Habitat Regulations Assessment

Thorpe Neighbourhood Plan

June 2020

Quality information

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1. Introduction

Scope of the Project

1.1 AECOM was appointed by Thorpe Neighbourhood Forum ('the Forum') to assist in undertaking a Habitats Regulations Assessment (HRA) for the Pre-submission Thorpe Neighbourhood plan (NP) drafted November 2019. This is for the purpose of informing Thorpe Neighbourhood Forum and Runnymede Borough Council of the potential effects on European Sites and how they are being addressed in the Neighbourhood Plan.

1.2 Runnymede Borough Council's Local Plan 2030 ("LP Document") has been subject to several iterations of HRA since June 2016, with the most recent iteration in May 2018 and has been found by The Planning Inspectorate subject to Main Modifications. The primary focus of the HRA was to assess air quality, water quality, species disturbance and recreational pressure matters with regards to the Thames Basin Heaths SPA, Windsor Forest & Great Park SAC and South West London Water Bodies SPA and Ramsar. These impacts were also assessed in combination with development in surrounding local authorities and this allowed the HRA to recommended policy mechanisms to protect European Sites. These are now reflected in the Runnymede Local Plan (LP).

1.3 At the time of HRA preparation for the Runnymede Local Plan, site allocations for residential development within Thorpe village were not identified (as these allocations were to be made by the Neighbourhood Plan) and were therefore not assessed at a Site level. The HRA of the Local Plan was based on c. 7,500 net new dwellings within Runnymede Borough over the plan period. This has now been increased as part of the Main Modifications to 7,920 dwellings to account for completions which were consented and delivered and were found to have no adverse effects on European sites once mitigation was considered. Since the Main Modifications HRA has confirmed that the conclusions of the Local Plan HRA have not changed regarding strategic matters, the objective of this particular HRA is to identify if any particular site allocations in the Neighbourhood Plan and/or policies have the potential to cause an adverse effect on the integrity of Natura 2000 or European designated sites (Special Areas of Conservation, SACs, Special Protection Areas, SPAs, and Ramsar sites designated under the Ramsar convention), either in isolation or in combination with other plans and projects, and to determine whether site-specific mitigation measures are required

Legislation

1.4 The need for HRA is set out within Article 6 of the EC Habitats Directive 1992 and interpreted into British law by the Conservation of Habitats & Species Regulations 2017 (as amended). The ultimate aim of the Habitats Directive is to "maintain or restore, at favourable conservation status, natural habitats and species of wild fauna and flora of Community interest" (Habitats Directive, Article 2(2)). This aim relates primarily to habitats and species, and designated sites that have a significant role in delivering favourable conservation status. European sites (also called Natura 2000 sites) can be defined as actual or proposed/candidate Special Areas of Conservation (SAC) or Special Protection Areas (SPA). It is also Government policy for sites designated under the Convention on Wetlands of International Importance (Ramsar sites) to be treated as having equivalent status to Natura 2000 sites.

1.5 The Habitats Directive applies the precautionary principle to protected areas. Plans and projects can only be permitted having ascertained that there will be no adverse effect on the integrity of the site(s) in question. This is in contrast to the SEA Directive which does not prescribe how plan or programme proponents should respond to the findings of an environmental assessment; merely that the assessment findings (as documented in the 'environmental report') should be 'taken into account' during preparation of the plan or programme. In the case of the Habitats Directive, plans and projects may still be permitted if there are no alternatives to them and there are Imperative Reasons of Overriding Public Interest (IROPI) as to why they should go ahead. In such cases, compensation would be necessary to ensure the overall integrity of the site network.

Box 1: The legislative basis for HRA

Habitats Directive 1992

Article 6 (3) states that:
"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."

Conservation of Habitats and Species Regulations 2017 (as amended)

With specific reference to Neighbourhood Plans, Regulation 106(1) states that:
'A qualifying body which submits a proposal for a neighbourhood development plan must provide such information as the competent authority [the Local Planning Authority] *may reasonably require for the purposes of the assessment under regulation 105* [which sets out the formal process for determination of 'likely significant effects' and the 'appropriate assessment']...'.

1.6 Over the years, 'Habitats Regulations Assessment' (HRA) has come into wide currency to describe the overall process set out in the Habitats Regulations, from screening through to identification of IROPI. This has arisen in order to distinguish the overall process from the individual stage of "Appropriate Assessment". Throughout this Report the term HRA is used for the overall process and restricts the use of Appropriate Assessment to the specific stage of that name.

1.7 It is therefore important to note that this report has two purposes:

- To assist the Qualifying Body (the Neighbourhood Plan Group) in preparing their plan by recommending (where necessary) any adjustments required to protect European sites, thus making it more likely their plan will be deemed compliant with the Conservation of Habitats and Species Regulations 2017 (as amended); and
- On behalf of the Qualifying Body, to assist the Local Planning Authority to discharge their duty under Regulation 105 (in their role as 'plan-making authority' within the meaning of that regulation) and Regulation 106 (in their role as 'competent authority').

1.8 As 'competent authority', the legal responsibility for ensuring that a decision of 'likely significant effects' is made, for ensuring an 'appropriate assessment' (where required) is undertaken, and for ensuring Natural England are consulted, falls on the local planning authority and the Neighbourhood Plan examiner. However, they are entitled to request from the Qualifying Body the necessary information on which to base their judgment and that is a key purpose of this report.

1.9 Natural England were consulted upon a draft of this HRA report during the Regulation 14 consultation into the Neighbourhood Plan but had no comments to make.

2. Methodology

Introduction

2.1 This section sets out the approach and methodology for undertaking the HRA. HRA itself operates independently from the Planning Policy system, being a legal requirement of a discrete Statutory Instrument. Therefore, there is no direct relationship to the 'Test of Soundness'.

2.2 The HRA is being carried out in the absence of formal Government guidance. The Department for Communities and Local Government (DCLG, now MHCLG) released a consultation paper on Appropriate Assessment (AA) of Plans in 2006[1]. As yet, no further formal guidance has emerged specifically regarding HRA of plans, although government has released general guidance on HRA[2]. Moreover, Court Judgements can be used to shape the approaches used.

2.3 The draft DCLG guidance[3] makes it clear that when implementing HRA of land-use plans, the AA should be undertaken at a level of detail that is appropriate and proportional to the level of detail provided within the plan itself: "*The comprehensiveness of the [Appropriate] assessment work undertaken should be proportionate to the geographical scope of the option and the nature and extent of any effects identified. An AA need not be done in any more detail, or using more resources, than is useful for its purpose. It would be inappropriate and impracticable to assess the effects* [of a strategic land use plan] *in the degree of detail that would normally be required for the Environmental Impact Assessment (EIA) of a project*." More recently, the Court of Appeal[4] ruled that providing the Council (competent authority) was duly satisfied that proposed mitigation could be 'achieved in practice' to avoid an adverse effect, then this would suffice. This ruling has since been applied to a planning permission (rather than a Local Plan)[5]. In this case the High Court ruled that for '*a multistage process, so long as there is sufficient information at any particular stage to enable the authority to be satisfied that the proposed mitigation can be achieved in practice it is not necessary for all matters concerning mitigation to be fully resolved before a decision maker is able to conclude that a development will satisfy the requirements of reg. 61 of the Habitats Regulations*'.

2.4 In other words, there is a tacit acceptance that HRA can be tiered and that all impacts are not necessarily appropriate for consideration to the same degree of detail at all tiers.

2.5 **Figure 1** below outlines the stages of HRA according to current draft DCLG guidance. The stages are essentially iterative, being revisited as necessary in response to more detailed information, recommendations and any relevant changes to the plan until no significant adverse effects remain.

[1] DCLG (was CLG) (2006) Planning for the Protection of European Sites, Consultation Paper
[2] https://www.gov.uk/guidance/appropriate-assessment
[3] Ibid
[4] No Adastral New Town Ltd (NANT) v Suffolk Coastal District Council Court of Appeal, 17th February 2015
[5] High Court case of R (Devon Wildlife Trust) v Teignbridge District Council, 28 July 2015

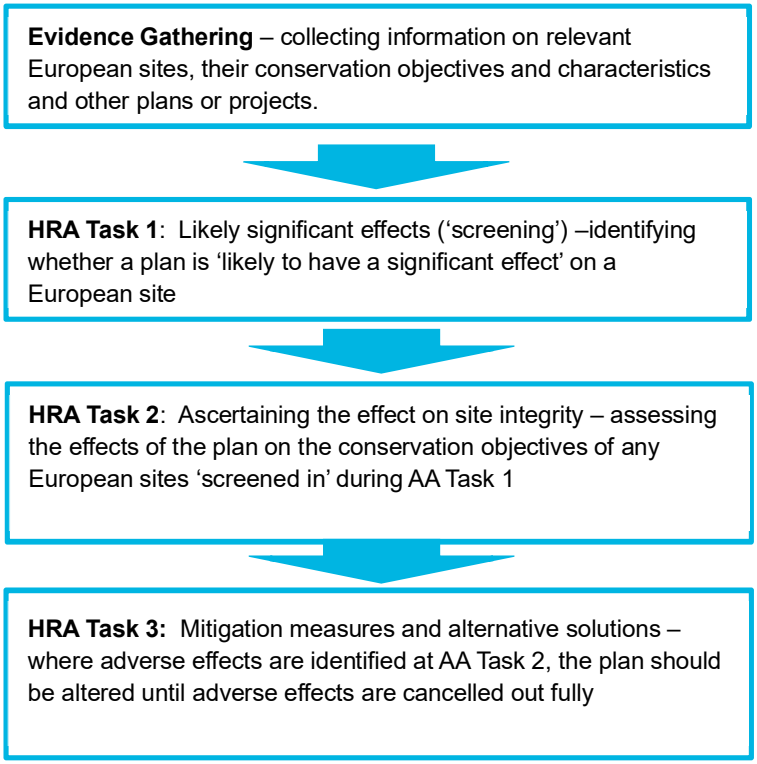


Figure 1: Four-Stage Approach to Habitats Regulations Assessment (Source: CLG, 2006)

Likely Significant Effects (LSE)

2.6 The first stage of any Habitats Regulations Assessment (HRA Task 1) is a Likely Significant Effect (LSE) test - essentially a risk assessment to decide whether the full subsequent stage known as Appropriate Assessment is required. The essential question is:

2.7 "Is the Plan, either alone or in combination with other relevant projects and plans, likely to result in a significant effect upon European sites?"

2.8 The objective is to 'screen out' those plans and projects that can, without any detailed appraisal, be said to be unlikely to result in significant adverse effects upon European sites, usually because there is no mechanism for an adverse interaction with European sites.

HRA Task 2 – Appropriate Assessment (AA)

2.9 Where it is determined that a conclusion of 'no likely significant effect' cannot be drawn the analysis has proceeded to the next stage of HRA known as Appropriate Assessment. Case law has clarified that 'appropriate assessment' is not a technical term. In other words, there are no particular technical analyses, or level of technical analysis, that are classified by law as belonging to appropriate assessment rather than determination of likely significant effects.

2.10 One of the key considerations during appropriate assessment is whether there is available mitigation that would entirely/ appropriately address the potential effect. This reflects a recent decision by the European Court of Justice[6] that concludes that measures intended to avoid or reduce the harmful effects of a proposed project on a European site cannot be taken into account at the Likely Significant Effects or 'screening' stage of HRA. In practice, the appropriate assessment takes any policies or allocations that could not be dismissed following the determination of Likely Significant Effects with a view to concluding whether there would actually be an adverse effect on integrity (in other words, disruption of the coherent structure and function of the European site(s)).

[6] People Over Wind and Sweetman v Coillte Teoranta (C-323/17)

HRA Task 3 – Avoidance and Mitigation

2.11 Where necessary, measures are recommended for incorporation into the Plan in order to avoid or mitigate adverse effects on European sites. There is considerable precedent concerning the level of detail that a plan needs to contain regarding mitigation. The implication of this precedent is that it is not necessary for all measures that will be deployed to be fully developed prior to adoption of the Plan, but the Plan must provide an adequate policy framework within which these measures can be delivered.

2.12 This fits with the advice of Advocate-General Kokott[7] who commented that: *'It would …hardly be proper to require a greater level of detail in preceding plans [rather than planning applications] or the abolition of multi-stage planning and approval procedures so that the assessment of implications can be concentrated on one point in the procedure. Rather, adverse effects on areas of conservation must be assessed at every relevant stage of the procedure to the extent possible on the basis of the precision of the plan. This assessment is to be updated with increasing specificity in subsequent stages of the procedure'.*

2.13 In evaluating significance, AECOM has relied on professional judgement as well as the results of previous stakeholder consultation regarding development impacts on the European sites considered within this assessment.

2.14 When discussing 'mitigation' for the proposed development sites, one is concerned primarily with the policy framework to enable the delivery of such mitigation rather than the details of the mitigation measures themselves since the Neighbourhood Plan document is a high-level policy document.

Confirming Other Plans and Projects that may act 'In combination'

2.15 It is a requirement of the Regulations that the impacts and effects of any plan being assessed are not considered in isolation but in combination with other plans and projects that may also be affecting the European site(s) in question.

Table 1. Other projects and plans that may act 'in-combination' to the development of Thorpe NP.

Plans
Ascot, **Sunninghill** and **Sunningdale** Neighbourhood Plan 2011-2026, adopted 2014
Elmbridge Core Strategy 2011, new Local Plan consultation 2019
Eton and **Eton Wick** Neighbourhood Plan 2016-2036, adopted 2018
Horton and Wraysbury Neighbourhood Plan 2017-2032, Updated 2019
Old Windsor Neighbourhood Plan 2019, post-examination 2019
Runnymede Local Plan 2030, draft 2018, Main Modifications 2020
Spelthorne Borough Council Draft Statement of Five Year Housing Supply, 2019. Spelthorne Core Strategy 2009
Surrey Heath Draft Local Plan Issues Options/Preferred Options, 2018. Surrey Heath Core Strategy 2012.
Windsor and **Maidenhead** Local Plan 2013-2033, Submitted 2017
Woking Core Strategy 2012, Local Plan Part 2 going through Examination 2019

[7] Opinion of Advocate General Kokott, 9th June 2005, Case C-6/04. Commission of the European Communities v United Kingdom of Great Britain and Northern Ireland, paragraph 49. http://curia.europa.eu/juris/document/document.jsf?docid=58359&doclang=EN

3. Internationally Designated Sites

South West London Waterbodies SPA and Ramsar

Introduction

3.1 The South West London Waterbodies SPA and Ramsar is underpinned by a total of seven SSSI units, including Kempton Park Reservoirs SSSI, Kinght and Bessborough Reservoirs SSSI, Staines Moor SSSI, Thorpe Park No. 1 Gravel Pits SSSI, Wraybury and Hythe End Gravel Pits SSSI, Wraysbury No. 1 Gravel Pits SSSI and Wray Reservoir SSSI[8].

3.2 Those of significant relevance to Thorpe village is Thorpe Park No. 1 Gravel Pits SSSI since this site lies within the Thorpe village boundary. Also located within close distance from Thorpe village includes Staines Moor SSI, Wraybury and Hythe End Gravel Pits SSSI, Wraybury Reservoir SSSI and Wraysbury No. 1 Gravel Pit SSSI.

Reasons for SPA Designation[9]

3.3 The site qualifies under article 4.2 of the Directive (79/409/EEC) as it is used regularly by 1% or more of the biogeographical populations of the following regularly occurring migratory species (other than those listed on Annex 1), in any season:

- Gadwall *Anas strepera*
- Shoveler *Anas clypeata*

3.4 It has been recorded that 84% of non-breeding birds assemblages within SPA are in favourable condition.

3.5 Thorpe Park No. 1 Gravel Pit, in particular, is a former gravel pit that has been subject to habitat creation schemes. As a result, planted and natural colonised habitats are matured to a relatively stable ecological state with the banks being almost entirely dominated by broadleaved trees and shrubs[10].

Reason for Ramsar Designation[11]

3.6 This site is designated under Ramsar Criterion 6. Species with peak counts in autumn:

- Northern shoveler, *Anas clypeata*

3.7 Species with peak counts in winter:

- Gadwall, *Anas strepera*

3.8 It has been recorded that 88% of non-breeding birds assemblages within Ramsar are in favourable condition.

Historic Trends and Current Pressures[12]

3.9 The South-West London Waterbodies SPA comprises several gravel pits and reservoirs scattered around Staines in Greater London. There are several pressures and threats that are considered to impact South West London Waterbodies these include:

- Public access and disturbance issues;
- Changes in species distributions;
- Invasive species;

8 https://designatedsites.naturalengland.org.uk/SiteDetail.aspx?SiteCode=S2000382&SiteName=&countyCode=41&responsiblePerson=&unitId=&SeaArea=&IFCAArea=

9 https://www.bto.org/sites/default/files/shared_documents/publications/research-reports/2004/rr361.pdf

10 https://designatedsites.naturalengland.org.uk/PDFsForWeb/Citation/2000382.pdf

11 http://archive.jncc.gov.uk/pdf/RIS/UK11065.pdf

12 http://publications.naturalengland.org.uk/publication/6662064386867200

- Natural changes to site conditions;
- Fisheries: fish stocking; and
- Inappropriate weed control.

Windsor Forest and Great Park SAC

Introduction

3.10 Windsor Forest and Great Park SAC 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.

Reasons for Designation[13]

3.11 The SAC supports a number of Ann I habitats that are of importance these include:

- Old acidophilous oak woods with Quercus robur on sandy plains (as described above); and
- Atlantic acidophilous beech forests with Ilex and sometimes also Taxus in the shrublayer (Quercion robori-petraeae or Ilici-Fagenion) (a qualifying feature but not the primary reason or designation).

3.12 Annex II species that are the primary reason for selection includes:

- Violet click beetle *Limoniscus violaceus*

Historic trends and current pressures

3.13 The SAC is thought to support the largest of the known populations in the UK of European important Violet click beetle *Limoniscus violaceus*. It is also recognised as having rich fungal assemblages. Atlantic acidophilous beech forest habitat (H9120) is present at the site and supports many of the important invertebrate and fungi assemblage. As a result, there are several pressures and threats that are considered to impact the SAC, these include:

- Appropriate management for Violet click beetle habitat;
- Appropriate management for veteran trees;
- Invasive species;
- Air pollution;
- Disease; and
- Habitat fragmentation.

Thursley, Ash, Pirbright and Chobham SAC

Introduction

3.14 Thursley, Ash, Pirbright and Chobham SAC supports a variety of habitats that include wet heath and mires, dry heath and broadleaved woodland.

Reasons for designation[14]

3.15 Thursley, Ash, Pirbright and Chobham SAC supports a number of Annex I habitats, these include:

- 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

[13] https://sac.jncc.gov.uk/site/UK0012586
[14] https://sac.jncc.gov.uk/site/UK0012793

plants, including great sundew Drosera anglica, bog hair-grass Deschampsia setacea, bog orchid Hammarbya paludosa and brown beak-sedge Rhynchospora fusca. There are transitions to valley bog and dry heath. Thursley Common is an important site for invertebrates, including the nationally rare white-faced darter Leuccorhinia dubia.

- 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. This heath type has a marked south-eastern and southern distribution. 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, European nightjar *Caprimulgus europaeus*, Dartford warbler *Sylvia undata*, sand lizard *Lacerta agilis* and smooth snake *Coronella austriaca*.
- 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. The vegetation is found in natural bog pools of patterned valley mire and in disturbed peat of trackways and former peat-cuttings.

Historic trends and current pressures[15]

3.16 Thursley, Ash, Pirbright and Chobham SAC forms part of an extensive complex of lowland heathland, acid grassland, mire and commercial conifer plantations in south east England. The complex is located close to urbanization and therefore a number of pressures and threats currently impact the site, these include:

- Public access disturbance issues;
- Management issues (undergrazing);
- Forestry and woodland management;
- Hydrological changes;
- Inappropriate scrub control;
- Invasive species;
- Wildfire/ arson;
- Air pollution;
- Military; and
- Habitat fragmentation.

Thames Basin Heaths SPA

Introduction

3.17 The Thames Basin Heaths Special Protection Area (SPA) consists of a number of fragments of lowland heathland scattered across Surrey, Hampshire and Berkshire. It is predominantly dry and wet heath but also includes area of deciduous woodland, gorse scrub, acid grassland and mire, as well as associated conifer plantations. Around 75% of the SPA has open public access being either common land or designated as open country under the Countryside and Rights of Way Act 2000. The SPA consists of 13 Sites of Special Scientific Interest. Three of the SSSIs are also designated as part of the Thursley, Ash, Pirbright and Chobham Special Area of Conservation, though these parts of the SAC (see Chapter 6) lie outside of Runnymede Borough.

3.18 The location of the Thames Basin Heaths SPA has resulted in the area being subject to high development pressure. English Nature (now Natural England) published a Draft Delivery Plan for the Thames Basin Heaths SPA in May 2006, partly in response to the European Court of Justice ruling of October 2005. This

[15] http://publications.naturalengland.org.uk/publication/6249258780983296

is updated by the 'Thames Basin Heaths Special Protection Delivery Framework' published by the Thames Basin Heaths Joint Strategic Partnership Board in January 2009. These documents aim to allow a strategic approach to accommodating development by providing a method through which local authorities can meet the requirements of the Conservation of Habitats and Species Regulations through avoidance and mitigation measures.

Reasons for Designation[16]

3.19 Thames Basin Heaths SPA qualifies under Article 4.1 of the Birds Directive (79/409/EEC) by supporting populations of European importance of the following species listed on Annex I of the Directive:

3.20 During the breeding season:

- Nightjar *Caprimulgus europaeus*
- Woodlark *Lullula arborea*
- Dartford warbler *Sylvia undata*

3.21 These species nest on or near the ground and as a result are susceptible to predation and disturbance.

Historic trends and current pressures

3.22 The Thames Basin Heaths coincides with one of the most densely populated parts of the UK and attracts an estimated 5.36 million visitors per annum to the SPA, 4.45 million of whom arrive by car. Research (Liley, Jackson & Underhill-Day, 2005) established that 100% of visitors on foot arrived from within 5km, with 93% of people arriving by bicycle and 70% of people arriving by car from within the 5km zone covered by the Thames Basin Heaths Delivery Framework. Therefore 1.33 million people travel for over 5 kilometres to the SPA, with the report stating that "*the majority of people travelling by car came from within a radius of 15km*".

3.23 The latest Natural England condition assessment indicated that almost 100% of the site was recovering from an unfavourable status. The appraisal identified that habitats present were beginning to approach target conditions, largely as a result of improved management, primarily through grazing.

[16] http://archive.jncc.gov.uk/default.aspx?page=2050

4. Likely Significant Effects

Introduction

4.1 The historic village of Thorpe is located in the administrative area of Runnymede Borough Council and forms part of the Thorpe Ward. In total, approximately 79% of the Borough is located in the Green Belt, this includes Thorpe village and the designated neighbourhood area. However, the new Local Plan proposes to inset Thorpe village from the Green Belt.

4.2 The village lies immediately to the east of the M25 motorway with its interchange with the M3 and is located between the main towns of Egham, Staines and Chertsey, the latter being the closest neighbour. Heathrow Airport is approximately 10 miles away. Other neighbouring settlements include Thorpe Lea/Egham Hythe, Lyne, Virginia Water, Trumpsgreen, Stroude and Longcross.

4.3 Based upon previous HRA work undertaken for Runnymede Council LP, there are several pathways of impact that require analysis regarding increased development within the Thorpe NP. These are:

- Air quality;
- Water quality;
- Species disturbance;
- Recreational pressure; and
- Urbanisation.

4.4 Table 2 identifies the environmental impact pathways to the European Sites identified in section 3 due to increased development within the Thorpe NP.

Table 2. How each European Site could be susceptible to the above impact pathways due to increased housing proposed by Thorpe NP and associated development policies.

Impact pathway	Description
Air quality	Increased residential development within Thorpe village will lead to a greater number of vehicles. As such, increased air pollution is expected from vehicles emissions. Pollutants realised from vehicles may be carried directly by wind currents and deposited to European Sites or pollutants may become soluble and taken up during evaporation and deposited to European Sites at precipitation.
Water quality (surface water runoff)	Increased residential development within Thorpe village could lead to the loss of previously undeveloped land and therefore increased surface water runoff to nearby European Sites.
Water quality (discharge of treated sewage effluent)	Increased housing development within Thorpe village will lead to increase sewage production. It is therefore necessary to consider any risk that increased sewage could degrade the water quality (i.e. through increased phosphorus discharge) of the South West London Waterbodies SPA and Ramsar when in the absence of environmental mitigation and adequate wastewater treatment works[17]. However, the wastewater treatment works that serves Thorpe is Chertsey Sewage Treatment Works. Although this discharges to the River Thames approximately 1.7km upstream of Thorpe Gravel Pit No. 1 the Runnymede Water Cycle Study (2018) concluded that it is unlikely the planned increase in growth within the catchment of Chertsey WwTW will have a significant detrimental effect on hydrologically sensitive statutory designated sites, largely due to the lack of direct connectivity between the River Thames and water quality in the gravel pits. This pathway therefore does not need further discussion.
Water abstraction	Increased residential development within Thorpe village will lead to increased water uses within the area and by default increased water abstraction. Increased water abstraction could degrade the habitat structure of European Sites and therefore impact their ability to

[17] Jarvie, H. P., Neal, C., & Withers, P. J. (2006). Sewage-effluent phosphorus: a greater risk to river eutrophication than agricultural phosphorus?. *Science of the total environment*, *360*(1-3), 246-253.

	ability to support designated features. Water abstraction and construction controls are recognised by Affinity Water in their Water Resources Management Plan 2020-2080[18].
Recreational pressure and Species disturbance	Increased residential development within Thorpe village could lead to an 'in combination' increase in visitors to both the South West London Waterbodies SPA and Ramsar (depending on the location of housing within the village) as this European Site is located inside the NP area. For example, the nature, scale, timing and duration of some human activities can result in the disturbance of birds at a level that may substantially affect their behaviour, and consequently affect the long-term viability of the population. Recreational pressure is also a consideration for the Thames Basin Heaths SPA.
Urbanisation	Increased urbanisation could lead to likely significant effects to European Sites. In particular, increased residential development within 5km (and particularly 400m) of the Thames Basin Heath SPA could increase cat predation to ground nesting birds and chicks reducing breeding success of Annex II species.
Disturbance of functionally linked habitat	There are a range of other waterbodies around the South West London Waterbodies SPA that are known to provide important supporting foraging or roosting habitat for the two species of duck for which the SPA is designated. It is therefore assessed that Thorpe supports functionally linked habitat that could be of importance to designated features of the South West London Waterbodies SPA and Ramsar.

4.5 For the Screening assessment (Table 3) green shading in the final column indicates that the proposed development site or policy has been deemed not to lead to a likely significant effect on any European sites due to the absence of any mechanism for an adverse effect. Orange shading indicates that a pathway of impact potentially exists, and further discussion is therefore required. For the purposes of this assessment a 5km zone of influence is used around each European Site. A 5km zone is chosen because a) this is the zone within which a series of HRAs have identified that all net new housing will have an adverse effect on the integrity of Thames Basin Heaths SPA without mitigation and b) the HRA of the Runnymede LP recommended that Neighbourhood Plan or development proposals should undertake a project-level HRA on all developments located within 5km of the Thames Basin Heaths SPA.

4.6 **Note: Thames Basin Heath SPA and Thursley, Ash, Pirbright and Chobham SAC overlap at their closest location to Thorpe village. Therefore, these European Sites are collectively referred to as Thames Basin Heath SPA for the purpose of the screening exercise.**

[18]Affinity water (2019) Draft Final Water Resource Management Plan. [Online] Available from: https://www.affinitywater.co.uk/docs/corporate/plans/water-resources/latest/Draft_Final_Water_Resources_Management_Plan_2019_Published_June_2019.pdf, accessed 29/10/2019

Table 3. Screening outcome of likely significant effects.

Policy	Designated Site location	Brief summary	Screening outcome
TH1: Thorpe Settlement Boundary	Within Thorpe NP area.	Policy describes the removal of land from the green belt to encompass land to the East of Ten Acre Lane and North of Coldharbour Lane.	**Likely significant effects. Screened in.** This policy removes land from green belt to provide for additional housing within the village. There is therefore a risk that likely significant effects could occur due to the loss of this designation, in combination with the site allocations. The potential impact pathways are: -air quality (in combination) -water quality -recreational pressure -disturbance of functionally linked habitat
TH2 – Site Allocation Policies	N/A	Policy describes how the Forum has arrived at its preferred options for allocated sites and described the importance of meeting housing stock needs with a mix of dwelling types and tenures suited to the local needs.	**No impact pathways. Screened out.** The policy merely described the process by which the Forum came to their preferred allocation options and mix of dwelling type and tenure required for local needs. The allocated sites are described in policies below.
TH2 (i) Land off Rosemary Lane, Coltscroft Farm	• South West London Waterbodies SPA and Ramsar: 450km south-east • Windsor Forest and Great Park SAC: 4.4km west • Thames Basin Heath SPA: 4.8km south west	Policy allocates 1.75ha of land for residential development. The allocation is to include 24 dwellings with a predominance of two to three bedrooms, associated car parking facilities and publicly accessible open space.	**Likely significant effects. Screened in.** This policy allocates 24 residential dwellings 450m from the South West London Waterbodies SPA and Ramsar (Thorpe Park No. 1 Gravel Pit). In addition, the allocation is within 5km of the Thames Basin Heaths SPA and Windsor Forest and Great Park SAC. Increased residential development has the potential to increase residents, cars and disturbance. These could lead to likely significant effects to European Sites. The potential impact pathways are: -air quality (in combination) -water quality -recreational pressure -disturbance of functionally linked habitat
TH2 (ii) Land off Green Road, Woodcock Hall Farm	• South West London Waterbodies SPA and Ramsar: 260km south-east • Windsor Forest and Great Park SAC: 4.6km west • Thames Basin Heath SPA: 4.7km south west	Policy allocates 0.6ha of land for residential development. The allocation is to include between five and ten net dwellings of mixed types including 2 and 3 bed homes with primary consideration given to the provision of single storey downsizer housing.	**Likely significant effects. Screened in.** This policy allocates five to ten residential dwellings 260m from the South West London Waterbodies SPA and Ramsar (Thorpe Park No. 1 Gravel Pit). In addition, the allocation is within 5km of the Thames Basin Heaths SPA and Windsor Forest and Great Park SAC. Increased residential development has the potential to increase residents, cars and disturbance. These could lead to likely significant effects to European Sites. The potential impact pathways are:

			-air quality (in combination) -water quality -recreational pressure -disturbance of functionally linked habitat
TH2 (iii): Land East of Ten Acre Lane/North of Coldharbour Lane	• South West London Waterbodies SPA and Ramsar: 206m south • Windsor Forest and Great Park SAC: 5km west • Thames Basin Heath SPA: 5.6km south-west	Policy allocates 13.57ha of land for residential development, sport and recreational space, blue and green infrastructure and cemetery uses. The allocation is to include at least 40 net residential dwellings within 1.76 ha of land within the Settlement Boundary.	**Likely significant effects. Screened in.** This policy allocated 40 residential dwellings 260m from the South West London Waterbodies SPA and Ramsar (Thorpe Park No. 1 Gravel Pit). In addition, the allocation is also within 5.5km from the Thames Basin Heath SPA and Windsor Forest Great Park SAC. Increased residential development has the potential to increase residents, cars and disturbance. These could lead to likely significant effects to European Sites. The potential impact pathways are: -air quality (in combination) -water quality -recreational pressure -disturbance of functionally linked habitat It should be noted that the policy includes the statement regarding mitigation for European sites: *c. A parkland scheme extending to approximately 11.81 Ha including a new multi-use community area for the benefit of the local community and the wider area, additional car parking and cemetery space. As the land will remain in the Green Belt, proposals in the parkland will only be supported if they are defined as appropriate development in the Green Belt. The parkland will be laid out to provide a functional and accessible parkland having regard to the design criteria for SANG;* *f. Existing mature boundary trees of value and mature hedgerow to be retained to provide adequate screening to the South West London Waterbodies SPA unless removal is required to provide access.* *n. Mitigation is agreed in accordance with the requirements of the development plan, to offset the effects of the scheme on European Designated sites including the South West London Waterbodies Special Protection Area.* However, in line with case law, this is not taken into account at the initial screening stage.
TH3: TASIS School	• South West London Waterbodies SPA and Ramsar: 125m south • Windsor Forest and Great Park SAC: 4.9km • Thames Basin Heath SPA: 5.3km	Policy describes support to the development objectives of TASIS private school provided any proposals are consistent with preservation of the heritage and environmental (particularly green belt) setting. This includes the retention and expansion of existing facilities.	**Likely significant effects. Screened in.** TASIS school is located 125m from South West London Waterbodies SPA and Ramsar (Thorpe Park No. 1 Gravel Pit). Expansion of the school could lead to increased pupils and staff depending on the proposals. There is a risk that increased traffic and disturbance may lead to likely significant effects to European Sites. The potential impact pathways are: -air quality (in combination) -disturbance of functionally linked habitat

TH4: Housing mix and type	N/A	Policy describes requirements of mixed housing types within the NP area.	**No impact pathways. Screened out.** This policy relates to housing types this includes house form and the number of bedrooms per house. This policy does not allocate new sites for development and is therefore not expected to impact European Sites.
TH5: High Quality Design	N/A	Policy describe that new development must be of high quality and delivered according to the design principles relevant to local character.	**No impact pathways. Screened out.** This policy requires design of development to demonstrate good quality and to be of sensitive design. A list of criteria is set out to ensure that all new development demonstrates a connection with local character and place making. The policy does not in and of itself provide for development and therefore not expected to effect European Sites.
TH6: Local Heritage Assets	N/A	This policy identifies non-designated heritage assets and supports their continuing use as current facilities.	**No impact pathways. Screened out.** This policy affords additional protection to local heritage assets and provides strict requirements for redevelopment. As such, this policy is not expected to impact European Sites.
TH7: Green and Blue Infrastructure	N/A	This policy identified areas of green and blue infrastructure including amenity green spaces, natural and semi-natural urban green spaces, water bodies and assets of biodiversity value.	**No impact pathways. Screened out** This policy affords protection to green and blue infrastructure and requires that all development proposals must demonstrates protection and enhancement to these networks. As such, this policy is not expected to impact European Sites.
TH8: Local Green Spaces	N/A	Policy identifies and designates local green spaces.	**No impact pathways. Screened out** This policy designates local green spaces thereby protecting these areas from development. As such, this policy is not expected to impact European Sites.
TH9: Community Facilities	N/A	Policy describes the continuing use of current community facilities.	**No impact pathways. Screened out.** This policy does not allocate new sites for community development nor does this policy allocate community facilities for redevelopment. Therefore, it is not expected to impact European Sites.
TH10: Mitigating Effects on European Designated Sites	N/A	Policy describes European Site protection.	**No impact pathways. Screened out.** This is a positive policy the affords protection to the European Sites within the NP area and those where their influence boundary expends into Thorpe. As such, this policy is expected to benefit European Sites.
TH11: Water Infrastructure and Flood Risk	N/A	Policy describes the requirements of increased development to provide appropriate sewer networks and flood control measures.	**No impact pathways. Screened out.** This is a positive policy that requires all new development to accommodate for additional sewage and appropriately manage flood risk and surface water flooding. In addition, development proposals located within Environment Agency groundwater Source Protection Zone must avoid direct infiltration of surface water into the ground. As such, this policy is expected to benefit European Sites.

5. Consideration of Effect ‘in combination’

5.1 The Runnymede LP was subject to HRA in 2016 and updated in 2018. That HRA included a strategic assessment of air quality, water quality, species disturbance, recreational pressures and disturbance of functionally linked habitat ‘in combination’ with growth in other authority areas and villages (including Thorpe village) over the same time period. The ‘in combination’ assessment is discussed further in the appropriate assessment section of this report.

6. Appropriate assessment

Introduction

6.1 The law does not prescribe how an appropriate assessment should be undertaken or presented but the appropriate assessment must consider all impact pathways that have been screened in, whether they are due to policies alone or to impact pathways that arise in combination with other projects and plans. That analysis is the purpose of this section. The law does not require the 'alone' and 'in combination' effects to be examined separately provided all effects are discussed.

6.2 By virtue of the small amount of growth planned in Thorpe, the main impacts pathways of concern to this HRA (water quality, water resources, species disturbance, recreational pressure and disturbance of functionally linked habitats) are inherently 'in combination' with neighbouring plans and projects. However, for completeness, potential impacts of the residential developments within Thorpe village in isolation are also assessed.

6.3 The HRA screening exercise undertaken in Chapter 4, Table 3 indicated a total of five policies that were expected to have likely significant effects to the European Sites due to air quality, water quality and resource, species disturbance, recreational pressures, disturbance of functionally linked habitat and urbanisation issues. At the screening stage the following policies were screened in, requiring further assessment:

- TH1: Thorpe Settlement Boundary
- TH2 (i) Land off Rosemary Lane, Coltscroft Farm
- TH2 (ii) Land off Green Road, Woodcock Hall Farm
- TH2 (iii): Land East of Ten Acre Lane/North of Coldharbour Lane; and
- TH3: TASIS School.

6.4 With regards to TH3 (TASIS School) the Neighbourhood Plan does not make or contain proposals for how the school may change as this will be driven by the school's own masterplan. The policy is simply intended to express general support for the continued growth and modernisation of the school. It is therefore not possible to assess the impacts of policy TH3 in any detail. However, it is noted that there is a specific policy (TH10) that seeks to protect European sites, and this would apply to any proposals for the school. Therefore, no specific additional wording is recommended for the Neighbourhood Plan regarding this issue. **However, it was recommended that reference to protection of the South West London Waterbodies SPA/Ramsar site is included within Policy TH10 which at time of assessment only specifically mentioned Thames Basin Heaths SPA. This has now been done.**

Air quality

Introduction

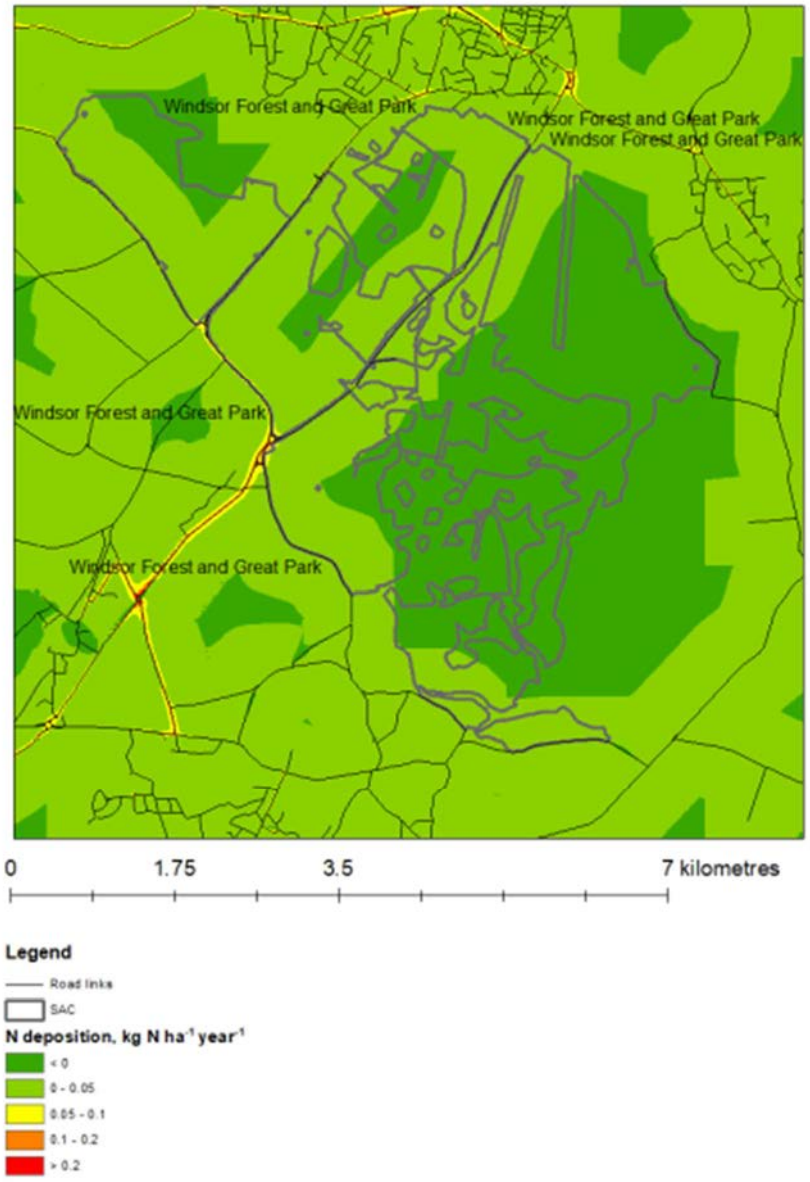
6.5 Increased residential development within Thorpe village could decrease air quality through increased emissions from vehicle exhausts. There are two measures of relevance regarding air quality impacts from vehicle exhausts. The first is the concentration of oxides of nitrogen (known as NOx) in the atmosphere. In extreme cases NOx can be directly toxic to vegetation but its main importance is as a source of nitrogen, which is then deposited on adjacent habitats. The guideline atmospheric concentration advocated by Government for the protection of vegetation is 30 micrograms per cubic metre (μgm^{-3}), known as the Critical Level, as this concentration relates to the growth effects of nitrogen derived from NOx on vegetation.

6.6 The second important metric is a measure of the rate of the resulting nitrogen deposition. The addition of nitrogen is a form of fertilization, which can have a negative effect on woodlands and other habitats over time by encouraging more competitive plant species that can force out the less competitive species that are more characteristic. Unlike NOx in atmosphere, the nitrogen deposition rate below which we are confident effects would not arise is different for each habitat. The rate (known as the Critical Load) is provided on the UK Air Pollution Information System (APIS) website (www.apis.ac.uk) and is expressed as a quantity (kilograms) of nitrogen over a given area (hectare) per year ($kgNha^{-1}yr^{-1}$).

Windsor Forest and Great Park SAC

6.7 It was assessed during the Runnymede LP HRA that Windsor Forest and Great Park SAC was susceptible impacts of air pollution. Particularly, impacts associated with increased traffic flow on Blacknest Road. Figure 2 highlights nitrogen deposition within the Windsor Forest and Great Park SAC.

Figure 2. Modelled contribution from BLP to nitrogen deposition at Windsor Forest and Great Park SAC taken from Windsor & Maidenhead Local Plan HRA, shows increased nitrogen at the roads sides for vehicles.



6.8 Habitats that are support by the SAC includes old acidophilous oak woods with *Quercus robur* on sandy plains. This habitat type comprises ancient lowland oak woodland on acidic, sandy or gravelly substrates. Veteran trees are relatively abundant in UK stands compared to examples in continental Europe, and are often associated with assemblages of notable lichens, fungi and invertebrates.

6.9 Atlantic acidophilous beech forests with Ilex and sometimes also *Taxus* in the shrublayer (*Quercion robori-petraeae* or *Ilici-Fagenion*) is also supported by the SAC. This Annex I type comprises beech Fagus sylvatica forests with holly Ilex, growing on acid soils, in a humid Atlantic climate. Sites of this habitat type often are, or were, managed as wood-pasture systems, in which pollarding of beech and oak *Quercus* spp. was common. British stands of this woodland type tend to contain a higher proportion of veteran trees than examples found in other parts of Europe. The biodiversity of many sites is enriched by the presence of assemblages of epiphytic lichens or saproxylic invertebrates.

6.10 As a result of these ancient habitats the extremely rare violet click beetle *Limoniscus violaceus* is supported by the SAC where the site is thought to support the largest populations of this species in the UK.

6.11 Elevated nitrogen deposition in general has driven strong biogeochemical responses in woodlands with many authors documenting reductions in soil carbon-nitrogen ratio, acidification and increased nitrate leaching[19] and understory plants can be negatively affected by nitrogen inputs. However, the impact of nitrogen deposition on vegetation composition of woodlands is poorly understood partly due to the strong confounding influence that tree canopy structure places on ground flora species richness, cover and other parameters that might illustrate the influence of nitrogen deposition. The canopy does this through interception of light, rainfall and pollution and the effect of woodland management upon this structure also has a big influence on ground flora.

6.12 Given the rarity of habitats and species supported by the SAC any impact that poses a risk to plant assemblages (i.e. habitat structure) could threaten rare habitats on a European level.

6.13 Nitrogen deposition impacts to the Windsor Forest and Great Park SAC have been assessed by several Borough Council's LP HRAs 'in-combination' with each other through the use of nitrogen modelling techniques. For the purpose of this NP HRA the Runnymede LP HRA conclusions are used as these are of most relevance to increases in residential development at Thorpe village.

6.14 The Local Plan HRA determined that NOx concentrations on this link are low, which strongly suggests that NOx from the local road is not a major source of nitrogen in this area. The modelling also indicated that the 'in combination' nitrogen dose due to traffic growth on Blacknest Road was forecast to fall to, or below, 1% of the critical load (i.e. a negligible dose) by 5m from the roadside and that nitrogen deposition rates within 200m of the roadside were expected to be considerably better in 2030 than is currently the case due to improvements in vehicle emissions technology. At the most affected point (at the roadside) the Runnymede LP HRA concluded that policies within the LP are forecast to retard the improvement in deposition rates that would otherwise occur by 0.03 kgN/ha/yr compared to a forecast net improvement of 4kgN/ha/yr. This is the difference between a forecast deposition rate of 18.14 kgN/ha/yr and a rate of 18.17 kgN/ha/yr, which in ecological terms is the same rate. No habitat studied to date has revealed itself to be responsive to such very small incremental changes in deposition.

6.15 Therefore, the Runnymede LP HRA further concluded that '*there will be no adverse effect of the Runnymede Local Plan on the integrity of Windsor Forest & Great Park SAC in combination with other plans and projects'*. In addition, the location of Thorpe village is 4.9km from Windsor Forest and Great Park SAC and it is unlikely Blacknest Road will be a significant journey to work route for residents of the village given its location. The Runnymede Local Plan Main Modifications affirmed that the latest housing numbers for the district did not alter the conclusions of the strategic HRA.

Thursley, Ash, Pirbright and Chobham SAC/Thames Basin Heaths SPA

6.16 A total of two site allocations for residential development lie within 5km of the SAC/SPA, these include:

- **Policy TH2 (i) Land off Rosemary Lane, Coltscroft Farm** – 24 net dwellings, 4.8km; and
- **Policy TH2 (ii) Land off Green Road, Woodcock Hall Farm** – 5-10 net dwellings, 4.7km.

6.17 A single site allocation for residential development is located within 5-6km of the SAC:

- **Policy TH2 (iii): Land East of Ten Acre Lane/North of Coldharbour Lane** – 40 net dwellings, 5.6km.

6.18 There is also a risk that increased development at TASIS (Policy TH3) school generated from policy could lead to increased commuting traffic into Thorpe.

6.19 However, a similar Local Plan traffic-related air quality modelling exercise to that for Windsor Forest & Great Park was undertaken for roads within 200m of the Thames Basin Heaths SPA/Thursley, Ash, Pirbright and Chobham SAC (particularly around the M3 at Chobham Common). While the 'in combination' change in NOx and nitrogen deposition due to traffic growth on the M3 was (unsurprisingly) large, in all cases, the 'in combination' nitrogen deposition rate for the modelled future year is considerably lower than the 2017 base rates due to improvements in emissions technology. Moreover, even for the most affected links (the M3), the forecast retardation of improvement at the roadside due to Runnymede Local Plan was a negligible 0.03-0.04 kgN/ha/yr, or a further 3-4 milligrams of nitrogen per square metre over the course of a year. For the most affected point along the M3, this would make the difference between a deposition rate of 15.49

[19] Ibid. Section 7.3, page 65

kgN/ha/yr and one of 15.53 kgN/ha/yr, which in ecological terms is essentially the same rate. Moreover, most of Chobham Common in the transect locations either side of the M3 is closely mown as a firebreak, up to a distance of c. 50-75m from the roadside, which essentially removes the ability of that zone to support nesting SPA birds or to function as heathland.

6.20 As a result, the 2018 Runnymede LP HRA concluded: '*an in-combination assessment relating to air quality at Thursley, Ash, Pirbright & Chobham SAC of the Local Plan and other plans has been undertaken and reported. It was found that it can be included that there are no in-combination effects*.' As for Windsor Forest & Great Park, the Runnymede Local Plan Main Modifications HRA affirmed that the latest housing numbers for the district did not alter the conclusions of the strategic HRA.

Water quality

Introduction

6.21 Thorpe village settlement area is located adjacent to the South West London Waterbodies SPA and Ramsar. Historically, Thorpe gravel pits were developed for the extraction of sand and gravel during the 1930s for use in construction material. Thorpe village lies upon River Terrace deposits that has high porosity and high permeability as sand and gravel deposits provide a large storage volume within flood plains[20].

6.22 Based upon the hydrological characteristics of the local area; there is a risk that increased development within the village of Thorpe could lead to water quality issues of the South West London Waterbodies SPA and Ramsar.

6.23 Water quality includes components such as dissolved oxygen, acidity/alkalinity, levels of other chemicals such as nitrogen and phosphorous, amounts of suspended solids and heavy metals. Dissolved oxygen is affected by the Biochemical Oxygen Demand (BOD); the higher the BOD the lower the dissolved oxygen available in the water for fish and other wildlife. Excess nutrients can lead to various impacts including algal blooms and smothering growth of large algae, while high ammonia concentrations and heavy metals are directly toxic to aquatic life. Each species has its own tolerance range with respect to water quality. For example, fish, such as the salmon, which are totally dependent on water are more sensitive to changes in water quality. Water quality can have other indirect effects, for example high volumes of nitrogen and phosphorous can lead to algal blooms and excessive growth of other water plants.

6.24 Different species have their own optimal ranges for these properties (and these can vary from season to season), and their own tolerance levels. It has been extensively researched that aquatic invertebrates are susceptible to poor water quality (i.e. chemical contamination and suspended sediment)[21][22]. There is a considerable risk that, with increased urbanisation, water pollution could lead to a reduction in food abundance and therefore have an indirect impact to the population health of goldeneye at the SPA and Ramsar and by default the UK.

Surface runoff and groundwater flow

6.25 All site allocations for residential development are within 450m (and in most cases within 260m) of the South West London Waterbodies SPA and Ramsar. In addition, parts of Thorpe NP area overlap flood zone of the River Thames (Flood Zone 2 and 3), as identified in Plan D of the NP. There are two allocations that pose potential water quality risks due to their partial location adjacent to Flood Zone 2 or 3 (areas most likely to flood) and their proximity to the SPA/Ramsar. These are Policy TH2 (ii) Land off Green Road, where the site lies directly to adjacent Flood Zone 2 and 3 and Policy TH2 (iii) Land East of Ten Acre Lane/North of Coldharbour Lane, which lies directly adjacent Flood Zone 2 and within 100m of the SPA/Ramsar. Since these sites are potentially hydrologically connected to the SPA and Ramsar; during periods of flooding there is risk that surface water runoff could contain suspended solids (e.g. during construction), or pollutants (e.g. oil leaking from vehicles) during operation and that these could then leach into the SPA and Ramsar thereby degrading the integrity of the European Site.

[20] BGS (2019). Characterising the hydrogeology of river terrace deposits. [Online] Available from: https://www.bgs.ac.uk/research/groundwater/waterResources/thames/riverTerraceDeposits.html, accessed 29/10/2019.
[21] Lenat, D.R. and Crawford, J.K., 1994. Effects of land use on water quality and aquatic biota of three North Carolina Piedmont streams. *Hydrobiologia*, *294*(3), pp.185-199.
[22] Yee, D.A. and Juliano, S.A., 2006. Consequences of detritus type in an aquatic microsystem: effects on water quality, micro-organisms and performance of the dominant consumer. *Freshwater Biology*, *51*(3), pp.448-459.

6.26 While in practice this will be assessed on an application by application basis, it is considered that an explicit reference is required in the Thorpe Neighbourhood Plan. Policy TH11 currently states that '*Any development proposed in either flood zone 2, or flood zone 3, on sites over 1ha in flood zone 1, or in a dry island, must be accompanied by a site specific Flood Risk Assessment that demonstrates that proposals will not increase flood risk from fluvial flooding or any other form of flooding, including surface water flooding*'. However, this concerns itself solely with flood risk. **It was recommended that wording is also included in Policy TH11 that states that new development within or adjacent to Flood Zone 3 will not be supported unless it contains details of the measures that will be taken to ensure that polluted runoff (including suspended sediment) does not leave the site and enter the surrounding waterbodies during either construction or operation. This has now been done.**

6.27 The SPA lakes are supported by groundwater inflows from the sand and gravel aquifer of the Shepperton Gravel Member. Outflows from the gravel pit lakes via groundwater flow are also likely, with the general groundwater flow direction converging on the River Thames in a southerly and south easterly direction. Therefore, inflows to the Thorpe No. 1 Gravel Pit and surrounding waterbodies can be expected from the north and west, and outflows toward the south meaning that the likely groundwater flow direction to and from the lakes is in a north/west to south/east direction. As such, there is a small risk that development within Thorpe to the west of the lakes, even outside Flood Zone 3, could potentially affect the ground water flows to the South West London Waterbodies SPA and Ramsar if the development is inappropriately designed and depending on the need for, and depth of, sub-surface construction.

6.28 Geological logs in the area indicate that soil and made ground are recorded to depths of 0.3-1.3m. Some logs then record a discrete sand layer underlain by gravel while other logs refer to sand and gravel as a combined unit (e.g. sandy gravel). A discrete sand layer is recorded from 0.6-1.8m depth. This is underlain by sandy gravel to between 6.4m and 10m depth, where London Clay has been recorded. Some boreholes are terminated before encountering London Clay at 10m depth. Therefore, the base of the gravel is an undulating surface varying between 6.4m in depth to more than 10m in depth. Resting water levels are recorded at elevations less than 1m depth to greater than 4m depth. Generally, groundwater may be considered to be typically at approximately 2m depth, though in winter depths are likely to be approximately 1m. Therefore, the aquifer is anticipated to have a typical saturated thickness of at least 5m and in some places 10m. Except for very deep structures it is therefore unlikely that groundwater flows would be blocked by new development, particularly in winter when the lakes have their greatest value for gadwall and shoveler.

6.29 The risk of blockage to groundwater movement is therefore very low, the policies for all relevant allocated sites specifically state that development will not be supported if the scheme causes detrimental impact or loss of the integrity to the South West London Water Bodies SPA, and there is a specific policy (TH10) that specifically seeks to protect European sites. Therefore, no specific additional wording is recommended for the Neighbourhood Plan regarding this issue. **However, it was recommended that reference to protection of the South West London Waterbodies SPA/Ramsar site is included within Policy TH10 which only specifically mentioned the Thames Basin Heaths SPA. This has now been done.**

Abstraction for public water supply

6.30 A number of the reservoirs that constitute the South West London Waterbodies SPA/Ramsar site (notably the various purpose-built reservoirs) are still utilised for operational water supply by Affinity Water and Thames Water. Affinity Water is the statutory water company for Thorpe village an increase in the population of Thorpe in-combination with the rest of Runnymede Borough over the NP and LP period could theoretically result in a potential effect on the South West London Waterbodies and their ability to support SPA if they required the top level of any of the reservoirs to be increased (to improve their capacity). This would likely result in loss of habitat around the reservoir margins which is used by SPA birds. However, Affinity Water and Thames Water draft Water Resource Management Plans do not indicate that this is part of their intended solution for water supply in Runnymede or elsewhere in their areas. Both plans have been subject to HRAs that conclude no adverse effect on the integrity of European sites. As such, it is considered that an adverse effect will not occur through this pathway.

Recreational pressure and disturbance

Introduction

6.31 Recreational use of a European site has the potential to:

- Prevent appropriate management or exacerbate existing management difficulties[23];
- Cause damage through erosion and fragmentation;
- Trampling of vegetation[24];
- Cause eutrophication as a result of dog fouling; and
- Cause disturbance to sensitive species, particularly ground-nesting birds[25].

6.32 Different types of European sites are subject to different types of recreational pressures and have different vulnerabilities. Studies across a range of species have shown that the effects from recreation can be complex. It should be emphasised that recreational use is not inevitably a problem. Many European sites also contain nature reserves managed for conservation and public appreciation of nature. For example, Parts of the Wealden Heaths Phase II SPA are managed by the National Trust where access is encouraged and where resources are available to ensure that recreational use is managed appropriately.

Mechanical/Abrasive Damage and Nutrient Enrichment

6.33 Most types of terrestrial European site can be affected by soil compaction and erosion, which can arise as a result of visits by walkers, cyclists, horse-riders and users of off-road vehicles. Dog walkers adversely impact sites through nutrient enrichment via dog fouling and also have potential to cause greater disturbance to fauna as dogs are less likely to keep to marked footpaths and move more erratically. Motorcycle scrambling and off-road vehicle use can cause serious erosion, as well as disturbance to sensitive species.

6.34 The Thames Basin Heaths SPA is an internationally designated sites for species that known to be adversely affected by the impacts of excessive trampling and erosion to their supporting habitats. Direct mechanical trampling and nutrient enrichment are both more subtle and reversible effects than disturbance of nesting bird populations.

Disturbance

6.35 Concern regarding the effects of disturbance on birds stems from the fact that they are expending energy unnecessarily and the time they spend responding to disturbance is time that is not spent feeding. Disturbance therefore risks increasing energetic output while reducing energetic input, which can adversely affect the 'condition' and ultimately survival of the birds. In addition, displacement of birds from one feeding site to others can increase the pressure on the resources available within the remaining sites, as they must sustain a greater number of birds.

6.36 Human activity can affect birds either directly (e.g. through causing them to flee) or indirectly (e.g. through damaging their habitat). The most obvious direct effect is that of immediate mortality such as death by shooting, but human activity can also lead to behavioural changes (e.g. alterations in feeding behaviour, nest abandonment, avoidance of certain areas etc.) and physiological changes (e.g. an increase in heart rate) that, although less noticeable, may ultimately result in major population-level effects by altering the balance between immigration/birth and emigration/death.

6.37 The factors that influence a species response to a disturbance are numerous, but the three key factors are species sensitivity, proximity of disturbance sources and timing/duration of the potentially disturbing activity.

Discussion

6.38 The impact pathways assessed at the screening stage regarding increased residential development and by default more visitors to European Sites is considered alone and in combination with residential development elsewhere in the Runnymede Borough.

South West London Waterbodies SPA and Ramsar

6.39 There several SSSI waterbodies that make up the South West London Waterbodies SPA and Ramsar. Those that are also of relevance to the Thorpe NP include:

- Thorpe Park No.1 Gravel Pit SSSI – within NP area;

[23] JNCC (2019) Threats to UK Lowland Heathland Habitats. Available online from: http://archive.jncc.gov.uk/default.aspx?page=5942, accessed 30/09/2019.
[24] Roovers, P., Verheyen, K., Hermy, M. and Gulinck, H., 2004. Experimental trampling and vegetation recovery in some forest and heathland communities. *Applied Vegetation Science*, *7*(1), pp.111-118.
[25] Underhill-Day, J.C. and Liley, D., 2007. Visitor patterns on southern heaths: a review of visitor access patterns to heathlands in the UK and the relevance to Annex I bird species. *Ibis*, *149*, pp.112-119.

- Staines Moor SSSI – 2.6km north;
- Wraysbury Reservoir SSSI – 3.7km north;
- Wraysbury & Hythe End Gravel Pits SSSI – 3.8km north;
- Wraysbury No. 1 Gravel Pit SSSI – 5km north;
- Knight & Bessborough Reservoirs SSSI – 7.3km east; and
- Kempton Park Reservoirs SSSI – 8km east.

6.40 As defined by Natural England, '*the term 'functional linkage' refers to the role or 'function' that land or sea beyond the boundary of a European site might fulfil in terms of supporting the populations for which the site was designated or classified. Such an area of land or sea* [or inland water in this case] *is therefore 'linked' to the site in question because it provides a (potentially important) role in maintaining or restoring a protected population at favourable conservation status. The concept of functional linkage is therefore an important consideration in decision making under the Habitats Regulations because the tests arising from Article 6(3) and 6(4) will need to be applied in respect of plans or projects which may significantly affect such supporting habitat and its contribution to the favourable conservation status of the relevant species*.'

6.41 The Runnymede LP HRA identified three waterbodies that could constitute functionally linked habitat for the SPA/Ramsar site. The following waterbodies (in accordance to the Briggs PhD thesis (2007))[26] have been investigated in the past for their ability to constitute important supporting habitat for the SPA/Ramsar site:

- A320 Gravel Pit;
- Longside Lake; and
- Cemex HQ (Manor Lake).

6.42 The only SSSI unit that lies within Thorpe Village and Runnymede is Thorpe Park No.1 Gravel Pit SSSI. Based on the 2016 Runnymede Local Plan, Natural England commented '*The village of Thorpe is situated in very close proximity to South West London Waterbodies Special Protection (SPA), and Thorpe No 1 Gravel Pits Site of Special Scientific Interest (SSSI). The SSSI does not currently have general public access, but there is a level of current disturbance from water sports on the site. If through these allocations in Thorpe, the site does become open to the public, or there is an increase in water sports on the site, then this should be covered within the Habitats Regulations Assessment. It should be flagged as a potential risk to the over wintering birds and safeguards such as zoning of access or sanctuary areas should be considered*'.

6.43 Policy TH2 (i) Land off Rosemary Lane and Policy TH2 (ii) Land off Green Road lie within close proximity to the SPA and Ramsar (i.e. within 260m) and therefore also poses a risk of increased recreational disturbance of the SPA and Ramsar.

6.44 The 2018 HRA of the Runnymede LP commented that '*there are no proposals in the Local Plan to provide general public access to Thorpe No. 1 Gravel Pit. Thorpe Park No. 1 Gravel Pit is used for waterskiing. Waterskiing can be a highly disturbing activity and a spatial and temporal zoning system is in operation at that site which is intended to prevent any waterskiing in the primary over-wintering gadwall feeding areas (gadwall being the main SPA bird that uses the site) during the period 1st October to 31st March. The nature of water-skiing sites is that only a certain number of skiers are permitted on the water at any time. Therefore, unless an application was submitted to increase the extent of water-skiing on the site, there is no direct link between a change in the local population and a change in the amount of water-skiing activity at any time. Since the Local Plan does not contain any proposal to change usage of the gravel pit, it is possible to conclude that the Local Plan will not lead to any likely significant effects on Thorpe Park Gravel Pit No. 1'*. Fleet Lake and Abbey Lake are close to Thorpe No.1 Gravel Pit. Both are part of Thorpe Park Resort and are immediately adjacent to the main amusement park and main car park, largely screened by tree planting. As such, neither are directly accessible to locals. Manor Lake (called CEMEX HQ in the Briggs study) is located adjacent to Thorpe village and is recorded in the Briggs thesis as attracting rarely more than a 'handful' of Gadwall and Shoveler. The site was recorded as being relatively undisturbed at the time the study was undertaken, the low bird numbers being due to the very low macrophyte (large aquatic plant) cover and fairly low zooplankton (microscopic animal) levels which make it a poor food resource for both species. Although the Briggs work was conducted some years ago, it is understood that the low macrophyte

[26] Based on Natural England's advice, Runnymede Council intends to update the Briggs winter survey work, as it relates to waterbodies in Runnymede.

and zooplankton levels at this gravel pit persist. There is a public footpath called Monks Walk that runs past Manor Lake and Abbey Lake through woodland, but the lakes are well-screened and not directly accessible from this path.

6.45 The 'A320 Gravel Pit' is situated just east of Thorpe Park and is used by the Runnymede Angling Society, although the number of anglers in winter is relatively small. Both dogwalkers and joggers use the site frequently, but disturbance levels are described in the Briggs work as being low at the time the survey was undertaken and the path around the waterbody is well screened from the waterbody by dense tree cover and separated on the eastern side by the Abbey River. Longside Lake is a large gravel pit to the west of Thorpe Gravel Pit No. 1, situated immediately west of the M25. It has been noted to hold large numbers of gadwall. At the time of the Briggs work it was used only occasionally by dogwalkers and fishermen and was relatively undisturbed. In 2011 there were reports of occasional anti-social behaviour (specifically quad bikes) around this lake but the site owners installed kissing gates to restrict this activity. There appears to be no water-based recreation and the path around the lake is well screened from the waterbody by trees.

6.46 Moreover, the Neighbourhood Plan contains several safeguards to protect the SPA/Ramsar. Policy TH2 (ii) specifically states that development will not be supported if the scheme causes detrimental impact or loss of the integrity to the South West London Water Bodies SPA and Policy TH2 (iii) requires that "*Mitigation is agreed in accordance with the requirements of the development plan to offset the effects of the scheme on European Designated sites, including the South West London Waterbodies Special Protection Area*". There is also a specific policy (TH10) that specifically seeks to protect European sites.

6.47 It is therefore considered that none of the areas of functionally-linked habitat in the vicinity of Thorpe are of particular risk of unsustainable increases in recreational use due to new housing in Thorpe village. Therefore, no specific additional wording is recommended for the Neighbourhood Plan regarding this issue. **However, it was recommended that reference to protection of the South West London Waterbodies SPA/Ramsar site is included within Policy TH10 previously only specifically mentioned the Thames Basin Heaths SPA. This has now been done.**

6.48 It is therefore considered that the conclusion of the LP HRA is applicable to the issue of recreational pressure to the South West London Waterbodies SPA and Ramsar and increased residential development within Thorpe Village.

Thames Basin Heaths SPA

6.49 After extensive research, Natural England and its partners produced the Thames Basin Heaths Special Protection Area Delivery Framework which made recommendations for accommodating development while also protecting the interest features of the European site. This included the recommendation of implementing a series of zones within which varying constraints would be placed upon development (see South East Plan Policy NRM6). The zones relating to recreational pressure extended to 5km (as this was determined from visitor surveys to be the principal recreational catchment for this European site). At distances from the SPA of 400m-5km the Delivery Framework advises that development projects should be required to contribute toward provision of Suitable Alternative Natural Greenspace (SANG) and toward access management to the SPA. Additionally, Runnymede Borough Council's Thames Basin Heaths Special Protection Area Delivery Framework details that any proposals for residential dwellings site allocations located between within 5km of the Thames Basin Heaths SPA will need to '*provide or contribute to the provision of avoidance measures'.*

6.50 Where increased recreational use is predicted to cause adverse impacts on a site, avoidance and mitigation should be considered. Avoidance of recreational impacts at European sites involves location of new development away from such sites; Local Plans provide the mechanism for this. Where avoidance is not possible, mitigation will usually involve a mix of access management, habitat management and provision of alternative recreational space.

6.51 A total of two site allocations for residential development lie within 5km of the Thames Basin Heaths SPA, these include:

- **Policy TH2 (i) Land off Rosemary Lane, Coltscroft Farm** – 24 net dwellings, 4.8km; and
- **Policy TH2 (ii) Land off Green Road, Woodcock Hall Farm** – 5-10 net dwellings, 4.7km.

6.52 These will therefore result in an in combination recreational pressure effect on Thames Basin Heaths SPA without mitigation.

6.53 A single site allocation for residential were located within 5-7km of the Thames Basin Heaths SPA, these include:

- **Policy TH2 (iii): Land East of Ten Acre Lane/North of Coldharbour Lane** – 40 net dwellings, 5.6km.

6.54 However, TH2 (iii) falls below the 50-dwelling threshold required to trigger mitigation in the 5-7km zone. Even though individual plans or sites may only result in a small impact, when combined with a large number of other plans that propose to deliver housing within 5km of the SPA over the same time period, large 'in combination' effects are likely to arise. Because of this, the Conservation of Habitats and Species Regulations 2017 (as amended) specifically requires an appropriate assessment to also consider impacts 'in combination' with other projects and plans. The following section thus discusses Thorpe NP's contribution to this 'in combination' effect on the Thames Basin Heaths SPA within the wider area of Runnymede.

6.55 The parts of Thursley, Ash, Pirbright and Chobham SAC of interest to this Appropriate Assessment are coincident with the Thames Basin Heaths SPA, principally Chobham Common. Since impacts of recreational pressure on the habitats of importance to the interest features of the SPA (i.e. the heathland) have already been assessed in the preceding and later chapters, the conclusions of that assessment will apply equally to the SAC.

7. In Combination Assessment of Thames Basin Heaths SPA

7.1 Impact pathways that have potential to link to the Neighbourhood Plan and to act in-combination with other projects or plans are as follows:

- Recreational Pressure

7.2 The Thames Basin Heaths SPA 5km zone affects a large number of authorities: Waverley, Hart, Wokingham, Bracknell Forest, Rushmoor, Runnymede, Guildford, Surrey Heath, Elmbridge and Woking. In total approximately 30,000 new dwellings are planned for delivery within 5km of the Thames Basin Heaths SPA over the Neighbourhood Plan period.

7.3 In particular, the Runnymede Local Plan identifies a total housing requirement of 6,250 new homes in the Borough of the period 2019-2030, plus 1,670 completions. The Runnymede LP was subject to HRA in 2018 that HRA identified that there are considerable threats to the Thames Basin Heaths SPA within Runnymede Borough from recreational pressure 'in-combination' without mitigation. The in-combination housing growth of the surrounding settlements of Runnymede include the Borough of Windsor and Maidenhead allocated 14, 260 net dwellings over the Plan period. Surrey Heath LP proposes the allocation of at least 5,632 net dwellings over the Plan period and Woking Borough of at least 4,964 net dwellings. The grouping effects of all these settlements in the absence of mitigation would result in adverse effects on the integrity of the Thames Basin Heaths SPA.

7.4 However, for all of the Local Plans discussed above, appropriate Thames Basin Heaths SPA avoidance and mitigation strategies and HRA assessments have been previously conducted prior to publication. Example policies and related text are included in Table 4.

Table 4. Summaries the relevant Thames Basin Heaths SPA policies of Runnymede Borough, Windsor and Maidenhead Borough, Surrey Heath Borough and Woking Borough.

Relevant Thames Basin Heaths SPA policy	Policy text
Runnymede Borough	
Policy EE10: Thames Basin Heaths Special Protection Area	'*Within 400m of the boundary of the Special Protection Area, no additional residential development will be permitted. Any non-residential development within 400m may require an Appropriate Assessment under the Habitats Regulations.* *All additional residential development (including strategic allocations) beyond the 400m Special Protection Area exclusion zone, but within 5km of the Special Protection Area boundary, will need to put in place adequate measures to avoid and mitigate potential effects on the Special Protection Area. These must be delivered prior to occupation and in perpetuity and agreed with Natural England*.'
Windsor and Maidenhead Borough	
Policy NR4: Thames Basin Heaths Special Protection Area	*'New residential development which is likely to have significant effects on its purpose and integrity will be required to demonstrate that adequate mitigation measures are put in place to avoid any potential adverse effects.* *No sites will be allocated nor planning permission granted, for a net increase in residential development within the 400 metres exclusion zone of the Thames Basin Heath SPA* *Development proposals between five to seven kilometres linear distance from the SPA boundary, for 50 or more residential units, will be assessed on an individual basis to ascertain whether the proposal would have a significant adverse impact on the SPA.*

	Future levels of housing development expected in the area of influence of the SPA will require appropriate mitigation and it is likely that new strategic SANG land will need to be identified in the future.'
Surrey Heath Borough	
Thames Basin Heaths Special Protection Area, Avoidance Measures & Strategy	*'A significant proportion of the Borough lies within 400m of the SPA and all of Surrey Heath lies within 5km of the SPA. In order to allow new development while safeguarding the integrity of the TBH SPA, the Council has put in place mitigation measures to avoid harm to the SPA arising from new housing development. These measures include:* • *The establishment of a 400 metre buffer around the SPA within which no net new residential development will be permitted;* • *The provision of Suitable Alternative Natural Greenspace (SANG);* • *Strategic Access Management and Monitoring (SAMM) measures - coordinated visitor management across the whole of the publicly accessible SPA.'*
Woking Borough	
DM Policies	'*The requirements of Policy CS8: Thames Basin Heaths Special Protection Areas of the Core Strategy will apply where relevant*'. And/or *' an appropriate contribution is made to avoid harm to the Thames Basin Heaths Special Protection Areas, as set out in Core Strategy Policy CS8, where relevant*';

Suitable Alternative Natural Greenspace

7.5 Runnymede Borough supports a number of Suitable Alternative Natural Greenspace (SANG) to encourage dog walkers away from SPAs. There are two Local Nature Reveres that hold this function Chertsey Meads LNR and Virginia Water LNR. Policy TH2 (i) Land off Rosemary Lane, and Policy TH2 (ii) Land off Green Road are considered too small to provide an 'on-site SANG' and therefore developers will be required to make financial contribution to other functioning SANG sites within the Runnymede Borough. On the other hand, Policy TH2 (iii): North of Coldharbour Lane is a much larger site that could have capacity to provide an 'on-site' SANG. However, since there are no detailed development designs it is not possible at this stage to confirm the proposals of an 'on-site' SANG.

7.6 In their submissions to the Local Plan Examination, Runnymede Council demonstrated that a range of potential SANG were being secured to cover the shortfall in SANG capacity of up to c. 600-700 dwellings across Runnymede, several of which are located close enough to Thorpe to be potentially suitable. Natural England responded that '…*this gives us enough assurance on the availability of options for SANG'.*

7.7 Thorpe NP does provide mitigation to the Thames Basin Heaths SPA through SANG mitigation described in the following policies:

- Policy TH2 (iii): '*C. A parkland scheme extending to approximately 11.81 Ha including a new multi-use community area for the benefit of the local community and the wider area, additional car parking and cemetery space. As the land will remain in the Green Belt, proposals in the parkland will only be supported if they are defined as appropriate development in the Green Belt. The parkland will be laid out to provide a functional and accessible parkland having regard to the design criteria for SANG'.*
- Policy TH10: '*Residential schemes will be required to include proposals for mitigating their effects on European Designated sites. This should be in accordance with the requirements of Runnymede's Avoidance and Mitigation Strategy for the Thames Basin Heaths Special Protection Area through securing contributions to Suitable Alternative Natural Greenspace and Strategic Access Management and Monitoring as set out in the development plan, including compliance with the Thames Basin Heaths Special Protection Area SPD'*.

Strategic Access Management and Monitoring Contributions

7.8 In addition to SANG provision, it must be noted that all net new residential dwellings within 5km of the Thames Basin Heaths SPA must also provide an appropriate Strategic Access Management and Monitoring (SAMM) contribution in line with the Runnymede Thames Basin Heaths Avoidance Strategy:

7.9 *'From April 2007, a contribution has been required from developers who wish to build additional properties within the zone of influence of TBH SPA (the zone of influence is a 5km straight line distance from the SPA). Specifically, since 1 May 2010, a contribution of £2,630 per net dwelling has been required. This money goes towards mitigation of recreational impacts from new residents on the SPA.*

- *£2,000 of the collected money goes towards the establishment, improvement, maintenance and upkeep of SANGS within the Borough.*
- *The remaining £630 per additional dwelling goes towards access management of the SPA and towards monitoring this and the effectiveness of SANGS.'*[27]

7.10 Based upon NP and LP policies it is concluded that appropriate safeguarding is in place for the Thames Basin Heaths SPA to ensure no adverse effects on site integrity arises as a result of increase residential development within the Thorpe NP area, alone or 'in-combination.

[27] Runnymede Council (2010) Thames Basin Heaths Special Protection Area (TBH SPA) (policy documents and guidance) [Online]. Available from: https://www.runnymede.gov.uk/article/15568/Thames-Basin-Heaths-Special-Protection-Area-TBH-SPA-policy-documents-and-guidance-, accessed 30/10/2019.

8. Conclusion

8.1 The following recommendations were made for amendments to the Neighbourhood Plan:

- It was strongly recommended that wording is included in Policy TH11 that states that new development within or adjacent to Flood Zone 3 will not be supported unless it contains details of the measures that will be taken to ensure that polluted runoff (including suspended sediment) does not leave the site and enter the surrounding waterbodies during either construction or operation.
- It was recommended that reference to protection of the South West London Waterbodies SPA/Ramsar site is included within Policy TH10 which at the time only specifically mentioned Thames Basin Heaths SPA.

8.2 These recommended changes have now been included. It is therefore considered that in conjunction with Runnymede LP mitigation policies this will ensure no adverse effects of Thorpe Neighbourhood Plan on the integrity of European Sites.