmental Report was prepared in 2008 in support of the application for renewal of the existing licence, and concluded that owing to the generally confined nature of the Chalk aquifer being abstracted by the ELRED source, there is no significant interaction between the Chalk and the surface water bodies, including the River Lee and the River Roding. No impacts on European sites were identified. In addition, the operation of this drought option would be in accordance with the existing abstraction licence. The existing abstraction licence was granted and the Operating Agreement prepared subsequent to the Review of Consents process, and therefore will have been screened for potential impacts to a European site. No impacts were identified as part of this process, therefore LSEs during operation are considered unlikely. No LSEs are anticipated from the construction or operation of the ELRED drought option on the Epping Forest SAC, either alone, or in combination with other licences and consents.	No	No	No

Option	European Site[27]	Qualifying features	Potential for effects on qualifying features?	Is scheme likely to have a significant effect on European site(s) alone?	Effect in combination with existing consents?	Effect in combination with other drought options?
		important site for fauna associated with decaying timber, and supports many Red Data Book and Nationally Scarce invertebrate species. **<u>Qualifying features</u>** **4010 Northern Atlantic wet heaths with *Erica tetralix*** **4030 European dry heaths**				
	Lee Valley SPA and Ramsar (9.6km from the nearest borehole)	**<u>Article 4.1</u>** Over winter: • Bittern *Botaurus stellaris*, 6 individuals representing at least 6.0% of the wintering population in Great Britain (5 year peak mean, 1992/3-1995/6) **<u>Article 4.2</u>** Over winter: • Gadwall *Anas strepera*, 515 individuals representing at least 1.7% of the wintering Northwestern Europe population (5 year peak mean 1991/2 – 1995/6) • Shoveler *Anas clypeata*, 748 individuals representing at least 1.9% of the wintering Northwestern/Central Europe population (5 year peak mean 1991/2 – 1995/6) **Ramsar Criterion 2** The site supports the nationally scarce whorled water-milfoil (*Myriophyllum verticillatum*) and rare invertebrate *Micronecta minutissima* (a water boat-man). **Ramsar Criterion 6** Site supports Northern shoveler and gadwall	<u>Construction</u> There is no construction phase associated with this drought option. <u>Operation</u> The option operates from the confined Chalk aquifer. The SPA and Ramsar sites consist of artificial bunded reservoirs which are supplied with water from the River Lee. There is therefore unlikely to be any hydrological connectivity between the two. Operation of this drought option would be in accordance with the existing abstraction licence. The existing abstraction licence was granted and the Operating Agreement prepared subsequent to the Review of Consents process, and therefore will have been screened for potential impacts to a European site. No LSEs are anticipated from the construction or operation of the ELRED drought option on the Lee Valley SPA and Ramsar, either alone, or in combination with other licences and consents.	No	No	No
Stratford Box	Epping Forest SAC (3.4km)	**<u>Primary features</u>** **9120 Atlantic acidophilous beech forests with *Ilex* and sometimes also *Taxus* in the shrublayer (*Quercion robori-petraeae* or Ilici-Fagenion)** - Epping Forest represents Atlantic acidophilous beech forests in the north-eastern part of the habitat's UK range. Although the epiphytes at this site have declined, largely as a result of air pollution, it remains important for a range of rare species, including the moss *Zygodon forsteri*. The long history of pollarding, and resultant large number of veteran trees, ensures that the site is also rich in fungi and dead-wood invertebrates. **1083 Stag beetle *Lucanus cervus*** Epping Forest is a large woodland area in which records of stag beetle *Lucanus cervus* are widespread and frequent; the site straddles the Essex and east London population centres. Epping Forest is a very important site for fauna associated with decaying timber, and supports many Red	<u>Construction</u> There is no construction phase associated with this drought option. <u>Operation</u> An Environmental Report was prepared in 2008 in support of the application for the modification of the existing licence, and concluded that owing to the generally confined nature of the Chalk aquifer being abstracted by the Stratford Box source, there is no significant interaction between the Chalk and the surface water bodies, including the River Lee and the River Roding. No impacts on European sites were identified as part of this work. Operation of this drought option would be in accordance with the existing abstraction licence. The existing abstraction licence was granted and the Operating Agreement prepared subsequent to the Review of Consents process, and therefore will have been screened for potential impacts to a European site. As no potential impacts were identified as part of this process it has been assumed that the proposed drought plan would also not have any impacts on this site. No LSEs are anticipated from the construction or operation of the Stratford Box drought option on Epping Forest SAC, either alone, or in combination with other licences and consents.	No	No	No

Option	European Site[27]	Qualifying features	Potential for effects on qualifying features?	Is scheme likely to have a significant effect on European site(s) alone?	Effect in combination with existing consents?	Effect in combination with other drought options?
		Data Book and Nationally Scarce invertebrate species. **<u>Qualifying features</u>** **4010 Northern Atlantic wet heaths with *Erica tetralix*** **4030 European dry heaths**				
	Lee Valley SPA and Ramsar (4.4km)	**<u>Article 4.1</u>** Over winter: • Bittern *Botaurus stellaris*, 6 individuals representing at least 6.0% of the wintering population in Great Britain (5 year peak mean, 1992/3-1995/6) **<u>Article 4.2</u>** Over winter: • Gadwall *Anas strepera*, 515 individuals representing at least 1.7% of the wintering Northwestern Europe population (5 year peak mean 1991/2 - 1995/6) • Shoveler *Anas clypeata*, 748 individuals representing at least 1.9% of the wintering Northwestern/Central Europe population (5 year peak mean 1991/2 - 1995/6) **Ramsar Criterion 2** The site supports the nationally scarce whorled water-milfoil (*Myriophyllum verticillatum*) and rare invertebrate *Micronecta minutissima* (a water boat-man). **Ramsar Criterion 6** Site supports Northern shoveler and gadwall	<u>Construction</u> There is no construction phase associated with this drought option. <u>Operational</u> An Environmental Report was prepared in 2008 in support of the application for the modification of the existing licence, and concluded that owing to the generally confined nature of the Chalk aquifer being abstracted by the Stratford Box source, there is no significant interaction between the Chalk and the surface water bodies, including the River Lee and the River Roding. No impacts on European sites were identified as part of this work. Operation of this drought option would be in accordance with the existing abstraction licence. The existing abstraction licence was granted and the Operating Agreement prepared subsequent to the Review of Consents process, and therefore will have been screened for potential impacts to a European site. As no potential impacts were identified as part of this process it has been assumed that the proposed drought plan would also not have any impacts on this site. No LSEs are anticipated from the construction or operation of the Stratford Box drought option on the Lee Valley SPA and Ramsar, either alone, or in combination with other licences and consents.	No	No	No
Old Ford	Epping Forest SAC (4.4km)	**<u>Primary features</u>** **9120 Atlantic acidophilous beech forests with *Ilex* and sometimes also *Taxus* in the shrublayer (*Quercion robori-petraeae* or Ilici-Fagenion)** - Epping Forest represents Atlantic acidophilous beech forests in the north-eastern part of the habitat's UK range. Although the epiphytes at this site have declined, largely as a result of air pollution, it remains important for a range of rare species, including the moss *Zygodon forsteri*. The long history of pollarding, and resultant large number of veteran trees, ensures that the site is also rich in fungi and dead-wood invertebrates. **1083 Stag beetle *Lucanus cervus*** Epping Forest is a large woodland area in which records of stag beetle *Lucanus cervus* are widespread and frequent; the site straddles the Essex and east London population centres. Epping Forest is a very important site for fauna associated with decaying timber, and supports many Red Data Book and Nationally Scarce invertebrate species.	<u>Construction</u> There is no construction phase associated with this drought option. <u>Operation</u> An Environmental Report was prepared in 2008 in support of the application for the modification of the existing licence, and concluded that owing to the generally confined nature of the Chalk aquifer being abstracted by the Old Ford source, there is no significant interaction between the Chalk and the surface water bodies, including the River Lee and the River Roding. No impacts on European sites were identified as part of this work. Operation of this drought option would be in accordance with the existing abstraction licence. The Epping Forest SAC Review of Consents did not report any adverse impact of this licence on the SAC. No LSEs are anticipated from the construction or operation of the Old Ford drought option on the Epping Forest SAC, either alone, or in combination with other licences and consents.	No	No	No

Option	European Site[27]	Qualifying features	Potential for effects on qualifying features?	Is scheme likely to have a significant effect on European site(s) alone?	Effect in combination with existing consents?	Effect in combination with other drought options?
		Qualifying features **4010 Northern Atlantic wet heaths with *Erica tetralix*** **4030 European dry heaths**				
	Lee Valley SPA and Ramsar (4.1km)	**Article 4.1** Over winter: • Bittern *Botaurus stellaris*, 6 individuals representing at least 6.0% of the wintering population in Great Britain (5 year peak mean, 1992/3-1995/6) **Article 4.2** Over winter: • Gadwall *Anas strepera*, 515 individuals representing at least 1.7% of the wintering Northwestern Europe population (5 year peak mean 1991/2 - 1995/6) • Shoveler *Anas clypeata*, 748 individuals representing at least 1.9% of the wintering Northwestern/Central Europe population (5 year peak mean 1991/2 - 1995/6) **Ramsar Criterion 2** The site supports the nationally scarce whorled water-milfoil (*Myriophyllum verticillatum*) and rare invertebrate *Micronecta minutissima* (a water boat-man). **Ramsar Criterion 6** Site supports Northern shoveler and gadwall	Construction There is no construction phase associated with this drought option. Operation Operation of this drought option would be in accordance with the existing abstraction licence. An Environmental Report was prepared in 2008 in support of the application for the modification of the existing licence, and concluded that owing to the generally confined nature of the Chalk aquifer being abstracted by the Old Ford source, there is no significant interaction between the Chalk and the surface water bodies, including the River Lee and the River Roding. No impacts on European sites were identified. The option operates from the confined Chalk aquifer. The SPA and Ramsar site consists of artificial bunded reservoirs which are supplied with water from the River Lee. There is no evidence to suggest hydrological connectivity between the reservoirs and aquifers and it is therefore highly unlikely that the drought order would impact on the designated features of either the SPA or the Ramsar. No LSEs are anticipated from the construction or operation of the Old Ford drought option on the Lee Valley SPA and Ramsar, either alone, or in combination with other licences and consents.	No	No	No
West Berkshire Groundwater Scheme (WBGWS)	River Lambourn SAC (<2km to the nearest of wellfield)	**Primary features** **3260 Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation -** The Lambourn is an example of sub-type 1 in central southern England, a chalk stream discharging into the middle reaches of the Thames system. For part of its length it is a winterbourne, drying through the summer months. It is one of the least-modified rivers of this type, with a characteristic flora dominated by pond water-crowfoot *Ranunculus peltatus*. In the downstream perennial sections *R. peltatus* is replaced by stream water-crowfoot *R. penicillatus var. pseudofluitans*. 1163 Bullhead *Cottus gobio* - The Lambourn represents bullhead *Cottus gobio* populations inhabiting chalk streams in central southern England. Good water quality, coarse sediments and extensive beds of submerged plants again provide excellent habitat for the species**.** **Qualifying features** **1096 Brook lamprey *Lampetra planeri*** **1163 Bullhead *Cottus gobio*** **1355 Otter *Lutra lutra***	Construction Minor pipeline connections/repairs may be required. Operation The WBGWS comprises seven separate wellfields located in the Kennet and Pang Valleys, of which three (Lambourn, Shefford and Winterbourne) are located in the Lambourn catchment and have been identified as having the potential to impact the River Lambourn SAC. The Review of Consents for the River Lambourn SAC concluded that the prolonged operation of the WBGWS in the event of a significant drought has the potential to result in adverse environmental impact on the River Lambourn SAC. However, the Review of Consents also stated that the basis for the operation of the WBGWS could be modified to avoid this potential impact. A proposed solution (a sluice to allow offtake from the River Kennet to supply the SAC when the drought option is in use) has been agreed, though the licence is still outstanding. Once the licence is in place it is considered unlikely that the drought option would have a significant effect on the designated features of this site as water levels could be maintained more effectively during drought conditions. Subject to the modified operating agreement, it has been concluded that the WBGWS is unlikely to have a significant effect on the River Lambourn SAC. No LSEs are anticipated from the construction or operation of the WBGWS drought option on the Kennet and Lamborne Floodplain SAC, either alone, or in combination with other licences and consents.	No (Subject to modified operating agreement)	No (Subject to modified operating agreement)m)	No (Subject to modified operating agreement)m)
	Kennet and	**Primary features**	Construction	No	No	No

Option	European Site[27]	Qualifying features	Potential for effects on qualifying features?	Is scheme likely to have a significant effect on European site(s) alone?	Effect in combination with existing consents?	Effect in combination with other drought options?
	Lamborne Floodplain SAC (<2km to the nearest wellfield)	1016 Desmoulin`s whorl snail *Vertigo moulinsiana* - The cluster of sites selected in the Kennet and Lambourn valleys supports one of the most extensive known populations of Desmoulin's whorl snail *Vertigo moulinsiana* in the UK and is one of two sites representing the species in the south-western part of its range in the important chalk stream habitat. Integrity of the population is being maintained by taking measures, including habitat creation, to safeguard populations. The habitat occupied at this site differs from the Fenland sites in East Anglia in that it is predominantly reed sweet-grass *Glyceria maxima* swamp or tall sedges at the river margins, in ditches and in depressions in wet meadows.	Minor pipeline connections may be required as part of the construction phase of this drought option. Operation Operation of this drought option would be in accordance with the existing Operating Agreement and abstraction licence (which is held by the Environment Agency). The WBGWS augments river flows to support surface water abstractions at downstream points of demand, such as the River Thames, during severe drought. The WBGWS comprises seven separate wellfields located in the Kennet and Pang Valleys. The Review of Consents for the Kennet and Lamborne Floodplain SAC concluded that the potential operation of the WBGWS in a prolonged drought could lead to lowering of groundwater levels under the Thatcham Reedbeds, with the potential for adverse impact on the surface water regime on which the habitat assemblage in the Reedbeds is dependent. The Appropriate Assessment identified two measures to avoid or mitigate this impact. The first was the reduction of the Speen licence, which has been implemented by Thames Water (April 2015). The second was augmenting the groundwater supply to Thatcham Reedbeds[28]. Thames Water have now implemented the latter being in the form of sluice to allow a small offtake form the Kennet into the Kennet and Lambourn Floodplain SAC. Subject to the modified operating agreement, it has been concluded that the WBGWS is unlikely to have a significant effect on the Lambourne Floodplain SAC. No LSEs are anticipated from the construction or operation of the WBGWS drought option on the Kennet and Lamborne Floodplain SAC, either alone, or in combination with other licences and consents.	(Subject to modified operating agreement)	(Subject to modified operating agreement)	(Subject to modified operating agreement)

[28] Environment Agency (2008) Kennet and Lambourn Floodplain SAC – Habitats Directive Stage 4, Appendix 19 and Site Action Plan

Table 3.3 Screening of Supply Side Drought Permit/Order Options[29] for Impacts on European Sites

Option	European Site[30]	Qualifying features	Potential for effects on qualifying features?	Is scheme likely to have a significant effect on European site(s) alone?	Effect in combination with existing consents?	Effect in combination with other drought options?
London Water Resource Zone						
Lower Thames	South West London Water bodies SPA, Ramsar (operationally direct link)	**Article 4.2** *Overwinter:* • Gadwall *Anas strepera*, 786 individuals representing at least 2.6% of the wintering Northwestern Europe population (5 year peak mean 1991/2 - 1995/6) • Shoveler *Anas clypeata*, 1,075 individuals representing at least 2.7% of the wintering Northwestern/Central Europe population (5 year peak mean 1991/2 - 1995/6). **Ramsar Criterion 6** Supports species/populations occurring at levels of international importance; Northern shoveler (2.6% of GB population in spring) and gadwall (2.8% of GB population over winter).	Construction The Lower Thames Drought Permit would involve some construction works associated with the back-pumping element of the scheme (temporary pipework to pump water over weirs with associated generators). The location of the backpumping element of the scheme would approximately 3km distance from the SAC/Ramsar. It is assumed that the works would be carried out incorporating best practice construction methods and incorporating all appropriate mitigation measures for works in, or near water, in accordance with the Environment Agency Pollution Prevention Guidelines. There will be no loss of designated habitat due to the scheme as the construction footprint does not impinge on any European sites. Transport of materials and equipment during construction on site will require minimal general construction traffic. Transport will utilise the existing road network or the River Thames; the temporary increase in vehicle numbers required for the construction of the scheme is considered to be negligible. Operation The drought option would allow greater abstraction from the River Thames via the Lower Thames intakes, resulting in reduction of the rate of drawdown in the Thames Valley storage reservoir system (including those reservoirs designated as part of the SPA, Ramsar). Therefore, this option has the potential for minor beneficial effects on the SPA and Ramsar by reducing the rate of reservoir drawdown than would be experienced without the option. No LSEs are anticipated from the construction or operation of the Lower Thames drought option on the Southwest London Waterbodies SPA, Ramsar, either alone, or in combination with other licences and consents.	No	No	No
	Windsor Forest and Great Park SAC (1km from River Thames)	**Primary features** **9190 Old acidophilous oak woods with *Quercus robur* on sandy plains** Windsor represents old acidophilous oak woods in the south-eastern part of its UK range. It has the largest number of veteran oaks *Quercus* spp. in Britain (and probably in Europe), a consequence of its management as wood-pasture. It is of importance for its range and diversity of saproxylic invertebrates, including many rare species (e.g. the beetle *Lacon querceus*), some known in the UK only from this site, and has recently been recognised as having rich fungal assemblages. Windsor Forest and Great Park has been identified as of potential international importance for its saproxylic invertebrate fauna by the Council of Europe **1079 Violet click beetle *Limoniscus violaceus*** Violet click beetle *Limoniscus violaceus* was first recorded at Windsor Forest in 1937. The site is thought to support the largest of the known populations of this species in the UK. There is a large population of ancient trees on the site,	Construction The Lower Thames Drought Permit would involve some construction works associated with the back-pumping element of the scheme. The location of the backpumping element of the scheme would be at least 16km from the SAC and therefore at a sufficient distance that no LSEs on the qualifying features are anticipated during construction. Operation The designated features of the SAC are not dependent on specific flows or levels in the River Thames, therefore no LSEs of the drought option on the SAC are anticipated. No LSEs are anticipated from the construction or operation of the Lower Thames on the Windsor Forest and Great Park SAC, either alone, or in combination with other licences and consents.	No	No	No

[29] Environmental Assessment Reports (EARs) were prepared for drought permit/orderoptions in 2013. Following publication of the 2013 Drought Plan, a further assessment of potential impacts on designated sites in proximity to the drought permit/order sites was undertaken in consultation with Natural England. This screening assessment identified and agreed those designated sites that may be impacted during drought permit/order implementation. Those sites identified as potentially impacted have been included for full assessment in the EARs drafted in support of the 2016 Drought Plan.
[30] The distances given are to the nearest element of each scheme.

Option	European Site[30]	Qualifying features	Potential for effects on qualifying features?	Is scheme likely to have a significant effect on European site(s) alone?	Effect in combination with existing consents?	Effect in combination with other drought options?
		which, combined with the historical continuity of woodland cover, has resulted in Windsor Forest being listed as the most important site in the UK for fauna associated with decaying timber on ancient trees. The site was also identified as of potential international importance for its saproxylic invertebrate fauna by the Council of Europe. **<u>Qualifying features</u>** **9120 Atlantic acidophilous beech forests with *Ilex* and sometimes also *Taxus* in the shrublayer (*Quercion robori-petraeae* or *Ilici-Fagenion*).**				
	Richmond Park SAC (1km from River Thames)	**<u>Primary features</u>** **1083 Stag beetle *Lucanus cervus*** Richmond Park has a large number of ancient trees with decaying timber. It is at the heart of the south London centre of distribution for stag beetle *Lucanus cervus*, and is a site of national importance for the conservation of the fauna of invertebrates associated with the decaying timber of ancient trees.	<u>Construction</u> The Lower Thames Drought Permit would involve some construction works associated with the back-pumping element of the scheme. This will not require landtake from within SAC boundaries. Backpumping would be required over Molesey weir (4.4km from the SAC) and possibly Teddington weir (2km from the SAC). It would require installation of barges with fish friendly pumps and temporary pipework to get water over the weirs. There would also be a requirement to install a temporary power source to service the pumps. This could be done with mobile temporary generators and would require installation at an appropriate location with noise mitigation. The river reach between Molesey weir and Teddington weir is 1.2km from the SAC at its closest point. In light of the distances involved LSEs are not anticipated. <u>Operation</u> The designated feature of the SAC is not dependent on specific flows or levels in the River Thames, and therefore no impacts of the drought option on the SAC are anticipated. No LSEs are anticipated from the construction or operation of the Lower Thames drought option on the Richmond Park SAC, either alone, or in combination with other licences and consents.	No	No	No
Swindon Oxford Water Resource Zone						
Baunton 1	North Meadow and Clattinger Farm SAC (11km)	**<u>Primary features</u>** **6510 Lowland hay meadows (*Alopecurus pratensis, Sanguisorba officinalis*)** This site represents an exceptional survival of the traditional pattern of management for hay meadows with unique vegetation communities. The site also contains a very high proportion of fritillary *Fritillaria meleagris* (>90% of the surviving UK population), a rare species highly characteristic of damp lowland meadows.	<u>Construction</u> There is no construction phase associated with this drought option. <u>Operation</u> The 2016 Baunton 1 Environmental Assessment Report (EAR) confirms the Baunton abstraction is hydrogeologically isolated from this SAC. No LSEs are anticipated from the construction or operation of the Baunton 1 drought option on the North Meadow and Clattinger Farm SAC, either alone, or in combination with other licences and consents.	No	No	No
Baunton 2	North Meadow & Clattinger Farm SAC (11km)	**<u>Primary features</u>** **6510 Lowland hay meadows (*Alopecurus pratensis, Sanguisorba officinalis*)** This site represents an exceptional survival of the traditional pattern of management for hay meadows with unique vegetation communities. The site also contains a very high proportion of fritillary *Fritillaria meleagris* (>90% of the surviving UK population), a rare species highly characteristic of damp lowland meadows.	<u>Construction</u> There is no construction phase associated with this drought option. <u>Operation</u> The scheme involves increased abstraction from the existing boreholes. The hydro-ecology of North Meadow and Clattinger Farm SAC and the impact of licensed abstractions were the subject of detailed study as part of Stage 3 Review of Consents. The study considered the impact of abstractions on flows in the River Thames and River Churn. This concluded that the Baunton abstraction is hydrogeologically isolated from this SAC. No LSEs are anticipated from the construction or operation of the Baunton 2 drought option on the North Meadow and Clattinger Farm SAC, either alone, or in combination with other licences and consents.	No	No	No

Option	European Site[30]	Qualifying features	Potential for effects on qualifying features?	Is scheme likely to have a significant effect on European site(s) alone?	Effect in combination with existing consents?	Effect in combination with other drought options?
Latton	North Meadow & Clattinger Farm SAC (2km)	**Primary features** **6510 Lowland hay meadows (*Alopecurus pratensis, Sanguisorba officinalis*)** This site represents an exceptional survival of the traditional pattern of management for hay meadows with unique vegetation communities. The site also contains a very high proportion of snake's head fritillary *Fritillaria meleagris* (>90% of the surviving UK population), a rare species highly characteristic of damp lowland meadows.	Construction There is no construction phase associated with this drought option. Operation The scheme would increase abstraction from the aquifer. However, work done to support the EAR concludes that the Latton abstraction is hydrogeologically isolated from this SAC. No LSEs are anticipated from the construction or operation of the Latton drought option on the North Meadow and Clattinger Farm SAC, either alone, or in combination with other licences and consents.	No	No	No
Meysey Hampton	North Meadow & Clattinger Farm SAC (4.5km)	**Primary features** **6510 Lowland hay meadows (*Alopecurus pratensis, Sanguisorba officinalis*)** This site represents an exceptional survival of the traditional pattern of management for hay meadows with unique vegetation communities. The site also contains a very high proportion of fritillary *Fritillaria meleagris* (>90% of the surviving UK population), a rare species highly characteristic of damp lowland meadows.	Construction There is no construction phase associated with this drought option. Operation The scheme involves the increased abstraction from existing boreholes. The 2016 Meysey Hampton EAR confirms that there are no European sites within the zone of influence of the scheme (i.e. the area over which the scheme will influence groundwater or surface water). No LSEs are anticipated from the construction or operation of the Meysey Hampton drought option on the North Meadow and Clattinger Farm SAC, either alone, or in combination with other licences and consents.	No	No	No
Farmoor	Oxford Meadows SAC (5.3km)	**Primary features** **6510 Lowland hay meadows (*Alopecurus pratensis, Sanguisorba officinalis*)** Hay meadows with unique vegetation communities reflecting the influence of long-term grazing and hay-cutting on lowland hay meadows. **1614 Creeping Marshwort *Apium repens*** Port Meadow is part of the wider Oxford Meadows site and is one of only two known sites, for this species, in the UK.	Construction Minor construction works may be required to bring the option online as a drought source. Works will include temporary electric submersible pumps powered from the existing permanent Environment Agency electricity supply kiosks, adjacent to the locks. Two pumps would be required at each of the four locks (Iffley, Osney, Godstow and King's Weir). There will be no loss of designated habitat due to the scheme as the construction footprint does not impinge on any designated sites, and given the distance between Oxford Meadows SAC and the four locks (Iffley, Osney, Godstow and King's Weir) (>5km); impacts from noise or dust are unlikely. Transport of materials and equipment during construction on site will require minimal general construction traffic. Transport will utilise the existing road network. The temporary increase in vehicle numbers required for the construction of the scheme is considered to be negligible. Therefore, the construction phase of this scheme is not likely to have significant effects on the qualifying features of any European sites. Operation A hydrological assessment for the scheme has identified that the River Thames will be subject to reductions in velocity, whilst the distributaries (including the Oxford Watercourses) will be subject to a reduction in velocity, or level and velocity, due to lower flows. The lowland meadows are reliant on winter flooding, although many parts of the site are not considered to be significantly hydrologically linked with the River Thames – water levels are primarily linked to groundwater levels. The proposed scheme will impact low flows between ~ May and December, and not flood flows overwinter. Therefore no significant effects on the qualifying features are anticipated. No LSEs are anticipated from the construction or operation of the Farmoor drought option on the Oxford Meadows SAC, either alone, or in combination with other licences and consents.	No	No	No
	Little Wittenham SAC (>10km however, adjacent to potentially impacted reach of River Thames)	**Primary features** **1166 Great crested newt *Triturus cristatus*** Two main ponds set within mixed woodland that supports large numbers of this species.	Construction Minor construction works may be required to bring the option online as a drought source. However, the location of the construction work would be >10km distance from the SAC and therefore at a sufficient distance that no impacts on the qualifying features are anticipated during construction.	No	No	No

Option	European Site[30]	Qualifying features	Potential for effects on qualifying features?	Is scheme likely to have a significant effect on European site(s) alone?	Effect in combination with existing consents?	Effect in combination with other drought options?
			Operation The 2016 Farmoor EAR identifies that the Little Wittenham SAC is not likely to be fed by the River Thames, with springs and other surface sources almost certainly feeding into the site, thus the drought permit is not considered likely to impact on the SAC. No LSEs are anticipated from the construction or operation of the Farmoor drought option on the Little Wittenham SAC, either alone, or in combination with other licences and consents.			
	Hartslock Wood SAC (>10km however, adjacent to potentially impacted reach of River Thames)	**Primary features** **6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*)** Hosts the priority habitat type "orchid rich sites". The steep slopes of this site on the chalk of the Chilterns comprise a mosaic of chalk grassland, chalk scrub and broadleaved woodland. The site supports one of only three UK populations of monkey orchid *Orchis simia*, a nationally rare Red Data Book species. **91J0 Taxus baccata woods of the British Isles** Open patches show a rich flora including local species such as southern wood-rush *Luzula forsteri*, wood barley *Hordelymus europaeus* and narrow-lipped helleborine *Epipactis leptochila*.	Construction Minor construction works may be required to bring the option online as a drought source. However, the location of the construction work would be >10km distance from the SAC and therefore at a sufficient distance that no impacts on the qualifying features are anticipated during construction. Operation The designated features of the SAC are not likely to be dependent on specific flows or levels in the River Thames, and therefore no impacts of the drought option on the SAC are anticipated. No LSEs are anticipated from the construction or operation of the Farmoor drought option on the Hartslock Wood SAC, either alone, or in combination with other licences and consents.	No	No	No
	Cothill Fen SAC (6km)	**Primary features** **7230 Alkaline fens** One of the largest surviving examples of alkaline fen vegetation in central England, a region where fen vegetation is rare. The M13 *Schoenus nigricans – Juncus subnodulosus* vegetation found here occurs under a wide range of hydrological conditions, with frequent bottle sedge *Carex rostrata*, grass-of-Parnassus *Parnassia palustris*, common butterwort *Pinguicula vulgaris* and marsh helleborine *Epipactis palustris*. **Qualifying features** 91E0 Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*)	Construction Minor construction works may be required to bring the option online as a drought source. Works will include temporary electric submersible pumps powered from the existing permanent Environment Agency electricity supply kiosks, adjacent to the locks. Two pumps would be required at each of the four locks (Iffley, Osney, Godstow and King's Weir). There will be no loss of designated habitat due to the scheme as the construction footprint does not impinge on any designated sites, and given the distance between Cothill Fen SAC and the four locks (Iffley, Osney, Godstow and King's Weir) (>5km); impacts from noise or dust are unlikely. Transport of materials and equipment during construction on site will require minimal general construction traffic. Transport will utilise the existing road network. The temporary increase in vehicle numbers required for the construction of the scheme is considered to be negligible. Therefore, the construction phase of this scheme is not likely to have significant effects on the qualifying features of any European sites. Operation The 2016 Farmoor EAR confirms that Cothill Fen SAC is not within the zone of influence of the scheme (i.e. the area over which the scheme could affect groundwater and surface water). No LSEs are anticipated from the construction or operation of the Farmoor drought option on the Cothill Fen SAC, either alone, or in combination with other licences and consents.	No	No	No
Axford 1	Kennet and Lamborne Floodplain SAC (6.5km)	**Primary features** 1016 Desmoulin`s whorl snail *Vertigo moulinsiana* - The cluster of sites selected in the Kennet and Lambourn valleys supports one of the most extensive known populations of Desmoulin's whorl snail *Vertigo moulinsiana* in the UK and is one of two sites representing the species in the south-western part of its range in	Construction There is no construction phase associated with this drought option. Operation The drought option involves additional abstraction from existing boreholes. The 2016 Axford 1 EAR confirms that there are no European sites within the zone of influence of the scheme (i.e. the area over which the scheme will influence groundwater or surface water).	No	No	No

Option	European Site[30]	Qualifying features	Potential for effects on qualifying features?	Is scheme likely to have a significant effect on European site(s) alone?	Effect in combination with existing consents?	Effect in combination with other drought options?
		the important chalk stream habitat. Integrity of the population is being maintained by taking measures, including habitat creation, to safeguard populations. The habitat occupied at this site differs from the Fenland sites in East Anglia in that it is predominantly reed sweet-grass *Glyceria maxima* swamp or tall sedges at the river margins, in ditches and in depressions in wet meadows.	No likely significant effects of the Axford 1 drought option are anticipated on the Kennet and Lamborne Floodplain SAC, either alone, or in combination with other licences and consents.			
Axford 2	Kennet and Lamborne Floodplain SAC (6.5km)	**Primary features** 1016 Desmoulin`s whorl snail *Vertigo moulinsiana* - The cluster of sites selected in the Kennet and Lambourn valleys supports one of the most extensive known populations of Desmoulin's whorl snail *Vertigo moulinsiana* in the UK and is one of two sites representing the species in the south-western part of its range in the important chalk stream habitat. Integrity of the population is being maintained by taking measures, including habitat creation, to safeguard populations. The habitat occupied at this site differs from the Fenland sites in East Anglia in that it is predominantly reed sweet-grass *Glyceria maxima* swamp or tall sedges at the river margins, in ditches and in depressions in wet meadows.	Construction There is no construction phase associated with this drought option. Operation The drought option involves additional abstraction from existing boreholes. The 2016 Axford 2 EAR confirms that there are no European sites within the zone of influence of the scheme (i.e. the area over which the scheme will influence groundwater or surface water). No LSEs are anticipated from the construction or operation of the Axford 2 drought option on the Lamborne Floodplain SAC, either alone, or in combination with other licences and consents.	No	No	No
Blewbury	Little Wittenham SAC (8km)	**Primary features** **1166 Great crested newt *Triturus cristatus*** Two main ponds set within mixed woodland that supports large numbers of this species.	Construction Temporary treatment plant would be needed at the site to treat the water. This would require mobile treatment units to be installed for the duration of the drought requirement. Borehole pumps would need to be installed and the network recommissioned but this would use existing remaining network with work on site to recommission mothballed infrastructure. There will be no loss of designated habitat due to the scheme as the construction footprint does not impinge on any designated sites, and given the distance between Little Wittenham SAC (8km); impacts from noise or dust are unlikely. Transport of materials and equipment during construction on site will require minimal general construction traffic. Transport will utilise the existing road network. The temporary increase in vehicle numbers required for the construction of the scheme is considered to be negligible. Operation The 2016 Blewbury EAR confirms that there are no European sites within the zone of influence of the scheme (i.e. the area over which the scheme will influence groundwater or surface water). No LSEs are anticipated from construction or operation of the Blewbury drought option on the Little Wittenham SAC, either alone, or in combination with other licences and consents.	No	No	No
Gatehampton	Hartslock Wood SAC (0.4km)	**Primary features** **6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia)** Hosts the priority habitat type "orchid rich sites". The steep slopes of this site on the chalk of the Chilterns comprise a mosaic of chalk grassland, chalk scrub and broadleaved woodland. The site supports one of only three UK populations of monkey orchid *Orchis simia*, a nationally rare Red Data Book species. **Taxus baccata woods of the British Isles**	Construction There is no construction phase associated with this drought option. Operation The 2016 Gatehampton EAR confirms that Hartslock Wood SAC is not designated for features that are water dependent and that the drought option will have no impact on the SAC. No LSEs are anticipated from the construction or operation of the Gatehampton drought option on the Hartslock Wood SAC, either alone, or in combination with other licences and consents.	No	No	No

Option	European Site[30]	Qualifying features	Potential for effects on qualifying features?	Is scheme likely to have a significant effect on European site(s) alone?	Effect in combination with existing consents?	Effect in combination with other drought options?
		Open patches show a rich flora including local species such as southern wood-rush *Luzula forsteri*, wood barley *Hordelymus europaeus* and narrow-lipped helleborine *Epipactis leptochila*.				
Childrey Warren	River Lambourn SAC (6.5km)	**Primary features** **3260 Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation -** The Lambourn is an example of sub-type 1 in central southern England, a chalk stream discharging into the middle reaches of the Thames system. For part of its length it is a winterbourne, drying through the summer months. It is one of the least-modified rivers of this type, with a characteristic flora dominated by pond water-crowfoot *Ranunculus peltatus*. In the downstream perennial sections *R. peltatus* is replaced by stream water-crowfoot *R. penicillatus var. pseudofluitans*. 1163 Bullhead *Cottus gobio* - The Lambourn represents bullhead *Cottus gobio* populations inhabiting chalk streams in central southern England. Good water quality, coarse sediments and extensive beds of submerged plants again provide excellent habitat for the species**.** **Qualifying features** **1096 Brook lamprey *Lampetra planeri***	Construction There is no construction phase associated with this drought option. Operation The option will involve the abstraction of water from the Vale of White Horse chalk aquifer. The River Lambourn SAC is located in a different groundwater body (Berkshire Downs Chalk) and surface water catchment (River Lambourn). Therefore, there is no hydrological connectivity between the scheme and the SAC. No LSEs are anticipated from the construction or operation of the Childrey Warren drought option on the River Lambourn SAC, either alone, or in combination with other licences and consents.	No	No	No
	Hackpen Hill SAC (0.6km)	**Primary features** **1654 Early gentian *Gentianella anglica*** Hackpen Hill is an extensive area of unimproved chalk grassland in the Downs. The site has a variety of aspect and gradients, with the grassland dominated by red fescue *Festuca rubra* and upright brome *Bromus erectus*. The herb flora includes a significant population of early gentian *Gentianella anglica*. **Qualifying features** **6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia)** (* important orchid sites).	Construction There is no construction phase associated with this drought option. Operation The qualifying features of the site are not considered to be water sensitive, and Hackpen Hill SAC was not included in the 2016 EAR as it wasn't within the zone of influence of the scheme (i.e. the area over which the scheme could affect groundwater and surface water). No LSEs are anticipated from the construction or operation of the Childrey Warren drought option on the Hackpen Hill SAC, either alone, or in combination with other licences and consents.	No	No	No
Kennet Valley Water Resource Zone						
Fobney Emergency Boreholes	Hartslock Wood SAC (8.1km)	**Primary Habitats and Species** **6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia)** Hosts the priority habitat type "orchid rich sites". The steep slopes of this site on the chalk of the Chilterns comprise a mosaic of chalk grassland, chalk scrub and broadleaved woodland. The site supports one of only three UK populations of monkey orchid *Orchis simia*, a nationally rare Red Data Book species. **Taxus baccata woods of the British Isles** Open patches show a rich flora including local species such as southern wood-rush *Luzula forsteri*, wood barley *Hordelymus europaeus* and narrow-lipped helleborine *Epipactis*	Construction There is no construction phase associated with this drought option. Operation The 2016 Fobney Emergency Boreholes EAR confirms that there are no European sites within the zone of influence of the scheme (i.e. the area over which the scheme could affect groundwater and surface water). No LSEs are anticipated from the construction or operation of the Fobney Emergency Boreholes drought option on the Hartslock Wood SAC, either alone, or in combination with other licences and consents.	No	No	No

Option	European Site[30]	Qualifying features	Potential for effects on qualifying features?	Is scheme likely to have a significant effect on European site(s) alone?	Effect in combination with existing consents?	Effect in combination with other drought options?
		leptochila.				
Fobney Direct	Thames Basin Heaths SPA (9.1km)	A composite site of open heathland habitats that is located across the counties of Surrey, Hampshire and Berkshire in southern England. **Article 4.1** During the breeding season the site supports a number of Annex I species; Dartford Warbler *Sylvia undata* (considered to represent at least 27.8% of the breeding population in GB), Nightjar *Caprimulgus europaeus*, (considered to represent at least 7.8% of the breeding population in GB) and Woodlark *Lullula arborea*, (considered to represent at least 9.9% of the breeding population in GB)	Construction There is no construction phase associated with this drought option. Operation The scheme involves the redirection of water allowing more to be abstracted from the River Kennet, and less being directed to Holy Brook. As the qualifying features of the SPA are not dependent on river flow or levels, impacts are considered unlikely. No LSEs are anticipated from the construction or operation of the Fobney Direct drought option are anticipated on the Thames Basin Heaths SPA, either alone, or in combination with other licences and consents.	No	No	No
Guildford Water Resource Zone						
Shalford	Thames Basin Heaths SPA (4km)	A composite site of open heathland habitats that is located across the counties of Surrey, Hampshire and Berkshire in southern England. **Article 4.1** During the breeding season the site supports a number of Annex I species; Dartford Warbler *Sylvia undata* (considered to represent at least 27.8% of the breeding population in GB), Nightjar *Caprimulgus europaeus*, (considered to represent at least 7.8% of the breeding population in GB) and Woodlark *Lullula arborea*, (considered to represent at least 9.9% of the breeding population in GB)	Construction There is no construction phase associated with this drought option. Operation The 2016 Shalford EAR confirms that there are no European sites within the zone of influence of the scheme (i.e. the area over which the scheme could impact groundwater and surface water). No LSEs are anticipated from the construction or operation of the Shalford drought option on the Thames Basin Heaths SPA, either alone, or in combination with other licences and consents.	No	No	No
	Thursley, Ash, Pirbright and Chobham SAC (8km)	**Primary features** **4010 Northern Atlantic wet heaths with Erica tetralix** This site represents lowland northern Atlantic wet heaths in south-east England. The wet heath at Thursley is NVC type M16 *Erica tetralix – Sphagnum compactum* and contains several rare plants. There are transitions to valley bog and dry heath. Thursley Common is an important site for invertebrates. **4030 European dry heaths** This south-east England site contains a series of large fragments of once-continuous heathland. It is selected as a key representative of NVC type H2 *Calluna vulgaris – Ulex minor* dry heathland. There are transitions to wet heath and valley mire, scrub, woodland and acid grassland, including types rich in annual plants. The European dry heaths support an important assemblage of animal species, including numerous rare and local invertebrate species. **7150 Depressions on peat substrates of the Rhynchosporion** This site contains examples of Depressions on peat substrates of the Rhynchosporion in south-east England, where it occurs as part of a mosaic associated with valley bog and wet heath.	Construction There is no construction phase associated with this drought option. Operation The 2016 Shalford EAR has been confirms that there are no European sites within the zone of influence of the scheme (i.e. the area over which the scheme could impact groundwater and surface water). No LSEs are anticipated from the construction or operation of the Shalford drought option on the Thursley, Ash, Pirbright and Chobham SAC, either alone, or in combination with other licences and consents.	No	No	No
SWA Water Resource Zone						
New Ground	Chilterns Beechwoods SAC (1km)	**Primary features** **9130 *Asperulo-Fagetum* beech forests** The Chilterns Beechwoods represent a very extensive tract of *Asperulo-Fagetum* beech forests in the centre of the habitat's UK range. The woodland	Construction There is no construction phase associated with this drought option. Operation The2016 New Ground EAR confirms that there are no European sites within	No	No	No

Option	European Site[30]	Qualifying features	Potential for effects on qualifying features?	Is scheme likely to have a significant effect on European site(s) alone?	Effect in combination with existing consents?	Effect in combination with other drought options?
		is an important part of a grassland-scrub-woodland mosaic. A distinctive feature in the woodland flora is the occurrence of the rare coralroot *Cardamine bulbifera*. **Qualifying features** **6210 Semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia*)** **1083 Stag beetle *Lucanus cervus***	the zone of influence of the scheme (i.e. the area over which the scheme could affect groundwater and surface water). No LSEs are anticipated from the construction or operation of the New Ground drought option on the Thursley, Ash, Pirbright and Chobham SAC, either alone, or in combination with other licences and consents.			
Pann Mill	Chilterns Beechwoods SAC (4.2km)	**Primary features** **9130 *Asperulo-Fagetum* beech forests** The Chilterns Beechwoods represent a very extensive tract of *Asperulo-Fagetum* beech forests in the centre of the habitat's UK range. The woodland is an important part of a grassland-scrub-woodland mosaic. A distinctive feature in the woodland flora is the occurrence of the rare coralroot *Cardamine bulbifera*. **Qualifying features** **6210 Semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia*)** **1083 Stag beetle *Lucanus cervus***	Construction There is no construction phase associated with this drought option. Operation The draft 2016 Pann Mill EAR confirms that there are no European sites within the zone of influence of the scheme (i.e. the area over which the scheme could affect groundwater and surface water). No LSEs are anticipated from the construction or operation of the Pann Mill drought option on the Chilterns Beechwoods SAC, either alone, or in combination with other licences and consents.			
	Burnham Beeches SAC (9.2km)	**Primary features** **9120 Atlantic acidophilous beech forests with Ilex and sometimes also Taxus in the shrublayer (Quercion robori-petraeae or Ilici-Fagenion)** Burnham Beeches is an example of Atlantic acidophilous beech forests in central southern England. It is an extensive area of former beech wood-pasture with many old pollards and associated beech Fagus sylvatica and oak Quercus spp. high forest. Surveys have shown that it is one of the richest sites for saproxylic invertebrates in the UK, including 14 Red Data Book species.	Construction There is no construction phase associated with this drought option. Operation The draft 2016 Pann Mill EAR confirms that there are no European sites within the zone of influence of the scheme (i.e. the area over which the scheme could affect groundwater and surface water). No LSEs are anticipated from the construction or operation of the Pann Mill drought option on the Burnham Beeches SAC, either alone, or in combination with other licences and consents.			
Henley Water Resource Zone						
Harpsden / Sheeplands	Chilterns Beechwoods SAC (7.8km)	**Primary features** **9130 *Asperulo-Fagetum* beech forests** The Chilterns Beechwoods represent a very extensive tract of *Asperulo-Fagetum* beech forests in the centre of the habitat's UK range. The woodland is an important part of a grassland-scrub-woodland mosaic. A distinctive feature in the woodland flora is the occurrence of the rare coralroot *Cardamine bulbifera*. **Qualifying features** **6210 Semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia*)** **1083 Stag beetle *Lucanus cervus***	Construction There is no construction phase associated with this drought option. Operation The 2016 Harpsden / Sheeplands EAR confirms that there are no European sites within the zone of influence of the scheme (i.e. the area over which the scheme could affect groundwater and surface water). No LSEs are anticipated from the construction or operation of the Harpsden / Sheeplands drought option on the Chilterns Beechwoods SAC, either alone, or in combination with other licences and consents.	No	No	No

3.2 POTENTIAL IN-COMBINATION EFFECTS OF THE PLAN

Individually, Thames Water's drought options were identified as having no likely significant effects on European sites. However, a number of drought options could be used at a similar time, should they be required, and therefore an assessment has been completed to determine the potential for LSEs, as detailed in **Table 3.3**.

Drought occurrence in the Thames supply area tends to be as a result of one or two dry winters and the onset of drought leading to concern over resource availability is generally driven by reservoir storage reduction leading to triggers for drought action being breached. In a severe drought leading to the need for Drought Permits this reduction would normally begin in the spring or early summer and would result in Thames Water implementing demand management measures which are a prerequisite for implementation of any drought permit options. Therefore, the likely early onset of our drought permits would be in April or May and would run for 6 months which would mean them running for April to September or May to October i.e. spanning the summer months. Of course drought can extend in to the latter part of the year and into winter although this does not tend to be the case particularly in the SWOX WRZ where historically there has been sufficient rainfall to relieve drought conditions in the autumn. In view of this likelihood of drought occurrence generally being over the summer period the focus for environmental reporting on drought permit impacts has focussed on the summer period.

Table 3.3 Thames Water Drought Plan Options In-combination Effects

Option	European Site	Cumulative With	European Site	Effect In-Combination?
Axford 1	Kennet and Lambourne Floodplain SAC	Ogbourne	None within 10km	**No** – Ogbourne is not within 10km of a European site
Axford 2	Kennet and Lambourne Floodplain SAC	Ogbourne and/or Ogbourne EBH	None within 10km	**No** – Ogbourne options not within 10km of any European sites
Compton 1	None within 10km	West Berkshire Groundwater System	River Lambourn SAC Kennet and Lambourne Floodplain SAC	**No** – Compton 1 is not within 10km of a European site
Compton 2	None within 10km	West Berkshire Groundwater System	River Lambourn SAC Kennet and Lambourne Floodplain SAC	**No** – Compton 2 is not within 10km of a European site
Crayford	None within 10km	Wansunt	None within 10km	**No** – no European sites within 10km
Farmoor	Oxford Meadows SAC Hartslock Wood SAC Little Whittenham SAC Cothill Fen SAC	Gatehampton	Hartslock Wood SAC	**No** – Gatehampton has negligible hydrological impacts, therefore no in-combination effect

Option	European Site	Cumulative With	European Site	Effect In-Combination?
Fobney EBH	Hartslock Wood SAC	West Berkshire Groundwater System	River Lambourn SAC Kennet and Lambourne Floodplain SAC	**No** – no overlapping European sites
Fobney Direct	Thames Basin Heaths SPA	West Berkshire Groundwater System	River Lambourn SAC Kennet and Lambourne Floodplain SAC	**No** – no overlapping European sites
Fobney Direct	Hartslock Wood SAC	Fobney EBH	Thames Basin Heath SPA	**No** – no overlapping European sites
Sundrige 1	None within 10km	Eynsford	None within 10km	**No** – neither option within 10km of a European site
Sundrige 2	None within 10km	Eynsford	None within 10km	**No** – neither option within 10km of a European site
Latton	North Meadow and Clattinger Farm SAC	Mersey Hampton	North Meadow and Clattinger Farm SAC	**No** – neither option is in hydrological connectivity with European site, therefore no LSEs are anticipated.

3.3 POTENTIAL IN-COMBINATION EFFECTS WITH OTHER PLANS AND PROJECTS

Potential in-combination effects with other relevant plans and projects (as described in **Section 2.5**) have been reviewed and are summarised in this section.

3.3.1 Thames Water Water Resource Management Plan (2014)

Thames Water will be updating their Water Resource Management Plan in due course for the AMP6 period, with a draft ready in late 2019. Therefore potential in-combination effects have been considered with reference to the WRMP14. These should be reviewed when the preferred programme is known for WRMP19.

Preferred programmes were produced for two water resource zones (WRZs); London and Thames Valley. Of the Thames Valley WRZs the only one with a projected deficit on both a dry year annual average and dry year critical period basis was SWOX, and therefore the initial approach for the WRMP was to conduct programme appraisal for the SWOX WRZ in isolation. However, the impacts of that preferred programme had implications for all the remaining WRZs in the Thames Valley. It was therefore decided that a programme would be developed for the Thames Valley as a whole, encompassing SWOX, SWA, Guildford, Kennet Valley and Henley WRZs.

The following schemes were included in the London WRZ Preferred Programme, and therefore included in its HRA screening assessment (demand management schemes were screened out):

- BT RWE Didcot
- Essex & Suffolk Water - Essex from London (renegotiate existing transfer)
- Groundwater ELRED
- Groundwater Tottenham Borehole
- ASR - Horton Kirby
- Groundwater Honor Oak
- Artificial recharge - Kidbrooke
- Artificial recharge – SLARS Merton Abbey
- Groundwater Southfleet/Greenhithe (disaggregation)
- Beckton STW Reuse - 150 Ml/d
- Oxford Canal Transfer (Lon)
- Artificial recharge - HARS (Hornsey)

- Groundwater Addington

Of these options, five (AR Kidbrooke, Groundwater (GW) Addington, bulk transfer Essex and Suffolk Water - Essex from London, Oxford Canal Transfer and ASR Darent Valley (Horton Kirby)) were excluded from further consideration in the HRA screening assessment as they were located over 10km from any European site and hence unlikely to affect the sites' integrity.

Only two supply schemes are included in the Thames Valley WRZ Preferred Programme; NC Datchet and ASR Guildford (Abbotswood).

Potential in-combination effects on ten European sites have been considered, as they are within the zone of influence of both a drought option and WRMP option: Epping Forest SAC, Lee Valley SPA and Ramsar, South West London Water bodies SPA and Ramsar, Richmond Park SAC, Little Wittenham SAC, Hartslock Wood SAC, Cothill Fen SAC, Thames Basin Heaths SPA, Chilterns Beechwoods SAC and Burnham Beeches SAC.

Epping Forest SAC

Epping Forest SAC is within the zone of influence of five drought options; North London Artificial Recharge Scheme, Chingford Artificial Recharge Scheme, East London Resource Development (ELRED), Stratford Box and Old Ford, and four WRMP options; Groundwater ELRED, Groundwater Tottenham Borehole, AR HARS (Hornsey) and Beckton STW.

None of the drought options have any construction activities associated with them, therefore there cannot be in-combination construction related effects with any of the WRMP options.

The Epping Forest SAC Review of Consents Stages 1 and 2 concluded that the only water sensitive feature was Northern Atlantic wet heaths, and that this feature was not in hydrological connectivity with the aquifers being utilised by the North London Artificial Recharge Scheme, or Chingford Artificial Recharge Scheme, or East London Resource Development, or Stratford Box, or Old Ford.

Therefore, no LSEs are anticipated from the operation of the drought options in-combination with the WRMP options.

Lee Valley SPA and Ramsar

Lee Valley SPA and Ramsar is within the zone of influence of six drought options; North London Artificial Recharge Scheme, Hoddesdon Transfer Scheme, Chingford Artificial Recharge Scheme, East London Resource Development (ELRED), Stratford

Box, and Old Ford, and five WRMP options; Groundwater ELRED, Groundwater Tottenham Borehole, GW Honor Oak, AR HARS (Hornsey) and Beckton STW.

None of the drought options have any construction activities associated with them, therefore there cannot be in-combination construction related effects with any of the WRMP options.

None of the drought options have been identified as having an operational impact on the SPA and Ramsar. There is no evidence to suggest any hydrological connectivity between the aquifers from which five of the options abstract, and the artificial bunded reservoirs of the SAC and Ramsar. Water quality issues from the Rye Meads STW discharges (Hoddesdon Transfer Scheme) were assessed as part of the Review of Consents and it was concluded that there were no adverse effects on the SPA and Ramsar.

Operationally, the WRMP options; ELRED, GW Honor Oak, Beckton STW Reuse (RO) and AR HARS (Hornsey), are not considered to be hydrologically connected, or significantly hydrologically connected in the case of the AR HARS (Hornsey) scheme, and therefore likely significant effects are considered unlikely during the operation phase. Impacts associated with the operation of the Tottenham Boreholes scheme are identified as having a negligible effect on water levels, as the borehole abstracts from the confined chalk. Therefore no LSEs are anticipated from the operation of the drought options in-combination with the WRMP options.

South West London Waterbodies SPA and Ramsar

South West London Water bodies SPA and Ramsar is within the zone of influence of three drought options; Reduction in lowest residual flow on the LTCD from 300Ml/d to 200Ml/d, Earlier reduction in residual flow on the LTCD and Lower Thames, and two WRMP options; Bulk Transfer RWE Didcot and Datchet Network Constraint.

Temporary construction work is only required for the Lower Thames drought option, and this involves pipework and generators to pump water over weirs. However, this is approximately 3km from the SPA and Ramsar and therefore considered unlikely to result in any adverse effects. There are no construction requirements for the Bulk Transfer RWE Didcot, whilst those for the Datchet Network Constraint are approximately 2.7km from the SPA and Ramsar and therefore considered unlikely to result in any adverse effects, given the distance. Therefore, no LSEs are anticipated from the construction of the drought options in-combination with the WRMP options.

Operationally, the drought options all result in a reduced rate of drawdown in the Thames Valley storage reservoir system. There are no operational impacts from the

Bulk Transfer RWE Didcot or Datchet Network Constraint WRMP options. Therefore, no LSEs are anticipated from the operation of the drought options in-combination with the WRMP options.

Richmond Park SAC

Richmond Park SAC is within the zone of influence of three drought options; Reduction in lowest residual flow on the LTCD from 300Ml/d to 200Ml/d, Earlier reduction in residual flow on the LTCD and Lower Thames, and one WRMP option; AR SLARS Merton Abbey.

Temporary construction work is only required for the Lower Thames drought option, and this involves pipework and generators to pump water over weirs. However, this is approximately 1.2km from the SAC and therefore considered unlikely to result in any adverse effects. There are no construction requirements for the AR SLARS Merton Abbey WRMP option. Therefore, no LSEs are anticipated from the construction of the drought options or WRMP options.

The site's qualifying feature, stag beetle *Lucanus cervus* is not considered to be water sensitive, and therefore, no LSEs are anticipated from the operation of the drought options in-combination with the WRMP options.

Little Wittenham SAC

Little Wittenham SAC is within the zone of influence of two drought options; Farmoor and Blewbury, and one WRMP option; Bulk Transfer RWE Didcot.

Minor construction works are required for the Farmoor and Blewbury drought options, but are at sufficient distance; >10km and approximately 8km respectively, not to give rise to significant adverse effects on the designated site's qualifying feature; great crested newt *Triturus cristatus*. No construction activities are required for the Bulk Transfer RWE Didcot. Therefore, no LSEs are anticipated from the construction of the drought options or WRMP options.

The SAC is not considered to be in hydrological connectivity with the River Thames, the source for the Farmoor drought option, or within the zone of influence affected by the Blewbury groundwater abstraction. Water abstraction is not required for the Bulk Transfer RWE Didcot option and so could not influence the SAC. Therefore, no LSEs are anticipated from the operation of the drought options in-combination with the WRMP options.

Hartslock Wood SAC

Hartslock Wood SAC is within the zone of influence of three drought options;

Farmoor, Gatehampton and Fobney Emergency Boreholes, and one WRMP option; Bulk Transfer RWE Didcot.

Minor construction works are required for the Farmoor drought option, but are at sufficient distance, >10km, not to give rise to significant adverse effects on the designated site's qualifying features; semi-natural dry grassland and scrubland facies on calcareous substrates and *Taxus baccata* woods of the British Isles. No construction activities are required for the Gatehampton drought option or Bulk Transfer RWE Didcot WRMP option. Therefore, no LSEs are anticipated from the construction of the drought options in-combination with the WRMP options.

The qualifying features of the SAC are not considered to be highly water dependent, and unlikely to be affected by operational activities. Therefore, no LSEs are anticipated from the operation of the drought options in-combination with the WRMP options.

Cothill Fen SAC

Cothill Fen SAC is within the zone of influence of one drought plan option; Farmoor and one WRMP option; Bulk Transfer RWE Didcot.

Minor construction works are required for the Farmoor drought option, whilst none are required for the Bulk Transfer RWE Didcot. Therefore, no LSEs are anticipated from the construction of the drought option in-combination with the WRMP option.

The SAC is not within the zone of influence of the Farmoor drought option, and the transfer of licence as part of the Bulk Transfer RWE Didcot scheme will retain water in the River Thames. Therefore no LSEs are anticipated from the operation of the drought option in-combination with the WRMP option.

Thames Basin Heaths SPA

Thames Basin Heaths SPA is within the zone of influence of two drought options; Fobney Direct and Shalford, and one WRMP option; ASR Guildford.

No construction works are required for any of the options, therefore no LSEs are anticipated.

The redirection of water to the River Kennet for the Fobney Direct scheme is unlikely to impact the qualifying features of the SPA (Dartford warbler *Sylvia undata*, nightjar *Caprimulgus europaeus*, and woodlark *Lullula arborea*) as these are not considered to be sensitive to changes in river levels. The SPA is not within the zone of influence over which the Shalford groundwater abstraction impacts, and is hydrogeologically separated from the aquifer utilised by the ASR Guildford WRMP

option. Therefore no LSEs are anticipated from the operation of the drought options in-combination with the WRMP option.

Chilterns Beechwoods SAC

Chilterns Beechwoods SAC is within the zone of influence of three drought options; New Ground, Pann Mill and Harpsden/Sheeplands and one WRMP option; Bulk Transfer RWE Didcot.

None of the options have any associated construction activities, therefore no LSEs are anticipated.

The SAC is not within the zone of influence over which effects to groundwater or surface waters for the New Ground and Harpsden/Sheeplands options would occur. The transfer of licence as part of the Bulk Transfer RWE Didcot option will retain water in the River Thames. Therefore no LSEs are anticipated from the operation of the drought options in-combination with the WRMP option.

Burnham Beeches SAC

Burnham Beeches SAC is within the zone of influence of one drought plan option; Pann Mill, and one WRMP option; Datchet Network Constraint.

Pann Mill has no associated construction activities, and those required for the Datchet Network Constraint WRMP option are at sufficient distance (9.8km) that no significant adverse effects are considered likely. Therefore, no LSEs are anticipated during the construction of the drought option in-combination with the WRMP option.

There is no increase in abstraction licence required for the Datchet Network Constraint WRMP option. Therefore no LSEs are anticipated from the operation of the drought option in-combination with the WRMP option.

3.3.2 Environment Agency Drought Plans

The potential for in-combination effects of Thames Water's drought options with the Environment Agency's National Drought Action Plan has been assessed. When publicly available, the relevant area drought plans will be reviewed.

An overview of the process of using drought actions and triggers is provided in the Environment Agency National Drought Action Plan. Actions described include communications (internal and external), monitoring and drought orders.

External communications may have positive in-combination effects with Thames Water's media/water efficiency campaign demand side option, as drought

communication messages may reinforce each other, thereby resulting in increased demand savings.

Environment Agency environmental drought order actions have the potential to have in-combination impacts with Thames Water's drought options. The Environment Agency can apply to the Secretary of State for environmental drought orders if the environment is suffering serious damage as the result of abstraction during a drought.

However, liaison is required with the Environment Agency to permit the operation of the drought plan schemes, and the Environment Agency also monitor the actions taken to ensure these are in accordance with any drought permits/orders.

Therefore, no in-combination impacts between the Environment Agency's National Drought Action Plan and Thames Water's drought options are anticipated. However, due to the uncertainties of potential locations this should be considered further at the time of any potential application for drought permits/orders by Thames Water or the Environment Agency.

3.3.3 Other Water Company Drought Plans

Assessment of the potential for in-combination impacts of supply side and drought permit/order options with drought options listed in neighbouring water companies' drought plans was undertaken.

It should be noted that all DPs are subject to review on timescales that may not be aligned with the timescale of Thames Water's DP revision. The information used to carry out these assessments is considered to be the most up to date information available at the time of writing.

Affinity Water Central (2013)

Affinity Water Central's DP (2013) notes that there are no European sites within the supply area that would be affected by the DP options, therefore no HRA has been completed.

Therefore, no cumulative impacts with Thames Water's DP have been identified, and no LSEs anticipated.

Affinity Water Southeast (2013)

The Affinity Water Southeast's DP concluded that there were no European sites within the supply area, or near the boundaries of the supply area, that would be impacted by the drought options.

Therefore, no cumulative impacts with Thames Water's DP have been identified, and no LSEs anticipated.

Anglian Water (2014)

No cumulative impacts between drought options in Thames Water's DP and Anglian Water's DP, which would have potential for impact on European sites, were identified.

Bristol Water (2012)

No HRA has been completed for Bristol Water's DP as no impacts to European sites are anticipated as all the options are within existing permits.

Therefore, no cumulative impacts with Thames Water's DP have been identified, and no LSEs anticipated.

Essex and Suffolk Water (2013)

No cumulative impacts between drought options in Thames Water's DP and Essex and Suffolk Water's DP have been identified as the European sites being considered in both plans differ. Therefore no LSEs are anticipated.

Severn Trent (2014)

No cumulative impacts between drought options in Thames Water's DP and Severn Trent's DP have been identified as the European sites being considered in both plans differ. Therefore no LSEs are anticipated.

South East Water (2016)

Informal consultation with South East Water has confirmed that none of the drought options in their forthcoming DP will have an overlapping zone of influence, affecting the same European site, as those in Thames Water's DP.

Therefore no LSEs are anticipated from the operation of Thames Water's DP in-combination with South East Water's DP.

Southern Water (2013)

No cumulative impacts between drought options in Thames Water's DP and Southern Water's DP have been identified as the European sites being considered in both plans differ. Therefore no LSEs are anticipated.

Sutton and East Surrey (2013)

The Sutton and East Surrey DP concluded that there were no European sites within the supply area, or near the boundaries of the supply area, that would be impacted by the drought options.

Therefore, no cumulative impacts with Thames Water's DP have been identified, and no LSEs anticipated.

Wessex Water (2013)

No cumulative impacts between drought options in Thames Water's DP and Wessex Water's DP have been identified as the European sites being considered in both plans differ. Therefore no LSEs are anticipated.

3.3.1 Other Water Company WRMPs

Affinity Water (2014)

Affinity Water's WRMP HRA is not publicly available. This has been requested and the assessment will be updated once the relevant information has been received.

Anglian Water (2014)

No cumulative impacts between drought options in Thames Water's DP and Anglian Water's WRMP have been identified as the European sites being considered in both plans differ. Therefore no LSEs are anticipated.

Bristol Water (2014)

Although North Meadow and Clattinger Farm SAC was mentioned in the HRA for Bristol Water's WRMP, none of the preferred options in the plan are near the site and therefore do not have any impact on the site. Therefore no incombination effects with Thames Water's DP are anticipated.

Essex and Suffolk Water (2014)

Essex and Suffolk Water's WRMP does not include any supply schemes, and no LSEs have been identified from the majority of the sustainability reduction schemes. Three of the sustainability reduction schemes were considered in more detail (Trinity Broads, Geldeston Meadows and Alde Ore Estuary) however these are within the zone of influence of different European sites to those being considered in Thames Water's DP. Therefore no LSEs are anticipated.

Severn Trent (2014)

Severn Trent's WRMP identified no LSEs on European sites, therefore in-combination effects with Thames Water's DP options are considered unlikely; no LSEs are anticipated.

South East Water (2014)

Four European sites are considered in the HRA Screening assessment of both South East Water's WRMP and Thames Water's DP; Burnham Beeches SAC, Thursley, Ash, Pirbright and Chobham SAC, Windsor Forest and Great Park SAC and Thames Basin Heaths SPA. No LSEs on these sites have been identified in either plan, therefore in-combination effects are not anticipated.

Southern Water (2014)

Two options within Southern Water's WRMP required a Stage 2 Appropriate Assessment as potential LSEs were identified during the screening stage on the River Itchen SAC and Arun Valley SAC, SPA and Ramsar. Neither European site is within the zone of influence of any of Thames Water's DP options, therefore in-combination effects between the two plans are not anticipated.

Sutton and East Surrey (2014)

Three resource development options have been identified in Sutton and East Surrey's WRMP, and none are considered to have the potential to affect any European sites; a specific HRA Screening assessment was therefore not completed. No in-combination effects with the Thames Water DP options are therefore considered likely.

Wessex Water (2014)

Wessex Water's WRMP consists of demand management options only, which are considered unlikely to have a significant effect on the integrity of any European sites. Therefore in-combination effects with Thames Water's DP are not anticipated.

3.3.2 Other Plans and Projects

Thames River Basin Management Plan (2015)

The River Basin Management Plans set out how organisations, stakeholders and communities can work together to improve the water environment.

The Thames RBMP overlaps considerably with Thames Water's operational boundaries, and therefore considers all of the European sites considered in this HRA. The RBMP has identified potential hazards associated with the implementation of

measures to address significant water management issues (SWMI). As the level of detail within the plan does not allow consideration of effects on each European site individually, the plan has assessed the potential impacts on the qualifying feature as a collective i.e. 'dry grassland' across several SACs.

The RBMP HRA has concluded that none of the measures identified would have significant negative effects on any European site, as the locations where the measures would be implemented is not constrained. The measures would also be implemented in such a way that there would be no in-combination effects within the RBMP.

Therefore, no cumulative impacts with Thames Water's DP have been identified, and no LSEs anticipated.

Environment Agency River Thames Scheme

The Southwest London Water bodies SPA and Ramsar is present within the study area for the River Thames Scheme[31] which aims to reduce flooding between Datchet and Teddington.

The scheme has been subject to a full HRA which is not publicly available. However, the Strategy Appraisal Report (2010) confirms that Natural England support the scheme, and that subject to further surveys and on-going consultation, future projects arising would be environmentally acceptable.

The Southwest London Waterbodies SPA and Ramsar is within the zone of influence of the Lower Thames drought option. However, no LSEs are anticipated from the construction phase with minor construction work being mitigated by best practice construction methods, or operational phase with a reduced rate of drawdown being potentially beneficial.

Although no in-combination effects between the River Thames Scheme and Thames Water's DP are currently envisaged, this will be kept under review as more details of the River Thames Scheme become available.

Environment Agency Oxford Flood Alleviation Scheme

The Oxford Meadows SAC and Cothill Fen SAC are within 10km of the proposed Oxford Flood Alleviation Scheme[32]. Oxford Meadows SAC is upstream of the proposed scheme, whilst Cothill Fen SAC is approximately 4.7km south west, however, no HRA or environmental assessment is available for the scheme yet.

[31] Environment Agency (2010) River Thames Scheme: Strategy Appraisal Report. Accessed at https://www.gov.uk/government/publications/river-thames-scheme-strategy-appraisal-report.
[32] Oxford Flood Alleviation Scheme Public Consultation Boards. Accessed at https://www.oxfordshire.gov.uk/cms/sites/default/files/folders/documents/environmentandplanning/flooding/Oxford%20FAS%20Public%20Consultation%20boards%20-%20Final.pdf

The Farmoor drought option has minor construction works but no LSEs have been identified on either designated site due to distance. Cothill Fen SAC is not within the operational zone of influence, and the option will not impact flood flows over winter which the Oxford Meadows SAC is reliant on.

Therefore no in-combination effects between the Oxford Flood Alleviation Scheme and Thames Water's DP are currently envisaged, however this will be kept under review as more details of the Oxford Flood Alleviation Scheme become available.

Environment Agency Abingdon Flood Alleviation Scheme

Cothill Fen SAC and Little Wittenham SAC are within 10km of the proposed Abingdon Flood Alleviation Scheme[32]. Cothill Fen SAC is 3km north west of the scheme whilst Little Wittenham SAC is 9km south east. No HRA or environmental assessment is available for the scheme yet.

Little Wittenham SAC is within 10km of both the Farmoor and Blewbury drought options. The designated site is at a sufficient distance so as not to be impacted by the minor construction works required for the Farmoor and Blewbury drought options. The designated site is outside the operational zone of influence of the Blewbury drought option, and is fed by other water sources than the River Thames, and therefore not likely to be impacted by the operation of the Farmoor drought option.

No construction or operation effects have been identified on Cothill Fen SAC resulting from the Farmoor drought option due to distance from the construction site, and the designated site being outside the operational zone of influence.

Therefore no in-combination effects between the Abingdon Flood Alleviation Scheme and Thames Water's DP are currently envisaged, however this will be kept under review as more details of the Abingdon Flood Alleviation Scheme become available.

Canal and Rivers Trust Putting Water into Waterways Water Resources Strategy 2015-2020

To ensure a longer term security of water supply, and provide a level of service of 1 in 20 years (5% probability of a drought closure occurring in any single year), the Canal and Rivers Trust have developed a Water Resources Strategy[33] setting out 14 strategic actions for completion by 2020 and dividing the entire network into hydrological units for more effective management of water resources.

A number of the hydrological units overlap with Thames Water's DP including the Kennet and Avon Canal, Lower Lee/Lee Navigation and South Oxford Canal.

[33] Canal and Rivers Trust (2015) Putting the water into waterways: Water Resources Strategy 2015-2020. Accessed at https://canalrivertrust.org.uk/media/original/24335-water-resources-strategy.pdf.

However, the main actions for the strategy are to undertake a range of modelling scenarios for the hydrological units in order of preference. Specific restoration projects or other canal developments are not detailed, however Strategic Action 4 states that appropriate water resource assessments will be undertaken aiming for *"no net impact on long term water resource levels of service."*

In-combination effects with any of Thames Water DP options are therefore considered unlikely, however further consideration should be given at the project level.

4 CONCLUSIONS AND RECOMMENDATIONS

Thames Water has undertaken the first stage in the HRA process, Screening, on its draft Drought Plan options list. The screening stage establishes whether any schemes have the potential for a LSE on the integrity of a European site.

A summary of the conclusions of HRA Screening is presented in **Table 4.1**. This shows that no options are considered to have LSEs on European sites, either alone or in combination with other drought options in Thames Water's Draft DP 2016.

In-combination effects of Thames Water's draft DP 2016 with its WRMP14, the Environment Agency's regional DPs, the Thames River Basin Management Plan 2015, and other water company WRMPs and DPs, are not considered likely to have significant adverse effects on European sites.

On the basis of the results in **Table 4.1**, Appropriate Assessment of the Drought Plan is not required.

Table 4.1 Summary of HRA Screening Conclusions

Drought Option	Is scheme likely to have a significant effect on European site(s) alone?	Effect in combination with existing consents?	Effect in combination with other drought options?	Appropriate Assessment (AA) required?
Demand Management				
Media/water efficiency campaign	No	No	No	No
Leakage reduction	No	No	No	No
Sprinkler and unattended hose pipe ban	No	No	No	No
Temporary use Ban	No	No	No	No
Drought Order to ban Non-Essential Use	No	No	No	No
Emergency Drought Order	No	No	No	No
Supply Side Options				
London WRZ				
North London Artificial Recharge Scheme	No	No	No	No
Thames Gateway Water Treatment Works (TGWTW)	No	No	No	No
Hoddesdon Transfer Scheme (River Lee Flow Augmentation)	No	No	No	No
Chingford Artificial Recharge Scheme (CHARS)	No	No	No	No
Reduction in lowest residual flow on the Lower Thames Control Diagram at Teddington Weir from 300Ml/d to 200Ml/d	No	No	No	No
Earlier reduction in residual flow at Teddington Weir on the Lower Thames Control Diagram	No	No	No	No

Drought Option	Is scheme likely to have a significant effect on European site(s) alone?	Effect in combination with existing consents?	Effect in combination with other drought options?	Appropriate Assessment (AA) required?
East London Resource Development (ELRED)	No	No	No	No
Stratford Box	No	No	No	No
Old Ford	No	No	No	No
West Berkshire Groundwater Scheme (WBGWS)	No once abstraction licence for RoC Stage 4 avoidance/ mitigation measures is completed	No once abstraction licence for RoC Stage 4 avoidance/ mitigation measures is completed	No once abstraction licence for RoC Stage 4 avoidance/ mitigation measures is completed	No
Drought permit/order				
London WRZ				
Sundridge 1	No	No	No	No
Sundridge 2	No	No	No	No
Lower Thames	No	No	No	No
Crayford	No	No	No	No
Horton Kirby (Aquifer Storage & Recovery)	No	No	No	No
Eynsford	No	No	No	No
Wansunt	No	No	No	No
Increase in M2 annual licence	No	No	No	No
Waddon	No	No	No	No
SWOX Water Resource Zone				
Baunton 1	No	No	No	No
Baunton 2	No	No	No	No
Latton	No	No	No	No
Mersey Hampton	No	No	No	No
Farmoor	No	No	No	No
Axford 1	No	No	No	No
Axford 2	No	No	No	No
Bibury	No	No	No	No
Blewbury	No	No	No	No
Gatehampton	No	No	No	No
Ogbourne emergency boreholes	No	No	No	No
Oxford Canal - Banbury	No	No	No	No
Sor Brook	No	No	No	No
Childrey Warren	No	No	No	No
Ogbourne	No	No	No	No
Kennet Valley Water Resource Zone				
Compton 1	No	No	No	No
Compton 2	No	No	No	No

Drought Option	Is scheme likely to have a significant effect on European site(s) alone?	Effect in combination with existing consents?	Effect in combination with other drought options?	Appropriate Assessment (AA) required?
Fobney Emergency Boreholes	No	No	No	No
Pangbourne	No	No	No	No
Playhatch	No	No	No	No
Fobney Direct	No	No	No	No
Guildford Water Resource Zone				
Albury	No	No	No	No
Shalford	No	No	No	No
SWA Water Resource Zone				
New Ground	No	No	No	No
Pann Mill	No	No	No	No
Henley Resource Zone				
Harpsden/Sheeplands	No	No	No	No

APPENDICES

APPENDIX A

EUROPEAN DESIGNATION SUMMARIES

Site Name	Reason for Designation	Site Vulnerability
Burnham Beeches SAC	**Primary features** **9120 Atlantic acidophilous beech forests with Ilex and sometimes also Taxus in the shrublayer (Quercion robori-petraeae or Ilici-Fagenion)** Burnham Beeches is an example of Atlantic acidophilous beech forests in central southern England. It is an extensive area of former beech wood-pasture with many old pollards and associated beech Fagus sylvatica and oak Quercus spp. high forest. Surveys have shown that it is one of the richest sites for saproxylic invertebrates in the UK, including 14 Red Data Book species.	The beech forest is subject to pressures from recreational activities, air pollution and problematic native species.
Chilterns Beechwoods SAC	**Primary features** **9130 *Asperulo-Fagetum* beech forests** The Chilterns Beechwoods represent a very extensive tract of *Asperulo-Fagetum* beech forests in the centre of the habitat's UK range. The woodland is an important part of a grassland-scrub-woodland mosaic. A distinctive feature in the woodland flora is the occurrence of the rare coralroot *Cardamine bulbifera*. **Qualifying features** **6210 Semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia*)** **1083 Stag beetle *Lucanus cervus*** 	The majority of beechwoods in the Chilterns are very uniform in terms of age-class and species composition, as a result of historical promotion of beech as a timber tree. Significant changes to the structural and species diversity of these woods are required in order to promote a more natural composition. Beech woodland in the Chilterns is currently facing a decline due to very low market value for timber and damage to young trees by grey squirrels. The long-term sustainability of the juniper populations is uncertain due to the lack of natural regeneration and a poor ability to compete with other scrub species. Means of improving the prospects for juniper in the Chilterns are currently being investigated; a joint initiative between Natural England, local authorities and the local wildlife trust is in place.
Cothill Fen SAC	***Primary Habitats and Species*** ***7230 Alkaline fens*** *O*ne of the largest surviving examples of alkaline fen vegetation in central England, a region where fen vegetation is rare. The M13 *Schoenus nigricans – Juncus subnodulosus* vegetation found here occurs under a wide range of hydrological conditions, with frequent bottle sedge *Carex rostrata*, grass-of-Parnassus *Parnassia palustris*, common butterwort *Pinguicula vulgaris* and marsh helleborine *Epipactis palustris*. ***Qualifying features*** 91E0 Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)	The alkaline fens are subject to pressures from water pollution, hydrological changes and air pollution (atmospheric nitrogen depositions). No specific pressures have been identified on the qualifying features.
Epping Forest SAC	**Primary features** **9120 Atlantic acidophilous beech forests with *Ilex* and sometimes also *Taxus* in the shrublayer (*Quercion robori-petraeae* or *Ilici-Fagenion*)** -Epping Forest represents Atlantic acidophilous beech forests in the north-eastern part of the habitat's UK range. Although the epiphytes at this site have declined, largely as a result of air pollution, it remains important for a	After neglect of the pollard cycle for over 100 years, re-pollarding of ancient beech trees was started in the early 1990s, and creation of maiden pollards was begun in 1995. The forest's epiphytic bryophyte population had been declining due to the death of pollards, shading and pollution from acid rain. The reintroduction of pollarding and wood pasture management is

	range of rare species, including the moss *Zygodon forsteri*. The long history of pollarding, and resultant large number of veteran trees, ensures that the site is also rich in fungi and dead-wood invertebrates. **1083 Stag beetle *Lucanus cervus*** Epping Forest is a large woodland area in which records of stag beetle *Lucanus cervus* are widespread and frequent; the site straddles the Essex and east London population centres. Epping Forest is a very important site for fauna associated with decaying timber, and supports many Red Data Book and Nationally Scarce invertebrate species. **Qualifying features** **4010 Northern Atlantic wet heaths with *Erica tetralix*** **4030 European dry heaths**	helping to reverse the decline. The slow recovery can also be attributed to the reduction of atmospheric pollutants since the passing of the 1956 Clean Air Act. There is an active policy to leave felled timber on the ground to increase the habitat for stag beetle and other saproxylic insects. In 1988, the Corporation of London, who own and manage the forest, agreed a management strategy with Natural England to take forward the management outlined above. A comprehensive management plan was completed and consented in 1998. The site is subject to the provisions of the Epping Forest Act of 1878.
Hackpen Hill SAC	**Primary features** **1654 Early gentian *Gentianella anglica*** Hackpen Hill is an extensive area of unimproved chalk grassland in the Downs. The site has a variety of aspect and gradients, with the grassland dominated by red fescue *Festuca rubra* and upright brome *Bromus erectus*. The herb flora includes a significant population of early gentian *Gentianella anglica*. **Qualifying features** **6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia)** (* important orchid sites).	No current issues affecting the Natura 2000 feature(s) have been identified on this site.
Hartslock Wood SAC	***Primary Habitats and Species*** **1166 Great crested newt *Triturus cristatus*** Two main ponds set within mixed woodland that supports large numbers of this species. ***Primary Habitats and Species*** **6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia)** Hosts the priority habitat type "orchid rich sites". The steep slopes of this site on the chalk of the Chilterns comprise a mosaic of chalk grassland, chalk scrub and broadleaved woodland. The site supports one of only three UK populations of monkey orchid *Orchis simia*, a nationally rare Red Data Book species. ***91J0 Taxus baccata woods of the British Isles*** Open patches show a rich flora including local species such as southern wood-rush *Luzula forsteri*, wood barley *Hordelymus europaeus* and narrow-lipped helleborine *Epipactis leptochila*.	The grasslands are subject to pressures from air pollution (atmospheric nitrogen depositions). No issues affecting the other Natura 2000 feature(s) have been identified.

Kennet and Lamborne Floodplain SAC	**Primary features** **1016 Desmoulin`s whorl snail *Vertigo moulinsiana*** - The cluster of sites selected in the Kennet and Lambourn valleys supports one of the most extensive known populations of Desmoulin's whorl snail *Vertigo moulinsiana* in the UK and is one of two sites representing the species in the south-western part of its range in the important chalk stream habitat. Integrity of the population is being maintained by taking measures, including habitat creation, to safeguard populations. The habitat occupied at this site differs from the Fenland sites in East Anglia in that it is predominantly reed sweet-grass *Glyceria maxima* swamp or tall sedges at the river margins, in ditches and in depressions in wet meadows.	The majority of the *Vertigo moulinsiana* populations within the site are not considered to be under threat. Two of the component parts of the site lie immediately adjacent to the Newbury bypass. The road design has incorporated features to reduce possible impacts, such as spray and run-off. These measures are intended to prevent direct damage or habitat change to populations adjacent to the road. Monitoring is in place to determine the status of the populations potentially most at risk from impacts arising from the new road. The results of monitoring to date indicate that conditions for the species are favourable. Within the entire site, current management practises are maintaining the required open, unshaded conditions. The management of one component part is supported by Countryside Stewardship grant-aid. *V. moulinsiana* is critically dependent upon an adequate supply of high quality water. The Environment Agency and Natural England are working together to ensure that all parts of the site have appropriate water levels, through measures such as the production of water level management plans and regular monitoring of water quality.
Lee Valley SPA	**Article 4.1** Over winter: • Bittern *Botaurus stellaris*, 6 individuals representing at least 6.0% of the wintering population in Great Britain (5 year peak mean, 1992/3-1995/6) **Article 4.2** Over winter: • Gadwall *Anas strepera*, 515 individuals representing at least 1.7% of the wintering Northwestern Europe population (5 year peak mean 1991/2 - 1995/6) Shoveler *Anas clypeata*, 748 individuals representing at least 1.9% of the wintering Northwestern/Central Europe population (5 year peak mean 1991/2 - 1995/6)	The whole area is affected by rather eutrophic water quality. The other main threat is that of human recreational pressure, but this is already well regulated through zoning of water bodies within the Lee Valley Regional Park. The majority of the site is already managed in accordance with agreed management plans in which nature conservation is a high or sole priority. There is also a potential problem from over-extraction of surface water for public supply, particularly during periods of drought. This will be addressed through the Environment Agency review of consents. The threat from potential development pressures in this urbanised and urban-fringe area is largely covered by the relevant provisions of the Conservation Regulations (1994).

Lee Valley Ramsar	**Ramsar Criterion 2** The site supports the nationally scarce plant species whorled water-milfoil *Myriophyllum verticillatum* and the rare or vulnerable invertebrate *Micronecta minutissima* (a water-boatman). **Ramsar Criterion 6** Species/populations occurring at levels of international importance. Qualifying Species/populations (as identified at designation): *Species with peak counts in spring/autumn*: Northern shoveler, *Anas clypeata*, NW & C Europe 287 individuals, representing an average of 1.9% of the GB population (5 year peak mean 1998/9- 2002/3) *Species with peak counts in winter*: Gadwall , *Anas strepera strepera*, NW Europe 445 individuals, representing an average of 2.6% of the GB population (5 year peak mean 1998/9-2002/3).	No factors are reported to be adversely affecting the site's ecological character.
Little Wittenham SAC	***Primary Habitats and Species*** **1166 Great crested newt *Triturus cristatus*** Two main ponds set within mixed woodland that supports large numbers of this species.	Little Wittenham is managed primarily for nature conservation and environmental education. The great crested newt population has been the subject of intensive research and ongoing management includes the provision of new ponds and the creation of hibernation sites. The great crested newt population appears to be relatively stable and is not considered to be under any known threat.
North Meadow and Clattinger Farm SAC	***Primary Habitats and Species*** **6510 Lowland hay meadows (*Alopecurus pratensis, Sanguisorba officinalis*)** This site represents an exceptional survival of the traditional pattern of management for hay meadows with unique vegetation communities. The site also contains a very high proportion of fritillary *Fritillaria meleagris* (>90% of the surviving UK population), a rare species highly characteristic of damp lowland meadows.	These grasslands are partly a National Nature Reserve (NNR), with the other part owned by a wildlife charity. The habitat is dependent on traditional agricultural practices of hay-cutting with aftermath cattle grazing or seasonal cattle grazing. These management requirements are addressed in the NNR management plan and in a site management statement concerning the private land which stipulates an appropriate regime. The wildlife charity is developing a management plan with Natural England to secure the long-term maintenance of the interest feature. However the traditional hay meadow management is uneconomic in the present agricultural climate and support through agri-environment payments or a management agreement may be required in the long-term. Adjacent extraction and renovation of gravel workings are a potential threat to water levels and are subject to monitoring and mitigation measures.

Oxford Meadows SAC	***Primary Habitats and Species*** **6510 Lowland hay meadows (*Alopecurus pratensis, Sanguisorba officinalis*)** Hay meadows with unique vegetation communities reflecting the influence of long-term grazing and hay-cutting on lowland hay meadows. **1614 Creeping Marshwort *Apium repens*** Port Meadow is part of the wider Oxford Meadows site and is one of only two known sites, for this species, in the UK.	The special interest of the site is critically dependent upon groundwater levels and annual flooding, and the site is very sensitive to changes in groundwater levels. Several of the component parts are dependent upon traditional hay-cutting and aftermath grazing. ESA payments provide financial support for this management. Gravel extraction is taking place adjacent to one of the component parts. Safeguards and monitoring are in place to minimise the risk of damage to the site due to groundwater changes arising from this activity. Port Meadow is registered Common Land with common grazing rights administered by the Freemen of Oxford and Wolvercote Commoners' Committee. Stocking levels are high and grazing takes place throughout the year. The impact of this high grazing pressure upon *Apium repens* is under investigation as part of a wider programme of research into the ecology of the species. At present, it is thought that *A. repens* is tolerant if not dependent upon this management regime. Groundwater levels and flooding events on Port Meadows are monitored, as is the distribution of *A. repens* on the site.
Richmond Park SAC	**Primary features** **1083 Stag beetle *Lucanus cervus*** Richmond Park has a large number of ancient trees with decaying timber. It is at the heart of the south London centre of distribution for stag beetle *Lucanus cervus*, and is a site of national importance for the conservation of the fauna of invertebrates associated with the decaying timber of ancient trees.	The site is surrounded by urban area and therefore experiences high levels of recreational pressure. The whole site has been declared a NNR.

River Lambourn SAC	**Primary features** **3260 Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation -** The Lambourn is an example of sub-type 1 in central southern England, a chalk stream discharging into the middle reaches of the Thames system. For part of its length it is a winterbourne, drying through the summer months. It is one of the least-modified rivers of this type, with a characteristic flora dominated by pond water-crowfoot *Ranunculus peltatus*. In the downstream perennial sections *R. peltatus* is replaced by stream water-crowfoot *R. penicillatus* var. *pseudofluitans*. **1163 Bullhead Cottus gobio** - The Lambourn represents bullhead *Cottus gobio* populations inhabiting chalk streams in central southern England. Good water quality, coarse sediments and extensive beds of submerged plants again provide excellent habitat for the species. **Qualifying features** **1096 Brook lamprey *Lampetra planeri***	The River Lambourn is considered to have one of the least modified catchments in southern England and has one of the lowest levels of abstraction. Water quality, water quantity and habitat quality are all considered to be high. However, localised higher water nutrient levels and siltation problems are at present associated with sewage treatment works. Measures to reduce these problems have been investigated through the AMP3 water company investment programme. Natural England and the Environment Agency have produced an agreed protocol for dealing with issues affecting the river.
South West London Waterbodies SPA	**Article 4.2** *Overwinter:* • Gadwall *Anas strepera*, 786 individuals representing at least 2.6% of the wintering Northwestern Europe population (5 year peak mean 1991/2 - 1995/6) Shoveler *Anas clypeata*, 1,075 individuals representing at least 2.7% of the wintering Northwestern/Central Europe population (5 year peak mean 1991/2 - 1995/6).	There is an issue surrounding the potential future decommissioning of reservoirs once they are no longer required for the purposes of water supply; as well as the potential impacts of maintenance works, which may require winter draw-down of reservoirs. Discussions will be required with the current owners and occupiers regarding the future management, maintenance and decommissioning of the larger reservoirs, in order to maintain the site's interest. The threat from potential development pressures in this urbanised and urban-fringe area is largely covered by the relevant provisions of the Conservation Regulations (1994). Issues such as arresting (or locally reversing) vegetation succession will be addressed via management plans. Levels of disturbance from recreational activities on one part of the site will be monitored in the winter months to determine their effects on the interest of the site.
South West London Waterbodies, Ramsar	**Ramsar Criterion 6** Supports species/populations occurring at levels of international importance; Northern shoveler (2.6% of GB population in spring) and gadwall (2.8% of GB population over winter).	There is an issue regarding potential disturbance from recreational activities during the winter months.

Thames Basin Heaths SPA	A composite site of open heathland habitats that is located across the counties of Surrey, Hampshire and Berkshire in southern England. **Article 4.1** During the breeding season the site supports a number of Annex I species; Dartford Warbler *Sylvia undata* (considered to represent at least 27.8% of the breeding population in GB), Nightjar *Caprimulgus europaeus*, (considered to represent at least 7.8% of the breeding population in GB) and Woodlark *Lullula arborea*, (considered to represent at least 9.9% of the breeding population in GB)	The mosaic of habitats which form the internationally important lowland heathland are dependent on active heathland management. Lack of grazing and other traditional management practices therefore pose a threat. Development pressure on neighbouring land and the cumulative and indirect effects of neighbouring developments also pose a potential long-term problem. Housing developments are particularly relevant in this part of south-east England. This has been addressed through Natural England commenting on planning applications and providing input to structural and local plans. A strategic approach to accommodating development whilst ensuring compatibility with the Habitats Regulations is being addressed through the Thames Basin Heaths Area Based Delivery Project. Tenure is a mixture of public bodies, private landowners, local authorities and non-governmental organisations. The Ministry of Defence are significant landowners/managers. At present the MoD land is used principally for firing ranges and military exercises (predominantly on foot). A significant proportion of the site is local authority-owned land. The local authority land is often designated as Public Open Space and is heavily used for informal recreation. For the smaller private ownerships, conservation management has been addressed through the Site Management Statement process.

Thursley, Ash, Pirbright and Chobham SAC	**4010 Northern Atlantic wet heaths with *Erica tetralix*** **4030 European dry heaths** Supports a number of rare species including European nightjar, Dartford warbler, sand lizard (*Lacerta agilis*) and smooth snake (*Coronella austriaca*) **7150 Depressions on peat substrates of the *Rhynchosporion***	The mosaic of habitats across this large and varied site is largely dependent on active heathland management. Insufficient grazing or other traditional practices, including bracken control and scrub clearance, is therefore a serious potential threat, as is lowering of water tables as a result of water abstraction or other reasons which could cause loss or damage to wet heath and mire communities. Grazing trials have been established on several parts of the site with great success, but currently extensive grazing is absent from much of the site. The indirect effects of neighbouring housing developments pose a potential long-term problem, but can probably be addressed through the planning system. Measures are also needed to address recreational pressures, including disturbance to wildlife and fires resulting from arson, which may pose a serious risk to habitats and some species. The Ministry of Defence is a major landowner/manager and, at present, uses much of its land for firing ranges and military exercises (largely by infantry). A Memorandum of Understanding exists between Natural England and the MoD through which the impact of military activities is regulated. The MoD have produced comprehensive Management Plans which recognise the outstanding nature conservation importance of their land.

Windsor Forest and Great Park SAC	**Primary features** **9190 Old acidophilous oak woods with *Quercus robur* on sandy plains** Windsor represents old acidophilous oak woods in the south-eastern part of its UK range. It has the largest number of veteran oaks *Quercus* spp. in Britain (and probably in Europe), a consequence of its management as wood-pasture. It is of importance for its range and diversity of saproxylic invertebrates, including many rare species (e.g. the beetle *Lacon querceus*), some known in the UK only from this site, and has recently been recognised as having rich fungal assemblages. Windsor Forest and Great Park has been identified as of potential international importance for its saproxylic invertebrate fauna by the Council of Europe **1079 Violet click beetle *Limoniscus violaceus*** Violet click beetle *Limoniscus violaceus* was first recorded at Windsor Forest in 1937. The site is thought to support the largest of the known populations of this species in the UK. There is a large population of ancient trees on the site, which, combined with the historical continuity of woodland cover, has resulted in Windsor Forest being listed as the most important site in the UK for fauna associated with decaying timber on ancient trees. The site was also identified as of potential international importance for its saproxylic invertebrate fauna by the Council of Europe. **Qualifying features** **9120 Atlantic acidophilous beech forests with *Ilex* and sometimes also *Taxus* in the shrublayer (*Quercion robori-petraeae* or *Ilici-Fagenion*).**	The special invertebrate interest is heavily dependent upon a continuous supply of very old and decaying trees. Both the invertebrate interest and oak woodland are vulnerable to changes in management practices. However, fine-tuning to achieve continuity of sympathetic management is being undertaken through the Declaration of Intent signed between Natural England and the owners, the Crown Estate. The violet click beetle is thought to be present as a very small, localised population, restricted to two decaying trees. Research into its ecology with a view to gaining a better understanding of its habitat requirements is currently in progress. Management to enhance the conservation value of the wooded areas is being undertaken with financial support through a WGS scheme. This includes the removal of competing trees from around veteran trees, bracken control and clearance of Rhododendron. In addition, a large number of trees have been identified for retention as future veteran trees to ensure continuity of supply of dead wood habitats.
Wormley-Hoddesdonpark Woods SAC	**Primary features** **9160 Sub-Atlantic and medio-European oak or oak-hornbeam forests of the Carpinion betuli** Large stands of almost pure hornbeam *Carpinus betulus* (former coppice), with sessile oak *Quercus petraea* standards.	The habitat is being threatened by; disease (Acute Oak Decline), non-native invasive species, air pollution (atmospheric nitrogen deposition), damage from deer grazing, illicit vehicles, lack of or inappropriate forestry and woodland management, and poor control of public access.